

**Towards Adaptive Co-management of Artisanal Fisheries  
in Coastal Uruguay: Analysis of Barriers and Opportunities,  
with Comparisons to Paraty (Brazil)**

by

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## **Abstract**

The overall purpose of this research was to investigate barriers to and opportunities for adaptive co-management of artisanal fisheries in coastal Uruguay, with comparisons to Paraty (Southeastern Brazil). Following a qualitative approach, two case studies were developed; one in the Piriápolis area (Río de la Plata coast) and one in Praia Grande/Ilha do Araújo (Rio de Janeiro State), the former with more depth than the latter. Findings indicate that, first, artisanal fisheries have been under a social-ecological crisis (e.g. catches have been declining; fishing effort has increased; relationships among fishers have been eroded), opening windows of opportunity for alternative management. Second, a multilevel social capital analysis conducted by studying the relationships embedded in the bonding, bridging, and linking networks among fishery stakeholders (artisanal fishers, fish buyers, unions, universities, NGOs, government agencies) enabled the identification of more barriers than opportunities for co-management. For example, fishers are only weakly organized, and these bonding connections at the local level were undermined by conflict-laden linking relationships. Third, fishers from the two sites stated that they would like to be involved in resource management, and the proposed fisheries law in Uruguay (before the Parliament) would be an enabling policy for a consultative degree of participation, through the creation of national and zonal councils. Nevertheless, the negative impact that external agents have had on fishing communities are among the causes of low fisher participation. Fourth, findings from a participatory research initiative involving fishery stakeholders in Piriápolis (creating a multi-stakeholder body, POPA) showed that this approach can help overcome some of the barriers to co-management. These barriers include conflict-ridden relationships between fishers and the fisheries agency; stakeholders' lack of capacity; and weak fisher organization. Moreover, the case showed that participatory research can pave the way for adaptive co-management by injecting a dynamic learning element into the early stages of the collaborative process. These findings, as well as the multilevel conception of social capital, represent contributions to adaptive co-management theory. The thesis identified contributions to policy based on the barriers and opportunities found for this transition, and suggested areas for further research.

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## List of Acronyms

### Acronyms used in the case study in Uruguay:

ANCAP	State oil company of Uruguay (Administración Nacional de Combustibles, Alcoholes y Portland)
ANP	National Administration of Ports (Administración Nacional de Puertos)
BPS	Social service agency of Uruguay (Banco de Previsión Social)
CAPU	Chamber of large-scale ship-owners (Cámara de Armadores Pesqueros de Uruguay)
CENTMAQ	Chamber of vessel drivers (Centro de Maquinistas Navales del Uruguay)
CFR	Cooperative fisheries research
CIPU	Chamber of fisheries industries (Cámara Industrias Pesqueras del Uruguay)
CTMFM	Joint Technical Commission of the Maritime Front (Comisión Técnica Mixta del Frente Marítimo)
COOPESA	Cooperative of fishers from Salto (Cooperativa de Pescadores de Salto)
COOPESNUBE	Cooperative of fishers from Nuevo Berlín (Cooperativa de Pescadores de Nuevo Berlín)
COSSAC	Saving and loan cooperative (Cooperativa de la Seguridad Seguridad Social de Ahorro y Crédito)
DGI	General Tax Office (Dirección General Impositiva)
DINAMA	National Directorate of the Environment (Dirección Nacional de Medio Ambiente)
DINARA	National Directorate of Aquatic Resources (Dirección Nacional de Recursos Acuáticos)
DINOT	National Directorate of Land Planning (Dirección Nacional de Ordenamiento Territorial)
DNH	Port Authority (Dirección Nacional de Hidrografía)
Ecoplata	Inter-institutional program whose executive board is integrated by DINARA, DINAMA, DINOT, PNN, SOHMA, coastal Departmental Governments and the University (UDELAR)
Ecópolis	Interdisciplinary umbrella group in which Piriápolis citizens and local organizations promote sustainable development
FAO	Food and Agriculture Organization of the United Nations
Fcién	Faculty of Sciences (Facultad de Ciencias, UDELAR)
GEF	Global Environment Facility
GRT	Gross registered tons (Tonelaje de Registro Bruto – TRB)
IIFAC	International Institute for Facilitation and Change (Instituto Internacional de Facilitación y Cambio)
IIP	Fisheries Research Institute, Faculty of Veterinary Medicine (Instituto de Investigaciones Pesqueras)
ILPE	Fur seal and Fishing State Industry (Industria Lobera y Pesquera del Estado)
INAPE	National Fisheries Institute (Instituto Nacional de Pesca)
INDRA	Foundation Institute of Río Negro (Fundación Instituto del Río Negro)
MGAP	Ministry of Livestock, Agriculture and Fisheries (Ministerio de Ganadería, Agricultura y Pesca)
MSP	Ministry of Public Health (Ministerio de Salud Pública)
MSY	Maximum sustainable yields
MTOP	Ministry of Transport and Public Works (Ministerio de Transporte y Obras)
NGO	Non-governmental Organization
nm	Nautical miles
PH	Playa Hermosa (fishing landing site in the study area)
PNN	Coast Guard (Prefectura Nacional Naval)
POPA	Multi-stakeholder group formed during participatory research in Piriápolis (Por la Pesca Artesanal)

PP	Piriápolis Port
PR	Participatory research
PV	Playa Verde (fishing landing site in the study area)
SM	Pesquero Stella Maris (fishing landing site in the study area)
SMVU	Society of Veterinary Medicine of Uruguay (Sociedad de Medicina Veterinaria del Uruguay)
SOFLUMA	Fluvial and Maritime Society (Sociedad Fluvial y Marítima)
SOHMA	Navy Oceanography, Hydrography and Meteorology Service
SOS	NGO in charge of marine animal rescuing and rehabilitation
SOYP	Oceanographic and Fisheries Service (Servicio Oceanográfico y de Pesca)
SUDEPPU	Union of skippers of large-scale vessels (Sindicato Único de Patrones de Pesca del Uruguay)
SUNTMA	National Union of Seamen (Sindicato Único Nacional de Trabajadores del Mar y Afines)
TAC	Total allowable catches
UCU	Catholic University of Uruguay (Universidad Católica del Uruguay)
UDELAR	National University of Uruguay (Universidad de la República)
UTE	State power company (Administración Nacional de Usinas y Trasmisiones Eléctricas)
UTU	Labour University of Uruguay (Universidad del Trabajo del Uruguay)
VMS	Vessel monitoring system
ZCP	Argentine-Uruguayan Common Fishing Zone (Zona Común de Pesca)

**Acronyms used in the case study in Brazil:**

AMAPAR	Association of Fish Farmers of Paraty
CNPq	National Research Council
FIFO	Fisheries and Food Institute
FIPERJ	Government Institute of Fisheries of Rio de Janeiro State
IA	Ilha do Araújo
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
IDRC	International Development Research Center
INSS	National Institute of Social Services
MPA	Ministry of Fisheries and Aquaculture
PG	Praia Grande
PRONAF	National Program for the Strengthening of Family Agriculture
SEAP	Special Secretariat for Aquaculture and Fisheries
SUDEPE	Superintendency of Fisheries Development
UFRJ	Federal University of Rio de Janeiro
UNICAMP	State University of Campinas

## Glossary of Terms

### In Spanish:

Alcalde	Mayor
Alistador/a	Person who works preparing long-lines for the next fishing trip
Apariguar	Setting gear parallel to others'
Armador	Boat owner
Brótola	Brazilian codling ( <i>Urophycis brasiliensis</i> )
Comprador	Fish buyer
Corvina	Whitemouth croaker ( <i>Micropogonias furnieri</i> )
Desenmallar	Disentangling fish from gillnets
Ecosonda	Depth-finder
Intendencia	Departmental government
Intermediario	Middleman
Libreta	Fisher's navigation license issued by PNN
Marinero	Fisher who works as a seaman or deckhand
Matrícula	Boat's navigation permit issued by PNN
Merluza	Common hake ( <i>Merluccius hubbsi</i> )
Municipio	Municipal government
Palangre	Long-line
Palangrero	Fisher who uses long-lines all year long
Pangasius	Local name for imported <i>Pangasianodon hypophthalmus</i>
Partes de pesca	Fishing slips where information about catch and fishing effort is recorded
Patrón	Fisher who is responsible for the boat
Permiso de pesca	Fishing licenses issued by DINARA
Pescadilla	Stripped weakfish ( <i>Cynoscion guatupuca</i> )
Prefectura	Coast Guard (PNN)
Sindicato	Union
Solidarios	Supportive
Temporales	Wind storms (sometimes with rain)
Veda	Closed area (zona de veda) or closed season (período de veda)
Zafra	Period in which a certain species is abundantly caught (i.e. fishing season)

### In Portuguese:

Acordos de Pesca	Fishing agreements (co-management arrangement)
Associação de Moradores	Community association
Barqueiros	Boat operators
Caiçaras	Mixed European-indigenous descendants that live along the Atlantic Forest coast between Paraná and Rio de Janeiro states
Capitania	Coast Guard
Cerco de robalo	Encircling gillnet for snook
Colônias de Pescadores	Fishers' guilds functioning like unions
Defeso	Closed shrimp season (from March to May)
Marinha	Coast Guard
Parceria	Partnership
Peixaria	Local fish market
Prefeitura	Municipal Government
Robalo	Snook ( <i>Centropomus parallelus</i> and <i>C. undecimalis</i> )
Traineiras	Purse-seiners



## **CHAPTER 1: INTRODUCTION**

### **1.1. BACKGROUND**

This research focused on artisanal fisher participation in management in coastal Uruguay and Paraty (Southeastern Brazil). Similar to the trend observed worldwide, fisheries in these two countries are in crisis: fishing resources are declining, there are user group conflicts (e.g. between the small-scale and large-scale sectors), and artisanal fishing is becoming no longer enough to make a living throughout the entire year. This social-ecological crisis of the fisheries system is particularly alarming because artisanal fisheries sustain numerous coastal communities. In spite of user participation trends in natural resources management in many countries since the 1980s, Uruguay has little experience in fisher participation. Brazil, by contrast, has a wider experience in fisheries co-management, although with only a few cases in the Southeastern region. The purpose of my PhD thesis was to investigate barriers to and opportunities for adaptive co-management of artisanal fisheries in coastal Uruguay, with comparisons to Paraty. In what follows, some considerations that led to the purpose of this study are explored.

#### **1.1.1. From conventional fisheries management to adaptive co-management**

Global fisheries are in crisis. Landings have been declining since the late 1980s (Pauly et al. 2003), and overexploitation of stocks and habitat degradation is jeopardizing fisher livelihoods worldwide (Berkes 2009a). This situation of dwindling fishing resources suggests that conventional management has led to unsustainable actions. Indeed, it has been suggested that the current crisis of natural resources management could be a consequence of the predominant view of science as authoritarian, politically neutral, value-free, universal, and most importantly, isolated from society (Bocking 2004). Resource management based on positivistic science and reductionist approaches (e.g. single-species models) have assumed fisheries as predictable, without recognizing the limits of conventional scientific knowledge. Top-down management (usually of the kind “one size fits all”) has prevailed until recently and its command-and-control approaches have marginalized fishers in decision-making processes (e.g. Berkes et al. 2001, Andrew et al. 2007).

Even though conventional management could be appropriate in systems with low uncertainty and high controllability, these situations are almost nonexistent in nature due to the inherent complexity of open systems. Unlike the conventional view of fisheries as simple and predictable, current thinking is moving towards the recognition of fisheries as linked social-ecological systems, in which there is a two-way feedback relationship between the human components (e.g. fishers) and the ecosystem (Berkes 2009a, 2010a). Thus, social-ecological

systems are complex, that is, they present nonlinearity, uncertainty, and multiple-scales (with horizontal and vertical linkages among scales) (Berkes et al. 2003). These features, together with the feedback-driven changes that social-ecosystems experience, make them unpredictable. In turn, this unpredictability highlights the importance of iterative events of “learning by doing” (typical of adaptive management), in order to adapt the decision-making processes according to the variability of the system. This new way of thinking, which assumes that fishery management is really “people management”, aims at broadening management objectives in order to consider livelihood and equity issues (in addition to biological yields and economic returns) (Berkes 2009a).

Furthermore, this new perspective emerged concomitantly with an alternative view of science as not authoritarian, value-free or universal (Funtowicz & Ravetz 2000, Ludwig 2001, Bocking 2004), which assumes that user participation may help overcome the present crisis of natural resources management and solve complex environmental problems (Walker & Daniels 2001, 2004, Berkes 2007a). One of the arguments to support user or public participation states that not considering their judgement and opinion is against democratic values (Fiorino 1990). In this way, non-experts’ and experts’ judgments are equally important, and the combination of both may lead to a better governance of natural resources. In the case of fisheries management, users’ involvement in policy decision-making and understanding stakeholders’ attitudes were acknowledged as important aspects for the successful implementation of management policies (Jentoft & McCay 1995, Gelcich et al. 2005, Richardson et al. 2005, Gelcich et al. 2008, Varjopuro et al. 2008).

For a long time, the recognition and emergence of participatory approaches (e.g. co-management, community-based or bottom-up management) was hindered by the prevailing management thinking which used fisheries as the classical example of “the tragedy of the commons” (Hardin 1968). According to Hardin (1968), the only way to avoid the “tragedy” and to sustain commons was through privatization or government ownership<sup>1</sup>. Nevertheless, numerous cases worldwide have shown that the “tragedy” is neither a universal phenomenon (i.e. there is not such an “unavoidable tragedy”) nor is dependent on external regulation (Berkes 2009b). Moreover, the conditions under which the “tragedy” can be prevented have been extensively studied, and it was found that government could either help or hinder self-organization at the community level (Feeny et al. 1990, Ostrom et al. 1999, Dietz et al. 2002, 2003, Agrawal 2005). An extensive commons literature has shown that users can create local institutions (rules-in-use) to manage resources sustainably (Ostrom 1990, Agrawal 2001). Thus, two of the main flaws of Hardin’s thinking are that it ignored the social relations among resource users, and that it

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<sup>1</sup> Commons refer to resources (e.g. fisheries, grasslands, wildlife) which present two defining characteristics: excludability (i.e. excluding access to potential users is difficult or costly), and subtractability (i.e. exploitation by one user reduces resource availability for others) (Ostrom 1990).

assumed that users could freely and openly access commons, confusing “common property” with “open-access” (Berkes 2009a).

Since the late 1980s, co-management has been extensively proposed as a partial solution to resources crises (Jentoft 1989, Pinkerton 1989, Berkes et al. 1991, Sen & Nielsen 1996, Berkes 2009c). Numerous cases of inshore and offshore fisheries co-management can be found in the literature (e.g. Jentoft 1989, Sen & Nielsen 1996, Raakjaer Nielsen & Vedsmand 1999, Wilson et al. 2003, Defeo & Castilla 2005, Ayles et al. 2007, Kalikoski et al. 2009, Gutiérrez et al. 2011), and it was suggested that co-management could work better in small-scale fisheries due to the higher likelihood of long-lasting relationships among fishers (Jentoft 1989). Nevertheless, Gutiérrez et al. (2011), after statistical analysis on 130 co-managed fisheries in 44 countries, found that industrial fisheries (i.e. large-scale) had higher success scores than artisanal (i.e. small-scale) fisheries mainly because of stronger enforcement mechanisms.

Co-management was initially defined as a power-sharing arrangement between the state and a community of resource users (e.g. Pomeroy & Berkes 1997). However, the understanding of co-management has been evolving over time: the concept has become more complex, involving additional stakeholders to the state and the fishers (although without equal sharing of responsibility and authority) (Carlsson & Berkes 2005, Berkes 2009c). Co-management is currently seen as networks and governance systems, but also as a problem-solving process (i.e. task-oriented), in which power sharing is only the result of the process, downplaying the formal aspect of co-management arrangements (Carlsson & Berkes 2005). However, neither co-management nor adaptive co-management is a management or governance panacea: they are no guarantee of fairness or equity in resource sharing; learning does not necessarily lead to adaptation; and participatory processes may be reduced to another bureaucratic mechanism (Jentoft 2000a, Gelcich et al. 2006, Symes 2006, Armitage et al. 2009, Berkes 2009c).

Adaptive co-management can be seen as a result of an evolution of co-management. It combines the dynamic learning characteristic of adaptive management with the linkage characteristic of co-management (Armitage et al. 2007a). Some of its key features are a focus on learning-by-doing, integration of different knowledge systems, collaboration and power sharing among community, regional, and national levels, and management flexibility (Olsson et al. 2004). Several authors have discussed the conditions that can enhance the emergence or the success of adaptive co-management (Olsson et al. 2004, Armitage et al. 2007b, 2009). These include well-defined resource systems, small-scale resource use contexts, enabling legislation, ability to monitor and respond to environmental feedbacks, social networks, combining various sources of information, arenas of collaborative learning, commitment to support a long-term institution-building process, complex systems thinking, and key leaders.

Several authors have stressed the importance of social capital (i.e. connections among individuals—social networks, and the norms of reciprocity and trustworthiness that arise from

them, Putnam 1993) for natural resources co-management and governance (Pretty & Ward 2001, Folke et al. 2005, Plummer & FitzGibbon 2006, Armitage et al. 2009). Bonding, bridging, and linking (also known as the dimensions, levels or forms of social capital) are particularly important elements of networks (Grafton 2005, Crona & Bodin 2006, Ramirez-Sanchez & Pinkerton 2009). However, the focus of the majority of studies in the context of natural resources management has been on the community, not acknowledging the multi-faceted aspects of social capital. Social learning is another emerging theme in the field of natural resources management (Plummer & FitzGibbon 2007) and it has been particularly associated with co-management and adaptive co-management (Pinkerton 2003, Schusler et al. 2003, Armitage et al. 2008). There are various definitions of social learning. According to Schusler et al. (2003, p.311), social learning is defined “as learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action”.

Participatory research can be seen as a way of fostering learning and co-production of knowledge (both tending to deal with uncertainty), augmenting the resilience of social-ecological systems. This approach enhances the creation of place-based learning communities (Davidson-Hunt & O'Flaherty 2007) as dialogic networks involving all stakeholders. Participatory research, the origin of which goes back to the 1970s, is designed to support local people in responding to their own needs (Cornwall & Jewkes 1995, Wiber et al. 2004, Hartley & Robertson 2006). Participatory research has also been regarded as a strategy to facilitate or improve co-management (McConney et al. 2007, Berkes 2009c, Kalikoski et al. 2009). It offers one way to create power-sharing relationships between researchers and communities, to develop locally appropriate resource management strategies, and to strengthen social capital (Arnold & Fernandez-Gimenez 2007).

### **1.1.2. Artisanal fisheries management in Uruguay and Brazil**

Artisanal fisheries sustain numerous coastal communities in Uruguay<sup>2</sup> and Brazil. However, these communities<sup>3</sup> usually represent marginalized sectors of the population (Programa Eco-plata 2008, Begossi et al. 2010). The problems faced by artisanal fishers of both countries seem to transcend national borders. By comparing the results of two independent studies which investigated artisanal fishers' perceptions about current management in coastal Uruguay (Trimble & Lázaro 2009) and Ilha Grande Bay<sup>4</sup> in Southeastern Brazil (Oliveira et al. 2009), we found that the problems identified by fishers of both regions were similar. Three of

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<sup>2</sup> By definition, artisanal fishers use boats of up to 10 gross registered tons.

<sup>3</sup> In this dissertation, "communities" are conceived as spatially defined units, including local heterogeneity (see Section 2.1.2). It is worth noting that artisanal fishers in coastal Uruguay do not usually employ the term "community", as opposed to what occurs in Paraty.

<sup>4</sup> Comprising the municipalities of Paraty and Angra dos Reis (Rio de Janeiro State).

these problems were with regard to intergroup conflicts (e.g. with coastal trawlers), government regulations (e.g. protected areas, closed areas, fishing licenses, weak enforcement), and poor communication between fishers and government agencies, as well as among fishers themselves (Oliveira et al. 2010).

Brazil has made more progress than Uruguay with regards to fisher and community participation in resources management; there are several cases of fisheries community-based management and co-management (Seixas & Berkes 2003, Kalikoski & Satterfield 2004, MacCord et al. 2007, McGrath et al. 2008, Kalikoski et al. 2009, Seixas et al. 2009, Sobreiro et al. 2010). Nonetheless, a recent review of fisheries co-management in Brazil showed that many challenges still need to be overcome, such as lack of capacity in both government and communities (Kalikoski et al. 2009). Furthermore, there are only a few co-management experiences in the Midwest, South and Southeast regions (Kalikoski et al. 2009). As a consequence of this, and due to the importance of conserving the biodiversity hotspot of the Atlantic forest ecosystem, a collaborative project under the International Research Chairs Initiative (IRCI) began in 2009, with the aim of developing a community-based adaptive management system for artisanal fisheries in Paraty, a coastal municipality in Rio de Janeiro State (Southeastern Brazil). At that time, a type of co-management arrangement known as “fishing agreements” (*Acordos de Pesca*) (Castro & McGrath 2003) was being evaluated in the area by the Ministry of Fisheries and Aquaculture (MPA & FIPERJ 2009).

In Uruguay, artisanal fisheries have been largely neglected by the government, whose primary interests seem to be with large-scale industrial fisheries, probably because they represent 97% of the total landed catch and have the potential to generate important export sales (Astori & Buxedas 1986, Hernandez & Rossi 2001, Spinetti et al 2001, Galli 2008). Besides recent initiatives which are explored in this thesis, the only reported case of fisheries co-management, and a limited one, is that of the yellow clam (*Mesodesma mactroides*) in the late 1980s, in which artisanal fishers participated in enforcing regulations (Castilla & Defeo 2001). The degree of power sharing in that instance was described as an “extra-legal establishment of communal power assigned to local fishers to defend the resource against outsiders” (Castilla & Defeo 2001, p.17). Nevertheless, artisanal fisheries co-management was included by DINARA (National Directorate of Aquatic Resources) in a proposed fisheries law which has been before the Parliament since 2009. In turn, artisanal fishers from various communities stated willingness to support this transition towards participatory management (Trimble & Lázaro 2009).

Given this context, my doctoral work focused on investigating variables and processes that could enhance or hamper the emergence of future adaptive co-management. The concept of co-management guiding this thesis corresponds to that discussed by Carlsson & Berkes (2005) and Berkes (2009c), including the vision of co-management as networks, governance, problem-solving process, and learning (i.e. adaptive co-management).

## 1.2. PURPOSE AND OBJECTIVES

The overall purpose of this research was to investigate barriers to and opportunities for adaptive co-management of artisanal fisheries in coastal Uruguay, with comparisons to Paraty (Brazil). My research emphasis was mainly on multilevel social capital and participatory research.

The research objectives were:

1. To explore the changes that have been occurring in the studied artisanal fisheries as integrated social-ecological systems based on the analysis of stakeholders' perceptions and fisheries policies.
2. To investigate social capital at multiple levels by studying the relationships embedded in the bonding, bridging, and linking networks among fishery stakeholders (artisanal fishers, fish buyers, unions, universities, NGOs and government agencies).
3. To analyze stakeholders' perceptions about artisanal fisher participation in management, as well as government initiatives for fisher participation, such as the proposed fisheries law in Uruguay.
4. To analyze a participatory research project involving fishery stakeholders in Piriápolis (Uruguay), evaluating it as a participatory process and investigating its role in creating conditions that can facilitate the emergence of fisheries adaptive co-management

All objectives were addressed in Uruguay, whereas Objectives 1-3 were studied partially in Paraty, focusing on the local scale. Table 4.2 (Section 4.2) provides the research questions for each objective.<sup>5</sup>

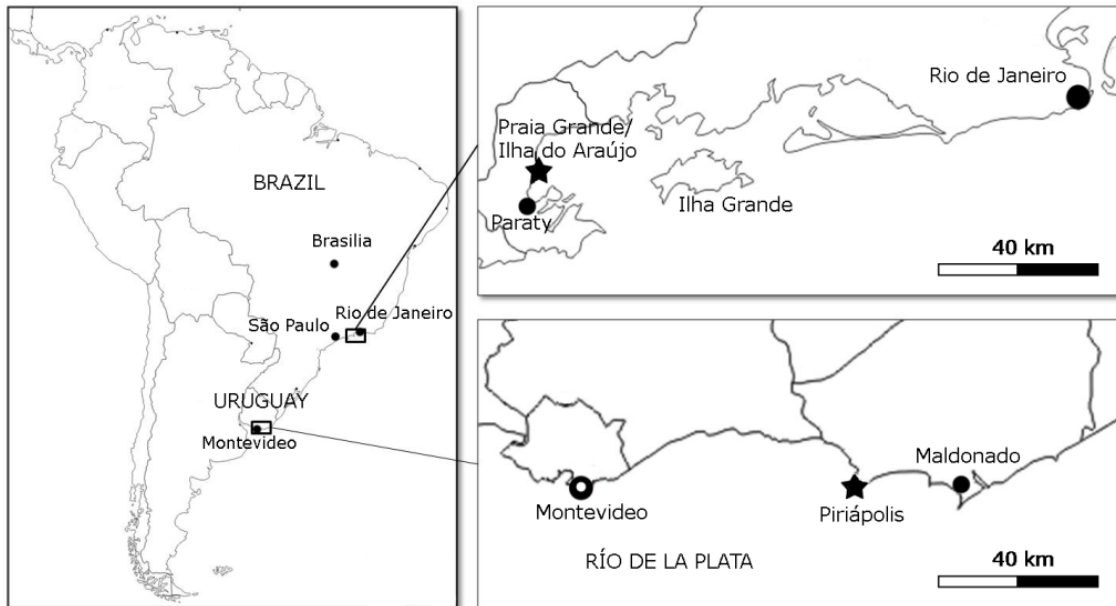
## 1.3. OVERVIEW OF RESEARCH METHODS

This research followed a participatory worldview and a qualitative approach (Creswell 2009), with case studies as strategy of enquiry (Yin 1994, Berg 2004). I developed one case study in coastal Uruguay (Piriápolis area) and one in Paraty (Praia Grande/Ilha do Araújo), the former with more depth than the latter (Figure 1.1). The Paraty case was included because I

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<sup>5</sup> My initial interest on social capital originated during the preliminary survey I conducted in 2009 in Uruguay, where I found that in most fishing communities fishers were not organized. However, while reviewing the literature on adaptive co-management, the need to investigate multilevel social capital became evident.

expected contrasting results (e.g. due to clearer community boundaries than in coastal Uruguay). The cross-case comparison would help the identification of barriers to and opportunities for adaptive co-management in both areas.



**Figure 1.1. Map of the study areas showing the location of the two case studies: Piriápolis in Uruguay, and Praia Grande/Ilha do Araújo in Paraty (Brazil)**

Fieldwork consisted of two phases: the first one addressed Objectives 1-3, and the second one Objective 4. Both phases were developed in Uruguay following a “bottom-up approach” in the sense that I started working at the local level, spending considerable time in the fishing community before addressing the government and other external stakeholders. The second phase of the fieldwork had participatory research as its focus. Artisanal fishers, one DINARA manager, university biologists and local NGOs worked collectively defining the problems to address and the actions to take. Evaluation of the participatory research took place throughout the entire project, focusing, for instance, on the changes in the relationships among participants and on mutual learning. Only Phase I was carried out in Paraty addressing Objectives 1-3 on a local scale.

Fieldwork was conducted over 21 months (17 in Piriápolis and 4 in Paraty) between May 2010 and April 2012. Data collection procedures in the two case studies consisted mainly of semi-structured interviews, participant observation and document analysis. The use of multiple sources of evidence helped ensure validity by triangulation. During Phase I, 19 semi-structured interviews with fishers were conducted in Piriápolis and 22 in Paraty (without considering numerous informal conversations with fishers from both sites). Also in Phase I, 21 semi-structured interviews with non-fisher stakeholders were conducted in coastal Uruguay, including government agencies, fish buyers, the national union, University and NGO members. During

Phase II, 62 semi-structured interviews took place with participants of the participatory research case in Piriápolis.

#### **1.4. SIGNIFICANCE OF THE RESEARCH**

This doctoral research exploring the transition from top-down artisanal fisheries management to co-management is timely because fisher participation in decision-making is under consideration in Uruguay. To my knowledge, this study represents the first one which investigates barriers and opportunities for moving towards adaptive co-management of artisanal fisheries in Uruguay. Therefore, its suggested contributions to policy (presented in Section 10.4.3) are significant. Moreover, the development of participatory research among direct stakeholders (in this case fishers), university researchers, government and non-government representatives, is timely for the transitional process which the national university (UDELAR) is going through. This transition is about the connection between communities or the broader society and the generation of new knowledge; instead of them being mere recipients of the knowledge produced by the university, they are intended to be active participants in the co-production of knowledge. As Chapter 8 shows, this is part of the epistemological roots of participatory research.

The present research is also significant in terms of its contributions to theory and practice (Chapter 10). First, this research contributes to deepening the understanding of the social components needed for adaptive co-management, such as multilevel social capital. Second, the research provides empirical evidence to support the idea that participatory research can act as a facilitating process towards the emergence of adaptive co-management. Lessons to help expand the participatory research approach (e.g. to other regions of Uruguay, Paraty and elsewhere) were identified. Finally, it is worthwhile that artisanal fishers who engaged in the participatory research experience benefited from capacity building, potential empowerment, and strengthened bonding and linking social capital (i.e. among fishers, and between fishers and government, respectively). Non-fisher stakeholders also benefited from capacity building and strengthened social networks. Furthermore, in the context of current policy formulations about fisheries co-management in Uruguay (i.e. new fisheries law before the Parliament), DINARA might have benefited from the experience of participatory research as a possible approach to initiate co-management or build its basis. Chapter 10 explores in further detail the theoretical, methodological, and policy contributions of this thesis, while also identifying opportunities for future research.



## 1.5. SCOPE AND LIMITATIONS OF THE RESEARCH

Adaptive co-management was the main theoretical framework guiding this research, from the initial phases of defining objectives and collecting data, to the final stages of analyzing findings and drawing conclusions. Within the “umbrella” of adaptive co-management, social capital and participatory research were major guiding frameworks.

The case study developed in Uruguay took place on the external zone of the Río de la Plata estuary, particularly in the Piriápolis artisanal fishery (Maldonado Department). The Río de la Plata covers most of maritime coast of Uruguay, comprising 452 km of the total of 680 km (228 km corresponds to the coast on the Atlantic Ocean). Given that most artisanal fishers in Piriápolis are migratory, moving along the Río de la Plata coast, mainly in the area from San José or Montevideo departments to the eastern limit of Maldonado, the case study can be considered as partially representative of that area. Nevertheless, it may not be representative of artisanal fisheries located on the inner part of the Río de la Plata, where the fishery resembles more inland or riverine fisheries, and on the oceanic coast (e.g. coastal lagoon fisheries differ greatly from those onshore) (Trimble et al. 2010). Likewise, the second case study was developed in two neighbouring communities in the Paraty Municipality (Ilha Grande Bay, RJ State), namely Praia Grande and Ilha do Araújo, and thus, it should only be considered partly representative of other communities in that municipality (Begossi et al. 2010).

Artisanal fishers were the main subjects of the case study in Brazil, whereas additional fishery stakeholders were an important component of the research in Uruguay (managers and researchers of the fisheries agency – DINARA, Coast Guard, Port Authority, Municipal government, national union, fish buyers, university and NGO members). It is noteworthy that the case study in Brazil followed a more conventional (i.e. extractive) research approach than in Uruguay, where in Phase II several fishery stakeholders became co-researchers during a participatory research experience to address local problems.

Regardless of the intimate connections between the artisanal and the large-scale fisheries sectors in coastal Uruguay (e.g. some fish species are targeted by both; artisanal fishers have worked on the large-scale vessels), the latter sector was merely dealt with peripherally. The voice of the large-scale workers was only gathered through interviews and informal conversations with members of the national union’s directorate and skippers I casually met in Piriápolis. Similarly, the significant influence of international markets on the artisanal fishery social-ecological system (e.g. most of the catches of both fisheries sectors are exported), was weakly addressed. Nevertheless, during the participatory research case in Piriápolis, the market competition of imported *pangasius* (farmed in Vietnam) became the focus of the second problem-solving exercise, although the actual influence of the species on the marketing of local fish was not investigated.

Even though the participatory research experience in Piriápolis demonstrated potential to overcome some of the barriers to co-management, and it was a very fruitful process, the multi-stakeholder group (POPA) did not reach the stage of co-producing results to answer the initial question about sea lions' impact on the long-line fishery. This can be considered a limitation given that I initially intended (too optimistically) to investigate the direct connection between the participatory research findings and the decision-making sphere (at DINARA). Nonetheless, what is more noteworthy is that POPA has continued working as a participatory research group and is still interested in addressing the sea lion problem (e.g. the use of fish traps as alternative fishing gear that could avoid sea lions will be evaluated in 2013-2014).

The major limitation of the case study in Brazil was the short fieldwork duration. Even though two field trips were conducted to Paraty, and data from the first season was validated in the second trip, a snapshot of four months is definitely not enough for a proper understanding of the dynamics and complexities of a social-ecological system. The views of non-fisher stakeholders would have improved greatly the social capital analysis. However, this was not possible due to the long and intense fieldwork in Uruguay.

## **1.6. ORGANIZATION OF THE THESIS**

The thesis is composed of ten chapters. After this introductory chapter in which an overview and objectives of the research were presented, Chapter 2 constitutes the literature review addressing three main areas underpinning this study: co-management and governance; social capital; and participatory research. Chapter 3 is the context chapter, providing thus a description of the study areas and the fisheries which are the foci of this research. Chapter 4 is all about research methods, from the general aspects, such as the research worldview, to the particular data collection procedures employed. Chapters 5 to 9 are the findings chapters. Chapters 5-8 explore respectively Objectives 1-4 in Uruguay: Chapter 5 analyzes the social-ecological dynamics of artisanal fisheries; Chapter 6 investigates the relationships within and among stakeholder groups following a multilevel social capital analysis; Chapter 7 explores stakeholders' perceptions about fisher participation in management and analyzes government initiatives in this direction, with particular emphasis on the proposed fisheries law; and Chapter 8 describes and evaluates a participatory research project among fishery stakeholders in Piriápolis, investigating its role in creating conditions for future adaptive co-management. Chapter 9 is dedicated entirely to the case study in Brazil, exploring changes in the Paraty fishery as a social-ecological system (Objective 1), and investigating fishers' bonding, bridging and linking relationships (Objective 2), as well as fishers' actual and desired participation in decision-making (Objective 3). Each of these five chapters ends with a Discussion section in which the main findings are discussed in the context of international literature, paying special attention to barriers

to and opportunities for the emergence of co-management. The discussion of Chapter 9 is also enriched by a cross-country comparison (Uruguay-Brazil). Finally, Chapter 10 integrates the key findings of this research from the angle of adaptive co-management, discussing the main barriers and opportunities detected in the previous chapters and identifying ways for moving forward. Theoretical and policy contributions, as well as opportunities for future research, are also provided in the last chapter.

## **CHAPTER 2: LITERATURE REVIEW**

This chapter focuses on the three main areas of knowledge guiding the development of this research: co-management and governance; social capital; and participatory research. The first three sections (2.1, 2.2 and 2.3) analyze the concepts and track their development, while also identifying positive and negative or controversial implications. The three concepts are indeed connected (e.g. social capital is a key aspect of co-management, whereas participatory research can promote social capital building). These interconnections are further explored in Section 2.4.

### **2.1. CO-MANAGEMENT AND GOVERNANCE**

#### **2.1.1. Co-management: What? When? What for?**

There are nearly as many different definitions of co-management as there are number of articles. Raakjaer Nielsen & Vedsmund (1999) mentioned that the concept of co-management was imprecise, and this might still be the case. In particular, Plummer & FitzGibbon (2004) pointed out the difficulty of defining the concept. Berkes (2007b) presented the origin and history of the concept, whereas Armitage et al. (2007a) provided a variety of definitions. Two of these definitions of co-management are: “A political claim [by users or community] to share management power and responsibility with the state” (McCay & Acheson 1987, in Armitage et al. 2007a); and “A partnership in which government agencies, local communities and resource users, NGOs and other stakeholders share ... the authority and responsibility for the management of a specific territory or a set of resources” (IUCN 1996, in Armitage et al. 2007a).

Regardless the great variety of definitions, the literature on co-management seems to agree on its triggering factors as well as on the purposes of its implementation. First, factors that trigger co-management are related to management problems, including real or imagined resource crises (such as overexploitation), conflicts between resource users, or conflicts between resource users and management agencies (Sen & Nielsen 1996, Pomeroy & Berkes 1997, Plummer & FitzGibbon 2004). Second, even though it is often stated that co-management is not a panacea for solving all the problems of fisheries management (e.g. Jentoft 1989, Raakjaer Nielsen & Vedsmund 1999), there are several arguments for stakeholders' participation in co-management arrangements. According to these arguments, some of the potential benefits of co-management include greater efficiency (Hanna 1995, Singleton 2000), fairness (McCay & Jentoft 1996), equity (Hanna 1995), legitimacy and compliance (Felt 1990, McCay & Jentoft 1996, Jentoft et al. 1998, Singleton 2000), sustainability (Hanna 1995), and community empowerment (Jentoft 2005). In this sense, greater efficiency could be achieved due to reduced transaction costs (i.e. costs of negotiation, implementation, enforcement and monitoring of regulatory

schemes, Jentoft et al. 1998, Carlsson & Berkes 2005); increased knowledge (McCay & Jentoft 1996, Jentoft et al. 1998); conflict resolution mechanisms, allocation of tasks, exchange of resources among stakeholders and risk sharing (Carlsson & Berkes 2005); improved data collection, monitoring and enforcement (Pinkerton 1989); and adaptability and flexibility to deal with uncertainty (McCay & Jentoft 1996).

However, how co-management is implemented, analyzed or evaluated depends on managers' and researchers' conception of it. Sandström (2009) argued that two principal approaches have emerged: one that considers co-management as a part of commons theory (common property or common pool resource theory), and the other that conceives co-management as a part of governance theory. She discussed the differences in their intellectual roots (rational choice institutionalism vs. sociological institutionalism) and in the way both approaches treat three core concepts: participation, power sharing, and process. Even though Sandström (2009) pointed out that the commons approach (named CPR approach by her) is the most dominant and the governance approach the most recent, she emphasized their different origins rather than making connections between them. In the next section I focus on the evolution of the concept of co-management and argue that what actually seems to be occurring is a transition from the former approach to the latter, after a shared origin in commons theory. Subsequently, I address the concept of governance and its evolution (including adaptive and interactive governance), after which I look at the links between governance theories and (adaptive) co-management.

### **2.1.2. Evolution of co-management**

The origin of co-management can be traced back to commons theory (Berkes et al. 2001). Despite earlier beliefs that resource users were not able to manage resources sustainably (Gordon 1954, Hardin 1968) - leading to the so-called "tragedy of the commons" (Hardin 1968), there is now substantial research supporting "sustainable" local institutions (Ostrom 1990, Agrawal 2001, Dietz et al. 2002). However, common property, private property, and state or government property, have all been associated both with success and failure, although state property is seldom associated with successful management (Feeny et al. 1990). In this sense, co-management should be understood as a type of property rights regime, in between common property and state property.

Over time, commons theory has evolved in many ways. For instance, commons research has increasingly moved to considering commons as complex systems (Berkes 2009b), characterized by self-organization, non-linearity, uncertainty, and scale (Berkes et al. 2003). In addition, there has been a change of scale, moving from a local level approach to a multilevel one, including local, regional and global levels (Ostrom et al. 1999). Furthermore, it has been

recently claimed the “need to avoid falling into either two analytical and policy traps: (1) deriving and recommending policy blueprints or ‘panaceas’; or (2) asserting ‘my case is unique’” (Basurto & Ostrom 2009).

Along with the evolution of commons theory, the concept of co-management has also evolved over the past twenty years. Co-management is more varied, more complex, and more dynamic than as described in the early literature (Berkes 2007b). The evolution of co-management was addressed by Berkes (2009c), who focused on a few aspects that have come to the forefront (knowledge generation, bridging organizations, social learning, and the emergence of adaptive co-management). However, the literature on co-management seems to lack an integrated analysis of the transition that this concept has gone through over time. This literature review aims to contribute to filling this gap, but rather than doing an exhaustive analysis, the focus will be on the evolution of eight aspects of co-management: participation, linkages, legitimacy, pluralism, capacity building and empowerment, process, power sharing, and learning (Table 2.1). This selection was based both on their relevance for my thesis and on their poor representation in the current literature (such as in the case of legitimacy, pluralism, and capacity building and empowerment). As mentioned above, three of these aspects (participation, power sharing and process) were already addressed by Sandström (2009) so my analysis builds upon her discussion.

**Table 2.1.** Evolution of the concept of co-management (see the text for references)

<b>Eight aspects addressed</b>	<b>Initial concept</b>	<b>Evolving concept</b>
Participation	User-groups (“Two to tango”)	Stakeholder approach (More than two)
Linkages	Vertical (between government and users, local level)	Vertical and Horizontal (multiple levels, networks)
Legitimacy	Outcome	Premise and Outcome Internal (users) and External (public interest)
Pluralism	Knowledge pluralism	Knowledge and Legal pluralism
Capacity building and Empowerment	Tied concepts: capacity building and empowerment of resource users and communities	Capacity building of all actors and more critical view of empowerment (individual/community)
Process	Formal aspects (legal components)	Functional aspects (collaborative problem-solving)
Power sharing	Starting point	Outcome
Learning	Short- to medium-term Instrumental reasons (single-loop)	Medium- to long-term (multiple/iterative cycles of learning) Varied reasons (and multiple-loops)

Although Table 2.1 (which represents a synthesis of the evolution of these eight aspects of co-management) looks static, this transition is still taking place. What I have called "evolving concept" corresponds largely to what has been termed "adaptive co-management". In addition, as it will be observed in the analysis below, the eight aspects presented in the table are not independent of each other but rather interrelated. Lastly, this discussion is supported by the growing literature that provides critiques of co-management.<sup>6</sup> In this regard, I agree with Pinkerton (2003) in that critiques are necessary if the concept of co-management is to remain useful.

### ***Participation***

Co-management was initially conceived as a partnership between two groups, the government and the users, thus the expression "two to tango" (Pomeroy & Berkes 1997). From this narrow perspective, only user groups were considered stakeholders. However, with time, a more pluralistic and democratic perspective has been growing, arguing that different groups other than users (fishers) may also have a "stake" in the resource (Jentoft & McCay 1995, Mikalsen & Jentoft 2001, Carlsson & Berkes 2005, Pomeroy & Rivera-Guieb 2005, Armitage et al. 2007b). From this broader perspective,

"Stakeholders in community-based co-management can be defined as individuals, groups or organizations of people who are interested, involved or affected (positively or negatively) by marine and coastal resources use and management. ... Stakeholders in coastal communities include fishers, their families and households, boat owners, fish traders, community-based groups, seasonal or part-time fishers, local business owners, local traditional authorities, elected government officials, representatives of government agencies, non-governmental organizations and others" (Pomeroy & Rivera-Guieb 2005, pp.33-34).

Mikalsen & Jentoft (2001) advocated for this stakeholder approach to fisheries management, according to which "all stakeholders" have a legitimate right to be consulted before decisions are made (thus their advice to replace the term user-groups by stakeholders). For instance, among these stakeholders, special attention has been given to women due to their lack of representation in participatory processes (Jentoft & McCay 1995, McCay & Jentoft 1996, Pomeroy et al. 2001, Breton & Davy 2006).

Related to participation is the notion of community, which has also evolved over time. Initially, a conventional or mythic notion was prevalent, by which communities were defined spatially and were characterized by their small size and locally-evolved norms and rules to manage resources sustainably and equitably (see Davis & Bailey 1996, Agrawal & Gibson 1999, Kearney & Berkes 2007). However, alternative conceptions of community have increasingly been

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<sup>6</sup> Several authors argued that there was a long period in the literature on co-management (and community-based management) lacking internal critique (Singleton 2000, Nadasdy 2003, Breton & Davy 2006).

found, advocating for heterogeneity at the local level due to multiple interests and actors, which in turn might lead to intracommunity conflicts (Agrawal & Gibson 1999, Jentoft 2000b, Singleton 2000, Breton et al. 2006, Kearney & Berkes 2007). This alternative conception emphasizes the existence of different groups at the local level (either resource users or not) which should be considered when aiming at participatory democracy.

Following the terminology used by Sandström (2009), the CPR (common pool resources) approach to co-management (which would correspond to what I have called "initial concept") is based on utilitarian principles, whereas the governance approach (corresponding to my "evolving concept") is based on democratic principles. Although more pluralistic and inclusive, the latter concept faces greater challenges due to the larger number and diversity of actors involved (Jentoft 1989, Jentoft & McCay 1995, McCay & Jentoft 1996, Jentoft et al. 1998, Mikalsen & Jentoft 2001, Sandström 2009). One of these challenges concerns the relative influence that the different stakeholder groups should have in decision-making (Jentoft & McCay 1995, Jentoft et al. 1998). As a first step to address this issue, Mikalsen & Jentoft (2001) proposed a score based on three dimensions of salience, namely legitimacy, power, and urgency. Nevertheless, the degree of participation of the different stakeholders is still an area that needs further research (Jentoft et al. 2003).

### ***Linkages***

In the initial concept of co-management, linkages were restricted to the vertical dimension, more specifically, to the connections between the resource users at the local level and the government at the national level. However, over time, in the same way as different stakeholders other than user groups were identified, the presence of different government agencies (either at one or more than one level) was also recognized (Carlsson & Berkes 2005). This means that neither the community nor the state is now considered a black box (or a monolithic actor according to the terminology used by Carlsson & Berkes 2005). Thus, the evolving concept of co-management is characterized by linkages of institutions horizontally (across geographical scale, e.g. among communities, or among government agencies of the same level) and vertically (across levels of organization: local, regional, national, international), building the so-called social networks (Carlsson & Berkes 2005, Folke et al. 2005). In fact, it is also claimed that these networks include private actors as well as public actors, linked to one another through a variety of relationships, leading to the image of co-management as governance (Carlsson & Berkes 2005, Berkes 2007b, Berkes et al. 2007, Chuenpagdee & Jentoft 2007, Marín & Berkes 2010), as it will be further discussed in Section 2.1.3.



## ***Legitimacy***

Closely related to participation is the idea of legitimacy. Co-management (and user participation in general) has long been seen as an important path to increase legitimacy and, as a consequence, to greater compliance (Jentoft 1989, Felt 1990, McCay & Jentoft 1996, Jentoft 2000a, Jentoft et al. 2009). However, in the initial concept of co-management, legitimacy seemed to be a rather straightforward outcome. It was not until later on that the concept of legitimacy was analyzed critically and it was identified as a premise and as an outcome, as well as a source of disappointment in fisheries management (Wilson & McCay 1998, Jentoft 2000a). According to Jentoft (2000a), currently there is a legitimation crisis in fisheries management which stems both from governments' actions (which might differ from what they try to accomplish) and from the differing perspectives between users and governments. Jentoft (2000a) also stressed the distinction between internal legitimacy (that of users) and external legitimacy (including public interests and other stakeholders), recognizing that they may be in conflict. This means that the extent to which co-management is legitimate depends on the stakeholder groups. In this sense, given the recent notion of community (which gives attention to the presence of multiple interests), different perspectives of legitimacy might be expected at the local level.

## ***Pluralism***

Knowledge pluralism has been present in the co-management literature since its origin. Claims about the benefits of integrating or combining different sources of knowledge, such as scientific, local, and traditional, are commonly found (Berkes et al. 2000, Huntington 2000, Johannes et al. 2000, Davis & Wagner 2003, Moller et al. 2004, Haggan et al. 2007, Berkes 2009c). There are also calls, however, for a critical perspective on the process of knowledge integration that considers the power relations underlying it (Nadasdy 1999, 2003, 2007). Interestingly, the concept of knowledge co-production is becoming increasingly common in the co-management literature (e.g. Armitage et al. 2011, Dale & Armitage 2011), and it may be defined as "the collaborative process of bringing a plurality of knowledge sources and types together to address a defined problem and build an integrated or systems-understanding of that problem" (Armitage et al. 2011, p. 996).

Another concept that has been recently proposed in the co-management literature (and which is related to legitimacy) is that of legal pluralism, which "assumes that the state is not the only legislator, that law is not unique to state societies, but that there exists 'folk law' or 'traditional law' in the absence of or in addition to state law" (Jentoft et al. 2009, p.28). In this sense, Jentoft et al. (2009) argued that co-management must be designed with legal pluralism in mind in order to maximize effectiveness, being the role of social researchers to make legislators

and managers sensitive to this concept. Legal pluralism is undoubtedly related to participation, and thus, to greater complexity of the management process: stakeholders who embody legal diversities must be equitably represented in a partnership with government authorities (Jentoft et al. 2009). However, it is important to stress that legal pluralism should not mean that local laws will be uncritically supported. Jentoft et al. (2009) gave some recommendations to deal with the unequal powers that might be present at the local level (i.e. to counteract the more powerful groups).

### ***Capacity building and Empowerment***

Capacity building in the co-management literature initially focused on the community (i.e. building community) and/or local resource users, arguing that they are not prepared to work with the government. However, the attention then diverted to the government, following the same train of thought: government agencies are not ready to work with local people. Berkes et al. (2007) cited the "two to tango" metaphor (by Pomeroy & Berkes 1997) to demarcate the beginning of this transition, in which it was argued that the government also needed capacity building. Even though it is now more common to find references to this (e.g. Jentoft 2005, Napier et al. 2005, Plummer & FitzGibbon 2006), it seems that the focus on capacity building at the government level is still relatively weak. Given that the tendency is to move towards a concept of co-management in which multiple actors are involved (and a Filipino or Turkish folk dance may be a more apt metaphor than the "two to tango"<sup>7</sup>), the focus of capacity building is also moving to all these actors (Berkes et al. 2007).

Capacity building frequently goes together with the concept of empowerment, often with the former leading to the latter (Pomeroy et al. 2001, Jentoft 2005). According to Pomeroy et al. (2001, p.201), "empowerment is concerned with capability building of individuals and the community in order for them to have greater social awareness, to gain greater autonomy over decision-making, to gain greater self-reliance, and in establishing a balance in community power relations". Despite the fact that this definition shows empowerment to have a much deeper meaning than capacity building, unfortunately both concepts are often placed in the same box.<sup>8</sup>

Jentoft (2005) pointed out that the fisheries co-management literature has addressed the issue of empowerment only implicitly, and so he analysed this concept thoroughly. From his analysis, a few points are worth mentioning. First, empowerment takes time because it needs to be a progressive process, in which community empowerment is built from individual

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<sup>7</sup> However, considering that my doctoral work took place in Uruguay and Brazil, "candombe" and "samba", respectively, are more suitable dances to refer to.

<sup>8</sup> For instance, Napier et al. (2005), while measuring the fulfilment of conditions for successful co-management, investigated if "training and empowerment" were provided to the community.

empowerment. Second, empowerment can be seen both as a precondition and as an outcome of co-management. And third, he argued that

"Empowerment does not necessarily imply the disarmament of the already powerful (...) Co-management is more a question of leveling the plainfield, by arming the disempowered stakeholders with the tools necessary to become equally as effective in the political process as other stakeholders, so that they can negotiate from strength rather than from an underdog position" (Jentoft 2005, p.6).

From my perspective, and in the context of the current literature on co-management and the devolution of power, this last point seems to be controversial. Similarly, there is a proposition that empowerment may lead to frustration and disappointment among stakeholders, as observed for legal pluralism. This could be due to government reluctance to devolve power (something often cited in the literature, Felt 1990, Pinkerton 1999, Pomeroy & Berkes 1997, Raakjaer Nielsen & Vedsmand 1999, Singleton 2000, Jentoft 2005, Nadasdy 2007, Berkes 2010b), and/or due to the challenge of dealing with powerful elites at the local level (Pinto da Silva 2004). For instance, Pomeroy et al. (2001) argued that the empowerment process may simply lead to a redistribution of power among elites rather than to a balance of power. Similarly, Davis & Bailey (1996) argued that local elites might be strengthened when authority over a resource system is transferred to the community.

### **Process**

Co-management is generally considered a dynamic and evolving process (Sen & Nielsen 1996, Pomeroy & Berkes 1997, Jentoft et al. 1998, Raakjaer Nielsen & Vedsmand 1999, Berkes 2007b, Jentoft et al. 2009). For instance, as Sen & Nielsen (1996, p.418) pointed out, "a co-management arrangement that is classified as consultative today may be cooperative in the future" (co-management typologies are addressed below under *Power sharing*). Nevertheless, how this process of co-management is seen has changed over time. Initially, co-management was mainly conceived as a formal process, with an emphasis on regulations and other legal components. This corresponds to what Sandström (2009) called the CPR-based approach. With time, co-management began to be considered a collaborative problem-solving process (Carlsson & Berkes 2005, Folke et al. 2005), in which the functional aspects (i.e. being task-oriented), the time dimension, and an extensive deliberation and negotiation became extremely important (Berkes 2007b). This emphasis on the temporal dimension of co-management was already addressed for the empowerment process, and in the same way, time is key for institution building and trust building (Berkes 2007b). This concept of co-management corresponds to the governance approach discussed by Sandström (2009), in which the institutional arrangements may vary from highly formalized to loosely defined or even informal frameworks. According to Berkes (2007b, p.28), "overemphasis on formal aspects of power sharing (e.g., legal details of co-management in land claim agreements) may put the parties at risk of overlooking the

dynamics of the process and its temporal requirements". However, viewing co-management as a problem-solving process does not mean that co-management will eliminate conflicts between the government and resource users. Rather, co-management takes the risk of just reconfiguring those conflicts (Singleton 2000).

### ***Power sharing***

Co-management can be seen as a continuum of possible arrangements in the degree of power sharing (such as in Arnstein's (1969) ladder for citizen participation). Indeed, most definitions of co-management are based on this characteristic (Berkes 2007b). This spectrum of co-management arrangements according to the role of government and users, was represented by varied typologies, such as "informing, consultation, co-operation, communication, advisory committees, management boards, partnership/community control" (Berkes 1994); "instructive, consultative, cooperative, advisory, informative" (Sen & Nielsen 1996); or "consultative, collaborative, delegated" (McConney et al. 2007). Nevertheless, several authors agree that mere consultation is not co-management (Jentoft 2003, Berkes 2007b, and see Pinkerton 2003 for "complete co-management").

The tendency of co-management to move from a formal process to a functional one (i.e. problem-solving) led to a change in perspective from which power sharing is viewed. In the early concept of co-management (CPR approach of Sandström 2009), power sharing was regarded as the starting point of the process, whereas in the evolving concept (i.e. governance perspective of co-management according to Sandström 2009), power sharing is seen as an outcome (Carlsson & Berkes 2005). However, this new perspective, as previously mentioned, means more complexity: power sharing becomes much more complicated given that co-management now involves multiple players rather than the two parties (government and community) originally envisaged (Berkes et al. 2007).

### ***Learning***

In the earlier literature on co-management, it was suggested that learning, or adaptive management (also known as "learning-by-doing"), could be an important component to bring feedback to management functions over time (e.g. Pomeroy & Berkes 1997, Jentoft et al. 1998). Thus, the argument for learning seemed to be mainly instrumental. The temporal scope of co-management at this point was short- to medium-term (Berkes et al. 2007). However, with time, co-management and adaptive management evolved towards common ground, in what is now called adaptive co-management (Armitage et al. 2007b). In this evolving concept of co-management, learning is an essential component which takes time, involving multiple or iterative

cycles of learning and adaptation, and thus, a temporal scope from medium- to long-term (Berkes et al. 2007). In addition, since this concept of co-management is characterized by horizontal and vertical linkages, learning would be enhanced across scales (Armitage et al. 2008). In addition to instrumental and normative reasons, in the current literature on collaborative management (in the broad sense of the term) it is also argued that learning may be a reaction to social-ecological change (Armitage et al. 2008). Institutional building, trust building, and social learning all require time and repeated rounds of learning-by-doing (Armitage et al. 2007a).

Armitage et al. (2008) conducted a careful analysis of learning in the context of collaborative management, including three different learning theories, namely experiential, transformative, and social learning. In particular, social learning is increasingly becoming the focus of the collaborative resource management literature (Pinkerton 2003, Schusler et al. 2003, Pahl-Wostl & Hare 2004, Diduck et al. 2005, Keen et al. 2005, Plummer 2006, Pahl-Wostl et al. 2007). According to Pahl-Wostl et al. (2007), multiparty processes in which representatives from stakeholder groups interact on a regular base are at the heart of the concept of social learning. Three types or dimensions of social learning could be taking place as part of a collaborative management process: single-loop (identifying alternative strategies and actions to resolve specific problems), double-loop (when worldviews and values are challenged), and triple-loop learning (directing attention to the norms and protocols on which single- and double-loop learning are predicated) (Armitage et al. 2008, p.88). Single-loop learning seems to correspond to the instrumental learning which was claimed in the initial literature.

Although emphasis has been placed on the importance of learning, Armitage et al. (2008, p.87) referred to the “paradox of learning” arguing that “vague notions of learning are often encouraged in the absence of careful examination of the factors that determine if, who, how, when and what type of learning actually occurs”. Besides identifying areas that need further research, these authors pointed out that some of the challenges of learning processes relate to the challenges of participatory processes themselves (e.g. who, how, and when stakeholders should participate) and to power issues at the local level. Furthermore, they argued that capacity building should be needed to create enabling conditions for learning (Armitage et al. 2008).

### ***Concluding remarks about the evolving concept of co-management***

To sum up, analysis of these eight aspects of co-management (participation, linkages, legitimacy, pluralism, capacity building and empowerment, process, power sharing, and learning) supports Berkes' (2007b) statement that co-management is now more varied, more complex, and more dynamic than initially assumed. The inter-relationship among these aspects was observed throughout the analysis. However, there is one issue that seems to pose different challenges to all those aspects of co-management, namely power. Jentoft (2007a), after recognizing that scant

attention had been paid to power in the literature on fisheries and coastal management, addressed this issue. From his analysis it can be deduced the importance of understanding the relations of power among fishery stakeholders, if we are to build a “robust and democratic co-management” (Jentoft 2007a).

Even though I tried to be optimistic when referring to the “evolving concept” of co-management, my analysis was based on literature that sometimes is more theoretical than grounded, and so, it is difficult to determine which concept or approach is currently prevalent in co-management practices. According to Sandström (2009), the CPR approach (which corresponds to what I have called “initial concept”) is now the most dominant one. Given that the concept of co-management is going through a complex transition, it becomes essential that researchers and managers specify the concept to which they adhere to. In my research I have followed the “evolving concept” when referring to co-management (e.g. co-management as governance). In the next section I will address the issue of governance and its linkages with co-management.

### **2.1.3. Linking adaptive co-management to adaptive and interactive governance**

As discussed previously, the concept of co-management has evolved over time, in a similar way to commons theory. However, governance theory seems to have evolved concomitantly but independently, and the links between governance and co-management have started to be identified only recently. Before focusing on these links, this section begins by addressing the evolution of the concept of governance, followed by describing two related approaches: adaptive and interactive governance.

#### ***Evolution of governance***

Initially, governance was related to governments and their agency. However, more recent concepts of the term imply a broader meaning, in which many other actors (e.g. communities, civic organizations, private organizations, general public), in addition to the government, are involved in governance (Lee 2003, Chuenpagdee & Jentoft 2009). This broader concept is sometimes referred to as the “new governance” (Lee 2003). It is also common to find the term “good governance”<sup>9</sup>, which is characterized by the following attributes: effectiveness, participation, representation, deliberation, legitimacy, accountability, empowerment, social justice, and organizational features such as being multilayered and polycentric (Lundqvist 2004, Lebel et al. 2006). Similarly, Chuenpagdee & Jentoft (2009) referred to efficiency, effectiveness,

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<sup>9</sup> The concept of “good governance” is also central to many international donors such as the World Bank (see Rhodes 1996), the International Monetary Fund, and the Canadian International Development Agency (Woods 2000).

legitimacy, and justice, as the desired governance performance outcomes. It is not surprising then, that governance has gained recognition during the past fifteen years (Fennell et al. 2008) and it has also become a catchword (Eckerberg & Joas 2004). Lee (2003) referred to the “new governance” in terms of adaptive systems and defined it in its polycentric form. In what follows, the concept of adaptive governance is addressed, involving learning as one of its components.

### ***Adaptive governance***

Folke et al. (2005) identified four interactive aspects of importance in adaptive governance of complex social-ecological systems, which can be summarized as follows: (1) building knowledge (by combining different knowledge systems); (2) adaptive management practices (in which learning requires leadership); (3) flexible institutions and multilevel governance systems; and (4) dealing with external perturbations, uncertainty and surprise. In a similar vein, in the context of commons theory, Dietz et al. (2003) identified three strategies for meeting the requirements of adaptive governance at the level of regional and global commons: analytic deliberation (i.e. involving interested parties in informed discussion of rules), nesting (i.e. allocating authority to allow for adaptive governance at multiple levels from local to global), and institutional variety (i.e. employing mixtures of institutional types, such as hierarchies, markets, and community self-governance). The nesting characteristic identified by Dietz et al. (2003) is related to the polycentric institutional arrangements emphasized by Folke et al. (2005). The interaction across organizational levels can increase the diversity of response options, and thus, the system could be better prepared to deal with uncertainty and change (Ostrom 2005). As a consequence of this, polycentric arrangements may be important in responding to ecosystem dynamics at different scales (Folke et al. 2005).

However, a critical view of adaptive governance was presented by Jentoft & Chuenpagdee (2009). According to them, adaptive governance (involving learning) does not work well with wicked problems<sup>10</sup>, such as fisheries and coastal governance, because solutions can have consequences that are not easily reversible. As an example, they described a situation in which common property is transformed into private property. They argued that, even though this change might create undesirable impacts (e.g. with regard to distribution of wealth, power and social values), it is in practice very difficult to reverse (Jentoft & Chuenpagdee 2009). Therefore, adaptive governance seems to be within limits: adaptation should involve marginal rather than radical changes; although unfortunately, according to Jentoft & Chuenpagdee (2009), drastic moves are often required.

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<sup>10</sup> "Problems are wicked (as opposed to "tame") when they are difficult to define and delineate from other and bigger problems and when they are not solved once and for all but tend to reappear" (Jentoft & Chuenpagdee 2009, p.553).

## ***Fisheries governance as interactive governance***

Fisheries governance has received much attention since the early twenty-first century (Symes 2006). Jentoft et al. (2007, p.612) traced the origin of governance in fisheries literature as follows:

“Governance theory was introduced into fisheries and marine resource conservation literature by Jan Kooiman et al. (1999, 2005), Jan Willem van der Schans (2001), and the so-called FISHGOVNET (an international network of social and natural scientists, based at the Centre for Maritime Research (MARE) at the University of Amsterdam with Jan Kooiman as Chair), through which the term ‘interactive governance’ was conceived”.

According to Jentoft & Chuenpagdee (2009), fisheries and coastal governance are a complex exercise because they deal with biological, social and economic issues. Interactive governance seems to be the most cited theory in the context of fisheries governance (Bavinck et al. 2005, Kooiman et al. 2005, Johnson 2006, Jentoft 2007b, Jentoft et al. 2007, Chuenpagdee & Jentoft 2009, Jentoft & Chuenpagdee 2009). Johnson (2006) stated that three central elements of this approach are a multiplicity of actors, the importance of institutions, and the clarity of the principles by which it is guided. The last one, which means to emphasize an ethical approach on what constitutes good goals and practices (Jentoft et al. 2007), seems to be an aspect that distinguishes interactive governance from adaptive governance. In addition, goals of interactive governance are negotiated (through learning) rather than assumed (Chuenpagdee & Jentoft 2009).

Three orders of governance were identified by Kooiman (2003), known as first-, second- and meta-order governance. As explained by Kooiman & Bavinck (2005, pp.19-20):

“First-order governing means solving the constant stream of problems which surface in the fish chain – problems of supply, price, market, employment, work satisfaction, etc. [...] Second-order governing focuses on the institutional arrangements within which first-order governing takes place. Here we use the term ‘institution’ to denote the systems of agreements, rules, rights, laws, norms, beliefs, roles, procedures and organisations that are applied by first-order governors to make decisions. [...] Third-order, or meta-governance, takes us to the centre of the onion that feeds, binds, and evaluates the entire governing exercise. One of the core principles of meta-governance is rationality – the idea that governing must be based upon verifiable facts, a logical choice of instruments, and a defensible strategy.”

According to interactive governance theory, fisheries and coastal governance consist of three systems: a system-to-be-governed (the fish chain that links producers to consumers), a governing system (including all of those individuals and institutions that have formal or informal power over the governance of the fish chain), and a system of governing interactions (linking those who govern the fish chain and those who work within the fish chain) (Kooiman et al. 2005, D. Johnson 2010). It has been argued that sensitivity, inclusiveness, flexibility and caution are the required qualities of the governing system to deal with the diversity, complexity, dynamics and vulnerability of the system-to-be-governed, respectively (Jentoft 2007b). Interactive governance



theory also argues that the three governing modes (hierarchical, co-governing and self-governance) should operate in combination (although the characteristics of the system will determine which arrangement or mixture is more appropriate). This emphasizes the need of involving the state, market and civil society (Kooiman et al. 2005, Jentoft 2007b). Similarly, this agrees with Dietz et al. (2003), who identified the mixture of institutional types as one of the strategies towards adaptive governance.

Three elements compose interactive governance: images (representations of the how and why of governance), instruments (linking images to action) and action (putting the instruments into effect) (Kooiman & Bavinck 2005). According to Jentoft et al. (2010), the conventional image of the governing system has been a pyramid with the government in the commanding post, whereas the conventional image of the system to be governed has been a trophic pyramid with humans at the top (note the correspondence between both images). Interestingly, the “tragedy of the commons” (Hardin 1968) has been identified as the most influential image in fisheries management (i.e. humans as short-sighted, non-communicative and profit-maximizing beings) (Kooiman & Bavinck 2005, p.20; Jentoft et al. 2010). However, given that images are shaped through a dialectic process, they can change. “Images change as people learn from experience, their own or others, as when observations do not conform to what is believed” (Jentoft et al. 2010, p.1317).

Another important concept within interactive governance theory is governability, which is defined as the overall capacity for governance at any societal entity or system (Kooiman 2003). Thus, interactive governance theory assumes that there are limits to how governable fisheries and coastal systems are and what level of governability they can achieve (Jentoft 2007b). Chuenpagdee & Jentoft (2009) argued that the more diverse, complex and dynamic the fisheries systems are, the more difficult it is to govern their functioning. Therefore, governance is seen as a way to promote governability. Following this train of thought, assessing the governability of a system is seen as a first step in fisheries governance (Chuenpagdee et al. 2008, Chuenpagdee & Jentoft 2009).

To take this first step, Chuenpagdee & Jentoft (2009) proposed a governability assessment framework, which involves the estimation of the potential of the governing system, given the limitations of the governability of the system-to-be governed, the governing system itself, and their interactions. Governability, then, is the link between theory and practical application (D. Johnson 2010, p.267). The framework proposed by Chuenpagdee & Jentoft (2009) parallels the diagnostic approach developed by Ostrom (2007) for going beyond panaceas to problems of natural resource overexploitation, although the focus differs (Chuenpagdee & Jentoft 2009, p.118.): “Whereas Ostrom’s approach, as we understand it, assesses how the governing system and the systems to be governed are affected by

interactions, ours works from the opposite direction. It assesses how these interactions are affected by the inherent and constructed (institutional) make-up of these systems”.

### ***Linking adaptive co-management to adaptive and interactive governance***

The evolving concept of co-management (Section 2.1.2), involving a diversity of players, embodies several principles of “good governance”, such as democracy, transparency, legitimacy, accountability and subsidiarity (Symes 2006, Berkes 2007b).<sup>11</sup> Moreover, Plummer & FitzGibbon (2004) discussed the evolution of the concept of governance, arguing that the tendency has been to move away from greater centralized control towards the practice of co-management. Co-management is sometimes regarded as a synonym of co-governance (Bavinck et al. 2005, Symes 2006). According to Jentoft (2007b), the advantage of co-governance is that it widens the source of knowledge and provides opportunities for interactive learning.

The connections between adaptive co-management and adaptive/interactive governance have appeared only recently in the literature. Huitema et al. (2009) claimed that the boundaries between both literatures are somewhat vague. According to them, “several adaptive (co-) management scholars have started to use concepts and approaches from the governance literature and now contribute to the empirical body of knowledge on governance (e.g., Scheffer et al. 2003, Folke et al. 2005, Olsson et al. 2006)” (Huitema et al. 2009). The literature I have reviewed led me to the same argument so I have illustrated this with some examples. For instance, Folke et al. (2005) and Armitage et al. (2009) viewed adaptive co-management as a way to operationalize adaptive governance. Also, Berkes (2007b, p.33) stated that “one practical significance of adaptive co-management is related to the call for governance ‘at all levels’ at the 2002 World Summit on Sustainable Development, Johannesburg”. Moreover, Berkes et al. (2007, p.313) stated that the three strategies proposed by Dietz et al. (2003) for adaptive governance are consistent with the framework of adaptive co-management, if the diversity of institutional types also serves to facilitate experimentation and learning.<sup>12</sup>

One commonality between adaptive co-management and governance is their polycentric nature (Huitema et al. 2009). In addition, if we look both at the adaptive co-management process as analyzed by Plummer (2009) and at the governability assessment framework proposed by Chuenpagdee & Jentoft (2009), three more commonalities can be identified: a) the co-management/governability process changes with time; b) internal and external factors (i.e. exogenous and endogenous variables) affect the process; and c) learning and flexibility help to cope with uncertainty, risks and changes.

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<sup>11</sup> However, the way these principles are converted into concrete management institutions may vary from one country to another and from one fishery to another (Jentoft 2003, p.3).

<sup>12</sup> See Plummer et al. (2013) for a recent systematic review about the connections between adaptive co-management and governance.

Related to the last point, Armitage et al. (2008) stated that collaboration and learning are emphasized in a variety of environmental management approaches, such as adaptive co-management, interactive governance, adaptive governance, and resilience management. “Adaptive co-management, in particular, is an outcome of the adaptive management and collaborative management experiences in which the learning and linking functions (horizontally and vertically) of governance are emphasized” (Armitage et al. 2008, p.87).

Similarly, governance allows for interactive learning for decision-making. According to interactive governance theory, “learning processes should be interactive because such processes are more effective if they are structured so that the actors involved learn from each other and together reflect on what they have learned” (Jentoft 2007b, p.361). Learning occurs throughout the three orders of governance, from practical problem-solving (first-order governing), to institutional learning (second-order governing) and meta-learning, that is “learning how to learn” (meta-governance) (Kooiman & Jentoft 2005). This perspective of learning relates to social learning theory (Armitage et al. 2008). In particular, the three orders of governance seem to correspond to the three dimensions of social learning, namely single-, double- and triple-loop learning. According to Kooiman & Jentoft (2005, p.289), “single-loop learning is considered to be learning of the common type at the level of problem-solving, i.e., first-order governing, while double-loop learning occurs at the institutional level, i.e., second-order governing, while meta-learning is ‘learning how to learn’”. From a governance perspective, the need for meta-learning is emphasized (Kooiman & Jentoft 2005).

### ***Conditions for success***

There is a vast literature specifying conditions that would promote a “sustainable” management of the commons (Ostrom 1990, Baland & Platteau 1996, Agrawal 2001) or a “successful” (adaptive) co-management (Felt 1990, Pomeroy & Carlos 1997, Raakjaer Nielsen & Vedsmand 1999, Singleton 2000, Berkes et al. 2001, Pomeroy et al. 2001, Pinkerton 2003, Napier et al. 2005, McConney et al. 2007, Pomeroy 2007, Armitage et al. 2009). Most authors agree that these conditions are situation-specific, because co-management itself depends on the context (Jentoft 1989, Pomeroy & Berkes 1997, Raakjaer Nielsen & Vedsmand 1999, Pomeroy et al. 2001, Napier et al. 2005, Jentoft et al. 2009), partly due to the shifting conditions of complex social-ecological systems (Armitage et al. 2009). However, despite the critical importance of context, “emphasis is increasingly placed on measuring and monitoring the conditions from which adaptive co-management may emerge, and the success and failure of adaptive co-management in diverse situations” (Armitage et al. 2007a, p.9). In fact, Armitage et al. (2007a) claimed that studies based on large number of cases and hypothesis testing are important areas for further research. There are only a few studies in which the relationship between the fulfillment of

conditions and the perception of achievement of success was measured (Pomeroy et al. 1997, Napier et al. 2005, Cinner et al. 2012). The underlying logic is that the chance of success will be greater when more conditions are fulfilled (Pomeroy et al. 2001). Given that these conditions interact with each other, multi-dimensional analyses might be appropriate.

On the other hand, looking at this extensive literature about “conditions for success” with a critical lens, we could argue against the use of the term success. Here are some supporting arguments: (a) success or failure depends on the perspective of the stakeholder (Pomeroy et al. 1997, Pomeroy et al. 2001, Nadasdy 2003, Napier et al. 2005); (b) success also depends on the co-management approach taken by researchers (Sandström 2009, and see Section 2.1.2) – based on the conditions they choose to investigate; and (c) given that co-management is a dynamic process, success would be a time-dependent variable. Also, it has been argued that success should be a continual variable rather than a binary one (Chuenpagdee & Jentoft 2009). This view of success seems to be present in the governance literature. For instance, Johnson (2006, p.748) argued that “governance does not result in a finished product, but rather its success is measured by the degree to which it fosters dialogue, debate, and collaboration among all stakeholders over guiding principles, integrating institutions, rules for interactions, and actions to resolve problems.”

From my perspective, *conditions* should be conceived as variables that might influence the emergence of adaptive co-management, or the whole process itself. Plummer (2009), synthesizing diverse literatures, identified these variables and classified them into exogenous and endogenous variables. Similarly, one nomenclature for conditions which is often found in the literature (initially identified by Pollnac 1998) refers to three levels: supra-community level (e.g. enabling legislation, external factors), community level (e.g. participation by those affected, leadership, community organizations), and individual and household level (e.g. individual incentives, benefits exceed costs) (Berkes et al. 2001, Pomeroy et al. 2001, McConney et al. 2007, Pomeroy 2007, Allahyari 2009). In the previous section I emphasized the importance of learning for adaptive co-management and governance. Additional elements of significance which have been suggested include social capital (comprising social networks, trust and leadership), flexible institutions, funds (not only from external sources), and bridging organizations (connecting institutions across levels and scales to enhance their capacity to deal with change) (Folke et al. 2005, Napier et al. 2005, Armitage et al. 2009). Nonetheless, barriers to co-management have also been identified, such as distrust and resistance of management agencies, and lack of broadly organized political support (Pinkerton 1999). Furthermore, regarding legislation, it has been claimed that enabling policies not only need to be created but they also need to be enacted (Pinkerton 2003, Napier et al. 2005).

#### **2.1.4. Summary**

The first area of the literature review has focused on co-management and governance. After describing broadly the objectives of co-management, the evolution of the concept was addressed, with particular attention to eight aspects: participation, linkages, legitimacy, pluralism, capacity building and empowerment, process, power sharing, and learning. Analyzing the transition that the concept of co-management is facing led me to stress the importance of researchers and managers specifying the approach they take. The linkages between co-management and governance seem to be growing in the literature (e.g. adaptive co-management can be seen as a process leading to adaptive/interactive governance) and I have contributed to making some connections among those literatures. However, as has been claimed, the theory of adaptive co-management should be further developed in collaboration with governance and adaptive co-management scholars. Lastly, I introduced some conditions or variables affecting the process of (adaptive) co-management, while at the same time I argued against the use of the term success. The following two areas of the literature review will focus on two variables or processes which have been suggested to enhance the emergence of adaptive co-management, namely social capital and participatory research.

### **2.2. SOCIAL CAPITAL**

In this area of the literature review I will discuss the concept of social capital (which has "interactions among individuals" as a central component), from its origin in the work of Bourdieu, Coleman, and Putnam, to its current use in the field of natural resources management and co-management, including ways of analysis. Lastly, a critical reflection is provided, addressing the downside or limitations of social capital.

#### **2.2.1. Social capital: What are we talking about?**

The past twenty years have been characterized by a growing interest in social capital in diverse disciplines, such as political science, sociology, economics, development practice, and natural resources management (Wall et al. 1998, Rudd 2000, Woolcock & Narayan 2000, Pretty & Ward 2001, Sanginga et al. 2007, Dahal & Adhikari 2008, Sano 2008). This growing interest can be partially explained by the frequent association between social capital and improved economic and social wellbeing (Bebbington 1999, Pretty 2003, Grafton 2005, Sekhar 2007, Fowler & Etchegary 2008, Wagner & Fernandez-Gimenez 2009). According to Eames (2005, p.82), "the concept of social capital has shifted from a phenomenon to be estimated by a cost-benefit analysis and used as a purely market economy decision making tool to its current

manifestation as the glue that binds social interaction in and between groups concerned with a given issue”.

Although numerous scholars have contributed to the conceptualization of social capital, it is largely agreed that Pierre Bourdieu, James Coleman, and Robert Putnam represent its three seminal authors (Wall et al. 1998, Kadushin 2004, DaCosta & Turner 2007, Sanginga et al. 2007, Dahal & Adhikari 2008, Vermaak 2009). Table 2.2 shows a comparison of the view of social capital by these three authors, based on the analysis by Wall et al. (1998), Kadushin (2004), and Vermaak (2009). It should be noted, however, that there are at least two commonalities among the view of social capital by Bourdieu, Coleman and Putnam: (1) social capital is a resource for action (Wall et al. 1998, Sanginga et al. 2007), and (2) the definitions of social capital lie with “relations” and the benefits that arise from these relations (Dahal & Adhikari 2008).

**Table 2.2.** Comparison of some attributes of social capital according to the three seminal authors of the concept

<b>Attributes of social capital</b>	<b>Pierre Bourdieu</b>	<b>James Coleman</b>	<b>Robert Putnam</b>	<b>References</b>
Structural vs. Functional	More structural than functional	More functional than structural	As structural as functional	Kadushin (2004) Vermaak (2009)
Valuational (i.e. attitudinal - trust and shared norms included)	No	Yes	Yes	Kadushin (2004) Vermaak (2009)
Scale	Individual and collective (focus on class factions, or specific social fields)	Individual and collective (from families to formal organizations)	Collective (large regions)	Wall et al. (1998) Kadushin (2004) Vermaak (2009)
Goal	Sub-group or individual power over others	Increasing individual human capital and therefore socioeconomic prosperity	Establishing democratic institutions	Wall et al. (1998)

Given the three different roots of the concept of social capital, it is not surprising thus to find that the literature abounds with definitions of social capital (see Wall et al. 1998, Rudd 2000, Vermaak 2009). These diverse definitions can be partially explained by differences in the attributes of social capital showed in Table 2.2. For example, Kadushin (2004) pointed out that norms, values and institutions are sometimes considered outcomes of social capital rather than social capital itself. The same occurs with “trust”, which is sometimes seen as an outcome of social capital (Grafton 2005, Sano 2008). Within this varied range of definitions, there are even authors who would like to replace the term (Kadushin 2004, p.88, advocates for the concept of

“networked resources” due to the many conceptual and measurement problems of social capital). On the other hand, Sekhar (2007, p.497) considered that Putnam’s (1993) definition of social capital is the most commonly accepted, namely, “connections among individuals—social networks, and the norms of reciprocity and trustworthiness that arise from them”. However, based on the literature I have reviewed, I would not state this is the case, unless Sekhar (2007) is only referring to a specific discipline. The wide range of definitions of social capital is accompanied by numerous citations about the difficulty to operationalize this concept (Woolcock & Narayan 2000, Eames 2005, Grafton 2005, Plummer & FitzGibbon 2006, Plummer & FitzGibbon 2007, Sekhar 2007, Sano 2008).

Undoubtedly then, it is essential to specify the perspective from which we are using the term, including the level of analysis or scale that we have chosen (Wall et al. 1998). It is worth noting, however, that there seems to be agreement in that relations and interactions among individuals are a central component of social capital: “Whether social capital is seen from the societal-group level or the relational level, the majority of the scholars remain committed to the view that it is the interacting members who make the maintenance and reproduction of this social asset possible” (Sekhar 2007, p.498).

### **2.2.2. Social capital in natural resources and environmental management (NREM)**

The concept of social capital has been increasingly found in the literature on natural resources and environmental management (Pretty & Ward 2001, Pretty 2003, Plummer & FitzGibbon 2007, Bodin & Crona 2008, Vermaak 2009). For instance, Bodin & Crona (2008, p.2777) pointed out that “efforts directed at enhancing NRM at the community level should take several aspects of social capital into consideration”. The initial interest by NREM scholars in social capital seems to be related to the discovery of numerous “successful” cases of community-based resource management (Pretty & Ward 2001, Pretty 2003, Sanginga et al. 2007). Thus, social capital is commonly associated with collective action (Uphoff & Wijayaratra 2000, Bodin & Crona 2008, Dahal & Adhikari 2008) and with the ability to solve conflicts (Sanginga et al. 2007, Bodin & Crona 2008).

However, the relationship between social capital and collective action should not be interpreted as being straightforward. Ramirez-Sanchez & Pinkerton (2009), for instance, studying seven coastal fishing communities in Loreto (Baja California Sur), found that collective action for addressing resource decline was not mobilized despite there being an awareness of the problem and the needed network structure (i.e. social capital). Likewise, it is acknowledged that social capital is not the only factor explaining the “success or failure” of resource management (Bodin & Crona 2008), or the only factor to achieve sustainable livelihoods (Pretty & Ward 2001). In this sense, Pretty & Ward (2001) and Pretty (2003) emphasized the need for policy support.

Moreover, Bodin & Crona (2008), when addressing this view of social capital as having only “some explanatory potential”, argued that agency is another factor that also contributes to collective action. Specifically, they were referring to leaders as influential actors (i.e. key individuals) “who activate a potentially latent stock of social capital and use it to produce a flow of benefits” (Bodin & Crona 2008, p.2764). It should be noted, however, that leadership is sometimes considered as a component of social capital itself (e.g. Folke et al. 2005).

### ***Analyzing social capital: structural and cognitive components***

In order to understand social capital more concretely, Uphoff & Wijayaratra (2000) proposed a distinction between structural and cognitive social capital. They argued that the former is more external and objective, and “include roles, rules, procedures, and precedents as well as social networks that establish on-going patterns of social interaction” (p.1876). On the other hand, the latter is more internal and subjective, including “norms, values, attitudes and beliefs that predispose people to cooperate” (p.1876). Uphoff & Wijayaratra (2000) also noted that these two forms of social capital are connected and mutually reinforcing (proposition that was supported by Devine & Roberts 2003<sup>13</sup>). Similarly, Plummer & FitzGibbon (2007), after reviewing the literature, argued that social capital consists of two main types of components: the objective or structural elements of networks, and the subjective or experiential components – such as shared values, shared understanding and social norms. Several authors suggested the combination of structural and cognitive (i.e. cultural) aspects for analyzing social capital (e.g. Devine & Roberts 2003, Krishna 2003, van Deth 2003).

Bonding, bridging, and linking (also known as the dimensions, levels or forms of social capital) are particularly important elements of networks (Grafton 2005, Plummer & FitzGibbon 2007): the bonding form (‘strong ties’) occurs among individuals who already have a considerable relationship (such as in families and small fishing communities); the bridging form (‘weak ties’) refers to the connections across similar, but different, groups or social networks, involving a greater social distance among individuals (such as among groups within a community or among communities); and linking is concerned about the connections across disparate groups at different hierarchies (such as between a government agency and a group of fishers). Several studies have focused on these dimensions of social capital (Crona & Bodin 2006, DaCosta & Turner 2007, Sekhar 2007, Sano 2008<sup>14</sup>, Ramirez-Sanchez & Pinkerton 2009<sup>15</sup>). Grafton (2005,

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<sup>13</sup> In particular, these authors argued that the structural and the cultural (i.e. cognitive) are mutually constitutive of each other (Devine & Roberts 2003, p.94), contrasting with van Deth (2003, p.82) who discussed a causal relation between the two (the structural aspects facilitating the development of trust and norms of reciprocity).

<sup>14</sup> According to this author, bridging social capital seems to include vertical linkages as well (Sano 2008).

<sup>15</sup> In this work, linking social capital includes intercommunity connections (in addition to community links with external agencies) (Ramirez-Sanchez & Pinkerton 2009).



p.763) suggested that “social connections in the form of ‘strong ties’ within communities, ‘weak ties’ across communities and links between fishers and the regulator are important in ensuring successful fisheries management outcomes”. Interestingly, Eames (2005) noted that there can be a conflict of interest between bonding (within groups) and bridging (between groups) social capital, requiring social learning processes to link the two.

Despite all these connections across different horizontal and vertical levels, the focus of the majority of studies on social capital in the context of NREM has been on the community. For instance, Dahal & Adhikari (2008, p.1) stated that many studies have overemphasized the local relations (i.e. bonding social capital) in NREM, without acknowledging the multi-faceted aspects of social capital. They stressed the need to study bridging and linking social capital, in addition to bonding, because there is interplay among them. Furthermore, and of critical importance to my study, if we go back to Pretty & Ward’s (2001) article, which can be recognized as one of the earliest in the literature on social capital in NREM, we will find that the “external” and the “external-external” connections have not been addressed thereafter.

First of all, and to describe better the context, Pretty & Ward (2001) identified four central aspects of social capital: relations of trust; reciprocity and exchanges; common rules, norms and sanctions; and connectedness, networks and groups (Pretty & Ward 2001, p.211). Within the last point, they identified five types of connections (p.212): (i) Local connections: strong connections between individuals and within local groups and communities (which could be better named “intra-local connections”); (ii) Local-local connections: horizontal connections between groups within communities or between communities, which sometimes become platforms and new higher-level institutional structures; (iii) Local-external connections: vertical connections between local groups and external agencies or organizations, being one-way (usually top-down) or two-way; (iv) External-external connections: horizontal connections between external agencies, leading to integrated approaches for collaborative partnerships; and (v) External connections: strong connections between individuals within external agencies (which could be better named “intra-external connections”). Interestingly, even though Pretty & Ward (2001) noted that not all these connections were emphasized in practice (e.g. a development agency may focus on the local level without building connections with other external agencies), it seems to me that subsequent research have not given attention to the last two. For instance, although Dahal & Adhikari (2008) studied bonding, bridging, and linking social capital, they did not investigate external-external or intra-external connections. Similarly, Adhikari & Goldey (2010) analyzed social capital using a framework which included cognitive and structural social capital (and its downside), but with focus only on the village level. This is unfortunate if we agree with Pretty & Ward (2001, p.212) in that “in general, the more linkages the better; two-way relationships are better than one-way; and linkages subject to regular update are generally better than historically-embedded ones”.

### ***Social capital as a process and its relationship to co-management and governance***

Contemporary authors seem to agree that social capital changes over time and thus, it should be seen as a process (Uphoff & Wijayaratna 2000, Plummer & FitzGibbon 2006, Fowler & Etchegary 2008, Sano 2008, Wagner & Fernandez-Gimenez 2008, 2009). Pretty & Ward (2001) proposed three stages to represent the evolution of social capital in groups (pp.218-220), based on fifteen criteria clustered in five themes: worldviews of members; internal norms and trust; external linkages and networks; technologies and improvements; and group lifespan. In the initial stage, called Reactive-Dependence, individuals tend to look back (e.g. at a threat or crisis), rules and norms are externally imposed or derived, and there are few or no links with other groups, among other characteristics. In the second stage, called Realization-Independence, groups start developing their own rules and norms, and at the same time they develop horizontal links with other groups. Finally, in the third stage, called Awareness-Interdependence, there is more critical reflection in the groups so they are more dynamic and expect changes, while at the same time they want to stay linked with other groups and external agencies. Pretty & Ward (2001) questioned whether these three stages are in reality part of a continuum, although with likely thresholds or ratchets. For instance, they considered that groups at stage 3 appear unlikely to regress to a previous stage, whereas groups at stage 1 can easily regress or terminate without external support or facilitation due to their instability.

However, Uphoff & Wijayaratna (2000) argued that social capital can diminish over time, although it can also be restored: "It is, of course, possible for social capital to diminish, through disuse or if no or few benefits are produced by the roles, norms, procedures, attitudes, etc. But where social capital is lost, it can also be restored". Interestingly, Falk & Kilpatrick (2000) discussed how social capital can be built through learning and interaction. In a similar vein, Wiber et al. (2009, p.178), proposed to consider social capital as a process (instead of a fixed fund) that must be nurtured through co-learning:

"Working with participatory approaches to research and fishery management have led us to broaden the thinking on social capital, and in particular to instead view social capital not as a "fund" but as a process that must be nurtured in particular ways so that trust and network relationships can develop through co-learning [10]."

Several authors have stressed the importance of social capital for natural resources co-management and governance (Pinkerton 2003, Folke et al. 2005, Grafton 2005, Plummer & FitzGibbon 2006, Sekhar 2007, Armitage et al. 2009). Of the four views of social capital proposed by Woolcock & Narayan (2000), namely communitarian, networks, institutional, and synergy view, the last one is the most appropriate for co-management and governance because it combines network and institutional views (Plummer & FitzGibbon 2006). Crona & Bodin (2006) conducted one of the first studies that attempted to analyze quantitatively the social network (at the community level) as a prerequisite for co-management. They investigated the social network

used for communication of knowledge and information related to resource extraction among villagers in Mombasa (Kenya). One of their conclusions was that it is unlikely to find one optimal network structure because this would be related to the phase of the management process:

“For example, high centralization may be beneficial during the initiation phase to coordinate and instigate collective action. Decentralization, on the other hand, may provide access to the diversity of information from different groups, which is needed for sustainable management in the long term” (Crona & Bodin 2006).

Accordingly, Marín & Berkes (2010), studying co-management social networks of loco (*Concholepas concholepas*) fisheries in Chile, found that the high degree of centralization was one of the weaknesses of the co-management system.

While it is emphasized in the literature that social capital should be seen as a process, there are only a few studies which investigated how social capital changes over time during a co-management or collaborative process. One of these few attempts is Plummer & FitzGibbon's (2006) work, which qualitatively examined the role of social capital in the process of developing co-management in three river corridors in Canada. They found that the degree to which co-management was achieved (following the conceptual framework proposed by Plummer & FitzGibbon 2004) was directly proportional to the level of social capital present or developed during the project (the indicators of social capital were: participation in networks, shared values and shared understanding, social norms, and forms and functions - bonding, bridging, linking). They proposed a theoretical model of the role of social capital in the co-management process consisting of three consecutive stages: unarticulated, formulation, and conjoint. In the first stage, each actor type has an amount of inherent social capital with similar actors and with actors of a different type. Then, through interactions, the formulation stage begins, where a cyclical process gradually builds social capital. After many iterations of the formulation phase, the actors enter the conjoint stage, which is characterized by undertaking shared actions and learning. It is in this final stage that co-management emerges, and social capital continues to increase if iterations keep taking place (Plummer & FitzGibbon 2006). Nevertheless, they argued that “if a critical amount of social capital were destroyed, the group would return to the formulation stage or disband altogether” (Plummer & FitzGibbon 2006, p.59).

From my perspective, the model proposed by Plummer & FitzGibbon (2006) is analogous to the three stages described by Pretty & Ward (2001), but focused on a multiplicity of actors (aiming at co-management) rather than on a group of users. Furthermore, an important gap identified by Plummer & FitzGibbon (2006) concerns social capital at the government level, and is related to the lack of emphasis on all the connections of social capital identified by Pretty & Ward (2001). In their own words, “the cases examined above suggest that social capital on the part of resource agencies may be wanting, both in relations with other agencies and with local communities” (Plummer & FitzGibbon 2006, p.59).

More recently, Wagner & Fernandez-Gimenez (2008) quantitatively analyzed the change of social capital in community-based collaborative natural resource management groups in northwest Colorado. They included four dimensions of social capital, namely trust, rules and reciprocity, similar values and beliefs, and communication quality and quantity. Most social capital measures showed an increase over time (mimicking a pre- vs. post-test design), suggesting that collaboration builds social capital. In particular, linkages (connections between the group and government agencies) tended to strengthen more than group bridges (connections among group participants). In an additional article, Wagner & Fernandez-Gimenez (2009) investigated which of the following group characteristics affected social capital: perceived success, conflict, activeness, stakeholder diversity, previous collaboration experience, similar values and beliefs<sup>16</sup>, group size, group age, and initial social capital. According to their results, the strongest predictors of current levels of and changes to social capital over time were perceived success and initial levels of social capital, whereas collaboration experience negatively influenced current levels of trust (Wagner & Fernandez-Gimenez 2009). The first finding (i.e. influence of perceived success) represents a challenge because it seems that interaction and communication are not sufficient to build social capital if the group does not make tangible progress towards goals (Wagner & Fernandez-Gimenez 2009). This comprehensive study represents an important contribution to the current literature of social capital in the context of co-management or collaborative processes, both due to the insightful methodology and the identification of areas for further research within the complex relationship between collaboration and social capital.

### **2.2.3. Social capital – a critical reflection**

In the late 1990s, Wall et al. (1998) claimed that the concept of social capital was on the threshold of being weakened due to wide and divergent use. They also argued that positive outcomes of social capital were commonly assumed without giving much attention to likely negative outcomes. However, they mentioned that some authors did question whether social capital within a particular group or community may exclude others from access to resources (Wall et al. 1998). Nowadays it is increasingly common to find critiques or limitations to the concept of social capital (Durlauf 1999, Portes & Landolt 2000, Pretty & Ward 2001, Ballet et al. 2007, DaCosta & Turner 2007, Plummer & FitzGibbon 2007, Cudney-Bueno & Basurto 2009, Vermaak 2009, Adhikari & Goldey 2010), but the trend of overusing the concept might still be taking place. According to Vermaak (2009, p.399), a “reconceptualisation is necessary because the concept is variously interpreted in the academic literature, leaving it vulnerable to misinterpretation,

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<sup>16</sup> Note that “similar values and beliefs” was one of the measured dimensions of social capital in their previous paper: Wagner & Fernandez-Gimenez (2008).

confusion and even abuse". From my perspective, a critical view of social capital is necessary if the concept is to remain useful.

To begin with, Portes (1998, p.15), referring to social capital at the group level, identified four negative consequences of social capital: exclusion of outsiders, excess claims on group members, restrictions on individual freedoms, and downward levelling norms. Moreover, group social capital can lead to intergroup hostility (Durlauf 1999), or may discourage bridging social capital formation (Ballet et al. 2007). In addition, Vermaak (2009) argued that a small group may acquire social capital at the cost of the larger community. DaCosta & Turner (2007) found that sampan dwellers of Tam Giang Lagoon (Vietnam) depended on bonding social capital to access loans to be able to resettle on land, identifying this as a downside. Similarly, Grant & Berkes (2007), in their study about fisher knowledge as expert system in Gouyave (Grenada), found that those fishers who were not part of the social networks did not have access to the updated knowledge about fishing strategies.

Furthermore, Ballet et al. (2007) built on some additional negative aspects of social capital: (1) building and maintaining social capital is costly; (2) whether a norm of reciprocity will have positive or negative outcomes will depend on the values from which it arises (i.e. "traditional values are not necessarily efficient in common resource management", p.366), suggesting then, that community empowerment should be preceded by investigating its values; (3) bonding social capital could be seen as an obstacle hindering agency, unlike bridging social capital which would promote it (Newman & Dale 2005, 2007); and (4) social capital can support power relationships (e.g. benefiting the richest at the expense of the poorest, see Ballet & Hamzetta 2003 in Ballet et al. 2007). With regard this last point, Dahal & Adhikari (2008) argued that in many cases traditional norms are used in favour of elites (to which leaders usually belong). Similarly, Adhikari & Goldey (2010, p.190) also commented about the downside of social capital in relation to power relationships:

"Contrary to the popular belief that people at a more powerful position in the locality help bridge and link the local initiatives horizontally and vertically in order to draw resources for the local good, in many cases such people were found to be using their networks to feed their own self-interest and unleash the downside of social capital on the rest of the group."

#### **2.2.4. Summary**

In the second area of the literature review I have addressed the concept of social capital. Even though numerous definitions can be found, all of them have "interactions among individuals" as a central component. The concept of social capital (involving structural and cognitive aspects) has been increasingly found in the literature on natural resources and environmental management (NREM), concomitantly with the growing consideration of social components in this field (in addition to ecological components). However, and despite the fact

that connections among multiple levels have been identified, the focus of the majority of studies on social capital in the context of NREM has been on the community. Moreover, although the importance of social capital for co-management and governance has been stressed in the literature, there are only a few studies that investigated how social capital changes over time during a co-management or collaborative process. After discussing these few studies, and the view of social capital as a process, I finished this second section of the literature review by presenting the negative aspects or limitations of social capital. In the next section I will address participatory research, since it is a process that can enhance social capital, social learning, and thus, adaptive co-management.

## **2.3. PARTICIPATORY RESEARCH**

In the third area of the literature review I will describe the origin and characteristics of participatory research, followed by its potential positive impacts and its challenges. Then, I will focus on participatory research in the field of natural resources management and co-management, with special interest in fisheries.

### **2.3.1. What is participatory research?**

Participatory research is an approach in which there is an action-oriented component, based on local interests and concerns, and in which local people participate in the entire process (Fals Borda 1987, Cornwall & Jewkes 1995, Wiber et al. 2004, Hampshire et al. 2005). Here there are a couple of aspects to emphasize: (1) by approach it means that participatory research lies in researchers'/practitioners' attitudes, or even worldviews, rather than in the methods or techniques that are used (e.g. Cornwall & Jewkes 1995, Hampshire et al. 2005); and (2) participatory research is seen as an iterative process in which there is mutual learning among participants through dialogue (Sohng 1996, Hampshire et al. 2005, Opondo et al. 2006). In this regard, the success of participatory research depends on the progress of this process (e.g. enabling the development of skills, capacities, knowledge) rather on the information gathered as a result of the research (Kemmis & McTaggart 2005).

The origin of participatory (action) research (PR or PAR) goes back to the 1970s, when a research methodology that combines theory, action and participation committed to further the interests of exploited groups and classes was initiated in many Third World countries (Fals Borda 1987, p.329). Orlando Fals Borda (2006), one of the Colombian pioneers of participatory research, recalled two main motives for promoting this movement. One was "to protest against the sterile and futile university routine, colonized by western Euro-American culture, and so subordinating as to impede us from discovering or valuing our own realities"; the second, "rather

Quixotic and more utopian, was to right wrongs, so as improve the form and foundation of our crisis-ridden societies by fighting against their injustices and trying to eradicate poverty and other socio-economic afflictions caused by the dominant systems” (Fals Borda 2006, p.353).

This first wave of participatory research (in the 1970s) was clearly predominated by the South: Paulo Freire, Camilo Torres and the Colombian team. In the 1990s, however, a greater northern presence was evident, with major studies by university colleagues (Fals Borda 2006). Also during the 1990s, participatory research began to become institutionalized. Budd Hall (1992, p.25), Canada’s best known proponent of PAR, argued that participatory research deserved to be taught in universities; “the academic community deserves to discuss and challenge and be challenged by these and other ideas that raise questions of the role of knowledge and power”. In fact, in 1997 it was estimated that PAR was taught or practiced in at least 2,500 universities in 61 countries (Fals Borda 2006).

Some authors (e.g. Chambers 1994a, Cornwall & Jewkes 1995) argue that participatory research and PAR constitute two schools that originated under the influence of the Brazilian Paulo Freire (e.g. *The Pedagogy of the Oppressed*, 1970), whereas others argue that the former fits within the latter (e.g. Kemmis & McTaggart 2005). Participatory research has been associated with the adult education movement, with community development, and health development, among others (Chambers 1994a, Cornwall & Jewkes 1995). As Susan Walsh (2003, p.71) put it,

“However many hands have molded and nurtured PAR since its beginnings, few would deny that the conceptual framework for this innovative research model, including its three most critical components: action-reflection or “praxis”; the notion of researcher as learner and learner as researcher; and the valuing of the knowledge of the “common people”, was influenced by Freire’s work on literacy education (1970)”.

Freire’s work, within the political movement of liberation theology, aimed at producing knowledge and action relevant to oppressed communities; a process of “conscientization” supported people to develop and utilize their own knowledge in ways that were accessible to them. Freire’s theory of popular education considered learning as a bidirectional process between teachers and students (Freire 1970). In this regard, the relationship between teachers and students could be perceived as homologous to the relationship between researchers and local people (in the context of a participatory research). Participatory action research also draws on action research, whose origin is associated with the social psychologist Kurt Lewin and lies in community action projects in the United States during the 1940s (Kemmis & McTaggart 2005).

The relations of power between researchers and those being researched is a central component of the research modes that stemmed from Freire’s approach, such as participatory research/inquiry (Cornwall & Jewkes 1995, Sohng 1996, Heron & Reason 1997, Hampshire et al. 2005). Participatory research challenges the gap between researchers and local people that is prevalent in conventional research, aiming at empowering disenfranchised and marginalized

groups.<sup>17</sup> This means that researchers/practitioners need to take an explicitly political stance, articulated with values of social justice and equity (Cornwall & Jewkes 1995, Sohng 1996). According to Sohng (1996), “participatory research promotes empowerment through the development of common knowledge and critical awareness which are suppressed by the dominant knowledge system”. Furthermore, three additional attributes distinguish participatory research from conventional research: shared ownership of research projects, community-based analysis of social problems, and an orientation toward community action (Kemmis & McTaggart 2005, p.561).

According to Hampshire et al. (2005, p.340), nowadays “it is almost impossible to find a dissenting voice to the view that involving local people in research, decisions, and priority setting is a pre-requisite for long-term sustainability and effectiveness of community development initiatives”. However, as they also pointed out, there is no consensus about the meanings of “community” and “participation” (Hampshire et al. 2005). Therefore, although some authors would refer to “participatory research” only when all the features described in the paragraphs above are achieved, it is common to find different modes according to the degree of participation or the relationship between the researcher and the researched group. These modes have been represented by varied typologies<sup>18</sup>, such as “contractual, consultative, collaborative, and collegiate” (Biggs 1989)<sup>19</sup>, “from functional participation to empowering participation” (Johnson et al. 2001, in Arnold & Fernandez-Gimenez 2007), and “co-option, compliance, consultation, cooperation, and co-learning” (Kindon 2008). In one extreme of the continuum, the researcher designs and carries out research; researched group representatives are chosen but largely uninvolved; and there is no real power sharing. In the other extreme, researcher and researched group share knowledge, create new understanding, and work together to form action plans, with clear power sharing (Kindon 2008). An encouraging finding is that the participation mode can change over time along this continuum, towards more “collaborative” forms of participatory research (Hampshire et al. 2005, Opondo et al. 2006).

From discussions thus far, it seems that there are only two groups of participants in a participatory research: local people and researchers. However, although that might often be the case, in several situations there are other actors involved (e.g. Hampshire et al. 2005, Wiber et al. 2009), such as government representatives and NGOs.

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<sup>17</sup> However, as Grant et al. (2008, p.593) pointed out with regard to participatory action research (PAR), “researchers need to acknowledge that power inequities within the research relationship are not erased, only reduced through processes of PAR”.

<sup>18</sup> Note that these typologies are analogous to those regarding co-management arrangements (Section 2.1.2).

<sup>19</sup> Biggs’ (1989) typology seems to be the most cited in the literature (Cornwall & Jewkes 1995, Hampshire et al. 2005, Opondo et al. 2006).



### **2.3.2. The positive side of participatory research: Is it faint due to numerous challenges?**

Numerous positive impacts have been attributed to participatory research (some of which have already been mentioned in the previous section). The following list of impacts is an attempt to summarize what constitutes the “positive side” of participatory research: increased trust in the research process (Arnold & Fernandez-Gimenez 2007); two-way knowledge flow (T. Johnson 2010); mutual learning and understanding among participants (Cornwall & Jewkes 1995, Opondo et al. 2006, T. Johnson 2010); trust/confidence building (Opondo et al. 2006); improved interactions among participants (Opondo et al. 2006); increased linkage and synergy forms of social capital (following Woolcock’s framework, Arnold & Fernandez-Gimenez 2007); (slightly) more equitable balance of power (Hampshire et al. 2005); conflict resolution (T. Johnson 2010); capacity building (Chuenpagdee et al. 2004, Kindon 2008, T. Johnson 2010); community empowerment (Arnold & Fernandez-Gimenez 2007); all participants empowerment (Wiber et al. 2009); and time and money saved in the long term (Cornwall & Jewkes 1995).<sup>20</sup> Moreover, Arnold & Fernandez-Gimenez (2007), working with the Tohono O’odham (TO) Nation (an American Indian nation in Southern Arizona), showed hopeful findings about putting the findings of participatory research into action. The TO Community College adopted participatory methods to develop their new program on Agriculture and Natural Resources; and the TO Natural Resources Department implemented a series of public forums to build policy recommendations (Arnold & Fernandez-Gimenez 2007).

Of all the positive outcomes mentioned above, I consider that capacity building deserves an additional comment. As observed in the (earlier) co-management literature (see Section 2.1.2), capacity building in the context of participatory research also seems to be focused on the community (e.g. Chuenpagdee et al. 2004) rather than on all participants. Could this be a consequence of researchers and managers not having any capacity that needs to be built? As I argued in Chapter 1, I do not think this is the case, and thus, this comprised one of the gaps that my research intended to fill, aiming to build capacity at different levels, with special attention given to the government.

Even though participatory research has numerous potential positive impacts, it has many challenges as well. For instance, empowering and collegiate participatory research can be difficult to achieve (Cornwall & Jewkes 1995, Arnold & Fernandez-Gimenez 2007). It may also happen that local people are not confident in what they know (and so it could be advisable to use exercises that can build confidence, Cornwall & Jewkes 1995), or they may be skeptical and hesitate to invest time and energy in the project (Cornwall & Jewkes 1995, Bar-On & Prinsen 1999). Moreover, Hampshire et al. (2005) found that there was a shift in power relations but only

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<sup>20</sup> Others have noted that participatory research might demand more time and effort than initially envisaged (Bar-On & Prinsen 1999, Opondo et al. 2006).

towards the end of the research process, arguing that it was slow and difficult. They noted that the power imbalance at the start of the research affected the remainder of the process (Hampshire et al. 2005). Furthermore, participatory research might be risky if it is assumed that the community is homogeneous and power relations are ignored. Cornwall & Jewkes (1995) explained what I would call a trade-off: participatory research might be facilitated by working with leaders (i.e. dominant local stakeholders), but the manipulation of the research by the more powerful individuals might not represent the most marginalized groups, and even be detrimental to them. Chambers (1994b), when referring to participatory rural appraisal, also identified that overcoming dominance by one person or a vocal minority is one of its challenges.

Additional challenges to participatory research stem from differences in ideas, methodological paradigms, and language (e.g. use of jargon) among participants (Hampshire et al. 2005, Hartley & Robertson 2006, Opondo et al. 2006). For instance, as T. Johnson (2010, p.252) pointed out, “communication between scientists and non-scientists is often hindered by pragmatic, institutional, and cultural factors”. As suggested by Hartley & Robertson (2006), bridging the gap between these two groups might need a social learning process. Also, Sohng (1996) argued that to counter researchers’ tendencies of imposing their ideas, they must engage in explicit reflexivity: “they need to examine privately and publicly the sources of social power in their lives and how these sources appear in their research.”

### **2.3.3. Participatory research and natural resources management**

#### ***Is participatory research good for co-management?***

Due to the purpose of my research, it is worthwhile to focus on the link between participatory research and natural resources co-management. In this regard, many of the potential positive impacts of participatory research that were mentioned in the previous section have actually been identified as conditions or variables affecting the (adaptive) co-management process, namely: mutual learning and understanding, trust building, strengthened social capital (including the transformation of existing relations and the development of new ones), more equitable balance of power, capacity building, and empowerment (Pomeroy & Carlos 1997, Singleton 2000, Berkes et al. 2001, Pomeroy et al. 2001, Pinkerton 2003, Armitage et al. 2009). For instance, Pomeroy et al. (2001) argued that forums for discussion (one of the conditions affecting the success of fisheries co-management) are essential for developing trust among partners. These forums can be part of a participatory research process. Also, they might be fundamental when co-management is viewed with mistrust or as ineffective by different stakeholders (Kaplan & McCay 2004).

According to Arnold & Fernandez-Gimenez (2007, p.483), despite growing interest in participatory research, “there are still relatively few published studies of empowering participatory research in the natural resources literature”. That growing interest can also be observed in the co-management literature; several authors have referred to participatory research as a strategy to facilitate or improve co-management (McConney et al. 2007, Berkes 2009c, Kalikoski et al. 2009). For instance, McCay & Jentoft (1996) argued that participatory research might help improve the knowledge base and attitudes involved in decision-making. Moreover, Pomeroy & Carlos (1997, p.460) found that “research conducted with fisherfolks provides real and effective participation from problem and needs identification to the evaluation phase”. Furthermore, a clear argument for the positive role of participatory research in enhancing co-management comes from the lessons learnt by Chuenpagdee et al. (2004, p.160):

“The participatory research process employed in this project is facilitating progress toward comanagement in the San Felipe community. It brings awareness about resource issues to the community members at large; it encourages an open discussion on resource management issues; and it initiates dialogue for collaboration between the community and government officials. Finally, it assists in exploring options for education and research, as well as options for the management of their marine reserve that might otherwise not be known to exist.”

### ***Cooperative fisheries research: participatory research in fisheries management***

As recognized by Charles (2001),

“Although resource users in fishery systems have accumulated a large body of knowledge (notably traditional ecological knowledge; TEK), in most cases there has been little effort to involve these users in determining research priorities or in the research activity itself. Indeed, in most nations, the vast majority of fishery research takes place within government (and universities), and although fishers may often express the desire to participate in such research, such cooperative ventures are still uncommon.”

Fisheries management conflicts have often been associated with poor (or lack of) communication between stakeholders, such as fishers, scientists and managers (see T. Johnson 2010). Also, it has been suggested that either real or imagined negative relationships will hinder the management process (Kaplan & McCay 2004). In turn, this can explain why cooperative fisheries research (CFR) is increasingly common (Kaplan & McCay 2004, Conway & Pomeroy 2006), particularly since 2000 (Hartley & Robertson 2006). Hartley & Robertson (2006, p.161) defined CFR as follows:

“Cooperative research directly involves stakeholders, particularly the fishing industry and coastal community organizations, in the design, conduct and communication of biophysical, gear design and engineering, and social science research, although the degree of involvement and nature of the partnership can vary. Cooperative fisheries research can employ any scientific paradigm, from action and participatory research to hypothesis-driven, deterministic research.”

Kaplan & McCay (2004) argued that CFR should use the expertise of the different stakeholders (including social scientists – whose role in fisheries management is not often

emphasized). Accordingly, T. Johnson (2010, p.265) noted that “cooperative research is a better solution than relying solely on either scientists or fishers to produce knowledge for policy”.

As observed in Section 2.3.1, for CFR there also seems to be a continuum of participation. Sometimes, the term collaborative fisheries research is used when the degree of fishers’ involvement is maximum. According to the National Research Council of the United States (Hartley & Robertson 2006, p.163), collaborative research includes “cooperative research projects where fishermen and agency personnel work together in all phases of the project, including development of the research question design of the project, performance of research, analysis and interpretation of results, and communication and dissemination of study findings.” However, a project being cooperative or collaborative will depend on stakeholders’ perceptions, as illustrated by Conway & Pomeroy’s (2006) findings. This is not surprising if we bear in mind that success or failure of co-management also depends on stakeholder perspectives (Pomeroy et al. 2001, Nadasdy 2003, Napier et al. 2005).

While the potential of cooperative fisheries research may appear high, Wiber et al. (2009) argued that this potential often goes unrealized. Similarly for participatory research in general, some of the positive outcomes of CFR include: increased credibility in the management process and in science (due to increased transparency), improved research methodologies (based on the expertise of different stakeholders), cost-effective, improved relationships among stakeholders, two-way knowledge flow between fishers and scientists (increased communication, trust and capacity building), and more effective policy (Kaplan & McCay 2004, Conway & Pomeroy 2006, Hartley & Robertson 2006, Johnson & van Densen 2007, T. Johnson 2010). In addition, Johnson & van Densen (2007, p.837) noted that “cooperative research facilitates interest in and opportunities for more adaptive types of management, in which catch and effort data play a more prominent role”. Moreover, as mentioned in the previous section, CFR also has potential positive impacts in relation to co-management. According to Wiber et al. (2009), co-management is not likely to emerge before collaborative research linkages get right, in agreement with the study by Chuenpagdee et al. (2004), who suggested that participatory research facilitated the process towards co-management. In addition, other authors have emphasized the potential of participatory research in fisheries management after co-management has emerged (e.g. Pomeroy & Rivera-Guieb 2005).

Nevertheless, as expected, many challenges of CFR have been recognized too. First, Conway & Pomeroy (2006) argued that both fishers and scientists face disincentives to participate in CFR. On the one hand, fishers may be afraid about data gathered during research being used against them (e.g. restricting fishing activities). On the other hand, scientists might see higher time investment and limited publication opportunities as disincentives. In addition, the boundary between scientists and fishers also represents a challenge for CFR. In this regard, Wiber et al. (2009) suggested that one challenge faced by academics working with coastal

communities is to avoid acting as “society’s knowledge elites”, and to enter the process as co-learners. T. Johnson (2010), in turn, emphasized the role of boundary spanners (either scientists or fishers) for successful knowledge exchange between those two groups. As she stated, boundary spanners “are able to communicate on both sides of the boundary (Johnson 2007, forthcoming). In some cases, they are scientists with “abstract/generalizable” contributory expertise (Carolan 2006) who recognize the value of fishers and their knowledge and are able to communicate with non-scientists (i.e. they have “interactional expertise”). Fishers can also be boundary spanners, such as key fishers who promote cooperative research to other fishers” (T. Johnson 2010, p.267).

A further challenge concerns the actual “participation” taking place. Conway & Pomeroy (2006), when evaluating the human dimensions of CFR in Oregon and California, found that the project could have been improved by involving fishers earlier in project design (e.g. fishers desired more substantive input throughout the project). Likewise, Wiber et al. (2004) argued that considerable improvement of fisheries participatory research is needed because the three common “levels of engagement” are not fully participatory, calling for: a) fishers as subjects of study, b) fishers as research assistants, c) fishers identifying questions (without being involved thereafter). One common failure of such approaches is that the results of research are not seen as valid by all participants (government officers, scientists, fishers). Also, they hinder the development of relationships between academics and non-academics (Wiber et al. 2004). Likewise, T. Johnson (2010) gave examples of fishers getting disappointed when they did not have access to raw data.

Participation “challenges”, however, not only concern fishers. Hartley & Robertson (2006) found limited direct participation of fisheries managers and conservation organizations in CFR projects in New England. They concluded that “cooperative research may have increased inclusiveness and openness in fisheries science but has not challenged the existing power structure or led to more shared authority and accountability” (Hartley & Robertson 2006, p.169). This shows the limitations that CFR may have in terms of empowering participants. In addition, they called for further study in projects with active participation of managers’ and claimed that CFR involving a broader range of stakeholders (e.g. industry participants, fisheries managers, representatives of conservation organizations) would expand the breadth of social learning and knowledge integration (Hartley & Robertson 2006).

Moreover, two additional challenges can be identified in the findings of Wiber et al. (2004). Although their experience of getting fisher groups to control the entire research process was effective, it proved highly time-consuming and only a few of the topics these groups chose matched the pre-defined interests of the academic team. Finally, an extensive list of variables affecting participatory fisheries research can be found in Wiber et al. (2009), under three categories (institutional frameworks, barriers, and politics). However, here I would like to

emphasize two of them: (1) capacity building is required both for communities and for academic institutions; and (2) it is difficult to work across existing networks and to build trust through new social links (Wiber et al. 2009).

Undoubtedly, all the challenges and limitations of CFR that were discussed in this section should be taken as lessons that, if taken into consideration, can help achieve the numerous positive impacts of a participatory research approach. In this respect, evaluating CFR projects also seems crucial. For example, Hartley & Robertson (2006) assessed specific propositions which emerged from considering CFR as a form of democratic science. Furthermore, according to Conway & Pomeroy (2006, p.454), four issues should be borne in mind for designing and implementing partnerships between fishers and scientists: (1) recognize that the beginning is important; (2) communicate effectively and regularly; (3) track resources (including time, funding, and people); (4) it is not just science but relationships. I think that these four suggestions also apply when other actors, in addition to fishers and scientists, are involved.

#### **2.3.4. Summary**

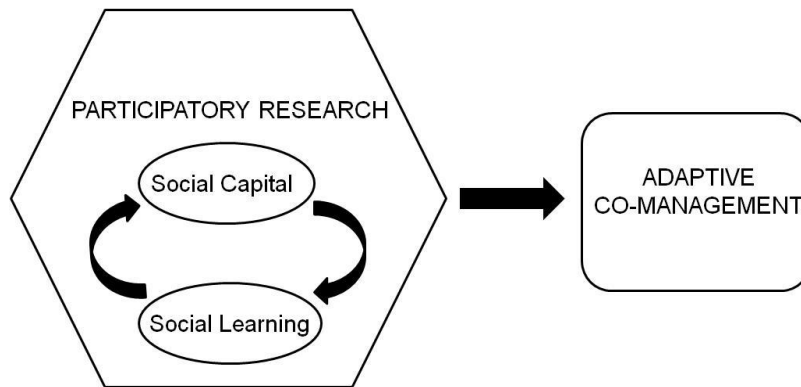
In the third area of the literature review I have addressed participatory research as an approach and as an iterative process, in which research is based on local interests (although to different degrees). The most common type of participatory research seems to be one in which local people and researchers are the only two groups of participants. Nevertheless, in several cases (as in my doctoral work), additional actors are involved, such as government representatives and NGOs. I have mentioned numerous potential positive impacts of participatory research. More importantly, I have argued that many of those impacts are also important variables for (adaptive) co-management, namely mutual learning and understanding, trust building, strengthened social capital, more equitable balance of power, and capacity building and empowerment of all participants. Lastly, I exposed many of the challenges of participatory research, such as fishers' and scientists' disincentives to participate, and the difficulty in achieving empowering and collegiate modes. These and other challenges served as lessons which helped me develop the participatory research in Uruguay. In the following section, the connections among the main concepts addressed in the literature review are explored.

#### **2.4. CONCLUSIONS SUPPORTING THE RATIONALE OF THIS RESEARCH**

After reviewing the literature, I could identify three commonalities among co-management as governance, social capital, social learning, and participatory research. First, all of them are *processes*, and as such, they are expected to be dynamic and time-dependent. Second, they are based on *interactions* between individuals. And third, all these processes face the challenge imposed by *power relations* that might hinder the interactions between individuals.

Plummer & FitzGibbon (2007) had already pointed out that *interaction* was a characteristic (along with dialogue, pluralism, and linkages) shared by three of the above four processes: social learning, social capital and co-management. They suggested that “deliberation that enables social learning may produce social capital, both of which are requisites for adaptive co-management” (Plummer & FitzGibbon 2007, p.57).

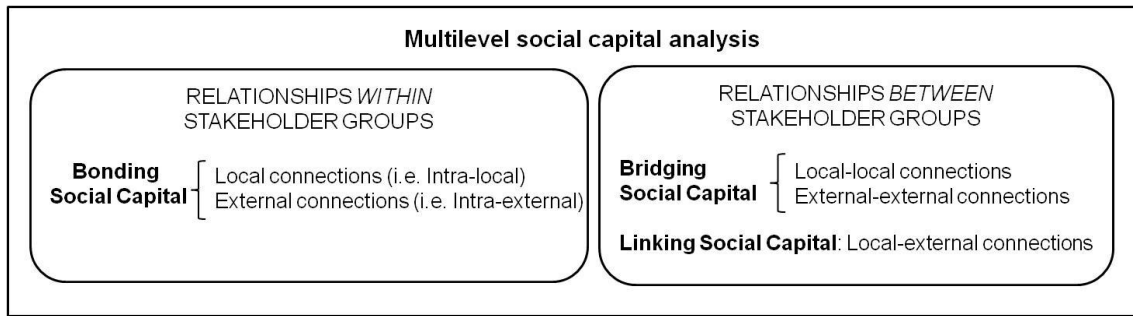
From my perspective, and this constitutes the rationale underlying my research (Figure 2.1), there is a feedback loop between social capital and social learning: mutual learning enables positive changes in relationships, which in turn facilitate further learning<sup>21</sup>. I propose that participatory research, besides being a process itself, represents a context within which the feedback loop between social capital and social learning can be reinforced. This would explain why participatory research can help pave the way for fisheries adaptive co-management.



**Figure 2.1. Rationale underlying this research**

Moreover, the rationale underlying my research is that the interactions which characterize co-management, social capital, social learning, and participatory research, occur among fishery stakeholders within and across various levels (including a range of stakeholder groups). Thus, I consider these processes as multilevel. Out of the four, the only one which had not been earlier recognized as being multilevel is social capital. To contribute to filling this gap, I developed a multilevel social capital analysis combining structural and cognitive components to study relationships among fishery stakeholders at multiple levels: within and between stakeholder groups. Thus, the analysis included bonding, bridging, and linking relationships, and also the five types of connections that were identified by Pretty & Ward (2001): local (i.e. intra-local), local-local, local-external, external (i.e. intra-external), and external-external connections (Figure 2.2).

<sup>21</sup> However, if adversarial relationships are unintentionally reinforced, social learning is hindered, preventing in turn, positive changes in those relationships.



**Figure 2.2. Components of the multilevel social capital analysis conducted in coastal Uruguay and partially in Paraty**

First, bonding social capital at the local level (i.e. intra-local connections) refers to the relationships among fishers from the same community or landing site, whereas bonding at the external level (i.e. intra-external connections) describes, for instance, the relationships between employees of the management agency. Second, bridging social capital at the local level (i.e. local-local connections) comprises the relationships between fishers from different communities or neighbouring landing sites, while bridging at the external level (i.e. external-external connections) regards the relationships between government agencies, among others. Lastly, linking social capital (i.e. local-external connections) refers to the relationships between fishers and external (or non-fisher) stakeholders (e.g. fish buyers, unions, agencies, universities, NGOs).

Structural and cognitive components of social capital informed the development of this framework for investigating relationships within and between stakeholder groups at multiple levels. Structural components included the type of interaction or general description of a certain dyadic relationship of the above network dimensions (including stakeholders' perceptions of that relationship), whereas cognitive components comprised trust, respect, reciprocity, solidarity, and additional social norms. Both types of components (structural and cognitive) have been interconnected when analyzing data (see Chapters 6 and 9). After having summarized the rationale behind this research, the following chapter focuses on the study areas.



## CHAPTER 3: STUDY AREAS

Given that this research was based on two case studies, one in Uruguay and one in Brazil, in this chapter I explore the fishery sectors in both countries, including some information about their history and management. The study sites are also described. Considering that the Uruguayan case was developed in more depth than the Brazilian one, Section 3.1 is more detailed than Section 3.2. In the latter, some comparisons between fisheries of the two countries can be found.

### 3.1. FISHERIES IN URUGUAY

#### 3.1.1. Fishery sectors (industrial vs. artisanal)

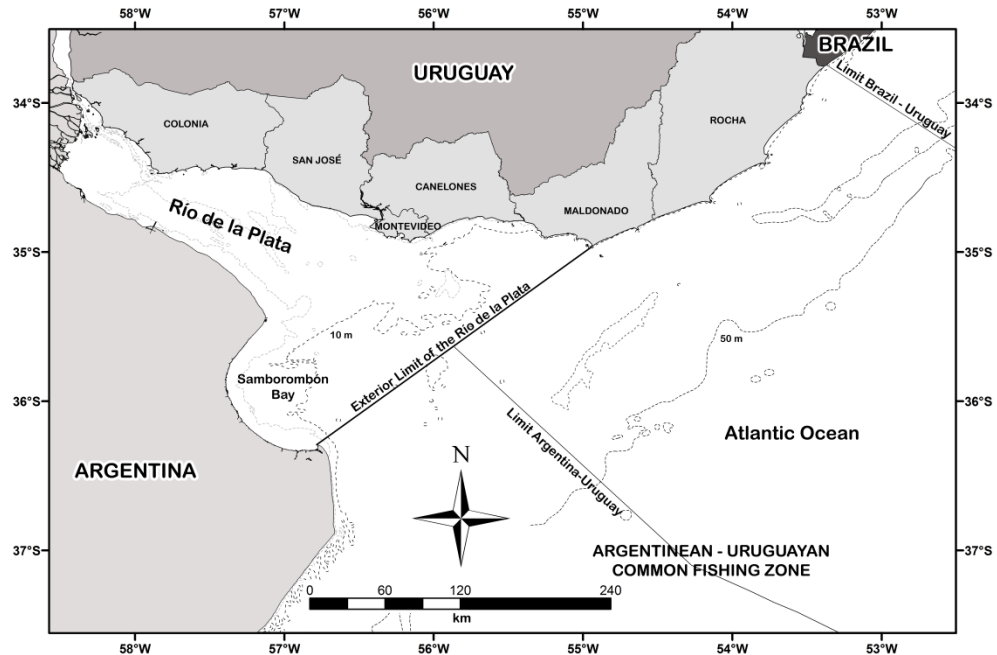
In Uruguay there are two fishery sectors: industrial (i.e. large-scale) and artisanal (i.e. small-scale). According to national legislation (Law No. 13833/969, Decree 149/997), industrial fisheries are those with vessels of more than 10 gross registered tons (GRT), whereas artisanal fisheries are those with vessels smaller than 10 GRT.<sup>22</sup> Artisanal fisheries are also characterized by using minimal technology (e.g. gillnets are pulled by hand in most boats).

Artisanal boats (estimated at 1,364 in all the country, Puig et al. 2010) fish off the coast of the Río de la Plata estuary and Atlantic Ocean (usually within 7 nautical miles - nm), but also in coastal lagoons and inland water bodies (e.g. rivers, artificial lakes). On the other hand, industrial vessels (94 in total) operate in the Río de la Plata, Atlantic Ocean (off the territorial waters where artisanal boats operate), international waters, and exclusive economic zones (EEZ) of other countries (upon authorization). Despite the high biodiversity of Uruguayan aquatic ecosystems (Río de la Plata, Atlantic Ocean, coastal lagoons, inland water bodies), many species are not commercially viable and thus they are discarded. The development of the fishing industry was mainly based on the common hake (*Merluccius hubbsi*), whitemouth croaker (*Micropogonias furnieri*) and striped weakfish (*Cynoscion guatucupa*). However, the number of species commercially exploited has increased over the past twenty years. Several of these species (e.g. whitemouth croaker, striped weakfish) are exploited by both the artisanal and industrial fleets (Defeo et al. 2009), not only in Uruguay but also in neighbouring countries (Argentina and Brazil). There are four main categories of industrial vessels: (A) vessels whose target species is the common hake, (B) vessels whose target species are the whitemouth croaker and the striped weakfish, (C) vessels which catch a great variety of non-traditional species, and (D) vessels which operate outside of Uruguay's jurisdictional waters (e.g. in Antarctic waters)

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<sup>22</sup> Article 3 of Decree 149/997 defines "artisanal fishery" as the one that is developed commercially at a small-scale, either from shore or using boats smaller than 10 GRT.

(DINARA 2008, 2009). The main port from which industrial vessels operate is situated in Montevideo (the country's capital city), followed by the port in La Paloma (Rocha Department) (Figure 3.1).



**Figure 3.1. Map of Uruguay coastal zone.** The limits of the Río de la Plata (shared with Argentina) are shown, as well as the six coastal departments: Colonia, San José, Montevideo, Canelones, Maldonado and Rocha.

Considering both sectors (small and large-scale), Uruguayan fisheries catch about 120,000 tons/year from its EEZ (11,930 km<sup>2</sup>) (Mikkola & Montiel 2008). In 2005, fisheries' GDP was US\$ 91 million, representing 0.55% of the country's GDP (0.35% from extractive activities and 0.20% from fishing industries) (DINARA 2008). Fish consumption was estimated at 30,000 ton/year (or 9.3 kg/capita/year, FAO 2009). The majority of the catch from both sectors is exported - approximately 80% of the industrial sector (Mikkola & Montiel 2008) and 80% of the artisanal sector.<sup>23</sup> Exports have been increasing since the 1970s, although with fluctuations. For instance, the volume of exports decreased from 80,000 ton in 1997 to 71,000 ton in 1998-1999, and then increased to 83,000 ton in 2000 (FAO 2009). In 2008, exports were valued at US\$ 213 million (35% of which corresponded to the European Union).

It should be noted that most of the total landed catch comes from the industrial sector (97%). However, even though artisanal fisheries represent only 3% (3,000-4,000 tons/year) of the total landed catch, they employ many more people than the industrial sector (e.g. Astori &

<sup>23</sup> This figure is a rough estimate because there is no record about the amount of the artisanal catch being exported (pers. comm. with DINARA Artisanal Fisheries Unit, 2010).

Buxedas 1986, Defeo et al. 2009). In particular, Defeo et al. (2009, 2011) estimated that the employment generated per landed ton is 30 times higher in the artisanal sector, indicating that this is an important socio-economic activity for the country. Considering that on average, three artisanal fishers work onboard each boat and two other people work in related land-based activities after the boats land, it can be estimated that about 6,000 people work in the artisanal sector. On the other hand, around 4,700 people work in the industrial sector (29.7% onboard and 70.3% in processing plants<sup>24</sup>). Moreover, the fishing permits of the industrial coastal fleet are concentrated in only four groups of companies (Galli 2008).

Continuing the comparison between sectors, it is noteworthy that the by-catch<sup>25</sup> of industrial fisheries is much greater than in artisanal fisheries. This is a consequence of differences in fishing gear used by the two fishing sectors. Of the 94 industrial vessels that operated in Uruguay in 2007 (number in each category: A=25, B=33, C=32, D=4), the main fishing method was bottom trawling (72%), followed by long-line (20%) (DINARA 2008). Industrial vessels, using single otter trawlers and pair trawlers (two ships operating together simultaneously towing a single trawl) are of 125 GRT on average and 23 meters mean length, and they have powerful motors (404 mean horsepower) (Horta & Defeo 2012). In contrast, gillnets and long-lines are the dominant gear in the artisanal sector<sup>26</sup>, which uses boats generally smaller than 4 GRT, with 45-60 horsepower. In fact, bottom trawling has been considered internationally among the most destructive; over one-third of the global catch would be discarded particularly due to bottom trawling (Nellemann et al. 2008).

### 3.1.2. Fisheries history

The emergence of the industrial fisheries sector in Uruguay occurred in the mid-70s and was determined by three main factors: international markets, State fisheries policy, and resources availability. National markets have always played a minor role (low fish consumption in the country can be explained by the prevailing meat-consumption tradition and high prices of fish products, Astori & Buxedas 1986).<sup>27</sup> Based on the analysis found in the literature (Astori & Buxedas 1986, Bertola et al. 1996, Amestoy et al. 2007, FAO 2009), different phases can be identified in fisheries development in Uruguay. Table 3.1 presents a summary of the main events in the history of Uruguayan fisheries, from 1911 to 2001.

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<sup>24</sup> It is worth noting that the catches from the artisanal sector are processed in the same plants as the industrial sector.

<sup>25</sup> By-catch comprises the species caught in a fishery while it is intended to catch another species, and the reproductively immature juveniles of the target species.

<sup>26</sup> Bottom trawling in artisanal fisheries is only allowed seasonally in some areas of the Atlantic coast (targeting the red shrimp, *Pleoticus mulleri*).

<sup>27</sup> It is worth pointing out that Uruguay's population was estimated at 3,286,314 through a national census conducted in 2011 by the National Institute of Statistics (<http://www.ine.gub.uy/censos2011/resultadosfinales/analisispais.pdf>)

**Table 3.1.** Main events in the history of Uruguayan fisheries (Astori & Buxedas 1986, Bertola et al. 1996, Amestoy et al. 2007, FAO 2009).

Year	Events
1911	The Fisheries Institute ( <i>Instituto de Pesca</i> ) was created (Law N° 3.908). Its goals were essentially scientific (but it ended up as a company).
1934	The Fisheries Institute became part of the Navy ( <i>Armada Nacional</i> ) (Decree-Law N° 8.948) and changed its name to Oceanography and Fisheries Service ( <i>Servicio de Oceanografía y Pesca</i> ). Its goals were both scientific and production-oriented.
1945	The Oceanography and Fisheries Service was replaced by the Oceanographic and Fisheries Service ( <i>Servicio Oceanográfico y de Pesca - SOYP</i> ) (Law N° 10.643), a decentralized agency under the Ministry of Industries and Labour. SOYP was entirely in charge of fish exploitation, oceanographic research, sanitary control, and fisheries management. SOYP started to do research on population dynamics of the main fish resources in the mid-70s.
1969	The Law “Wealth of the Sea” ( <i>Riquezas del mar</i> , N° 13.833) was enacted, declaring of national interest the exploitation, preservation and study of the marine resources. Several subsidies were included in the law (e.g. for oil, and gear/machinery imports).
1970	The Commission for the Development of the Fishing Industry ( <i>Comisión de Desarrollo de la Industria Pesquera - CODEPU</i> ) was created to promote the Fisheries Development Plan and to regulate the access of the benefits (i.e. subsidies) proposed in the Law 13.833. The Fisheries Development Plan was announced by SOYP in 1970, and its final version was finalized by the end of 1974.
1971	A covenant between Uruguay government and UNDP (in charge of FAO) was signed to delineate and carry out a project for fisheries research and development.
1972	The National Fisheries Board ( <i>Junta Nacional de Pesca</i> ) was created, under the Ministry of Industries and Commerce. Its main goal was to give support and advice to the Fisheries Development Plan.
1973	The Treaty of the Río de la Plata and its Maritime Front ( <i>Tratado del Río de la Plata y su Frente Marítimo</i> ) was signed with Argentina, enabling the access to fishing resources in the Argentine-Uruguayan Common Fishing Zone (Zona Común de Pesca - ZCP).
1975	The National Fisheries Institute ( <i>Instituto Nacional de Pesca - INAPE</i> ) was created (Law N° 14.484) under the Ministry of Livestock, Agriculture and Fisheries (MGAP), in order to develop and apply the country’s fisheries policy. The Fisheries Development Plan was the main instrument of INAPE.
1976	SOYP was transformed and the Seal and Fishing State Industry was created ( <i>Industria Lobera y Pesquera del Estado - ILPE</i> ).
1977	The Joint Technical Commission of the Maritime Front ( <i>Comisión Técnica Mixta del Frente Marítimo – CTMFM</i> ) started working. The common hake, whitemouth croaker, and stripped weakfish were declared as priority species, and thus, they began to be studied jointly with Argentina’s National Institute of Fisheries Research and Development (INIDEP). The degree in Biological Oceanography was created (within the Faculty of Humanities and Sciences, <i>Universidad de la República - UDELAR</i> ). Concomitantly (mid-70s), the Fisheries Research Institute ( <i>Instituto de Investigaciones Pesqueras – IIP</i> ) was created (within the Faculty of Veterinary Medicine, UDELAR), offering courses on fishing technology. Moreover, at the same time the Labour University ( <i>Universidad del Trabajo – UTU</i> ) initiated its Maritime School ( <i>Escuela Marítima</i> ) in charge of training workers for the industrial fleet. (These three educational institutions did not coordinate their programs but rather were competitive).
1992	The Fisheries Research Plan began ( <i>Plan de Investigación Pesquera: PNUD-INAPE URU/92/003</i> ) and INAPE could improve the knowledge about several non-traditional resources. However, government support to fisheries research was not continued over time (i.e. research was expected to be conducted in private or academic spheres).
2001	The National Fisheries Institute (INAPE) became the National Directorate of Aquatic Resources ( <i>Dirección Nacional de Recursos Acuáticos – DINARA</i> ).

First, in the pre-industrial phase, until the beginning of the 1970s, artisanal fisheries were prevalent and were totally oriented towards domestic consumption. At the same time, stocks in the Northern Hemisphere were being progressively exploited by industrial fleets. Later on, in the 1970s, the overexploitation of fishing resources in the North, the introduction of exclusive fishing zones, and the increased international prices of fish products, led to the promotion of fisheries expansion in other parts of the world. Concomitantly, Uruguay was facing economic problems (e.g. due to the oil crisis and the suspension of meat exports to Europe) and thus, non-traditional exports (including fish) were encouraged by the government. Under UNDP and FAO support, as in other countries in the South, this period represented the emergence of the industrial fisheries sector in Uruguay (consisting of extraction, industrialization, and exports), which peaked until 1981. The development of this sector (by few private companies) was encouraged by the law "Wealth of the sea" (N° 13.833) in 1969 and the Fisheries Development Plan (*Plan de Desarrollo Pesquero*). Also during this phase, the signing of the Treaty of the Río de la Plata and its Maritime Front (1973) with Argentina, enabled the access to fishing resources in the Argentine-Uruguayan Common Fishing Zone (ZCP, situated 34°-39°30'S; Figure 3.1). From 1975 to 1981, total landed catch increased by 600%, getting to 120,000 ton annually. Fisheries exports went up from insignificant volumes to 82,000 ton (\$61 million) in 1981.

Around 1985 a fisheries crisis began to be evident in the country due to the decline of international prices of fish products and the status of fishing resources (the three main species were close to their maximum sustainable yield), among other factors. Partly as a consequence of this, the importance of artisanal fisheries worldwide started to be recognized, given that they represented 25% of the global catch, employed more than 100 million people and provided low-cost food to low-income populations. According to the government (INAPE) records, the number of artisanal fishers in Uruguay rose from 746 in 1974 to 1,528 in 1984 (approx. 560 boats). As in many other developing countries, different projects aimed at organizing the artisanal fisheries sector and re-orienting them towards international markets. Even though the latter was achieved, many interventions (with national and international support) trying to create fishers cooperatives or associations (e.g. through the construction of cold-storage rooms) failed. Fishers' individualistic behaviour has always been used to explain the lack of (successful) cooperatives in the country, although inherent weaknesses of the government agencies involved in those initiatives have also been recognized. Most of the national catch of artisanal fishers is still sold to fish buyers, who in turn sell it to local markets and processing plants (which process the fish mainly for exports but also for local markets).

The expansion and crisis of the industrial fisheries sector in Uruguay took place during an authoritative political climate due to the dictatorship (military regime) in place (1973-1985). All kind of participation of workers' organizations (e.g. in salaries regulation) was strictly forbidden. In 1985, when the country returned to a democratic government, effective participation of workers'

organizations and companies in salary negotiation was evident. However, when it came to fishing policies other than salaries, only the companies were consulted by the government, either formally or informally. It is noteworthy that two private companies were responsible for almost 50% of total exports (thus, they could influence the fish price). In the 1990s, fisheries policy was directed towards the diversification of both captures and fish products, in order to make use of resources that had not been exploited (some of which were part of the traditional fisheries discards). A great variety of species, both coastal and demersal (i.e. bottom-dwelling, benthic), began to be commercialized. However, given the insufficient scientific information and the weakness of the enforcement mechanisms, several of these species were overexploited.

### **3.1.3. Fisheries management**

As described above, fisheries in Uruguay are State property. DINARA, within the Ministry of Livestock, Agriculture and Fisheries (MGAP), is the agency in charge of management and enforcement. Its mission is to regulate and promote the sustainable use of fishing resources and aquaculture. Additional agencies belonging to five other ministries deal with fisheries in various ways. These ministries are: Social Development (MIDES); Housing, Planning and Environment (MVOTMA); Defense (MDN); Transport and Public works (MTOPE); and Industry, Energy and Mining (MIEM). Unfortunately (regardless of exceptions), these ministries' interventions in the fisheries sector are not coordinated, and sometimes conflict with DINARA's policy for the artisanal sector (Puig & Grunwaldt 2008). The Coast Guard (PNN - National Navy Prefecture), under the Ministry of Defense, is the second most important government agency related to fisheries management, acting as a maritime police and enforcing some of DINARA regulations.

Management measures of industrial fisheries in Uruguay have focused on determining maximum sustainable yields (MSY) and total allowable catches (TAC) based on information from stock assessment. In 2002, when overexploitation of the common hake was discussed during a Parliament session, an overestimation of the TAC was mentioned as one of the most likely causes. It was pointed out that the TAC of 200,000 tons per year estimated for the Argentine-Uruguayan Common Fishing Zone (ZCP) in the 1970s was never achieved (neither Argentina nor Uruguay caught 100,000 annually) (ROU 2002). However, it was also mentioned that catch records only consider the fish that is taken to port (landed catch), excluding undersized fish. This means that the actual catch might have been much greater than the TAC most years (ROU 2002). The same could be applied to the remaining species facing overexploitation. In addition, poor enforcement may have led to the under-reporting of actual landed catches. This was observed in the case of the whitemouth croaker, where annual exports were curiously greater than annual landed catch (Galli 2008).

With regards to the artisanal sector, since 2002 several management measures have been taken by the government (see Chapter 5), mainly in inland fisheries, such as closed

seasons and banning of gillnets in streams. Most of these measures were established *top-down*, and not surprisingly, artisanal fishers expressed dissatisfaction with some of them, arguing, for instance, that the dates of closed seasons should be re-evaluated, making use of local knowledge as well as scientific data (Trimble & Lázaro 2009). However, DINARA has recently expressed interest in defining management measures jointly with fisher groups, which would represent the first co-management initiative of fish species in the country (Puig & Grunwaldt 2008). In fact, the fisheries law proposed by DINARA (still before a Parliamentary committee), includes the creation of Fisheries Zonal Councils in which one representative of DINARA, one of PNN, one of the local government, and two representatives of fisher groups will get together to “co-manage” fishing resources (see Chapter 7).

#### **3.1.4. Artisanal fisheries in the Río de la Plata**

The coast of the Río de la Plata extends along 5 of the 19 country’s departments (Colonia, San José, Montevideo, Canelones and Maldonado) and 452 km, from Punta Gorda (Colonia) to Punta del Este (Maldonado) (Figure 3.1). About 40-50 landing sites of artisanal fishers were estimated on the Río de la Plata coast (Spinetti et al. 2001), where there are approximately 575 artisanal boats (Puig et al. 2010).

Artisanal fishers in the Río de la Plata catch a total of 48 species, mostly estuarine but also freshwater and marine species. Only 21 of these species represent the main part of the catch. As in the rest of the country, most of the catch is commercialized through fish buyers. Montevideo is the department with the greatest catch, followed by Canelones, Maldonado, Colonia and San José (Spinetti et al. 2001). Fish consumption by fishers of the Río de la Plata was estimated at 6 kg/family/week, although the lowest value was 2 kg, in Maldonado department (where Piriápolis is located).

Three zones of the Río de la Plata can be distinguished (Astori & Buxedas 1996, Spinetti et al. 2001): (1) superior zone (close to the Río Uruguay), with predominance of freshwater species; (2) middle zone, in which the whitemouth croaker is the species of greatest commercial interest (heavily exploited in Pajas Blancas – Montevideo, and San Luis - Canelones); and (3) exterior zone (close to the Atlantic Ocean and thus, with higher salinity), in which the Brazilian codling (*Urophycis brasiliensis*) is the main commercialized species. The gear commonly used consists of long-lines (either mid-water or bottom-set), gillnets (of different mesh sizes), and diving equipment and spatulas to manually extract mussels (*Mytilus edulis platensis*) – in Piriápolis and Punta del Este. The weather, especially the wind, represents one of the major restrictions to the number of fishing trips per month.

Given the availability of fish resources (and the marketing opportunities), artisanal fisheries in the Río de la Plata are seasonal. Fishers are mobile (“nomads” or migratory according to their own words): they move along the coast (either sailing or carrying their boats on

a truck) in response to whitemouth croaker movements. During the fall and winter (Southern hemisphere), fishers usually move from Montevideo to the East (to San Luis and surroundings, in Canelones), to catch more croaker and other species, such as the stripped weakfish and the Brazilian codling. During the spring and early summer, the croaker can be found in Montevideo (where it spawns) and thus, fishers concentrate in that area. Currently, however, fishers' movements are not as predictable as they were in the past (see Chapter 5).

### ***Piriápolis and surroundings***

Piriápolis (34°52.8'S, 56°12.7'W) is a city located in the external zone of the Río de la Plata, 98 km East from Montevideo, in Maldonado Department.<sup>28</sup> This seaside city was founded by Francisco Piria in 1890, thus its current name. Ten thousand people live in Piriápolis throughout the year, but this number increases to 40,000 during the austral summer (tourism is one of the main economic activities). The history of the artisanal fishery in this area has not been documented. Some written records mention fishers' presence close to Solís Stream (near Piriápolis) in 1800, and according to oral histories, there were a small number of vessels in 1930 in Piriápolis (D'Ambrosio, unpublished<sup>29</sup>). The characteristics of the artisanal fishery in Piriápolis come from the Spanish and Italian tradition.<sup>30</sup> Piriápolis port (which began operating in 1915) was also used by the industrial fleet during the period of fisheries development (1970-1980).

Currently, there are five landing sites within Piriápolis jurisdiction (west to east): Arroyo Solís, Playa Verde, Playa Hermosa, Piriápolis port, and Pesquero Stella Maris (in a zone called Punta Fría, 600 m east from Piriápolis port). All but the first site were included in my study area (Figure 3.2).



**Figure 3.2. Location of the four landing sites included in my case study in the Piriápolis area.** From west to east: Playa Verde (PV), Playa Hermosa (PH), Piriápolis Port (PP) and Pesquero Stella Maris (SM).

<sup>28</sup> Maldonado has 161,594 inhabitants in 4,793 km<sup>2</sup> (2.7% of the country's territory).

<sup>29</sup> "El lugar de los pescadores. Un estudio sobre la relocalización y reconstrucción del Pesquero Stella Maris". Seminario de Antropología del Desarrollo y Políticas Sociales.

<sup>30</sup> There is archaeological evidence showing that fishing was part of the livelihoods of the indigenous groups who lived in the current Uruguayan territory (until the European conquest in the XVI century).



Except for a few fishers who live on the coast (by the seashore, in Pesquero Stella Maris, Playa Hermosa and Playa Verde), they mostly live in Piriápolis (including its outskirts) and Pan de Azúcar city. Not all fishers were born in Maldonado Department; many have come from other parts of the country and decided to settle in Piriápolis and surroundings.

The number of artisanal fishers and boats varies greatly throughout the year (e.g. from 30 to 150 fishers) and from year to year, mainly due to resource availability. During my fieldwork in the area (2010-2012), the estimated number of artisanal boats operating in each landing site was as follows: 2-3 in Playa Verde, 3-12 in Playa Hermosa, 20-35 in Piriápolis port, and 3-10 in Pesquero Stella Maris. However, there were additional boats that could not operate because they lacked a crew. A maximum of 100 boats was observed a few winters ago during the croaker season in Piriápolis, meaning 300 fishers and 300 other people working on-land (i.e. 600 people directly employed). Most artisanal boats in Piriápolis are 4-8 m long (under 4 GRT), use outboard motors that vary from 8 to 60 horsepower, and have GPS, depth-finder (*ecosonda*) and VHF. However, a few boats are longer than 10 m and have inboard motors. Two to three fishers work onboard the former boats and four fishers in the latter. The number of fishing trips per week is variable, especially determined by the weather (e.g. there are weeks in which they go fishing almost every day, and there are weeks with no fishing trip). The duration of each trip is also variable (depending on where the fishing resources are) but they are rarely longer than 12 hours. Sometimes fishers do two fishing trips a day (when resources are abundant and not far).

Of the three fishers working on each boat (on average), the one in charge of the boat is called *patrón* (skipper or captain), whereas the other two are the *marineros* (mariners, seamen or deckhands). It is worth noting that *patrón* refers to the person's responsibility for the boat but (in most cases) not to a superior relationship with regard to the *marineros*. For instance, the *patrón* is in charge of making the decision of whether to keep working or return to the port when a storm is approaching. However, these decisions are usually made by all the crew members ("patrón" included) if they have enough fishing experience. The *patrón* license is provided by the Coast Guard (PNN) after the fisher has worked as *marinero* for a determined amount of time (likely six months) and has passed a written exam. Many boats have owner-operators (i.e. the owner is also the *patrón*). In the other cases, the owner (known as *armador*) decides who the boat's *patrón* is. It is common to find fishers who hold a *patrón* license but work as *marineros*.

The *patrón* does not make more money than the *marineros* (except when he is also the boat owner). Usually, 40% of the profit (i.e. after paying the fuel, bait, etc.) goes to the boat, in other words, to the owner; in theory, for the maintenance and replacement of fishing gear (but it is known that much less than that amount is invested in this). The remaining 60% is divided among the crew (*patrón* included): 20% for each fisher when the crew is composed of three. Owner-operators gain 60% of the profits (40% plus 20%). The term *patrón* is also used by the crew to refer to the owner (as the "boss"), especially when he does not operate the boat. In some

cases, owner and crew members gain equal shares. There is still an additional form of remuneration: sometimes, one fisher brings his own five long-lines (*palangres*), and his profits come from the catch he gets (i.e. he does not get a share). Onboard the boat, the three fishers work equally but the fisher with five long-lines (*con 5*) does not have to pay any of the costs; sometimes this fisher makes more money than the other two.

In the Piriápolis fishery, fishers' wives and other women do shore work related to fishing, such as preparing the long-lines, known as *alistar*, and baiting the hooks or disentangling (*desenmallar*) the fish from gillnets (*redes de enmalle*) when the boats arrive at the port. All of these tasks are also done by youth of both sexes, either when they work as apprentices in the fishery, or as a fall-back when they do not have an alternative occupation. At least one fisherman's wife in the study area holds a *patrón* license, although she does not go fishing often. Women are also in charge of cooking for the family, cleaning the house, and looking after the children. According to Fernández et al. (2003), Maldonado is the department with the lowest proportion of fisherwoman (2% vs. 15% in Rocha).

At least 14 fish species are caught by artisanal fishers in Piriápolis commercially, but the three main ones are the whitemouth croaker, Brazilian codling and stripped weakfish (Table 5). Most fishers sell their catch (entirely or partly) to fish buyers. All the Brazilian codling go for domestic markets, whereas almost all the croaker and weakfish are exported (e.g. to China, Brazil, Europe). At least eight additional species (fish and shellfish) are caught but not commercialized. Bottom-set long-lines are used all year long by some fishers (known as *palangreros*), whereas others do not use them during the croaker season, which requires gillnets (12-14 cm mesh size). Each long-line is 180 m long and contains 100 hooks (one hook every 1.8 m). Each gillnet is 50 m long and 5-7 m high.

**Table 3.2.** Commercial species in the Piriápolis fishery

Local name	English name	Scientific name
Corvina	Whitemouth croaker	<i>Micropogonias furnieri</i>
Brótola	Brazilian codling	<i>Urophycis brasiliensis</i>
Pescadilla (de calada)	Stripped weakfish	<i>Cynoscion guatupuca</i>
Burriqueta	Southern kingcroaker	<i>Menticirrhus americanus</i>
Palometa	Parona leatherjacket	<i>Perona signata</i>
Anchoa	Bluefish	<i>Pomatomus saltatrix</i>
Lisa	Striped mullet	<i>Mugil platanus</i>
Pejerrey	Marine silverside	<i>Odontesthes argentinensis</i>
Mochuelo	White sea catfish	<i>Netuma barba</i>
Pescadilla de red	King weakfish	<i>Macrodon ancylodon</i>
Cazón	Tope shark	<i>Galeorhinus galeus</i>
Angelito	Angular angel shark	<i>Squatina guggenheim</i>
Pargo blanco	Argentine croaker	<i>Umbrina canosai</i>
Lenguado	Flatfish White flounder	<i>Paralichthys orbignyana</i> <i>Paralichthys patagonicus</i>

After having described the Piriápolis fishery, it is evident that the study area comprises a diversity of artisanal fishers, which can be summarized as follows: (i) young and old fishers with 5-40 years of fishing experience; (ii) boat owners (having one or more boats, smaller or bigger than 4 GRT) and non-owners; (iii) fishers in charge of the boat (*patrones*) and those who are not (*marineros*); (iv) fishers who first started fishing in Piriápolis (and surroundings) and fishers who came from other coastal zones and decided to settle in Piriápolis; (v) fishers who migrate seasonally along the Río de la Plata estuary and those who do not; (vi) fishers who sell the entire catch to fish buyers and others who sell part of the catch directly to consumers and restaurants; (vii) fishers whose livelihoods are only related to the fishery and others who have additional sources of income; and (viii) fishers who are affiliated to the National Union of Seamen (SUNTMA) and others who are not. These are some of the differences among fishers which have created disunity and have hampered the formation of fisher organizations (see Chapter 6).

Fishers in the Piriápolis area have identified a number of problems related to the fishery, including: resources decline; bottom-trawlers (causing overexploitation and seabed destruction); dependence on fish buyers; sea lions and fur seals (feeding from long-lines and gillnets, and damaging them); climate change (e.g. weather is less predictable); pollution; lack of unity among fishers; difficulties in accessing Piriápolis port; bureaucracy in DINARA and PNN; lack of information regarding the reasons leading to new decrees and regulations; and lack of State support. Interestingly, several of these problems had already been identified by fishers from Piriápolis and other localities on the Río de la Plata coast in the early 2000s (Spinetti et al. 2001).

Before describing the Paraty area, it is worth presenting some additional information I got from the Piriápolis fishery, facilitated by university researchers. In 2009, a research team from the national university (*Equipo Pesca Artesanal de la Unidad de Estudios Cooperativos - UDELAR*) applied a questionnaire to artisanal fishers in three coastal areas of Uruguay, as a part of the social component of a project funded by DINARA (UTF/URU/025/URU:5) for small-scale fisheries development<sup>31</sup>. Here I point out the responses given by Piriápolis fishers (see Table 3.3): (a) Only 19% of the fishers were satisfied with the administration (i.e. fisheries management) performed by DINARA during the past ten years; (b) more than half of the fishers considered that they could work together to solve a fishery's problem; and (c) about 86% of the fishers stated that their knowledge should be combined, always or most of the times, with that of researchers in order to make decisions about resources management.

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<sup>31</sup> I contacted this team before they started to conduct the questionnaire and asked them to include three questions that would provide me with useful baseline information. They kindly accepted and found my proposed questions to be of interest. I am grateful to Alejandro Arbulo, Victoria Evia, Cecilia Etcheberre, Juan Geymonat, Cecilia Matonte, Gerardo Sarachu, Alicia Migliaro and Carlos Santos.

**Table 3.3.** Fishers' opinions supporting that alternative fisheries management is needed

Question	Categories				
	Strongly dissatisfied	Dissatisfied	Neither satisfied or dissatisfied	Satisfied	Strongly satisfied
(a) How satisfied are you with the administration performed by DINARA during the past 10 years? (n=31)	9.7%	32.3%	38.7%	19.3%	0
(b) How much do you agree with the following statement? "Fishers of this locality could work together to solve a fishery's problem." (n=31)	Strongly disagree 6.5%	Disagree 25.8%	Neither agree nor disagree 12.9%	Agree 35.5%	Strongly agree 19.3%
(c) Do you think that fishers' knowledge should be combined with that of researchers (DINARA, UDELAR) in order to make decisions about resources management? (n=28)	Never 3.6%	Only in certain cases 10.7%	Most of the times 46.4%	Always 39.3%	

Fishers' responses to these three questions support the need to look for management alternatives to the current top-down regime. Responses to the second question are worth highlighting because there is no fisher association and there has never been a successful or long-lasting one in Piriápolis (similar to what occurs in most coastal Uruguay). However, fishers considered that they have the potential for collective action.

### 3.2. FISHERIES IN BRAZIL, WITH COMPARISONS TO URUGUAY

In Brazil, the artisanal fisheries sector represents 52.5% of the total catch; the remaining corresponds to the industrial sector (2002 data, Diegues 2006). These figures vary across the different areas of the country. In the Southeast region (where Paraty is located), 34.3% of the total catch comes from artisanal fisheries (2000 data). As Diegues (2006) pointed out, the artisanal sector seems to be more important than the industrial sector in the North and Northeastern regions (in terms of catch), but not in the South/Southeastern regions. It is worth highlighting that the relative importance of artisanal fisheries catch in Brazil (even in the Southeast) is much higher than the estimates for Uruguay (3%).

In Brazil, as in Uruguay, fishing was an important activity for indigenous people before the colonization. Native people in the Brazilian territory were not exterminated. The best estimate of the total population of "índios" in Brazil is of 460,000.<sup>32</sup> In addition to these people officially classified as indigenous, there are mixed-heritage people inhabiting different regions of Brazil, such as the Caiçaras. The Caiçaras are recognized as "traditional people" who live in Paraná,

<sup>32</sup> FUNAI (<http://www.funai.gov.br/funai.htm>, retrieved June 2010)

São Paulo and Rio de Janeiro states. They are descendants of Portuguese colonizers, natives (such as the Guarani and the Tupinambá) and blacks (African slaves) (Diegues 2006).

In 2000 there were more than 248,000 artisanal fishers registered in “Colônias” (fishing guilds functioning like unions<sup>33</sup>, but with a top-down origin) in coastal Brazil. This figure is much higher than that in 1967, when the membership of 112,000 fishers was recorded. The increased number of fishers can be partly explained by the migration from the countryside to the coast. Of the total number of Colônias, 12% were in the Southeastern region, comprising about 29,900 fishers (2000 data) (Diegues 2006). The first Colônias were created in 1921 by the Brazilian Navy to control fishers' rebellions and to organize fishers for military defense.<sup>34</sup> The Colônias' regulations required all fishers to be registered in order to get permission to fish. Even though the Colônias were created as defense- or military-oriented groups, they were later changed to civil associations. At the beginning of the 1940s, once the compulsory membership for military purposes was abolished, the Colônias faced significant absenteeism (Breton et al. 1996). Each coastal municipality has a Colônia that regulates fishers' activities. After the 1998 Constitution, fishers can organize their own associations (Diegues 2006). However, “the extant military-derived authoritarian decision-style was maintained. As a result the Colonies have rarely functioned as fisher community organizations, nor have they worked toward fishers' interests” (Kalikoski & Satterfield 2004, p.516). This illustrates the danger of representation (i.e. representation is always inferior to direct participation; Jentoft et al. 2003, p.285).

Fish consumption in Brazil was estimated at 9 kg/capita/year (period 2003-2009), similar to that in Uruguay (9.3 kg/capita/year).<sup>35</sup> In some communities in Brazil, most of the protein consumed comes from artisanal fisheries (MacCord & Begossi 2006). Moreover, artisanal fisheries provide 40-60% of the marine fish consumed in Brazil (Diegues 1999). Until 1998, fish exports (mainly from the catch of the industrial sector) were higher than the imports, but this trend has since been reversed.

Despite the evident importance of artisanal fisheries in the country, government policy for fisheries development in Brazil has focused almost exclusively on industrial fisheries (as in Uruguay).<sup>36</sup> A few events are worth mentioning about the history of fisheries management in Brazil (see Diegues 2006), some of which have parallels to Uruguay. Even though industrial fishing emerged at the beginning of the 20<sup>th</sup> century in Brazil (when Portuguese and Spanish migrants started to use larger boats for sardine fishing), a more intense development occurred

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<sup>33</sup> Since 2008 (Law 11.699), the *Colônias de Pescadores* have the status of unions (*sindicatos* in Portuguese) (Medeiros 2009).

<sup>34</sup> However, Begossi & Brown (2003, p.136) noted that “colônias trace back to colonialism and to state intervention into Brazilian fisheries in 1846, which reported alternatively to the Ministry of Marine Affairs or Ministry of Agriculture during Brazilian history”.

<sup>35</sup> In both countries, fish consumption is lower than the global average (13.5 kg/person/year in 1990, Diegues 2006).

<sup>36</sup> Also, the interest on artisanal fisheries by government and the academy seems to be increasing in both countries (see Section 3.1. and Diegues 2006).

after 1960s with the support of a large fisheries development program carried out by the Superintendence for Fisheries Development (SUDEPE), under the Ministry of Agriculture. After a rapid growth between 1960 and 1975, the national total catch stabilized at 600-700,000 ton in the 1990s (450,000 ton came from marine fisheries). This period overlapped with the dictatorship, which took place from 1964 to 1984 (Diegues 2006).

Between 1980 and 2002, the total catch in the South and Southeastern regions (traditionally the most important fishing areas in the country) decreased (Diegues 2006). After 1989, fisheries policymaking was not in hands of SUDEPE but of the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA, under the Ministry of Environment), which was focused on environmental legislation (not fisheries). In 1998, the Department of Fisheries and Aquaculture (DPA), under the Ministry of Agriculture, was created. A large part of fisheries issues (but not all) became DPA duties. However, IBAMA was still in charge of some other issues, and thus, the need for inter-institutional coordination meant more complexity in terms of fisheries management. Moreover, DPA was under the influence of the industrial fisheries sector. In 2003, the Special Secretariat of Aquaculture and Fisheries (SEAP) was created, and in 2009 it was replaced by the Ministry of Fisheries and Aquaculture (MPA).

In 2007 IBAMA split into two institutes, IBAMA itself and the Chico Mendes Institute for Conservation of Biodiversity (ICMBio), the latter in charge of managing all federal protected areas. ICMBio guidelines are based on the National System of Conservation Units (SNUC), a federal law where protected areas are classified into *integral protection* (i.e. no-take) and *sustainable-use areas*. No-take areas shall hold a consultative council composed of representatives of all government levels (municipal, state and federal) and of civil society.

According to Diegues (1995, in Kalikoski & Satterfield 2004), common myths about artisanal fishers in Brazil contributed to excluding them from decision-making and made them more vulnerable to the management process. Some of these myths were paraphrased as follows: “artisanal fishers are beach beggars, they are a social problem that needs to be treated by social aid programs”; “artisanal fisheries are in transition to industrial, capitalist fisheries, and therefore are doomed to disappear”; “artisanal fishers are unintelligent and resist the technological innovations”; “artisanal fishers are predators, individualists and are not able to organize themselves” (Diegues 1995, in Kalikoski & Satterfield 2004). Interestingly, almost all of these myths about artisanal fishers are also evident in Uruguay.

### **3.2.1. Paraty (Ilha Grande Bay)**

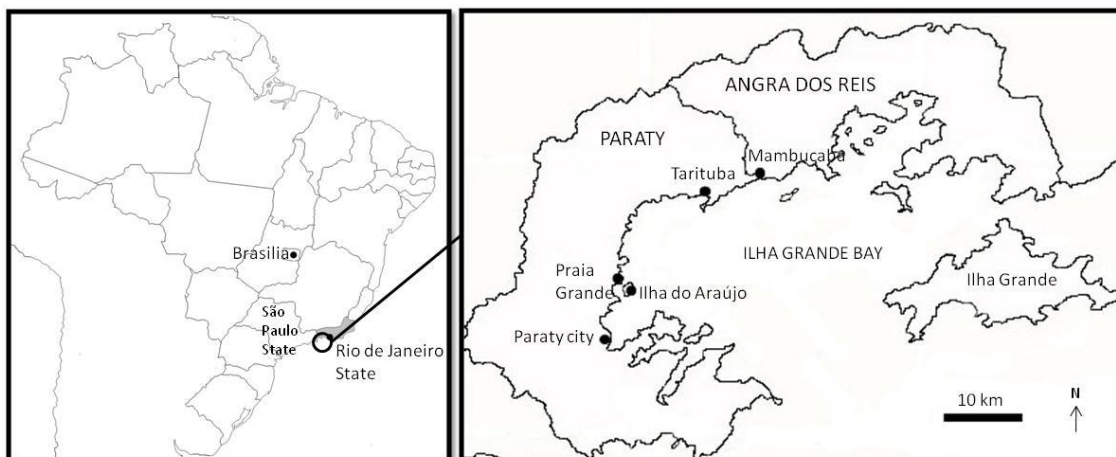
Paraty (with about 35,730 inhabitants<sup>37</sup>) is one of the municipalities of Ilha Grande Bay, a well-known touristic place (both nationally and internationally) at the South of Rio de Janeiro

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<sup>37</sup> IBGE (<http://www.ibge.gov.br/>, retrieved May 2010).

State (near the border of São Paulo State) (Figure 3.3). This area is located inside the remnants of the Atlantic Forest region (Mata Atlântica), between two of the largest urban centres in Brazil: Rio de Janeiro (approx. 260 km) and São Paulo (310 km). The Atlantic Forest is the most important ecosystem along the Brazilian coast; with a biodiversity as high as that of the Amazon Forest, it is one of the world's biodiversity hotspots for conservation (Metzger 2009). Due to its high biodiversity and increasing fragmentation, there has been a push to establish protected areas.

In Ilha Grande Bay, eleven protected areas have been established, with several degrees of restriction. In particular, about 80% of the terrestrial area of the Paraty Municipality and adjacent marine areas are occupied by protected areas. Tamoios Ecological Station (ESEC Tamoios) is a no-take protected area which was established by a government decree (Nº98.864) in 1990 with the aim of protection, research and monitoring the marine ecosystem of the Ilha Grande Bay, with its several islands. It also constitutes a buffer zone of a nuclear plant situated in the southern portion of the municipality of Angra dos Reis. The use of marine resources in the ESEC Tamoios is totally forbidden, resulting in conflicts between fishers and the protected area (ICMBio 2009). Even though the ESEC was created in 1990, it was only in 2006 that the government created a local office and allocated officials to start implementing the protected area. Since late 2006 ESEC Tamoios has had a Consultative Council with fisher representatives. This council also comprises a Thematic Chamber of Fisheries and Aquaculture to address specific issues, including species management (like for the snook or *robalo*, *Centropomus parallelus* and *C. undecimalis*).



**Figure 3.3. Map of the study area in Brazil.** Praia Grande and Ilha do Araújo (in Paraty Municipality) are the communities where I developed my case study.

Different ethnic groups, either Indians or their descendents (the Caiçaras and the Jangadeiros - raft fishers) have lived in the Atlantic Forest, developing traditional management systems of the forest and their adjacent coastal ecosystems (Diegues 2006). Caiçara livelihoods

are composed by a mix of activities, such as artisanal fisheries, small-scale agriculture, and increasingly, tourism and non-timber forest products (Hanazaki et al. 2007). From 40 to 70% of the protein consumed by Caiçaras come from marine resources (Begossi 2006).

A study conducted by Begossi and colleagues (2010) showed that artisanal fisheries are important for the subsistence of several communities in Ilha Grande Bay. In the 34 communities studied, most fishers work part-time, some full-time. Part of the catch is consumed locally and most of it is sold commercially to local and regional markets. The most important species for commercial sale are: mackerel, snook (*Centropomus spp.*), shrimp (various species), croaker (*Micropogonias furnieri/Umbrina coroides*) and grouper (*Epinephelus marginatus*) (Begossi et al. 2010). Artisanal fishing technologies in Ilha Grande Bay are diverse, and include hook and line, gillnet, bottom trawl, squid jig, cast net, long-line, purse seine, and spear fishing (Lopes 2010). Most fishers in Paraty, Angra dos Reis, and Ilhas da Gipóia and Grande, are affiliated to *Colônias* and/or *Associações de Moradores Locais* (communities' associations) (Begossi 2010).

Artisanal fishers in Paraty (and in Ilha Grande Bay in general) have identified a number of problems related to fisheries and management (Begossi et al. 2010): decline of fish stocks; intergroup conflicts (e.g. between artisanal fishers using different gear; between artisanal fishers and industrial or recreational fishers); lack of enforcement; pollution and environmental degradation; climate change; lack of communication with government agencies, or among fishers themselves (including lack of union or cooperation); protected areas; ineffectiveness of the licensing system; high prices of fuel, gear, and ice; fish buyers; no subsidies from government; lack of adequate credit system; lack of local market; and high technology fishing equipment.

With regards to fisheries management, it is noteworthy that in 2009 the federal government, by means of the Ministry of Fisheries and Aquaculture (MPA), was working on the institutionalization of fishing agreements (*Acordos de Pesca*) in Ilha Grande Bay. By definition, a fishing agreement consists of a series of meetings aiming at doing participatory diagnosis, problem discussion and deliberation, consensus searching, and definition of norms (MPA & FIPERJ 2009). Fishing agreements are concentrated in the Northern region of Brazil (mainly inland), where there are more than 50 agreements, with different levels of success (MPA & FIPERJ 2009). Fishing agreements were a traditional management tool of riverine communities of Central Amazon since the 1960-1970s. It was not until the end of the 1990s that IBAMA recognized these agreements and started to implement them in different Amazon lakes (Isaac & Cerdeira 2004). In 2002, IBAMA created a series of rules for fishing agreements, including procedures that need to be followed for agreements' implementation (Instrução Normativa N°29).

In June 2009, the MPA, together with the Foundation "Institute of Fisheries of Rio de Janeiro State" (*Fundação Instituto de Pesca do Estado do Rio de Janeiro – FIPERJ*) and the NGO IBIO (*Instituto BioAtlântica*) held three meetings to present the fishing agreements and to discuss the likely implementation of co-management in Ilha Grande Bay (MPA & FIPERJ 2009).



These meetings constituted the first step in the process of implementation of fishing agreements. As will be mentioned in Chapter 9, the fishing agreement project was transformed into a broader initiative called “Public Policies Program for Co-management of Fishing and Aquaculture resources at Ilha Grande Bay”.

### ***Praia Grande and Ilha do Araújo (Paraty)***

My case study in Paraty was developed in two adjacent communities: Praia Grande and Ilha do Araújo (Figure 3.3). Praia Grande is located nearly 10 km from Paraty city (highway BR-101), and Ilha Grande is an island adjacent to Praia Grande (5 minutes by boat). Fishers in the two studied communities are generally canoe and/or boat owners and they mostly work on their own (i.e. one fisher per canoe or boat). Although canoes have been largely replaced by motorized boats, some fishers, especially the older ones, still use canoes to go fishing. Fishing gear consists of trawl nets and otter trawls for shrimp, gillnets of different mesh sizes for fish and shrimp, and, to a lesser degree, bottom-set long-lines.

Most fishers alternate fishing with tourism (e.g. doing boat trips with tourists). The fishing tradition remains stronger in Ilha do Araújo, with an estimated number of 50 fishers from the 116 households of the village, as opposed to 25 in Praia Grande from a population of 140 households, where fishers have been increasingly moving to tourism.<sup>38</sup> Most fishers have always fished locally within the Ilha Grande Bay; they are not mobile as in coastal Uruguay. Women generally work on shore, peeling shrimp, catching crabs, cleaning fish (gutting and boning it). In Ilha do Araújo about 12 women are in charge of peeling shrimp caught either by their husbands or other fishers, whereas a few women also catch crabs from shore and sell their meat. Moreover, there is at least one woman who goes fishing with her partner every day (they do not have children).<sup>39</sup> Fishers’ wives from both communities not working in the fishery have diverse occupations including cleaning the houses of “rich people” or “outsiders” and working as nurses and cooks in small restaurants.

In the following chapter the research approach that I followed is described, as well as the fieldwork phases and the data collection procedures used to address each objective.

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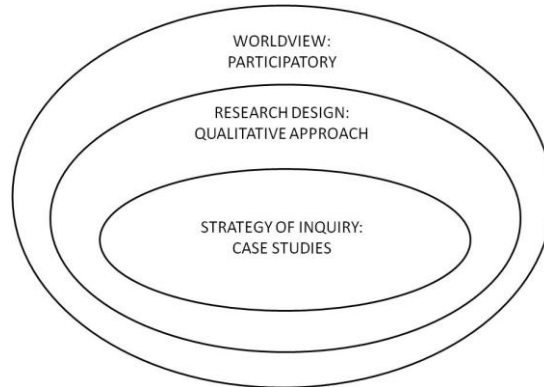
<sup>38</sup> The estimation of the number of households was provided by the presidents of the community associations. The estimated numbers of fishers were provided by interviewed fishers (and were validated by my estimation in Praia Grande). Estimations include people who work in the fishery to make a living, totally or partially (but not people who fish rarely). Through a different methodology (i.e. household surveys), Hanazaki et al. (2013) found high percentages of households involved in fishing, namely 75.9% and 65.9% in Ilha do Araújo and Praia Grande, respectively. One of the reasons to explain the differences is that the household questionnaire included people that fish rarely.

<sup>39</sup> The prohibition on female labour in fisheries (because it was considered a male activity) was only abolished in 1988 (Vasconcellos et al. 2011b).

## CHAPTER 4: METHODS

### 4.1. RESEARCH APPROACH

This section describes the research approach I followed, consisting of worldview, research design, and strategy of inquiry (Figure 4.1).



**Figure 4.1. Diagram representing my research approach**

#### 4.1.1. Research worldview

According to Creswell (2009, p.6), worldviews refer to “a general orientation about the world and the nature of research that a researcher holds”. Considering that I chose the topic of my research with the commitment of starting to promote changes in fisheries management through action, my worldview fits with advocacy/participatory (Heron & Reason 1997, Guba & Lincoln 2005, Creswell 2009) and critical social science paradigms (Neuman 2000). I strongly believe that better governance of natural resources can be achieved through stakeholder participation in decision-making processes, in agreement with democratic values, bridging the gap between local people, researchers, and managers. Thus, some of the characteristics of critical social research (Neuman 2000) and advocacy/participatory research (Creswell 2009) which can be observed in my proposed PhD work include: to be action oriented, to have empowerment as a focal point, and to aim at eliminating the division between researchers and those being researched.

Moreover, while identifying the leading theories of my proposed work, I envisaged participatory research (Cornwall & Jewkes 1995, Kindon 2008), or cooperative inquiry (Heron & Reason 1997), as a suitable approach to link theory with practice, in agreement with my worldview. My intent was that the participatory process I would facilitate could help transform existing social relationships and develop new ones (Neuman 2000), as well as to create the

capacity in participants for positive social change, partly through mutual learning (Heron & Reason 1997, Guba & Lincoln 2005). Guided by a participatory worldview, I considered important to reflect on my role as a researcher (Guba & Lincoln 2005), and to examine the sources of social power (such as knowledge, Neuman 2000; e.g. when conducting interviews, Dunn 2008). Furthermore, as part of the intertwining between my research questions and a political agenda (typical of the participatory worldview), through the outcomes of my doctoral work, I aimed to contribute to current policy formulations around artisanal fisheries co-management in Uruguay.

#### **4.1.2. Research design (qualitative approach) and strategy of enquiry (case studies)**

The participatory worldview is usually associated with the qualitative approach (Creswell & Plano Clark 2007). My research design followed this approach because I considered it appropriate for an in-depth investigation of my research questions (see Table 4.2). Even though my study could have taken a mixed methods approach (collecting and analyzing both qualitative and quantitative data), when I started fieldwork I found out that fishers were tired of answering questions that would have no direct effect in improving the fishery. This made me reflect on the appropriateness of my methods, and I decided not to aim at formally interviewing fishers with a particular sample size, which would have been a requirement for quantitative analysis. I did include some closed-ended questions in the interview guides but responses were analyzed qualitatively. The number of formal interviews with fishers was limited because I respected the prevailing fishers' reluctance to research (see Section 6.3.3). However, as Section 4.3 explains, additional sources of data were used.

Within this qualitative approach, case studies were the strategy of inquiry I chose. In case studies, "the researcher explores in depth a program, event, activity, process, or one or more individuals" (Creswell 2009, p.13). Detail and depth are the aims rather than breadth. According to Yin (1994, p.1), "In general, case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context." The "how" or "why" questions are typical of explanatory case studies (Yin 1994). These questions need to be traced over time if the researcher is to explain the links between the variables involved (including causal relations). For instance, case studies are often used in evaluation research, in which case, explanations would link program implementation with program effects (Yin 1994).

As Yin (1994) explained, multiple case studies can add more robustness to the overall study, even though they might be more expensive and time-consuming than the single-case design. I developed two case studies, one in Piriápolis-coastal Río de la Plata and one in Paraty (Rio de Janeiro State), the former with more depth than the latter. All objectives were addressed in Uruguay, whereas Objectives 1-3 were studied partially in Paraty, focusing on the local scale

(fishers and other local stakeholders). Multiple case studies can follow a literal replication (when each case predicts similar results) or a theoretical replication (when each case predicts contrasting results but for anticipatable reasons) (Yin 1994). My research followed the latter approach. I expected to find contrasting results in Paraty, for instance due to characteristics of the fishing communities, which in turn have implications for adaptive co-management (e.g. clearer boundaries, existence of community organizations). The cross-case comparison would thus help the identification of barriers to and opportunities for adaptive co-management in both areas. Curiously, more similarities than expected were found between the two cases, which in a certain way prevented a richer comparison and cross-country learning.

It should be mentioned that there is some controversy with regards to the generalizability of case studies. In this sense, Yin (1994, p.31) argued that case studies (either individual or multiple) should aim toward analytic generalization, “in which a previously developed theory is used as a template with which to compare the empirical results of the case study”. He contrasted analytical generalization to statistical generalization, claiming that case studies are not “sampling units” (and thus, suggesting avoid terms such as “small sample size of cases”) (Yin 1994). Moreover, with regard to the question if case studies are generalizable or not, he argued: “The short answer is that case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes” (Yin 1994, p.10). He also emphasized the importance of an early use of theory (i.e. in the design phase), to guide data collection and analysis, whether the purpose of the case study is to develop or to test theory (Yin 1994). My research followed this recommendation; the design of my methods was based on the theories explored in the literature review (Chapter 2).

### ***Selection criteria for case studies***

In Uruguay, I considered six criteria to select the case study<sup>40</sup>: (1) Artisanal fishers should be concerned about the current status of their fishery. (2) There should be heterogeneity among fishers in terms of boats' size, market mechanisms (fish buyers, local fish markets), among others, providing an interest opportunity for studying fishers' bonding, bridging and linking relationships. (3) The community should not be geographically isolated from other artisanal fishing communities because this would inevitably affect the study of bridging social capital at the local level. Also, the study site should be of easy access because some participants of the participatory research initiative (e.g. managers, researchers) would come from other locations. (4) There should be government (DINARA) interest in the community or area, facilitating its engagement during the participatory research process. (5) The study communities should have

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<sup>40</sup> Since my two case studies would not be developed in the same depth, the selection criteria did not need to be the same.

previous (and/or current) experience with NGOs and/or university researchers because its effect on the participatory research process was worth investigating. (6) Artisanal fishers (at least some of them) should be willing to participate in a participatory research initiative.

The Piriápolis area (which includes Playa Verde, Playa Hermosa, Piriápolis port, and Pesquero Stella Maris) was a site meeting all these criteria. During fieldwork in 2010 I was based in Playa Verde, whereas in 2011-2012 I was based in Piriápolis downtown and Playa Hermosa. Even though the Piriápolis area was the target of my case study, the bigger picture was coastal Río de la Plata in Uruguay. As will be shown in Section 4.3, data were collected in other localities besides Piriápolis, such as Montevideo, Carmelo and Maldonado cities.

In Paraty, given that my research was developed in the context of the collaborative research program “Community-based resource management and food security in coastal Brazil”, my case study was selected jointly with Brazilian researchers. Praia Grande was chosen as the main community (where I was based), focusing also on Ilha do Araújo. In Praia Grande micro-region there were only a few researchers of the project, and most importantly, nobody was looking at social capital.

#### 4.2. FIELDWORK PHASES, TIMELINE AND ETHICAL CONSIDERATIONS

Fieldwork consisted of two phases: the first one addressed Objectives 1-3 (in Uruguay and Brazil), and the second one addressed Objective 4 (only in Uruguay). A timeline of fieldwork is shown in Table 4.1.

**Table 4.1.** Fieldwork timeline according to field site

Field site	May - August 2010	November 2010 - January 2011	March 2011 – March 2012	April 2012
Uruguay – Phase I (Objectives 1-3)	X <sup>(a)</sup>		X	
Paraty (Brazil)		X <sup>(b)</sup>		X <sup>(c)</sup>
Uruguay – Phase II (Objective 4)			X <sup>(d)</sup>	

<sup>(a)</sup> The authorities of DINARA and MGAP assumed in March 2010 (for the period 2010-2015). Authorities of municipal governments (created by the decentralization law) assumed in July 2010. <sup>(b)</sup> The members of the Directorate of the Colônia de Pescadores de Paraty had been elected in August 2010. <sup>(c)</sup> The second field trip to Paraty took place during the shrimp closed season (which lasts three months from early March every year). <sup>(d)</sup> Even though most of the final interviews with participants of the participatory research initiative were conducted in February-March 2012, I continued observing and taking notes about the progress of the group (POPA) until the moment of writing this thesis.

An extended fieldwork was necessary due to the nature of my research questions (especially those related to participatory research – Objective 4). Even though most of the data for Phase I in Uruguay were collected from May to August 2010, during Phase II (participatory research initiative) I had the opportunity to collect additional information for Objectives 1-3 (e.g. I

was able to understand the relationships among fishery stakeholders in greater depth than the previous year).

Phase I contributed to identifying barriers to and opportunities for the emergence of artisanal fisheries co-management, whereas Phase II was about a participatory research process which could help overcome some of the barriers identified in Phase I. The two phases were thus interconnected. Moreover, as it can be observed in Table 4.2, the research questions during Phase II were as well related to the first three objectives (e.g. regarding changes in relationships). Three types of changes were expected: strengthening of existing healthy relationships, transformation of adversarial relationships, and development of new relationships (Schusler et al. 2003, p.316).

In the following sections (4.3 and 4.4), both phases are described, including the data collection procedures. My critical/participatory worldview informed the data collection, in which the procedures I used included participant observation, semi-structured interviews and document analysis. All these methods have been identified as appropriate to collect data about content and process, and using a plurality of methods helps secure the validity of the findings (e.g. Kaplowitz & Hoehn 2001, Bernard 2006). Also, it is agreed in the literature that case studies rely on multiple sources of evidence (Yin 1994, Berg 2004, Creswell 2009). Table 4.2 shows several research questions that were addressed within each objective and the corresponding data collection procedures used. In Uruguay, data were collected in Spanish, and in Brazil in Portuguese.<sup>41</sup>

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<sup>41</sup> Since the former is my first language and I speak Portuguese fluently, a translator was not needed.

**Table 4.2.** Some research questions addressed in each objective and corresponding data collection procedures

Objectives	Research questions	Data collection procedures
<p>1. Changes in the artisanal fishery as a social-ecological system</p>	<p>Are fishing resources declining? When did they start to decline? Which species are declining? What are the drivers of resources decline? What have been the consequences of the changes in fishing resources? How have relationships among artisanal fishers changed over time? How have the formal (governmental) and informal (local) institutions through which artisanal fisheries are managed changed? What have been the consequences of these changes? How have fishers' livelihoods changed over time? What are fishers' future aspirations?</p>	<ul style="list-style-type: none"> <li>• Participant observation</li> <li>• Semi-structured interviews</li> <li>• Document analysis</li> </ul>
<p>2. Relationships among fishery stakeholders (social capital analysis)</p>	<p>How are the relationships among fishers from the same and different communities? Are there trust, solidarity, respect and reciprocity norms? Do fishers exchange knowledge, gear and fish? Do they follow locally agreed rules? Are there fishers' organizations and representatives? How are artisanal fishers connected to markets, government agencies, Universities and NGOs? How much trust fishers have in these external stakeholders? How are the relationships within and between government agencies?</p>	<ul style="list-style-type: none"> <li>• Participant observation</li> <li>• Semi-structured interviews</li> </ul>
<p>3. Artisanal fisher participation in management</p>	<p>What are the stakeholders' opinions about artisanal fisher participation in management? Should different sources of knowledge be combined? Are artisanal fishers willing to participate in decision-making? What was the origin of the proposed fisheries law? How was it developed? What are the changes proposed by it? What is the degree of fisher participation anticipated? What do stakeholders think about the proposed law? What barriers to co-management do stakeholders identify? Why is there low fisher participation in meetings with the government?</p>	<ul style="list-style-type: none"> <li>• Participant observation</li> <li>• Semi-structured interviews</li> <li>• Document analysis</li> </ul>
<p>4. Participatory research for the emergence of adaptive co-management</p>	<p>How did past experiences affect the participants' motivations at the beginning of the participatory research initiative? How have the relationships among stakeholders changed during the process? Has there been mutual learning among participating stakeholders? Which elements have enhanced or hindered social learning and changes in relationships? Was there a feedback connection between social learning and changes in relationships? What are the stakeholders' perceptions about the success and applicability of participatory research? What do stakeholders think about the contributions of participatory research to the emergence of co-management?</p>	<ul style="list-style-type: none"> <li>• Participant observation</li> <li>• Semi-structured interviews</li> <li>• Questionnaires</li> </ul>

### ***Ethical considerations***

The University of Manitoba Joint-Faculty Research Ethics Board approved my research protocol (#J2010:060). Their guidelines with regards to the voluntariness of participation, the vulnerability of participants, fully informed consents, and the relationship between the researcher and those being researched, were followed. For instance, following Article 2.1 of the Tri-Council Policy Statement, prospective subjects (in my case fishery stakeholders) had the opportunity to give free and informed consent about participation, throughout the research. Moreover, following Article 2.2 of the same policy, free and informed consent were voluntarily given (and withdrawn at any time), without manipulation, undue influence or coercion. Informants' names were kept confidential.

It is worth mentioning that at the beginning of fieldwork in the two sites I handed out a presentation page of my research among fisher and non-fisher stakeholders. In the Paraty case, it was also important to introduce my research to the president of each community association (in Praia Grande and Ilha do Araújo), who found it interesting and offered support.

### **4.3. PHASE I (Objectives 1-3): DATA COLLECTION PROCEDURES**

#### **4.3.1. Participant observation**

Yin (1994, p.87) defines participant observation as a special mode of observation in which the researcher, rather than being a passive observer, may assume a variety of roles within a case study situation and may actually participate in the events being studied. Of the distinctive opportunities provided by participant observation and discussed by Yin (1994), the most important to me is the one related to the "ability to perceive reality from the viewpoint of someone "inside" the case study rather than external to it" (p.88). Moreover, Bernard (2006, p.354-356) identified at least five reasons supporting the use of participant observation: (1) It opens things up and makes it possible to collect all kinds of data; (2) it reduces the problem of reactivity (of people changing their behaviour when they know that they are being studied); (3) it helps you ask sensible questions, in the native language; (4) it gives you an intuitive understanding of what is going on in a culture and allows you to speak with confidence about the meaning of data; and (5) many research problems simply cannot be addressed adequately by anything except participant observation.

In my research, participant observation was used as a complementary, but essential, source of evidence to other data collection procedures throughout the project, such as interviews. For instance, participant observation was very important at the onset of the fieldwork, in which before starting to conduct semi-structured interviews, I spent plenty of time at the study sites,



getting to know local stakeholders and getting them to know me. In this regard, my fieldwork took a “bottom-up approach” in the sense that it began at the local level, spending considerable time with fishers and other community members before addressing the government and other external stakeholders. In addition, the interview guides were enriched from this exploratory stage of participant observation which enabled me to sharpen their focus. Finally, as expected, certain aspects of the relationships among fishers and other stakeholders could only be understood by participant observation in landing sites, fish markets, and meetings.<sup>42</sup> Table 4.3 shows the events during which participation observation was used for collecting data during Phase I. Following Bernard (2006), during every day of fieldwork I took field notes, mostly descriptive but also analytic and methodological.

**Table 4.3.** Events during which participant observation was conducted (\*)

Field site	Event
Uruguay	<ul style="list-style-type: none"> <li>- Inter-institutional meeting of artisanal fisheries, organized by NGO Cultura Ambiental (May 2010, Montevideo)</li> <li>- Regional Meeting of Artisanal Fisheries, organized by NGO Cultura Ambiental (May 2010, Carmelo-Colonia)</li> <li>- Fishers’ meetings I organized in Piriápolis (informal meetings at landing sites in May 2010, and one formal meeting at a municipal venue in June 2010)</li> <li>- “Fisheries Advisory Table” organized by DINARA (June 2010, Montevideo)</li> <li>- Two fishing trips from Playa Hermosa-Piriápolis (July 2010)</li> <li>- Second National Meeting of Fisherwomen, organized by NGO INDRA (July 2010, Maldonado)</li> <li>- Fisheries Seminar organized by the Faculty of Sciences-UDELAR (October 2011, Montevideo)</li> <li>- Third session of the Zonal Council of Ciudad de la Costa (December 2012, Canelones)</li> </ul>
Paraty	<ul style="list-style-type: none"> <li>- Two fishing trips from Praia Grande (November 2010, January 2011)</li> <li>- Training course on fisheries co-management, organized by UFRJ - Federal University of Rio de Janeiro (November 2010, Angra dos Reis)</li> <li>- General Assembly of the Colônia de Pescadores de Paraty (December 2010)</li> <li>- Meeting of Praia Grande community association (December 2010)</li> <li>- Santa Claus festivity (<i>Festa de Papá Noel</i>) in Ilha do Araújo (December 2010)</li> <li>- First meeting to discuss the Commitment Terms at ESEC Tamoios, organized by ICMBio (April 2012)</li> </ul>

(\*) I also used participant observation at landing sites, fish market and fishers’ houses, among others.

#### 4.3.2. Semi-structured interviews with artisanal fishers

Simply put, one of the reasons to use interviews is because other methods such as observation are not efficient in getting information about events, opinions, and experiences (Dunn 2008). Unlike structured interviews in which questions are asked in a standardized manner (i.e.

<sup>42</sup> This is supported by van Deth (2003, p.86), who argued that using perceptions instead of observations was one of the pitfalls of social capital research: “Usually, people are simply asked about their involvement in social networks and only very few studies try to focus on these networks before participants are interviewed”.

questions are asked in the same way and in the same order), semi-structured interviews have some degree of predetermined order (i.e. they follow an interview guide or schedule) but can be flexible in the way and order the themes and questions are addressed (Dunn 2008). As Berg (2004, p.80) stated, “The interviewers are allowed freedom to digress; that is, the interviewers are permitted (in fact, expected) to probe far beyond the answers to their prepared standardized questions.” Moreover, as other researchers, I see an interview as a two-way exchange of information. One advantage in this regard is that, according to Dunn (2008, p.80), “due to the face-to-face verbal interchange used in interviewing the informant can tell you if a question is misplaced”.

During Phase I, the first interviews I conducted were in-depth and semi-structured. These were developed at the beginning of the fieldwork with three fishers from Piriópolis (June 2010) and one from Paraty (November 2010). Interview guides, consisting almost entirely of open-ended questions, were prepared based on my research questions (Table 4.2) but they were partly enriched from the informal conversations I had had with fishers until that time (i.e. participant observation). Moreover, during these in-depth interviews, fishers shared with me several stories and anecdotes, not only related to the themes raised by me.

At a later stage of the fieldwork I prepared interview guides to conduct semi-structured interviews with a greater number of fishers (16 in Piriópolis and 10 in Paraty), targeting Objectives 1-3 in more detail. These interviews consisted of open and closed-ended questions (see Appendices 1 and 2), which were designed based on the information I had gathered until that time from participant observation and in-depth interviews. Initial interview guides were pre-tested (something often suggested in the literature, although more important in structured than in semi-structured interviews, Dunn 2008). As recommended by Berg (2004, p.90), two pre-testing steps were taken. First, the interview guide was examined by researchers and fellow students familiar with the study’s subject, and second, the guide was used in three practice interviews (one with a fisher from Valizas-Rocha, one in Piriópolis and one in Ilha do Araújo). The first step is meant to help identify poorly worded questions, whereas the second is important to show whether the interview is effective (i.e. if the type of information being sought will actually be obtained). The two practice interviews in Piriópolis and Paraty helped me improve the wording of some questions and add a few other questions. These interviews became part of the 16 and 10 analyzed interviews, respectively. Beyond the pre-testing stage, the interview guide was partly dynamic throughout the research (Dunn 2008).

Table 4.4 shows a summary of the interviews conducted in both field sites. Interviews lasted from one to three and a half hours. Fishers were selected for interview purposively to maximize respondent diversity in terms of age, years of experience in the fishery, and gear used. Partly due to fishers’ mistrust, interviews were not audio-recorded (except for one) but only recorded by note taking. In addition, the data from interviews was validated through

complementary informal interviews while participating in fishers' daily activities. By living in the study communities, I had the opportunity to establish close relationships with fishers, and to pose the same question to a given fisher at different times. This is particularly important given the dynamic and changing conditions of the fisheries in both areas. Data from these informal interviews were transcribed as part of my daily field notes so I have considered them within "participant observation". During the second field season in Paraty, I conducted 11 validation interviews, six of which took place with interviewees from the first field season. In these interviews, findings from the first season were shared with fishers and further questions were asked to contribute to a better understanding of the themes addressed in Objectives 1-3.

**Table 4.4.** Interviews with artisanal fishers during Phase I

Field site	Number of interviews (*)	Interview themes
Piriápolis (19 interviews)	- 3 in-depth semi-structured interviews (one fisher from PV, one from PH and one from SM) - 16 semi-structured interviews (2 fishers from PV, 3 from PH, 5 from PP and 6 from SM)	- Changes in the social-ecological system of the fishery (e.g. fishing resources, fishing practices, local rules, social norms) - Relationships among fishers from the same and different sites (Bonding and bridging social capital at the local level) - Fishers' relationships with fish buyers, unions, government agencies, universities and NGOs (Linking social capital)
Paraty (22 interviews)	- 1 in-depth semi-structured interview (PG fisher) - 10 semi-structured interviews (5 fishers from PG and 5 from IA) - 11 validation interviews (6 fishers from PG and 5 from IA) (**)	- Fisher participation (e.g. actual and intended participation in management, proposed fisheries law in Uruguay, and Fishing Agreements in Ilha Grande Bay) - Participatory research (fishers' interest in the initiative to be developed the following year in Piriápolis and suggestions for it)

(\*) Abbreviations of communities and landing sites: PV: Playa Verde, PH: Playa Hermosa, SM: Pesquero Stella Maris, PP: Piriápolis Port, PG: Praia Grande, IA: Ilha do Araújo.

(\*\*) Four of the five validation interviews in Ilha do Araújo were conducted with husband and wife (fisher couples).

#### 4.3.3. Semi-structured interviews with non-fisher stakeholders

Fishery stakeholders in coastal Uruguay were partly identified in a preliminary research I conducted in 2009 before starting the PhD program. During the development of my case study in Piriápolis, additional stakeholders were detected through conversations with fishers and DINARA members. In August 2010, I conducted 21 semi-structured interviews with non-fisher stakeholders, including fish buyers, National Union of Seamen, government agencies, as well as inter-institutional initiatives, groups from research/education organizations and NGOs with current or past experience with fishing communities. Table 4.5 provides a list of the interviewees and of the main themes addressed during the interviews (linked to Objectives 1-3). In a certain way, these interviews contributed to conducting a stakeholder analysis, which consists of identifying

the stakeholders, finding out their interests and concerns, understanding their roles in the system, and determining their capacity to play their part in co-management or participatory governance (Grimble & Chan 1995, Borrini-Feyerabend 1997, Borrini-Feyerabend et al. 2000, Bavinck et al. 2005, Pomeroy & Rivera-Guieb 2005).

**Table 4.5.** Semi-structured interviews (n=21) with non-fisher stakeholders in coastal Uruguay (Note: interviews were conducted in Piriápolis and Montevideo in August 2010)

<b>Stakeholder group and # of interviews</b>	<b>Interviewees</b> (field of specialization in brackets)	<b>Interview themes (*)</b>
DINARA (Fisheries Agency) n=8	- General Director (Veterinary Medicine) - Head of the Artisanal Fisheries Unit (Biology; Local development) - Four researchers of the Population Biology Department (Ecology, Fish Biology, Fisheries Technology) - Scientific and General coordinators of the project "Piloting of an Ecosystem-based Approach to Living Aquatic Resources Management" GEF-DINARA-FAO (Biology, Ecology)	- Changes in fishing resources and fisheries policies  - Inter- and intra-institutional relationships
PNN (Coast Guard) n=2	- Chief of Staff - Piriápolis Lieutenant	- Relationships with artisanal fishers (including previous or current projects)
DNH (Port Authority) n=1	- Chief of Piriápolis Port	
Municipal Government n=1	- Piriápolis Mayor	- Fisher participation and multiple sources of knowledge
Ecoplata Program (**) n=1	- General Coordinator (Biology)	
UDELAR (National University) n=2	- Coordinator of the Cooperative Studies Unit - Extension Service (Social worker) - Professor of Technology of Fish Products, Fisheries Research Institute (Veterinary Medicine)	- Proposed fisheries law
Maritime Technical School (UTU) n=1	- Professor (Fish Biology)	
SUNTMA (National Union of Seamen) n=1	- Secretary of organization - SUNTMA's Directorate	- Interest in the participatory research initiative (DINARA only)
NGO SOFLUMA n=1	- Coordinator of the project "Artisanal Fisheries Development" (Fisheries Biology)	
NGO Cultura Ambiental n=1	- Member of the Directorate and Program "Costas" for conservation of coastal resources (Veterinary medicine)	
Fish buyers n=2 (***)	- Fish buyers from Piriápolis	

(\*) Not all the themes were addressed in every interview. When research findings are presented (Chapters 5-8), it is specified what stakeholders answered each question.

(\*\*) Ecoplata is an inter-institutional program whose executive board is integrated by the Ministry of Livestock, Agriculture and Fisheries (by DINARA), Ministry of Defense (by PNN and SOHMA), Ministry of Housing, Planning and Environment (by DINAMA and DINOT), coastal Departmental Governments and the University (Faculty of Sciences and Faculty of Social Sciences – UDELAR).

(\*\*\*) I tried to interview two other fish buyers who work in Piriápolis but they were unreachable.

As mentioned above, my case study in Paraty was limited to the local level, and thus, only two interviews with non-fisher stakeholders were conducted: main fish buyer (located in Praia Grande) and President of the Colônia de Pescadores (Paraty city). The key themes addressed in the former interview were the relationship with fishers and other fish buyers, and changes which have occurred in the community. The latter interview focused on the role of the Colônia, its relationship with artisanal fishers and government agencies, and its involvement in the Fishing Agreements Project. Interviews with non-fisher stakeholders in the two field sites lasted from 45 minutes to one hour and a half. Most interviews were audio-recorded, in addition to note-taking.

#### 4.3.4. Document analysis

Document analysis was essential for Objective 3. I analyzed the proposed fisheries law in Uruguay, minutes of the sessions of the Parliamentary Commission analyzing the bill, among other documents (Table 4.6), giving particular attention to stakeholder participation and co-management. Document analysis was also useful for Objective 1 in Uruguay, for which some of DINARA fisheries regulations were reviewed.

**Table 4.6.** Documents analyzed in Uruguay

Objective	Documents
Objective 1 (Changes in the fishery as a social-ecological system)	<ul style="list-style-type: none"> <li>- DINARA reports about the status of fishing resources</li> <li>- Valid fisheries legislation (Law 13.833, Decree 149/1997, and regulations for the artisanal fishing sector)</li> <li>- Publication authored by the members of the DINARA Artisanal Fisheries Unit (Puig et al. 2010)</li> </ul>
Objective 3 (Artisanal fisher participation in management)	<ul style="list-style-type: none"> <li>- Report of the first national workshop organized by DINARA (and facilitated by IIFAC) to consult stakeholders during the development of the new fisheries law</li> <li>- Bill proposed by DINARA in 2009: “Law of Responsible Fisheries and Aquaculture Promotion”</li> <li>- Minutes of 20 sessions of the Deputies’ Commission of Livestock, Agriculture and Fisheries, during the assessment of the bill (2009-2012)</li> <li>- Report of the “Fisheries Advisory Table” organized by DINARA in 2010</li> <li>- Report of the project “Artisanal Fisheries Development” in charge of NGO SOFLUMA, with DINARA-FAO support (2011)</li> <li>- Evaluation report of the Program “Fisheries management in Uruguay” (UTF/URU/025/URU) (2011)</li> <li>- Proceedings of the sessions of the zonal council established in 2012 in coastal Canelones for artisanal fisheries co-management</li> <li>- DINARA informative newsletters</li> </ul>

#### 4.4. PHASE II (Objective 4): PARTICIPATORY RESEARCH IN PIRIÁPOLIS

Phase II, consisting of the participatory research process for addressing artisanal fishers' concerns about the fishery in Piriápolis, was initiated in March 2011. After an initial stage in which fishers decided that the research should tackle the problem of sea lions, I invited the other stakeholders to participate, such as DINARA, university biologists doing research about sea lions (UDELAR), and NGOs. Since May 2011, stakeholders have been meeting regularly in Piriápolis, generally on a monthly basis, to develop participatory research addressing local concerns of the fishery. One social scientist in communication and culture studies (UCU) joined the group in June 2011. These workshops, which were held at a venue owned by DNH (Port Authority), located in front of Piriápolis port, lasted from 3 to 4.5 hours. Chapter 8 (Table 8.2) presents a brief description of each of the nine workshops conducted in 2011, as well as the positive and negative aspects that participants identified during the evaluation. Two main problems of the fishery were tackled throughout this participatory research initiative: sea lions' impact on fishing gear (Section 4.4.3), and market competition from imported *Pangasianodon hypophthalmus*, locally known as *pangasius* (Section 4.4.4). The First Artisanal Fisheries Festival in Piriápolis (referred to as "the Festival") was an action which originated while addressing the latter problem.

Fifteen participants from four stakeholder groups were committed to the participatory research process and later formed the group POPA – *Por la Pesca Artesanal*: artisanal fishers (n=7), artisanal fisheries manager (DINARA, n=1), university scientists (n=5), and local NGO representatives (n=2). Even though a continuous effort was made throughout the process to invite fishers at landing sites, only fifteen (12 men and 3 women) participated in at least one workshop or collaborated during the Festival, and seven of them became part of the group (POPA). Participating fishers were mostly from three of the four landing sites included in my study area: Pesquero Stella Maris (SM), Piriápolis Port and Playa Verde (one fisher from Playa Hermosa participated only in one workshop and visited the Festival). Out of the seven committed fishers (six men and one woman), three were in their 30s, three in their 40s, and one in their 60s, with most having 20-30 years of experience in the fishery. Even though Piriápolis fishers are not formally organized, two of the participating fishers have been informally elected as representatives of SM (e.g. to negotiate with local government authorities) and they also are affiliated to the national union (SUNTMA). Another fisher who is part of POPA has more than 20 years of experience with university researchers (for whom he has been an assistant), and he is a member of a conservationist NGO. The POPA fisher with fewest years in the fishery (about eight) is a lifeguard in coastal Canelones, and he participates regularly in the meetings of the Lifeguard Union to which he is affiliated. Two other POPA fishers (one *alistora* and one son of the eldest SM representative) did not have previous experience with researchers or unions. Finally, the seventh fisher had had negative experiences both with SUNTMA (thus, he is no longer affiliated)

and with external interventions in Piriápolis (i.e. unsuccessful projects), but even so he became committed to the participatory research group.

For all participating stakeholders, this was the first involvement in a participatory research process. Stakeholders volunteered their time to participate; the DINARA representative was present as part of his job but also volunteered for weekend meetings. Workshop costs from May to December 2011, including travel (Montevideo-Piriápolis) and food, were funded by my research budget from the Centre for Community-Based Resource Management (Natural Resources Institute, University of Manitoba). In 2012, POPA got its own funding from several sources (see Section 4.4.4).

#### **4.4.1. Organizing and facilitating the participatory research process**

The participatory research initiative was organized and facilitated by a research group composed of Marila Lázaro (assistant researcher of the Science and Development Unit - UDELAR)<sup>43</sup>, Patricia Iribarne (undergraduate student of Human Biology, whom I co-supervise<sup>44</sup>) and me as primary researcher. Throughout the process, as the organization/facilitator team, we were in charge of:

- (i) Planning and facilitating workshops. Chairs were set up forming a semicircle, unlike conventional school rooms (formal education), promoting horizontal relations both among participants and between participants and the organization team (see pictures in Appendix 3). The “rules for good dialogue” (Box 4.1) were explained at the beginning of each workshop, with the aim of creating a nice environment for participants’ interactions and learning. We were also responsible for moderating or guiding the deliberation of the arguments or topics being discussed, making sure that everyone was participating, as well as facilitating collective decision-making through consensus building. Managing the few conflicts that arose among participants during the process (see Section 8.2.1) was another challenging task.
- (ii) Enhancing opportunities for face-to-face interaction among participants: mainly workshops (with time for informal interaction, such as breaks or brief birthdays’ celebrations) and informal meetings at participants’ houses (including mine), especially for sub-group work. From December 2011 until the Festival (February 2012), meetings took place every 10 days approximately.

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<sup>43</sup> After facilitating the first workshop in Piriápolis, Marila did not participate personally in other activities during the participatory research but rather helped me plan some of them. She also gave me advice in difficult times of the process.

<sup>44</sup> The title of Patricia’s honours thesis is “Participatory action research as a tool for socio-environmental transformation: the case of POPA – Por la Pesca Artesanal en Piriápolis”.

- (iii) Promoting a fluent communication among participants besides the workshops (e.g. via email and cell phone). At the beginning it was noticeable that I was the nexus between participants from Montevideo and those from Piriápolis. Even though the communication via email and cell phone among them increased over the months, fishers would still ask me to give them the phone number of the artisanal fisheries manager (e.g. for enquiries about their fishing licenses) and of other fishers.
- (iv) Inviting and motivating other fishers at the different landing sites in the Piriápolis area to join the group, keeping them informed about the progress of the participatory research initiative. Workshops were announced through posters (A4 size) on landing sites, and nearly 35 fishers were invited either personally or via text messages (SMS) each time (I knew most fishers from the first field season during 2010). After each workshop I provided a summary to disseminate among participants and other interested fishers. This persistent effort to achieve higher fisher participation weakened after the seventh workshop (November 2011) for two reasons. First, facilitating the group and sub-groups work was taking much more of my time than at the beginning of the process, and second, low fisher participation was discussed as a concern of the entire group during workshop evaluation, and thus, all its members took some charge of motivating other fishers to join us.
- (v) Making sure that all stakeholder groups and/or all participants were involved in every stage of the process. For instance, when sub-groups were formed during the organization of the Festival, I had to enhance and sometimes motivate the engagement of all who had offered to do specific tasks, making sure also that nobody was being left out (e.g. if someone was organizing a sub-group meeting, all its members should be informed).

**Box 4.1. Rules for good dialogue** (*Reglas del buen diálogo*)

- All opinions, knowledge and data are welcome.
- Listen carefully to what others say.
- Be open-minded when listening to others' opinions which might differ from yours.
- Be respectful to everyone.
- Do not interrupt when others are talking.
- Everyone should participate in the discussion.
- We all come to learn.
- Focus on the topic which is being discussed.
- Keep comments short and precise.
- Explain the "scientific jargon" or "fisheries jargon" when used.
- Take a break whenever needed.

Undoubtedly, practicing the facilitator role meant immense personal learning for me. One of the many lessons was to be patient, respecting participants' timing and the group's timing. Related to this, during the organization of the Festival I had to learn to not take over tasks that



were the participants' responsibility. In other words, I often had to remind myself that the Festival was a group's initiative, and that if it was not successful that would not be my responsibility but the group's. This was actually discussed collectively during the workshop in December 2011. At that time, one scientist commented that because of my PhD research she expected that I would dedicate much more time on the Festival's organization than participants. This was a perfect opportunity to clarify (one more time) my role as organizer and facilitator of the process, making explicit that the Festival was an initiative which had originated in the group and the event *per se* was not part of my PhD.

It was also in December 2011 when my role (and Patricia's) started to change. Participants had initially been invited for a participatory research initiative that would take place during 2011, and thus, close to the end of the year, they started wondering what would happen next. Given that all stated interest in continuing meeting and working together, but I would not be in charge of all the tasks described above, one scientist proposed taking turns for planning and facilitating workshops, which was appreciated by the other participants. Patricia and I produced two brief guides for these tasks (Appendix 4), and in 2012, participants started to take turns. This was important evidence showing that the group was in the process of becoming self organized.

#### **4.4.2. Initial stages: topic selection and stakeholder convening**

##### ***Selection of the topic to be addressed and fishers' initial convening***

Local stakeholders' interest in participatory research is a key factor before starting the project. Almost all the fishers (14 out of 16) interviewed in Piriápolis in 2010 expressed interest in participating in a participatory research initiative to be developed in 2011. They suggested a diverse list of topics/problems to be addressed: sea and fish pollution, interaction with sea lions, overexploitation by coastal trawlers, climate change, causes of resource decline, State support, relationships among fishers, cooperatives for market purposes, fleet improvement, and safety at sea. The first four topics were again proposed by fishers in March 2011, at the planning stage. Under the premise that participatory research should address local-scale problems, during informal interviews fishers were asked to choose which of the first two (pollution vs. sea lions) was more important to be addressed that year. Most fishers (15 out of 19) chose the latter, explaining that the conflict with sea lions is more urgent than pollution because of the overpopulation of the species, the expansion of its distribution along the coast, and an increased interaction with fishers' long-lines. Fishers gave diverse reasons to further explain their choice: pollution is a dead-end problem (i.e. there is no solution; it is impossible to stop pollution sources); it is more complicated than the sea lion topic (i.e. a lab and more financial resources would be needed); pollution is already being studied (referring to a biologist from the Faculty of

Sciences-UDELAR who was investigating heavy metals pollution in franciscana dolphins); fishers could not contribute to the research because of their lack of knowledge about pollution (unlike sea lions); and, the results could be counterproductive for them if the fish were actually polluted. It is worth noting, however, that one fisher who claimed the last argument, after knowing that one of the premises in participatory research is that participants decide how to disseminate the research findings, regretted having chosen the sea lion topic instead of pollution. In turn, the four fishers who chose to study pollution argued that it is important to know whether the sea and the fish are polluted, while at the same time explaining that sea lions have always been in the sea or that there is no solution to this conflict because DINARA will not take any measures. Interestingly, a few fishers wanted to investigate both topics, and most importantly, then all were happy to hear that the sea lion topic had been the “most voted”.

Regardless of fishers’ preferences for the topics that should be addressed, several reasons (sometimes complementary) came up to explain their interest in the proposed participatory research initiative: (i) the fishery is their source of livelihoods; (ii) the research will look for solutions to their problems (e.g. sea lions’ cull); (iii) they will learn and gain knowledge; (iv) theory (scientists’ knowledge) and practice (fishers’ knowledge) will be combined; (v) the causes of resource decline could be addressed at a later stage of the process; and (vi) they will be able to talk with a DINARA manager about fishing licenses. By asking fishers about the degree of participation (i.e. commitment) they would like to have in the participatory research initiative, I found that most of them wanted to collaborate or give assistance without being committed to all the activities (e.g. they did not want to attend every meeting) (Table 4.7).

**Table 4.7.** Degree of participation that fishers wanted to have in the participatory research initiative

<b>Participation categories</b>	<b>Description</b>	<b>No. fishers (n=16)*</b>
Research coordinator	Participates in all research stages jointly with additional stakeholders, and acts as a zonal coordinator keeping in close communication with the rest of the fishers at the landing site.	3
Research assistant	Participates in some or several research stages, including group meetings and data collection.	7
Research collaborator	Offers support to research assistants and coordinators, and is willing to be informed by them about the research progress.	6

\* Even though 19 fishers expressed interest in participating, I could not ask this question to three of them.

Only three fishers, each from a different landing site (Pesquero Stella Maris, Playa Hermosa and Playa Verde), wanted to be “research coordinators”. Furthermore, 13 out of 19 fishers who had voiced interest in participating (including one of the latter) did not attend any of the workshops.

An initial meeting with fishers was held at a cultural municipal center in Piriápolis (*Casa de la Cultura*), in April 2011, to develop the concept of participatory research, including its

differences from conventional research (with which some fishers have had previous experience), and to discuss in greater depth the sea lion problem. In particular, since achieving a common understanding of the problem (among stakeholders) would be a good starting point, we discussed the topics about which fishers thought there was disagreement with scientists' viewpoints. Even though the meeting notice was broadly disseminated, only four fishers participated (one of whom had stated that he wanted to be a "research coordinator").

### ***Invitation to additional stakeholders***

Once the problem to be addressed was defined and discussed with fishers, the next step was to invite the other stakeholders involved or related to it: government agencies, university scientists, NGOs, and fish buyers<sup>45</sup>. Table 4.8 shows the stakeholders who were invited and their responses.

Of particular importance for my doctoral research was the participation of DINARA: if this agency did not participate, it would not be possible to properly investigate the contributions of participatory research to co-management. Officers from two divisions were invited during meetings at DINARA, giving almost opposite responses (Table 4.8). After these meetings, a formal letter of invitation was submitted to DINARA's Director, who then asked for written advice from those officers. On the one hand, the Artisanal Fisheries Manager (who later became a member of POPA) highly appreciated the participatory research opportunity:

"This Unit understands that the topic of the project presented by MSc. Micaela Trimble is of great importance. The project will importantly contribute to the understanding of one of the main problems perceived by fishers from the Río de la Plata – Maritime Front, and particularly, by those who work in Piriápolis as their home port. Moreover, by taking place in an important place for the artisanal fisheries activity [Piriápolis], the project will enable to improve the ties between DINARA, the [artisanal fisheries] sector, and the academy. It is suggested to provide support to the project and the student."

From this, it should be underscored that improving relationships among stakeholders (a positive outcome of participatory research and a contribution to co-management) was one of DINARA's expectations. On the other hand, the Marine Mammals Manager, after writing a few paragraphs about the status of the sea lion population, reminded DINARA's Director that his department only has two employees, with limited time availability. Afterwards, the Director decided that the agency had no objections to support the participatory research initiative, but this support would depend on the availability of the Artisanal Fisheries Unit and Marine Mammals Department. As a consequence of this, the latter did not participate at all.

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<sup>45</sup> My previous experience as a marine mammal biologist was useful in this because the problem selected by fishers was not new to me, and also, I knew who the other stakeholders were.

**Table 4.8.** Invitation to additional stakeholders for the participatory research initiative. Except for two NGOs (APROBIOMA and SOCOBIOMA), who were contacted via email, the rest were invited personally. Stakeholders who did participate are shown underlined. (Gvt: government agency)

<b>Stakeholders</b>	<b>Mandate/Basis for invitation</b>	<b>Response</b>
<u>(Gvt) DINARA – Artisanal Fisheries Unit</u>	Artisanal fisheries management.	Interested in addressing the sea lion topic. Special interest in the participatory component of the project.
(Gvt) DINARA – Marine Mammals Department	Sea lion management.	Unwillingness to listen to fishers' criticisms to government data because fishers do not have university studies. No benefit from participating. Solving conflicts is not part of their duties, and there is no solution to the problem.
(Gvt) DNH (Port Authority)	Manages Piriápolis port (where there are fishing and recreational boats, and usually sea lions).	Sea lions are a tourist attraction for the port. A DNH venue in front of the port was provided for workshops but the Port manager never participated.
(Gvt) PNN (Coast Guard)	Fishers' safety at sea. (*)	Cannot participate because DINARA is the competent agency in this topic (sea lions).
<u>University scientists (biologists and ecologists, of BSc., MSc. and PhD level) (n=5) (**)</u>	Conduct research on sea lion ecology and its interaction with Uruguayan fisheries.	Interested in addressing and solving the problem. (n=5) Interested in keeping in touch with Piriápolis fishers and addressing the problem jointly (scientists-fishers). (n=1)
(NGO) APROBIOMA	Biodiversity conservation in Maldonado.	None of its members could participate.
(NGO) SOCOBIOMA	Biodiversity conservation in Maldonado.	No response was received.
<u>(NGO) SOS</u>	Marine animal rescuing and rehabilitation.	Tired of projects addressing the topic but interested in achieving a common understanding of the problem (rather than seeking solutions in a short period of time).
<u>(NGO) Ecópolis</u>	Interdisciplinary arena in which Piriápolis citizens and local organizations promote sustainable development. (***)	Interested in building relationships with fishers. Sea lions not only affect fishery resources but also recreational boats in Piriápolis port.
Fish buyers (n=2)	Indirectly affected by sea lions because fishers' catches are lower when these animals feed from fishing gear.	Too busy with work and could not participate. (n=2) Interesting topic because sea lions are causing resource decline. (n=1)

(\*) Although the Coast Guard was not a direct stakeholder of the sea lion topic, it was invited to bring it closer to fishers and DINARA. Piriápolis' Mayor (Municipal Government) could have been invited following the same criterion but given his evident lack of interest in the topic (during an informal conversation), I did not invite him. However, he offered logistical support. (\*\*) One biologist stopped participating after the first workshop due to personal reasons and job impediments. One social scientist in communication and culture studies joined the participatory research process in June 2011. She was interested in gaining field experience and finding a fishing community where she could do her Masters research. (\*\*\*) Even though Ecópolis was not a direct stakeholder of the sea lion topic, it was invited to link fishers with other citizens from Piriápolis. The NGO representative who got engaged in the participatory research indeed works at the Municipal Government, which meant a connection between fishers and the local government.

#### 4.4.3. Addressing the sea lions' impact on artisanal fisheries

A second meeting with fishers, this time informally, was held at a landing site (SM) to prepare their talk or presentation for the first multi-stakeholder workshop. Two fishers and three *alistoras* (also fishers' wives) participated. Some questions guided the meeting: How can the problem with sea lions be described (to scientists and additional stakeholders)? Which species do sea lion eat from their gear and how much? Has the problem gotten worse over time? Why?

Two weeks later, at the first multi-stakeholder workshop in Piriápolis, participants exchanged ideas and knowledge regarding the interaction between fishers and sea lions, including sea lion population status and feeding habits. Differing views between fishers and scientists were evident (Table 4.9). Given that the marine mammals manager did not participate, official information from the report he had written to DINARA's Director was shared at the workshop: (i) DINARA estimates that there are 10,000 sea lions in Uruguay; (ii) despite the fact that sea lions were culled by the State (SOYP and ILPE) until 1978, the population has been declining without any hope for recovery; and (iii) the main hypotheses to explain the latter include declines in prey, increased competition with other top predators and/or overlap with commercial fisheries (Ponce de León, May 2011). University scientists agree that the reasons for the population decline are unknown and may include direct harvesting, reduced prey availability and distribution as a consequence of environmental change, or biological interaction with fisheries (Riet et al. 2012). According to the personal opinion given by the artisanal fisheries manager and scientists at the workshop, the decreasing trend of the sea lion population would make resuming the cull unfeasible (one of the measures proposed by fishers).<sup>46</sup>

**Table 4.9.** Fishers' and scientists' views about the sea lion topic

	<b>Fishers' views</b>	<b>Scientists' views</b>
Sea lion population trend	Increasing (and expanding towards the West coast)	Decreasing (although expanding towards the West and East coast)
Sea lion depredation on fishing gear	Increasing since the cull stopped	Stable (1997-2010)
Main species in sea lion diet	Brazilian codling (sometimes only its liver and roe)	Whitemouth croaker (study based on scat analysis)
Fish quantity that sea lions eat	50 kg/day (two cases of fish)	Females: 5 kg/day; Males: 10-11 kg/day. (Estimation of food requirements)
Main causes of fishing resource decline	Coastal trawlers and sea lions	Coastal trawlers (and possibly artisanal fisheries, not sea lions)
Proposed measures to manage the conflict with sea lions	Cull; exports; subsidy; alternative gear; trawl banning	Subsidy; alternative gear; sacrifice the sea lions following fishing boats from the port; create fishers' cooperatives for direct marketing

<sup>46</sup> It is worth noting that DINARA's previous Director, in 2010 stated publicly that resuming the sea lion cull was a possible measure. This is well known among fishers.

Considering participants' interests, ideas, and research gaps, several activities were proposed as potential next steps after this first workshop (see Table 8.2). During individual interviews to evaluate the workshop, participants were asked to comment on which would be the most important, leading to defining a research question of interest to all.

### ***Defining the research question (sea lion impact on long-lines) and study methods***

Due to the high impact of sea lions on long-lines (which is a costly gear) and the lack of scientific data about these impacts in Piriápolis since 2002 (Szteren & Lezama 2006), most participants proposed to investigate the current interaction between sea lions and long-lines. At the second workshop, this research question (considered as the easiest to answer for some participants) was collectively agreed on, followed by a discussion of the study methods which ended in a protocol for joint data collection during fishing trips. This protocol (Appendix 5) was generated with input from all participants, based on a previous protocol developed by one of the scientists. For example, according to fishers, it was important to record not only the quantity of fish eaten by sea lions but also the fish damaged but not consumed (*pescado destrozado*), which were frequently given to sea gulls.

The next collective step to take would be testing the protocol (fishers in collaboration with other participants), something that did not take place. The main reason for this was that the long-line fishing season was ending at that time (June-July 2011) and fishers started to migrate along the coast. However, in September 2011 there were fishers in Piriápolis using long-lines, including participating fishers, and no fishing trip to test the protocol was coordinated. The protocol was resumed in 2012, as will be explained in Section 4.4.5.

### ***Marking sea lions at Piriápolis port to individually recognize them***

An activity that had been suggested at the first workshop but was not considered a priority by participants, that is, to investigate if the conflict is caused only by a small number of sea lions which have learned to follow artisanal boats, arose again at the second workshop. Thus, participants discussed ways of recognizing sea lions individually, and given their lack of natural marks (e.g. scars), as explained by fishers, scientists suggested bleach-marking them. The day of the fifth workshop, allowed by favourable weather conditions, one fisher, two scientists and the DINARA manager tried to bleach-mark a male sea lion that usually rests at the port (out of the water). However, the attempt was not successful because the animal would dive every time the pole approached it. During the workshop, participants concluded that a different strategy would be needed to mark the animal(s) successfully. Despite the fact that during interviews participants expressed their interest in finding out whether it is the same animals which

are always feeding from fishers' gear in Piriápolis, sea lion marking initiatives were not resumed because the group had other priorities (i.e. marking did not seem to be that relevant). Nevertheless, the one marking attempt (in September 2011) was valued positively by the four participating stakeholders for several reasons: it was an action taken collectively (e.g. not only by scientists); it meant a nice time shared by participants in an informal environment; and it was fun.

#### ***Fish traps as alternative fishing gear to avoid sea lions' attacks***

The use of alternative fishing gear (to gillnets and long-lines) was mentioned at the first workshop as a potential solution to the sea lion problem. Most participants were willing to try the use of fish traps (*nasas*), agreeing that DINARA should give financial support for this. However, at an informal meeting I had at DINARA with the artisanal fisheries manager and a technician of the Fishing Technology Lab, it was clear that financial support would not be available, although they would be willing to collaborate (with their knowledge) to build fish traps in Piriápolis. At the same time, some fishers were reluctant about trying alternative fishing gear because they perceived it as a threat to the long-lining fishing tradition in Piriápolis, which is a source of income for many families (e.g. *alistadores*). Nevertheless, when one fisher commented at a workshop that there were boats catching codling with fish traps in Punta del Este, everyone became motivated and it was decided to find out how fish traps have functioned in this area. The discussion on alternative fishing gear ended when fishers found out that traps were not getting very good catches and that they were hard to use in small boats. Nevertheless, trying fish traps regained participants' interest in 2012, when a possibility of applying for government funding became available (Section 4.4.5).

#### **4.4.4. Addressing another major problem (*pangasius* imports): First Artisanal Fisheries Festival, organized by POPA – *Por la Pesca Artesanal en Piriápolis***

Concomitantly with the progress of the planning stage of the study on sea lions' impact, the group started to discuss a second local concern that was initially brought up by one fisher during the first workshop and caught the attention of the other stakeholders. This was the market competition of imported *pangasius* (farmed catfish from Vietnam), which is sold at a cheaper price than local fish. In fact, restaurants that used to buy local fish in Piriápolis were now serving *pangasius*, often deceiving consumers about the identity and origin of the fish species (i.e. the menu says codling – *brótola* or flatfish - *lenguado*, which are local fish of high value). It is worth noting that several fishers who were not participating in workshops, during informal conversations at landing sites, had voiced their concern regarding *pangasius*. Some of them suggested that this problem should be addressed during the workshops (although they would not participate), even

before participants decided this. Conversely, when fishers who sell *pangasius* at their fish markets were invited to workshops in which the topic would be discussed, some explicitly stated that they would not attend, whereas others appeared to be annoyed and did not participate.

At the second workshop, participants shared the information they had found about *pangasius*, followed by a brainstorming exercise on which actions should be taken. While some tensions existed between scientists and fishers when discussing the sea lion problem, this time there was evident tension between fishers and the manager. According to fishers, the State should not have ever imported *pangasius* because there is enough fish production nationally (artisanal and industrial sectors) to supply the country's demand and even exports (the main destination of national catches). Even though the manager personally shared this viewpoint, fishers perceived that he accepted the import policies (i.e. he looked comfortable with that), which brought up a further difference between fishers and DINARA. However, when scientists proposed organizing a fisheries festival and a public campaign to inform consumers, all stakeholders became motivated with the potential initiatives, enhancing the group unity. The main decision was that the communication strategy would not be against *pangasius* but rather to promote artisanal fisheries and artisanal fish consumption. This is not to say, however, that fishers stopped thinking that *pangasius* imports should be banned or limited through quotas.

### ***Organizing the First Artisanal Fisheries Festival in Piriápolis and building group identity (POPA)***

As part of the communication strategy, the First Artisanal Fisheries Festival (*Primera Feria de la Pesca Artesanal en Piriápolis*) started to be planned. The objectives of the Festival, defined collectively at a workshop, were: to achieve informed consumption, leading people to have more local fish and less *pangasius*; to make people value local fish and the artisanal fishery; to bring consumers closer to fishers; and, in the long term, to improve the life quality of consumers and fishers. It is worth mentioning that given the prevailing fishers' stigmatization in Piriápolis (as in other regions in Uruguay), fishers and other participants considered it important to promote a greater valorization of their job and culture.

Logically, while organizing the Festival the group needed a name, and through a brainstorming exercise, the name "POPA<sup>47</sup> – *Por la Pesca Artesanal en Piriápolis*" (For Artisanal Fisheries in Piriápolis) was chosen. In order to develop a presentation page of the group, to be used while promoting the Festival and seeking funds, a collective discussion based on three guiding questions was held at a workshop: What characterizes POPA? Who is part of POPA? What are the group objectives in the short and long term? (See Box 4.3). Moreover, participants agreed on rules they had individually suggested for a functioning group, which should be

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<sup>47</sup> *Popa* (in Spanish) means stern.



respected by its members (Box 4.2). For the facilitators, this was a proper time to strengthen the incipient group, and promote participants' appropriation of it. Fortunately, that workshop (6<sup>th</sup>, October 2011) was the one with the highest number of participants, and the four stakeholder groups were present.

**Box 4.2. POPA's rules for a functioning group**

- ✓ Participate in workshops and make contributions
- ✓ Read workshops summaries
- ✓ Perform group tasks (e.g. as part of one or more sub-groups)
- ✓ Consult all the members before doing anything on behalf of POPA (e.g. progress done by sub-groups has to be shared with all the group before making final decisions)
- ✓ Commitment, will, dedication, trust, transparency, honesty, humbleness
- ✓ The common good of the group takes priority over personal interests
- ✓ For workshops: be punctual and respect the agenda as well as the rules for a good dialogue

The organization of the Festival required intensive group work, and sub-groups were formed to divide up the tasks: funding, logistics, brochures, posters (about sea lions and the conflict with the fishery and about fishing gear), media, photo exhibition, logo of the group, and primary school activities. Most sub-groups were composed by participants of three stakeholder groups. The idea of developing a poster about sea lions arose after the representative of one NGO (SOS) suggested bringing live sea lions for exhibition in the Festival. Fishers and scientists reacted negatively to this, and the poster was proposed by the latter. All participants agreed that it was necessary to provide information about the topic that had united them initially (i.e. the sea lion problem).

During the process of looking for financial and logistical support for the Festival, participants had meetings with several organizations, such as DINARA, the local and departmental governments (*Municipio de Piriápolis* and *Intendencia de Maldonado*), and the Center of Hotels and Restaurants of Piriápolis, among others. Two fishers participated in the meetings that took place in Piriápolis and Maldonado city, whereas unfortunately, none of them could attend the meeting with DINARA's Director in Montevideo. One scientist and the artisanal fisheries manager attended this meeting, during which the progress of the participatory research until that date (September 2011) was communicated to the Director, including the Festival's initiative. Among other things, he commented that *pangasius* imports would keep increasing, and he suggested showing the advantages of artisanal fish compared to *pangasius* (e.g. the former is fresh whereas the latter comes frozen), without mentioning the disadvantages of the latter.

**Box 4.3. Presentation page of the multi-stakeholder group formed during the participatory research initiative**



**Por la Pesca Artesanal en Piriápolis**

**Who is part of POPA?**

POPA is made up of artisanal fishers of the Piriápolis area, the Artisanal Fisheries Unit of DINARA (National Directorate of Aquatic Resources), the Faculty of Sciences-Universidad de la República, the Faculty of Human Sciences-Universidad Católica del Uruguay, Proyecto Pinnípedos-Cetáceos Uruguay, Ecópolis and SOS Rescate de Fauna Marina.

**How did POPA originate?**

The group was formed during a participatory research process (initiated in May 2011) to investigate problems of Piriápolis artisanal fishery among the different stakeholders (artisanal fishers, scientists, DINARA and NGOs). They participate in every research stage and every action that the group decides to take.

**What characterizes POPA?**

- POPA meets people with very different experiences and realities, but with one interest in common: artisanal fisheries. POPA is interested both in the relationships between artisanal fishers and other social actors and in the relationships between fishers and nature.
- POPA is an arena where different types of knowledge meet, enhancing mutual learning among participants. Each member contributes to the group from his/her experience and discipline.
- POPA is a non-profit group, and the participation of its members is voluntary.

**What are the group objectives?**

In the short term:

- To promote the knowledge and appraisal of artisanal fisheries by the society.
- To encourage artisanal fish consumption given growing fish imports.
- To investigate in an interdisciplinary and participatory way the interaction between artisanal fisheries and sea lions (which feed from gillnets and long-lines, damaging fishing gear).

In the long term:

- To look for strategies which contribute to sustainable fisheries.
- To facilitate direct marketing of artisanal fish, and to improve its quality.
- To contribute to improving the life quality of the people who chose to live from the artisanal fishery.

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The Festival was considered as the first significant accomplishment of POPA. It took place during a weekend in February 2012 (11-12<sup>th</sup>, from 6pm to midnight), and approximately 3,000 people attended, most of them Uruguayan tourists. DINARA's Director, six employees of this agency, MGAP's undersecretary, scientists from the Faculty of Sciences (UDELAR), members of Ecópolis, and fishers from other coastal communities also visited the Festival. The main attractions of the event were: a photo exhibition entitled "A day in the life of artisanal fishers"; an active exhibition of fishing gear, of which fishers were in charge (e.g. visitors could learn and try to prepare long-lines); art inspired by artisanal fisheries (two artists even painted during the Festival); talks about health education focusing on the nutritional properties of local fish; local fish tasting (seven recipes were made by different chefs, including one coming from Mexico); and live music. Two brochures describing the artisanal fishery in Piriápolis (e.g. fishing gear, fish species caught) and providing recipes, were distributed to every visitor (Appendix 6). To organize the Festival, the group received support from over 30 organizations and people from different sectors (public, private, academics, civil society) at different levels (local, national and international) (POPA 2012). The group spent nearly 2,500 USD, which was covered by the funding received from UDELAR (University Extension), ANCAP (State oil company), UTE (State power company), COSSAC (saving and loan cooperative), and Global Greengrants Fund<sup>48</sup>. The Festival was featured on TV and radio programs, local and national newspapers, websites, and other media. For instance, on February 14<sup>th</sup> (2012) the festival was on the front page of a national newspaper (*La Diaria*) (Appendix 7), which is remarkable because artisanal fisheries are rarely part of important news in the country's press.

During the days previous to the Festival and the weekend of the event the group worked intensely. For five consecutive days, group members worked together in an informal environment, sharing conversations, meals, and a mix of emotions (from nervousness and anxiety to tremendous joy). It was evident that the festival helped strengthen the group. Out of the fifteen group members, two scientists could not participate because they were doing fieldwork at Isla de Lobos, and one fisher (the only woman) could only visit the event briefly because she was working at a restaurant. However, family members of two participating fishers, as well as fishers who were not part of POPA, helped immensely during the Festival. Before the second day, the group and these other helpers did a preliminary evaluation of the first day in order to share their/our perceptions (everyone agreed it was a success!) and improve everything that could be improved. On the second day, brief surveys were conducted by the group's scientists, one fisher and the manager, with 44 visitors to get to know their opinion about the Festival and their habits of fish consumption. The survey had originated from a brainstorming discussion on how to evaluate the Festival and consumers' habits (which would provide useful information for

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<sup>48</sup> The financial support (USD 5,000) received from Global Greengrants Fund (<http://www.greengrants.org/>) would be spent not only on the Festival but also on other group activities (such as the study about sea lions).

future activities of the group). The visitors, like the organizers, rated the event positively (e.g. they learned about the fishery, they tried delicious fish) and asked for a second festival.

Concurrently with the organization of the Festival, at least two other actions were taken by participating fishers regarding the *pangasius* problem (i.e. these were not POPA's initiatives). First, fishers from SM, who were concerned about fish stalls selling *pangasius* at their landing site, made the decision to not sell their fish to them until these stalls stopped commercializing *pangasius*. The success of this local measure was temporary because fish markets resumed selling *pangasius* when local fish was scarce. Second, one fisher put a sign in front of his market at the port to advertise that he sells artisanal fish (*pescas artesana*). Indeed, during the last program at the local radio the day after the Festival, it was this fisher who asked all fishers not to sell *pangasius* but local fish.

#### **4.4.5. POPA's activities after the First Artisanal Fisheries Festival**

In February 2012 the group had an informal meeting to celebrate the Festival's success, as well as to start planning the group's work for that year. However, no decisions were made because participation was low (only four group members participated). In March 2012, the communication sub-group met to evaluate their activities. Later that month, there was a group workshop at the cultural municipal center with two main goals: evaluating to what degree the Festival's objectives had been achieved, and planning the group's work for the rest of the year. The group decided to resume the study about sea lion impact on long-lines, and to continue with the objective of promoting artisanal fisheries valorization. Moreover, in that workshop, tasks were divided for the following six months. For example, one fisher would be in charge of facilitating workshops, one scientist and DINARA manager would be in charge of organizing workshops, and two scientists with two fishers would coordinate the sea lion study.

Due to the need for assistants to collect data for the sea lion study, a training workshop was held in April 2012 at the Faculty of Sciences, addressed to students willing to volunteer in POPA. The workshop was organized by one scientist. Three other group scientists and three fishers participated. It is worth mentioning that this was the first POPA activity taking place at the University (and the first group activity of which I could not participate – I was doing fieldwork in Paraty). Moreover, in this opportunity, the participatory research approach was briefly introduced to biology students, and there was some exchange between fishers and students. In late May 2012, after the Piriápolis lieutenant expressed his concerns about fishing trips with observers (either POPA members or students) for data collection, the Coast Guard organized a 3 hour-course for POPA and volunteers about safety at sea.

In June 2012, there was a group workshop in which the discussion about the study sampling method was resumed, reaching consensus and leading to some changes in the

protocol that had been produced in 2011. In this workshop, communication activities of the group were discussed as well, for instance, to motivate additional fishers to join POPA (however, no action has been taken in this regard). From July to September 2012, no group activity took place, and email exchange was very little (I was in Winnipeg at that time). In October 2012, I sent an email suggesting that the group should meet and everyone agreed. The workshop we had that month was very productive. First, we discussed the reasons why the fishing trips for the sea lion study had not taken place (e.g. the croaker season started and fishers migrated; the boat of only one participating fisher had permission to take four people onboard, of which one could be an observer). Except for one fisher who considered that it was not a good idea to collect data for the sea lion study (e.g. because long-lines are used only a few months of the year and the study will not find a solution to the problem), the rest of the group wanted to continue in that direction. Given the constraints imposed by the boats' maximum crew (i.e. fishers cannot take anybody onboard), one fisher suggested collecting the data themselves. Scientists appreciated this, although they wanted to make sure that data would be taken "objectively". Moreover, in that workshop, three scientists shared with the rest information about DINARA-ANII<sup>49</sup> funding for research projects on fisheries, suggesting that the group could apply. One fisher mentioned that this was a good opportunity for trying out the fish traps, as alternative gear to avoid sea lions' impact, and everyone agreed.

From mid October to mid December the group worked intensely preparing the research proposal to be submitted to DINARA-ANII, entitled "Mitigation of the impact from the interactions between sea lions and artisanal fisheries: participatory research to evaluate fish traps as alternative fishing gear". Group meetings took place in Piriápolis and Montevideo every ten days approximately. It is worth mentioning that for the first time the group met at DINARA, at the offices of the Artisanal Fisheries Unit and Fisheries Technology Lab (division which will help POPA make different kinds of traps). Five fishers participated in these meetings in Montevideo (four of them travelling from Piriápolis), while at DINARA, they also did some paperwork regarding their fishing license or fishing slips. POPA members valued the initiative of submitting this research proposal. In May 2013, POPA applied for the Small Grants Program (PPD) of UNDP with a similar project, but soon after, PPD announced that the proposal was not approved. In August 2013, the National Agency for Research and Innovation (ANII) announced that POPA's research proposal (with a budget of around USD 55,000) had been approved. Also in 2013, POPA received a conservation award (2,000 Euros) from a German NGO (Yaqu-pacha), which was interested in supporting an artisanal fisher group in Uruguay.

It is worth noting that two POPA fishers did not participate in any group activity after February 2012. One of them explained that he was busy, at first working in construction in Montevideo and later working at the fish market he had just opened in that city. The second

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<sup>49</sup> National Agency for Research and Innovation (ANII: *Agencia Nacional de Investigación e Innovación*)

fisher, a woman, has not communicated with the group since the Festival. One NGO representative (SOS) has been participating only rarely, mainly because of health issues.

#### 4.4.6. Data collection procedures for investigating the participatory research case

An evaluation of the participatory research in Piriápolis was conducted throughout the process with the purpose of learning and improving, and the ultimate goal of informing future research work (Blackstock et al. 2007). Data collection took place by means of semi-structured interviews with participants, participant observation during workshops, group/subgroup meetings, the Festival, and informal conversations with participants. Data from participant observation were entered in my daily field notes. As suggested in the literature about the evaluation of participatory processes (Rowe et al. 2004, Blackstock et al. 2007), data was gathered from a variety of participating stakeholders, through combining recorded data (e.g. fieldnotes) and reported data (e.g. interviews), in order to capture the diversity of views.

Most interviews were audio-recorded. Written questionnaires were only used when interviews could not be scheduled. The number of evaluation instances with each participant varied between 1-7 (4 on average) depending on the number of workshops they attended and their time availability for evaluating the participatory research (Table 4.10).

**Table 4.10.** Number of workshops to which each participant attended and number of interviews

<b>Participants (POPA)</b>	<b>No. workshops (9 in total - 2011)</b>	<b>No. Interviews / questionnaires</b>
Fisher 1	5	4
Fisher 2	2	2
Fisher 3	6	3
Fisher 4	9	7
Fisher 5	3	1
Fisher 6	6	4
Fisher 7	4	3
Manager	7	6
Scientist 1	7	6
Scientist 2	5	5
Scientist 3	8	6
Scientist 4	7	5
Scientist 5	4	5
NGO 1	8	6
NGO 2	7	3
<b>TOTAL</b>		<b>66 (*)</b>

(\*) Out of the 66 individual instances of evaluation of the participatory research initiative, 9 consisted of written questionnaires. Five other interviews were conducted with individuals who participated only in one workshop (four fishers and one scientist).

Interviews were conducted with the collaboration of the undergraduate student who was part of the organization/facilitator team. The final interviews with all participants (n=15) took place

between February and April 2012, following the Festival; the interview guide, with open- and closed-ended questions, can be found in Appendix 8. Questions belonged to three main sections: evaluation of participatory research process and outcomes (including a specific question about the contributions for the emergence of co-management), changes in relationships, and learning.

#### **4.5. ANALYSIS AND VALIDATION OF DATA**

Before starting analyzing data, all interviews were transcribed. Transcripts from interviews and extensive field notes were coded both inductively (i.e. grounded) and deductively (i.e. from research objectives and interview questions), after which themes and categories were identified (Cope 2008). Atlas.ti Software was used for these purposes (Peace & van Hoven 2008). Data from closed-ended interview questions were tabulated in Excel spreadsheets for analysis. It is worth noting that the closed-ended questions about degree of agreement with particular statements, which originated from fishers' opinions at the beginning of Phase I in Piriápolis and were used with a 5-point scale (1: Strongly disagree, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Strongly agree), were transformed to a 3-point scale during analysis (1-2: Disagree, 3: Neither agree nor disagree, 4-5: Agree) because most interviewees did not differentiate among the five categories. In the following chapters (5-9), research findings are often illustrated by direct quotations from participants.

Triangulation was one of the strategies used to ensure the research validity. Triangulation of data methods (i.e. comparing data collected by various means, such as interviews and participatory observation) and triangulation of data sources (i.e. interviewing different people) were of particular relevance (Krefting 1991). In addition, member checking of findings (a strategy that ensures that the researcher has accurately translated the participants' viewpoints into data) was conducted throughout the research, and close to the end of it, to ensure accuracy and validity (Morse et al. 2002). Member checking was conducted both with participants (i.e. fishers who had been interviewed) and non-participants. In Piriápolis, in November 2010 I handed out among fishers a report describing the artisanal fishery based on my first field season, and asked them for feedback. In addition to written reports, I shared my research findings during informal conversations and meetings with fishers and POPA members. The collective results of the participatory research case were shared at a POPA meeting in June 2012, after which participants suggested distributing them to the Direction of DINARA and to general public through the media. In Paraty, validation was the main purpose of the second field trip. After validation during interviews and informal talks, a report was written in Portuguese and distributed among fishers and other community members in Praia Grande and Ilha do Araújo, as well as at the Colônia.

## **CHAPTER 5: CHANGES IN THE ARTISANAL FISHERY IN COASTAL URUGUAY**

### **5.1. INTRODUCTION**

It is increasingly claimed that alternatives to top-down or command and control management are needed for governing social-ecological systems as complex adaptive systems where society and nature are interdependent (e.g. Berkes & Folke 1998, Berkes et al. 2003). Focusing decision-making on ecological components only simplifies reality and leads to incomplete and narrow conclusions; the same is true if the focus is only on the social side (Folke et al. 2007). Moreover, it is well known that local knowledge about resources, climate, and ecosystem dynamics can provide unique information about local conditions and potentially complement scientific knowledge (if not intertwined during knowledge co-production) for natural resource and environmental management (e.g. Berkes et al. 2000, Armitage et al. 2011).

The objective of this chapter is to explore the changes that have been occurring in artisanal fisheries in coastal Uruguay, as an integrated social-ecological system, based on the analysis of stakeholders' perceptions and fisheries policies. The main argument is that the changes that have been occurring in the studied artisanal fisheries can provide a window of opportunity for seeking a more participatory management regime (i.e. co-management).

In what follows, the changes in fishing resources are explored (Section 5.2), after which Section 5.3 looks at changes in fishing practices and relationships among fishers. Section 5.4 focuses on changes in DINARA fisheries policies and regulations, whereas Section 5.5 explores the current transition in fishers' way of life. Lastly, findings from these sections are discussed from the angles of a social-ecological crisis and windows of opportunity.

### **5.2. CHANGES IN FISHING RESOURCES**

This section begins by exploring fishers' perceptions about changes in fishing resources, including their view about each of the causes of resource decline identified by them. Second, the perceptions from several DINARA members as well as one SUNTMA representative regarding the status of fishing resources, including official data, are presented. The view of these stakeholders about coastal trawling (the main cause of resource decline according to fishers) is explored at the end of the section.

#### **5.2.1. Fishers' perceptions about changes in fishing resources**

The decline of most fish species caught in Piriápolis and the Río de la Plata estuary (including the three main species: Brazilian codling, stripped weakfish, whitemouth croaker) was



a recurrent theme raised by fishers. Most of them have been noticing increasingly lower catches since 2000-2005 (according to an old fisher, however, resources have been declining since 1980). Moreover, nearly seven species which used to be caught in the Piriápolis area (mostly sharks: Chondrichthyans), are no longer found, which is told by fishers with nostalgia. Some of these species have been overexploited, whereas others could still be found farther offshore, fishers explained.

The fishing seasons, locally known as *zafras* (periods in which a certain species is abundantly caught), have shortened since 2000 (Table 5.1). For example, the croaker season in Piriápolis used to last three months in winter, whereas now it lasts less than a month. This has led fishers to move to other localities where the croaker season is taking place (Section 5.3.2). Furthermore, the dates of the fishing seasons are no longer predictable. Considering the economic importance of fishing seasons, because these are the times of the year when fishers make the highest income (e.g. 500-1000 USD per fishing day), enabling them to pay back their debts (e.g. with fish buyers, groceries stores), the unpredictability of the fishing seasons' dates and duration becomes a source of stress. Fishers stated that in the past the croaker catches were more abundant, and the money they used to make during the fishing season was enough to buy a fishing boat. Nevertheless, not all fishers agreed that fishing resources have been declining and that fishing seasons are now shorter (Table 5.1). During informal conversations, a few fishers commented that fish resources are not declining, but rather, that either there are more fishers to divide fish up or the boat engines' noise cause the fish to swim away.

Fishers generally commented that fish schools are smaller than in the past, and some of them also claimed that individual fish of certain species are smaller (Table 5.1). Rarely, fish extraordinarily big are caught in Piriápolis (e.g. codlings in 2011). A few fishers commented that fish with deformities were caught more often than in the past, although this was still infrequent. Fishers did not know the causes of the observed deformities and asked for research about it.

**Table 5.1.** Changes occurring in the fishery since 2000 according to fishers (\*)

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Currently, compared to 10 years ago...				
There are fewer fish.	12/15	1/15	0	2/15
Fishing seasons ( <i>zafras</i> ) are shorter.	11/13	2/13	0	0
The size of the species caught is smaller.	5/12	7/12	0	0
Fish with deformities are found more often.	3/10	7/10	0	0
The problem with sea lions/fur seals is worse.	12/13	1/13	0	0

(\*) The number of fishers asked these statements varied between 10 and 15.

Fishers identified several causes of resource decline (which were then used in a closed-ended question): coastal trawlers; sea lions and fur seals; climate change; pollution; and greater technology and gear of artisanal boats (Table 5.2). DINARA’s poor administration of fishing resources (allowing industrial bottom-trawling) was also mentioned by fishers as a driver of resource decline. Some fishers commented that they should tell DINARA all the changes they have been observing in the fishery so as the agency can take measures for improvement. Others, however, stated that DINARA already knows about resource decline but management is under the influence of powerful fishing companies. In what follows, the primary identified causes of resource decline (Table 5.2) are explored.

**Table 5.2.** Causes of resource decline ranked by fishers (\*)

<b>Causes of resource decline</b>	Coastal trawlers	Sea lions and fur seals	Climate change	Pollution	Greater technology and gear of artisanal boats
First cause	8/14	5/14	2/14	1/14	0
Second cause	4/14	5/14	3/14	3/14	0
Third cause	1/14	0	2/14	2/14	2/14
Fourth cause	0	1/14	0	1/14	1/14
Not a cause	1/14	3/14	7/14	7/14	11/14

(\*) In this closed-ended question asked to 14 fishers, the respondent could assign the same rank to more than one option. Only two fishers did so; one of them put coastal trawlers and climate change as the first cause, whereas another one put coastal trawlers and sea lions in first place, and climate change and pollution in second place.

### ***Coastal trawlers***

Coastal trawlers were identified by fishers as the main cause of resource decline, due to two major reasons: (i) trawl nets are non-selective; mesh size is very small and tons of fish are discarded; (ii) coastal trawlers do bottom-pair-trawling, damaging the sea floor, where several fish species feed or spawn. It is worth remembering that two main species targeted by coastal trawlers are also main species of the artisanal fishery: croaker and weakfish. It is common for artisanal fishers to have worked in the large-scale fishery, or to alternate their job in the two sectors, and know from first hand the negative effects of bottom-trawling. When resources were abundant, the industrial fishery was a very good source of income, but now fishing trips in the large-scale sector are longer and wages lower. Not all artisanal fishers are interested in working in that sector. Those who have not worked in large-scale fishing have not done so for lack of opportunity; because they do not like the idea of being away for one to two weeks at a time; or out of principled opposition to the non-selective and bottom-damaging nets used in trawling.

Most fishers strongly believe that the fishery would improve if coastal trawling was forbidden. However, although trawlers are seen as “the enemies” or “the bad guys”, fishers

recognized that the large-scale vessels are a source of income for many families, who have the right to live from fishing resources. As fishers would say, “The fault is always in the biggest”; artisanal fishers blame large-scale vessels for resource decline, and in turn, sport fishers blame artisanal fishers. Artisanal fishers commented that trawlers should be restructured in order to use more selective fishing gear (Table 5.3), but most feel hopeless about it. Even though a few fishers considered it unfair that large-scale vessels use trawl nets when this gear is forbidden for artisanal boats, most of them disagreed that artisanal fishers should be allowed to use trawl nets (e.g. because trawling overexploits resources and damages the sea floor).

Additional measures proposed by fishers seem more feasible than changing the gear used by trawlers, such as more enforcement of the 7 nautical miles (nm) zone exclusive for the artisanal fishery, extension of this zone to 15 nm, or trawlers’ suspensions when violating regulations (fines are weak sanctions because they are easily paid by fishing companies). Even though the vessel monitoring system (VMS) was implemented for the large-scale vessels, fishers stated that coastal trawlers always find a way to get into the 7 nm-zone. When this happens, artisanal fishers’ gear might be dragged by the trawler, and there is also a risk that the trawler sweeps away the small boat. Artisanal fishers also take these risks when they go fishing farther than 7 nm.

**Table 5.3.** Measures proposed by fishers regarding trawling

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Trawlers should be restructured so as to use more selective fishing gear.	14/16	0	0	2/16
More enforcement of trawlers is needed.	14/15	0	0	1/15
Trawlers should fish farther than 15 nautical miles.	11/15	2/15	0	2/15
Trawlers’ fishing licenses should be suspended when they violate regulations.	14/16	0	0	2/16
Artisanal fishers should be allowed to use trawl nets.	3/16	12/16	0	1/16

### **Sea lions and fur seals (*Pinnipeds*)**

Sea lions (*Otaria flavescens*) and fur seals (*Artcocephalus australis*), the two pinniped species breeding in coastal Uruguay (locally known as *lobos*), were the second most important cause of resource decline according to fishers. Most of them believe that the population of these species have been increasing since the cull conducted by the State stopped (in the 1980s), which would have been aggravated by the decline of shark populations (pinnipeds are known to be part of sharks’ diet). In fact, according to some fishers, sea lions and fur seals eat more tons

of fish than is caught by the entire large-scale fishing fleet. Furthermore, artisanal fishers face a direct interaction with sea lions and to a lesser degree with fur seals: these animals feed from gillnets and long-lines (diminishing fishers' catches) and damage this gear. This problem has gotten worse over the past ten years (Table 5.1), which some fishers associated with sea lions' overpopulation and others with resource decline. The latter explained that they are competing with sea lions for fishing resources, which are now scarcer. Fishers have adopted a number of strategies to avoid or diminish sea lions' impact at sea (Box 5.1). These strategies are frequently used in combination because sea lions are intelligent animals which learn easily how to find fishing gear at sea, fishers explained.

Those who did not identify pinnipeds as a cause of resource decline argued that these animals have always been at sea, which is "their" environment. Nevertheless, all interviewed fishers agreed that DINARA should take up the sea lion cull. Other fishers, during informal conversations, were more inclined towards alternative measures.

**Box 5.1. Strategies adopted by fishers to avoid or diminish sea lions' impact**

- Fishers give fish remains to the sea lions hanging out at the port with the purpose of "filling" them. When fishers leave the port, sea lions would follow the boats but they would be less hungry.
- Fishers try to depart from the port at the same time as others in order to decrease the probability of being impacted by sea lions or to diminish the impact. A few fishers wait to depart until most boats are at sea, a strategy which is not well-regarded by others.
- At sea, fishers may approach another boat pretending that they need something, but what they are actually doing is carrying sea lions along to this boat!
- Fishers have stopped leaving gillnets and long-lines set during a whole day or night.
- As soon as the fishing gear is set, fishers need to move away from the spot because otherwise the boat would be an attractor for sea lions.
- Buoys (used to indicate the position of fishing gear) without flags or pole markers are not as easily seen by sea lions. Some fishers use only the GPS.
- Gillnets and long-lines are set in separate "gangs", because otherwise, if sea lions found one net or long-line, they would eat the fish caught in all of them.
- Gillnets and long-lines need to be pulled as fast as possible when sea lions are around to minimize the proportion of the catch that they eat.
- In order to shoo sea lions away from the fishing gear, fishers may use petards, but the animals seem to have learned that these are not dangerous. Very few fishers use rifles instead (although this is against the law).

***Climate change***

According to half of the fishers interviewed, climate change is one of the causes of resource decline. Changes in sea currents, warmer sea temperature, and stronger winds negatively affect the feeding and reproductive habits of fish species. For instance, the sea

temperature used to be cold in March (end of summer / early autumn), an indicator of the arrival of cold water currents rich in nutrients and shrimps, and thus codling. Now the sea is still warm at that time of the year. Several fishers indicated that the strong storm which occurred in August 2005 (an extra-tropical cyclone), one of the strongest ever in Uruguay with winds exceeding 160 km/h, marked a before-and-after in the fishery (e.g. resources have been declining since then; the croaker season in Piriápolis became almost nonexistent).

Even though half of the fishers did not identify climate change as a cause of resource decline, they all in general have been noticing the same changes: (i) The weather is more unpredictable than ten years ago, and thus, they cannot predict *when* and *where* they are going to catch *what* based on the weather conditions. (ii) Wind storms (*temporales*) are more frequent than in the past, with stronger winds, leading to fewer fishing trips per month. (iii) The four seasons are no longer defined; during autumn and winter the sea temperature is warmer than it used to be, hampering the arrival of fish. (iv) The rainfall has increased, and thus the volume of freshwater getting in the Río de la Plata estuary has too. One of the subsequent changes of this is mussels decline in the Piriápolis area, meaning less food availability for the croaker, fishers explained.<sup>50</sup>

### **Pollution**

Most fishers agreed that the sea is more polluted than 10 years ago. For instance, plastic bags are found at sea more frequently, and the use of agrochemicals has been increasing. In addition, there is fishers' concern about a sewage drainpipe close to Pesquero Stella Maris; pollution generated by two-stroke engines; and potential increased heavy metal concentration in fish. However, according to fishers, pollution is not an important cause of resource decline.

### **Greater technology and gear of artisanal fishing boats**

The prevalent perspective among fishers is that the improved technology and gear they use (see Section 5.3.1) is not a source of resource decline because gillnets and long-lines are selective, unlike trawl nets. One fisher also explained that technology, referring to the depth-finder, is only used during three months of the year (i.e. during the croaker season). Nevertheless, a few fishers noted that the increased number of artisanal boats contributed to resource decline, although to a much lesser degree than trawlers and pinnipeds.

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<sup>50</sup> Mussels in Piriápolis (as in Punta del Este) have also been declining because of the invasive species *Rapana venosa* (veined rapa whelk), originally from Asia, which feeds on native mussels. *Rapana* also affects fishers directly by eating the long-lines' bait; fishers now try to set their gear in spots where this invasive species is not abundant.

## 5.2.2. Perceptions from non-fisher stakeholders about changes in fishing resources

Official data from DINARA show that all five of the most important species of Uruguayan fisheries (common hake; whitemouth croaker; stripped weakfish; Argentine croaker, *Umbrina canosai*; and long-tailed hake, *Macruronus magellanicus*) are fully exploited or overexploited (Mikkola & Montiel 2008). Of these, the whitemouth croaker and stripped weakfish are targeted by the artisanal and large-scale sectors. Based on information from stock assessment, both species have been catalogued as fully exploited, although with signs of overexploitation (Defeo et al. 2009, Defeo et al. 2011). Landings of whitemouth croaker and stripped weakfish have been declining since early 1990s (Galli 2008, Defeo et al. 2009, DINARA 2009). As Chapter 3 described, management measures of large-scale fisheries are focused on determining maximum sustainable yields (MSY) and total allowable catches (TAC) of single species. These are determined through stock assessments based on landed catches rather than actual catches, in coordination with Argentina (Joint Technical Commission of the Maritime Front). Moreover, catches are usually greater than MSY (e.g. the total catch of the stripped weakfish has been greater than the MSY since the 1990s, Defeo et al. 2009). It is noteworthy that there is not such information available about stock assessments for the Brazilian codling, which is targeted only by the artisanal sector.

During an interview, the artisanal fisheries manager stated that different indicators or models lead to different resource status (e.g. fully exploited, overexploited), but none of them shows that the whitemouth croaker is declining. He added that fishers' perception about croaker decline would be a consequence of the species' movements along the coast. For their part, members of the Directorate of the National Union of Seamen (SUNTMA), in agreement with industrial fishers I had the chance to talk to in Piriápolis and Montevideo, voiced their concern about resource overexploitation. One skipper of a coastal trawler stated that the croaker and weakfish have been declining; this was so that the number of fishing trips per month decreased markedly. He added that DINARA is aware of resource decline but it is not going to take any measures because of the economic profits from the large-scale sector. Likewise, SUNTMA's Secretary of Organization opined that:

“Scientists, both Argentinians and Uruguayans, say that the common hake will hardly recover from over exploitation, and also, that the whitemouth croaker is in its maximum level of exploitation, and the stripped weakfish is overexploited. ... Summing up, over the past ten years, resources have been under a permanent deterioration. This doesn't mean that businessmen [i.e. fishing companies] have had financial losses. On the contrary, they have earned more and more because commodity prices have been rising.”

In contrast to the perspective of two DINARA researchers working on stock assessments, who showed to be aware of resource decline and concerned about it, the Director's opinion varied in different contexts. In May 2010, during a National Meeting of Artisanal

Fisheries, DINARA's Director stated that there are fewer and fewer fish than in the past, a reason why they stopped granting artisanal fishing licenses. One month later, at an Advisory Meeting in DINARA's main office, after the data from stock assessment were presented, the Director stated that the croaker and weakfish were fully exploited and that the current catches could be maintained over time. However, during an interview in August 2010, he argued that more regulations for the artisanal sector would be needed because fishing resources had reached its limits of exploitation.

### ***Coastal trawling***

Similar to artisanal fishers, other interviewed stakeholders identified coastal trawling as a cause of resource decline: DINARA researchers in charge of stocks assessment, specialist of Fisheries Technology; SUNTMA representative; Port chief and fish buyers in Piriápolis. Most of them suggested that trawl nets should be gradually replaced by selective gear. Galli (2008), a DINARA researcher who also belongs to a NGO (REDES), pointed out that discarding is one of the main factors that contribute to the overexploitation of Uruguay's main fishing resources, together with allocating licenses to on-board freezer vessels, and concentration of ownership (i.e. oligopolies). Likewise, SUNTMA's Secretary of Organization stated that non-selective trawl nets have been overexploiting fishing resources. He commented that in 1987, a study conducted by the Faculty of Sciences (UDELAR) in coordination with the Union, determined that 140,000 tons of fish were being discarded annually. He added that this situation was aggravated by Argentinian vessels, whose catches doubled the MSY in the 1990s.

DINARA's Director and the artisanal fisheries manager argued that several measures were taken by the agency to prevent the negative effects of coastal trawling: the VMS was implemented to control large-scale vessels (2004-2005); the coastal zone exclusive for artisanal fishing was extended from 5 to 7 nm (2007)<sup>51</sup>; and closed areas (*vedas*) to protect croaker juveniles were implemented seasonally. While interviewed, DINARA's Director reported that:

“Artisanal fishers used to conflict with industrial fishers. Now this conflict has been greatly minimized due to enforcement mechanisms and the extension of the zone under trawler protection, from 5 to 7 nautical miles. Also, from the VMS data I don't remember any industrial vessel entering this zone during the past year. This conflict [between artisanal fishers and trawlers], which was present in 2005-2006, has been minimized, but the conflict between sport fishers and artisanal fishers still remains.”

The specialist of the Fisheries Technology Lab (DINARA)<sup>52</sup> stated that after the VMS was implemented, fewer vessels entered the artisanal fishing zone. However, he added that only a few vessels were fined, associating this with the long time taken by the judicial process.

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<sup>51</sup> Before taking this measure, DINARA estimated the amount of fish that would be lost (i.e. not caught) if the non-trawling zone was extended to 7, 10 or 12 nautical miles (confidential report).

<sup>52</sup> This Lab has been working on designing more selective trawl nets.

In 2010, the Chamber of large-scale ship-owners (CAPU) sued DINARA for having extended the non-trawling zone from 5 to 7 nm without providing reasons based on scientific or technical data.<sup>53</sup> In 2011, the administrative courts determined that the ship-owners won the legal action. Even though DINARA had gathered technical data supporting the extension of the zone, the courts stated that this should have been done before the lawsuit. Since 2012, the regulation extending the non-trawling zone was not valid any more, and thus only the Decree 149/1997 is valid, which determines that this zone is 7 nm width from Colonia to Isla de Flores (island in front of Montevideo), and 5 nm from there to the east (border with Brazil).

### **5.3. CHANGES IN FISHING PRACTICES AND RELATIONSHIPS AMONG FISHERS**

This section (mostly based on interviews with artisanal fishers) begins by looking at changes in technology and fishing effort, mostly related to the perceived resource decline (Section 5.2.1). In addition to the increased fishing effort, another change in fishing practices which is explored is fishers' mobility along the coast following fish movements. The last subsection focuses on changes in the relationships among fishers (such as increased competition and lower respect), which is interconnected to Chapter 6 (Section 6.2), where current relationships among fishers are investigated.

#### **5.3.1. Increased technology and fishing effort**

Fishers explained a number of changes which occurred as a consequence of resource decline: increased number of gillnets and long-lines, bigger boats, more powerful motors, use of depth-finder and GPS. Moreover, fishers need to go fishing farther from the coast to get good catches, which affects their safety given the increased weather unpredictability. All the innovative practices, however, still do not enable fishers to get as good catches as in the past, they explained.

The distance navigated to go fishing varies throughout the year, but sometimes they go as far as 15-20 nm. Fishers thus believe that they should be allowed to fish farther than 7 nm (Table 5.4), which is the maximum distance the majority of boats are allowed to operate by the Coast Guard. More powerful motors have been essential to go fishing farther. Outboard motors of 10-15 horsepower (HP) have been increasingly replaced by motors of 45-60 HP since 2000. In the 1970-1980s, artisanal boats in Piriápolis did not have motors and fishers would row, whereas during the 1990s all fishing boats started to use outboard motors.

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<sup>53</sup> DINARA's regulation states that "the current situation of coastal fishing resources at the Río de la Plata and its Maritime Front, as well as the measures to manage the fleet, make it advisable to expand the coastal zone [where trawling is not allowed]".



Since 2000-2005 fishers have been using depth-finders for searching fish schools. They argued that in the past, fish were so abundant, and schools were so big, that they would set gillnets anywhere and very likely they would catch fish. The depth-finder, nevertheless, was criticized by a few fishers who claimed that: (i) it promotes stock overexploitation because almost all the fish get caught, and (ii) the sound produced by depth-finders (together with the motor noise) would shoo the fish away.

In 2005, Piriápolis fishers started to use GPS for navigation purposes, which is especially important when they go fishing so far from the coast that triangulation via landmarks becomes unfeasible. Moreover, the GPS enables fishers to work better at night or during foggy days. However, several fishers still do not use GPS and were reluctant to use it, arguing that artisanal fishers (in contrast to large-scale fishers) should do all their work manually, with little technology.

Increased fishing effort has been a feedback mechanism to counter catch decline. The number of gillnets (each 50 meters long) per boat has increased from 5 to 15-20 in most cases, although bigger boats use 40-200 nets. Boats larger than 8 meters long sometimes have a hydraulic net puller, which is criticized by fishers who argue that this makes the fishery less labour intensive and/or that boats using net pullers are not artisanal because nets are not pulled manually. Similarly, the number of long-lines per boat has increased from 5 to 20-30. Fishers explained that the increased number of fishing gear has in turn provided more on-shore jobs in Piriápolis.

Increased fishing effort leading to resource overexploitation is a source of concern to several fishers. As one fisher stated:

“Now, fishers set more gillnets, but after setting 35, a bigger boat comes and sets 150 side by side with yours. And that boat has a net puller so you can't compete. ... Although I say that the fishing method is negative, other fishers tell me ‘Look, I need to go fishing, my family has to eat, I'll try to find a faster boat, with a bigger capacity, with net puller’, etc. There isn't awareness in fishers' minds to realize that this has to change ... because with this evolution we'll finish all the fish resources.”

This fisher and others believe that they should catch fewer fish and sell them at higher prices, instead of getting bigger boats with more fishing gear to get bigger catches. In fact, they claimed that a maximum number of gillnets should be set, not only to protect resources but also to avoid the competition for space. Their suggestions for a maximum differed greatly, from 12 to 100 gillnets maximum. Conversely, most fishers were against setting a maximum number of gillnets, arguing that gillnets are selective fishing gear (as long as mesh size is at least 12 cm).

Differences also exist among fishers regarding boat size. Many artisanal boats have been enlarged without DINARA authorization. This created discontent among some fishers who believe that boats larger than 8 meters long are semi-industrial rather than artisanal<sup>54</sup>. Differences in boat size lead to differences in catch size; for instance, the smallest boats (5 m

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<sup>54</sup> The census conducted by DINARA in 2007 showed that boat lengths in the fishing zone E, where Piriápolis is located, vary from 3.55 m to 15.58 (mean=5.73) (Puig et al. 2010).

length) can land 1,000 kilos maximum, whereas the biggest boats (15 m length) can land 10,000 kilos. Fishers who are not against large boats, and indeed wish they could have one, explained that risks at sea would be minimized, that they would be able to go fishing on windy days, and that they could take more fishing gear onboard.

The process of semi-industrialization that artisanal fisheries are going through in coastal Uruguay, with increased use of bigger boats, fishing gear and technology, has been accompanied by what fishers call the “boats’ monopolization”. In other words, one person owns several boats, contracting the crew and skipper as in the large-scale sector. In Piriápolis, all fish buyers are known for having several boats. The most famous monopoly of artisanal fishing boats in the country is in La Paloma (Rocha), where a previous fisher owns 14 large boats, also resembling the large-scale sector. The origin of these monopolies was allowed by the lack of government regulations determining a maximum number of boats per fisher. Only half of the fishers, however, stated that a maximum number of boats per household should be determined (e.g. from one to three boats) (Table 5.4).

**Table 5.4.** Fishers’ perceptions about their access to fishing resources

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Artisanal fishers should be allowed to fish farther than 7 nautical miles.	10/16	2/16	1/16	3/16
A maximum number of boats per household should be determined.	8/15	4/15	1/15	2/15
Everyone who wants to fish has the right to do so.	15/15	0	0	0
Only fishers who were born in Piriápolis and surroundings should fish in the area.	3/16	13/16	0	0
Only fishers who work in the fishery throughout the entire year should fish during the fishing season.	5/16	11/16	0	0
DINARA should grant fishing licenses to every artisanal boats asking for one, as it used to do.	9/15	2/15	1/15	3/15
Artisanal fishers should be allowed to fish within the 300 meters zone throughout the entire year.	9/15	3/15	1/15	2/15

### 5.3.2. Fishers’ mobility along the coast according to fish movements

Artisanal fisheries in Piriápolis and the Río de la Plata in general are seasonal. Fishers explained that their mobility along the coast originated as a consequence of resource scarcity during certain times of the year, which made them move to the places where there was fish. In particular, fishers from Montevideo have increasingly migrated seasonally to Piriápolis since 1995. At that time there were only eight boats at Piriápolis port. The number of boats and fishers

in the area increased greatly as a consequence of migration. This “demographic explosion” (as fishers call it) became more pronounced during the economic crisis the country faced in 2002, during which many people went to coastal fisheries looking for a source of income. At the same time, businessmen who were attracted to the fishery by the massive amounts of croaker caught during the winter decided to buy one or several boats (fishing licenses were provided by DINARA at no cost). Even though the growing number of fishers and fishing boats created discontent among several fishers (mostly locals), they all held the value that everyone has the right to make a living from the fishery (Table 5.4). In this regard, fishers would frequently claim that “the sea has no owner” and “everyone has the right to fish”.

Additional changes occurred in the fishery as a consequence of fishers’ migration to Piriápolis. For example, fishers from Montevideo would come along with a fish buyer, whereas most fishers in Piriápolis (of the very few at that time) would sell their small catch directly to consumers or to the owners of fish stalls at the port. An old fisher explained that it was the fish buyers who brought fishers from other areas to Piriápolis. In 1995 the landing site Pesquero Stella Maris (SM) was in its origins; the port was being renovated and fishers had to leave it for a couple of years. At SM fishers had norms for selling fish (at informal stalls): only fresh fish caught by them could be sold, during the two hours following their arrival. However, as Piriápolis fishers stated, with time these norms were broken by fishers coming from Montevideo and a few locals. Sheds were supposed to be used to store fishing gear but fishers from Montevideo started to stay there (where a few still live today). All these changes at SM made local fishers unhappy and they decided to stop selling their catch at stalls, although that was more profitable than selling to fish buyers. Later on, after the big storm in 2005 (which caused significant damage to SM due to its proximity to the shoreline), ten stalls for selling fish were formally allocated by the Departmental Government (*Intendencia de Maldonado*). Close ties with local politicians were determinant in the stall allocation; for instance, several stalls were provided to two families, and several other fishers remained with no stall.

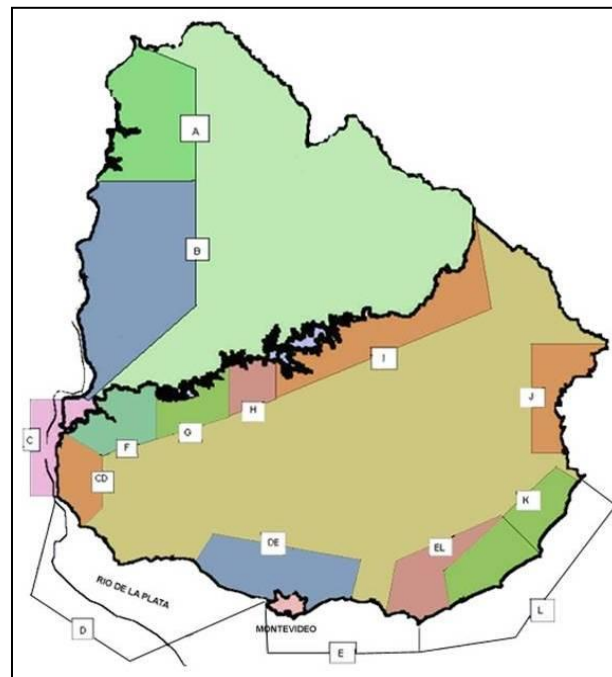
Fishers’ movements along the coast have changed over time. They are not as predictable as ten years ago, when the usual pattern was that fishers moved from Montevideo to Canelones during the fall and winter, and during the spring and early summer they concentrated in Montevideo where the croaker spawns. Piriápolis fishers were not migrants back in 1995 but now several of them are. Since 2006, they have increasingly migrated seasonally to the west, following the croaker. Curiously, a few fishers who came from Montevideo to Piriápolis in 1990s and decided to settle down in this city because there was fish during all seasons, now move to Canelones or Montevideo during the winter given the short duration of the croaker season.

Moving to a different locality for the croaker season is less profitable because fishers have to rent a truck to take their boat to the new place (unless the boat is big enough to move navigating) as well as a house where to stay. Moreover, fishers’ food and transport expenses

(e.g. to visit their family, who usually stays in Piriópolis) become higher. Fishers explained that these expenses, in addition to the decreased catches (partly because of the increased number of boats), do not enable them to save money for the subsequent months, as they would do in the past. The lower incomes that fishers now make during the croaker season do not compensate being away from their family, aggravating in some cases family conflicts. A further challenge related to migration is that when fishers arrive at a new locality, they are frequently rejected by non-fisher community members; “Every time we migrate we’re looked down upon by everybody. ... If you say that you’re a fisher, they won’t rent you a house”.

### ***Should fishers’ mobility along the coast be favoured?***

In 2002, DINARA defined 12 artisanal fishing zones in the country (Figure 5.1), using biological, geographical, social and administrative criteria, as the manager explained. One of the ultimate goals of this regulation was to facilitate fishers’ mobility within their zone. Zone E extends from Santa Lucía River (west border of Montevideo) to Punta del Este (Maldonado), and zone L from Punta del Este to the border with Brazil (Rocha). Artisanal fishing licenses state the zone where fishers are allowed to fish, as well as a sub-zone (i.e. areas which include part of one zone and part of one bordering zone) of their preference.<sup>55</sup>



**Figure 5.1. Zones (A-L) and sub-zones (CD, DE, EL) established by DINARA for artisanal fishing**

<sup>55</sup> Sub-zones were allocated by DINARA only during a certain period and thus, not all fishing boats have one.

**Box 5.2. Boat size vs. Right to fish: What matters the most? Contradictory thoughts after the arrival of La Paloma boats at Piriápolis port**

In March 2011, six artisanal fishing boats (from a single owner), 15 meters long, with about 150-200 gillnets each, came from La Paloma (Rocha) to Piriápolis, looking for whitemouth croaker. The arrival of these bigger boats created discontent among some fishers in Piriápolis, who saw them as competitors for space and fish. However, other fishers perceived advantages in the arrival of La Paloma boats: (i) middlemen buying these boats' catches paid higher prices than local buyers, and thus, Piriápolis fishers would likely get better prices; and (ii) given the increased number of boats (which were in communication with one another), it would be easier to find the fish schools.

Fishers complaining about La Paloma boats initially commented that they would contact DINARA about this event. A week later, one fisher phoned the Artisanal Fisheries Unit and he was told to send an email or letter to DINARA's Director, with the signatures of all the fishers who were complaining. Nevertheless, the intended formal complaint did not proceed, apparently because of the prevalence of the principle that "everyone has the right to fish". Piriápolis fishers (including those who were initially complaining) argued that fishers working in La Paloma boats had the right to come. In fact, they said that this was the same right as they had to fish in Montevideo. Other fishers did not want to sign the letter of complaint because their names would be known (the owner of La Paloma boats is known for being powerful). Finally, other fishers stated that in the future they might need assistance from La Paloma fishers, a reason why they would not do anything against them.

However, after La Paloma boats arrived at Piriápolis, a few fishers felt responsible for having promoted fishers' mobility along the Uruguayan coast, and also for having been against DINARA's intentions of setting a maximum number of gillnets a couple of years earlier. They stated that even though they did not want fishing effort limits imposed by DINARA, they had not thought that artisanal fishing boats would be so greatly enlarged to use 200 gillnets. Yet, in 2011, most fishers were against setting a maximum number of gillnets. Despite the contradictory thoughts about the arrival of La Paloma boats, and the prevailing open-access guiding principle, fishers later referred to this case as an example of their lack of unity and organization to defend their fishing spots from larger boats (see Section 6.2.3).

Even though fishers' opinions about DINARA's regulation of creating 12 zones were diverse, most of them argued that fishers' mobility needs to be favoured because otherwise they could not live from the fishery all year long. "Uruguay is of Uruguayans" fishers would say while claiming that they should be allowed to fish in the entire country. In fact, most fishers disagreed with two statements: (i) only fishers who were born in Piriápolis and surroundings should fish in the area, and (ii) only the fishers who work in the fishery throughout the entire year should fish during the fishing season (Table 5.4). In both cases, they stated (again) that everyone has the right to fish (see Box 5.2). Nonetheless, several fishers stated that the mobility of fishing boats

(not fishers' mobility) should be reduced because of problems originated from the concentration of numerous boats in a small area (i.e. "traffic jam"): (i) it shoos the fish away, due to the engine noise and the number of set gillnets; (ii) there is not enough fish for everybody; and (iii) conflicts among fishers are aggravated (see next section).

### 5.3.3. Changes in relationships among fishers

Fishers identified a number of changes in their relationships, which seemed to worry them as much as resource decline. Very frequently they referred to the increased competition among them as a consequence of both declining resources and the increased number of fishers (Table 5.5). They stated that this greater competition is more notorious during the croaker season, "when social codes [i.e. norms, principles] are usually lost", and misbehaviours are common (see Section 6.2.2), such as stealing of fishing gear and fish (either at sea or on land), setting gillnets over others', carrying guns onboard, and lying about fishing spots. Consequently, the croaker season has become a source of stress and anxiety to fishers, which in turn made some of them decide to stop migrating following the croaker.

**Table 5.5.** Fishers' perceptions about changes in relationships

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Currently, there is more competition among fishers due to resources decline.	13/13	0	0	0
Currently, there are fewer "social codes and principles" in the fishery than 10 years ago.	12/13	1/13	0	0
Young fishers have less respect towards the rest of the fishers than old ones do.	13/16	3/16	0	0
There are conflicts between fishers who are from Piriápolis and those who came from other localities.	3/11	6/11	1/11	1/11
There are conflicts between fishers who fish all year long and those who do it only during the fishing season.	6/12	3/12	0	3/12

Almost every fisher agreed that there are fewer social codes and principles in the fishery than 10 years ago (Table 5.5), referring particularly to decreased respect among them (i.e. local norms are less and less respected). Fishers' migration to Piriápolis from other localities was the most common explanation to this change, although along with other factors: people entering the fishery without having this profession (including businessmen and untrained people looking for a source of income during the 2002 crisis); fewer fish to share among more boats; drugs consumption; young fishers who were not taught the fishery's social codes; and lack of appropriate and enforced regulations by DINARA and PNN (e.g. nobody controls that fishers do not take guns on board the boats). Moreover, fishers wished there were government sanctions such as fines when stealing occurs. There are local sanctions, though. For instance, after all

fishers at SM and Piriápolis port found out that a young crew member had robbed a box of fish on shore, nobody would take him fishing. Stealing is usually associated with drugs consumption, and in turn, drugs are associated mainly with youth. This is one of the reasons why old fishers (except those who have sons in the fishery) prefer not to hang out with young fishers. Most fishers stated that young fishers have less respect towards the rest than old ones do (Table 5.5), arguing that the youth were not well educated at home (e.g. they were not taught the social codes and principles of the fishery). According to some fishers, however, the decreased respect observed among fishers, and more markedly among the youth, is happening in the entire Uruguayan society.

Even though fishers' migration to Piriápolis was identified as the main cause of deteriorating relationships, only a few fishers agreed that there are conflicts between fishers who are from Piriápolis and those who came from other localities (Table 5.5). The rest explained that the differences they had were bridged with time. Migrant fishers from Montevideo, called swallows (*golondrinas*), still remember when they were reported by local fishers (back in the 1990s). Some differences between fishers from the two places remain; for example, migrant fishers staying at SM were chased away by a local elite (Section 6.2.3), after which they stated that migrants are hosted much better in Montevideo than in Piriápolis.

Additional conflicts or differences which originated among fishers over time remain today. The most notorious is the latent conflict between fishers who fish all year long and those who do it only during the fishing season (Table 5.5). Among the latter are fishers who have opted to have additional sources of income when resource decline became evident (see Section 5.5), but also people who have bought a fishing boat simply to make money during the croaker season. This second type (non-fishers working in the fishery) are more rejected than the first type ("part-time" fishers) by full-time fishers. Still, as was shown above (Table 5.4), the prevailing value is that everyone has the right to make a living from the fishery.

#### **5.4. CHANGES IN DINARA FISHERIES POLICIES AND REGULATIONS**

As argued by the members of DINARA Artisanal Fisheries Unit, the historical government indifference to artisanal fisheries has turned this sector in a significant coastal problem, particularly in the Río de la Plata (Puig et al. 2010). In 2005, when new authorities assumed at DINARA, artisanal fisheries were defined as a priority, considering its economic and social importance in the country. The Department of Fisheries Biology started to focus on the small-scale fisheries sector, but in 2007 a specific division was created - the Artisanal Fisheries Unit. Its members have increasingly claimed the social importance of coastal and inland artisanal fisheries, despite the small contribution of this sector to the national catches. In this context, the present section explores the measures taken by DINARA in relation to artisanal fisheries since 2005. Subsequently, the creation of a no-fishing zone within 300 meters off the shoreline serves

as an example to analyze the complexities of the process and consequences of making new regulations, prevailing in a top-down manner.

#### **5.4.1. Increased DINARA attention to the artisanal fisheries sector**

Since 2005, a number of measures and policies have been taken to promote the permanence of the artisanal fisheries sector and its development, such as the allocation system of fishing licenses, regulations towards decreasing fishing effort (sometimes made after reaching agreements with fishers), tax exemption for oil, proposed fisheries law, and extension of the coastal zone exclusive for artisanal fisheries (Puig et al. 2010). Members of the Artisanal Fisheries Unit stated, however, that these initiatives (expanded below) will not be enough to ensure the permanence of artisanal fisheries and for resource sustainability, unless DINARA involves fishers in management (Puig et al. 2010), which is the focus of Chapter 7.

##### ***Artisanal Fishing Licenses***

Until the end of 2006, the prevailing management system was *de facto* open-access: DINARA granted artisanal fishing licenses to every person who applied for them and had a boat of up to 10 gross registered tons. This explains why this fishing activity developed in a chaotic manner. During 2001-2006, the number of artisanal boats boomed due to several factors: national economic crisis (artisanal fisheries represented the only labour option in many localities), rising prices since 2004, weak enforcement, and *de facto* open-access regime (Puig & Grunwaldt 2008). An artisanal fisheries manager, during an interview in 2010, stated that DINARA should have followed certain criteria for granting fishing licenses, such as fishers' family tradition in the trade and in the area. The paperwork to apply for fishing licenses was so easy that people without fishing boats would make up boat names and then sell their licenses (e.g. 2500 USD each license). As the manager explained, fishing licenses are not transferable; only the fishing boat together with the license can be sold. This created a black market of fishing licenses, which is common knowledge both among fishers and DINARA.

At the end of 2006, given the increased fishing effort and demand of artisanal fishing licenses, and based on the precautionary principle inscribed in the FAO Code of Conduct for Responsible Fisheries, DINARA stopped granting them. In 2007, a national census of artisanal fishing boats was conducted by DINARA in coordination with the Coast Guard (PNN), with the purpose of surveying all boats doing artisanal fishing, regardless if they were already registered at DINARA or if they had a fishing license. Boat owners were asked to register their boat(s) at the local PNN office. The database resulting from this census was used as a tool in order to regulate boats. The census showed that a total of 1,364 boats were doing artisanal fishing in the country



(only 580 boats were registered at DINARA at that time). Of these, nearly a third (378) belonged to zone E (which includes Piriápolis), representing the fishing zone with the highest number of boats. Zone E was thus considered “overcrowded” with boats (Puig et al. 2010). In 2008 and 2009, DINARA opened the fishing license applications only to the boats which had declared their artisanal fishing activity during the census. “Waiting lists” were created for every fishing zone from all the applications. The owners of the boats in these lists had to wait until DINARA’s Director approved the granting of the licenses. Licenses started to be granted inland (Uruguay River, Negro River) and then at the Río de la Plata.

In 2010, several fishers in Piriápolis complained about DINARA’s decision of not granting fishing licenses. In fact, 9 out of 15 fishers agreed that DINARA should grant fishing licenses to every artisanal boat asking for one, as it used to do (Table 5.4). They argued that people have the right to work in the fishery and that more jobs will be available if licenses are granted. Also, fishers claimed that black markets are reinforced if DINARA does not provide licenses to actual fishers. In this regard, fishers provided a number of suggestions for granting new licenses: applicants need to have at least two years of experience in the fishery; applicants need to show that they own a boat; and only licenses for small boats should be granted. Fishers who disagreed with the above statement were upset about the increase in boats over time, and about the increased number of licenses granted to people having nothing to do with the fishery.

In 2011, DINARA opened the applications to establish “a list of applicants” for fishing licenses in several zones of the country (e.g. applications for zone E were open during the month of October). DINARA resolution stated that only those people having more than three years of verifiable experience in the artisanal fishery, residing in the zone where they were applying, and not holding a fishing license, could apply. In addition, it was stated that people who had transferred a fishing license in the past could not apply, and when ranking the applicants, owning a fishing boat (at the time of application) was preferred. The subsequent applications to establish lists of applicants for fishing licenses would only be received in October 2015. In March 2012, the list of nearly 100 applicants for zone E had already been ranked and, as stated by the artisanal fisheries manager, the decision of DINARA’s Direction regarding the number of licenses to be granted was still pending. Given the “overcrowding” of this fishing zone, the decision would not be easy.<sup>56</sup>

### ***Artisanal fishing regulations in inland vs. coastal areas***

Since 2007, DINARA has implemented several regulations in inland waters to control fishing effort. For instance, in 2007, a closed season was established from September to

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<sup>56</sup> As of April 2013, no license has been granted for zone E; the number of valid licenses is 263, of a total of 464 in coastal Uruguay (zones D, E, K, L; personal communication with the Artisanal Fisheries Unit).

February at zone B (Uruguay River), in the North of the country. This was the first time artisanal fishers received a benefit during the closed season (Puig et al. 2010). This and other closed seasons were not defined in coordination with artisanal fishers, but additional measures which followed were. The artisanal fisheries manager stated that after meetings with fishers from several localities at Uruguay River and Negro River, minimum mesh sizes and gillnets' length limit (total meters to be set) were determined by DINARA, following fishers' suggestions. This was considered as the beginning of co-management processes in inland artisanal fisheries (Puig et al. 2010). In 2009, DINARA-FAO opened a competitive funding program for a research project focused on artisanal fisheries management on the coast (Río de la Plata and Atlantic Ocean), which would promote co-management, among other objectives (see Chapter 7).

Minimum mesh sizes and gillnets' length limit have not been determined for coastal artisanal fisheries. The manager recognized, however, that there is DINARA interest in negotiating with fishers the latter measure in some coastal zones, such as in Rocha (where large boats use up to 200 gillnets).<sup>57</sup> In contrast to what was stated by the manager, several fishers in Piriápolis insisted that there was a minimum mesh size (11 cm) imposed by DINARA and/or PNN in this area.<sup>58</sup>

### ***Tax exemption for engine oil***

During interviews at DINARA (with its Director, artisanal fisheries manager and researchers), the policy for oil tax exemption was referred to as an important step taken by the agency for the artisanal fisheries sector. The policy started to be discussed at DINARA in 2007, in collaboration with the National Oil Administration (ANCAP), and it was finally implemented on January 2009. Nevertheless, this "benefit" did not work as DINARA expected and only very few fishers in the country have been making use of it. As the Director stated when interviewed:

"[Artisanal fishers] spent more than 30 years complaining that they needed to pay the same oil price than the industrial fishery. The previous [DINARA] administration created the refund of oil taxes to artisanal fisheries. ... In a trimester, there are people getting 8,000-12,000 UR\$ back, which is not a little thing. A system [with other government agencies] had to be created, but there aren't more than 20 fishers in this.<sup>59</sup> Why? Because, of course, you need to be registered in BPS [social service agency] and DGI

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<sup>57</sup> During the third session of the Fisheries Zonal Council in Canelones Municipality, on December 2012, the artisanal fisheries manager proposed to set limits to the number of gillnets being used by the artisanal sector, in coordination with fishers. All Council members (including the fisher representatives) voted this motion. The next step would be to submit a letter to DINARA's Direction suggesting this measure along with others.

<sup>58</sup> It is uncertain what the origin of this fishers' belief is. There might have been certain misinformation in fishers' communication with DINARA or PNN. The supposed minimum mesh size could be related to the regulation of minimum landing sizes established by the Decree 149/997 for several species (including the croaker and the weakfish).

<sup>59</sup> As of March 2013, nearly 70 artisanal fishers are benefiting from the tax exemption for oil (personal communication with the Artisanal Fisheries Unit).

[general tax office]. With the money you get back [oil tax return] you could pay the rest [BPS, DGI] but you need to be a little organized for that.”

The artisanal fisheries manager’s view of this policy (of which creation he was involved) was somewhat different. He stated that during the negotiations with ANCAP, DINARA people did not know that fishers would need to be registered as formal workers to make use of the benefit.

### ***Proposed Fisheries Law before the Parliament***

In Uruguay there is not a fisheries law as such but rather a law of “the wealth of the sea” (Law 13.833, *Riquezas del mar*). It was passed in 1969 and declares of national interest the exploitation, conservation and study of sea species within the 200 nautical miles of territorial waters. Almost three decades later, the regulations for the use of aquatic resources were updated through a decree (149/1997). An example of fisheries regulations included in this decree is the prohibition of certain techniques and fishing gear, such as driftnets, use of explosives or toxic substances, and trammel nets (Article 45).

In 2009 DINARA presented a Fisheries Law before the Parliament (see Chapter 7). The law contains a specific chapter (with seven articles) dedicated to artisanal fisheries, which was proposed by the Artisanal Fisheries Unit. That chapter establishes the following: (i) DINARA will ensure equity in access to fishing resources, giving preference to local populations. (ii) Redefinition of artisanal and small-scale fisheries: “artisanal fishing owners” will hold one fishing license for a boat of up to 10 GRT, whereas “small-scale fishing owners” will hold 2-4 fishing licenses of boats of up to 10 GRT. (iii) Creation of Fisheries Zonal Councils for resources co-management among fishers and government agencies (see Section 7.3.2). (iv) Categorization of boat owners according to the size of the boat; this will be done by DINARA in coordination with Fisheries Zonal Councils. (v) Implementation of access rights costs according to the previous categories<sup>60</sup>; small-scale fishing owners will pay different (i.e. higher) amounts. During an interview, the artisanal fisheries manager commented that these payments would help reduce the number of people interested in entering the fishery just to try out a business. Moreover, he explained that the proposed artisanal fisheries chapter was purposefully written in general terms in order to have flexibility when regulating the law.

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<sup>60</sup> During a presentation at a Fisheries Seminar organized by the Faculty of Sciences in 2011, the artisanal fisheries manager proposed three boat categories: less than 1.5 GRT, between 1.5 and 4 GRT, and over 4 GRT. He stated that boats in the first category would not pay for access rights.

#### 5.4.2. Creation of a no-fishing zone within 300 meters off the shoreline

In November 2008, a new regulation was passed by MGAP (Box 5.3), forbidding artisanal fishing in several areas of the country. On the coastal area (Río de la Plata and Atlantic Ocean), artisanal fishing was forbidden within 300 meters of the shoreline (during all months of the year), thus creating a no-take zone. Several fishers at the Río de la Plata were informed via the Coast Guard about this new rule, although without providing them an explanation of the reasons for making it. This made fishers complain for not having been consulted by DINARA (or PNN<sup>61</sup>) before creating the rule, or for not having been at least better informed. As one fisher stated, “When did [DINARA] hold a meeting to consult us if that law was viable or not? Never! That was to favour their friends who are sport fishers and wanted to fish on the coast without any boat nearby.”

##### **Box 5.3. Three possible pathways leading to new fishery regulations in Uruguay**

First, a new regulation can be proposed by the Artisanal Fisheries Unit or Population Biology Divisions to DINARA’s Direction. The Director decides whether to approve it (with or without revisions), usually after having discussed it with other Divisions at DINARA. Second, a new regulation can be created directly by DINARA’s Direction. Lastly, a new regulation can be proposed by the country’s President to the Ministry, although DINARA’s Direction should be consulted before passing it.

Some regulations created through the first and second pathways are passed with the signature of DINARA’s Director (i.e. DINARA regulations) and others are passed with the signature of the Minister of Livestock, Agriculture and Fisheries (i.e. MGAP regulations). In any of these two cases, new regulations are usually based on scientific or technical data coming from DINARA’s divisions. Sometimes, however, they originate as a consequence of certain pressure coming from fishery stakeholder groups (e.g. Chamber of large-scale ship-owners, Sport fisher organizations). The 300 m zone is an example of the latter.

As of April 2013, there is no legislation determining that stakeholder consultation should take place before passing new regulations. Even though in 2007 the Artisanal Fisheries Unit started to take into consideration fishers’ local knowledge and opinions for making new regulations (in inland fisheries), the 300 m zone is an example of the prevailing top-down management regime.

#### ***Differing views among stakeholders***

Artisanal fishers explained that the 300 m zoning was detrimental for them because a few species are caught very close to shore at certain times of the year (marine silverside, striped mullet, whitemouth croaker, stripped weakfish and king weakfish). The creation of this rule during

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<sup>61</sup> At least one fisher thought that the 300 m zoning had been determined by PNN (possibly because it was this agency which informed fishers about the rule).

the first left-wing government shocked some fishers; they stated that they were disappointed with DINARA's Director (2005-2010), who had worked himself in the fisheries sector. Interestingly, in 2010 and 2011, some fishers were not aware of the 300 m zoning, whereas others thought that the no-take zone comprised 350 or 500 m off the shoreline. This questions the information and communication processes between government agencies and fishers.

All fishers in the Piriápolis area, either during interviews or informal conversations, stated that the 300 m zoning was determined to favour sport fishers, in detriment to them. Fishers frequently commented that "People with money are given preference" (sport fishing is usually associated with middle or high social classes). Moreover, several fishers stated that it was the country's President who proposed the 300 m zoning, arguing that he is a sport fisher and has many friends who are too. Artisanal fishers know that they are seen as problematic for sport fishers; first, they compete for space, and second, sport fishers argue that artisanal fishers are responsible for resource decline. A further reason for fishers' discontent about the new rule, was that sport fishing with gillnets is still allowed within the 300 m zone, which they found unjust.

Similar to fishers, the SUNTMA representative when interviewed stated that it was the President at that time who ordered the 300 m zoning, because he loves sport fishing. The current President (2010-2015) who was the Minister of Livestock, Agriculture and Fisheries (MGAP) in the previous government (2005-2010) told SUNTMA this information ("it's an order coming from the top, from the President"). DINARA interviewees also stated that the rule had come "from the top"; even though some were aware of the "rumour" regarding the President's intentions, they did not confirm it. DINARA's Director stated that the new regulation was proposed by the Ministry, based on the precautionary principle; artisanal fishing was forbidden in several areas because it is very difficult for DINARA to get valid data about catches. The precautionary principle is mentioned in the regulation, along with other reasons supporting its creation: (i) the number of fishing boats has greatly increased; (ii) artisanal fisheries in several areas have reached the maximum level of exploitation; (iii) interaction and conflicts between artisanal fishing and nautical activities have been detected; and (iv) spawning and nursing areas need to be protected. The basis for the second reason is curious given that the Director recognized the agency's limitations in collecting valid information about catches.

In turn, the artisanal fisheries manager and one researcher (DINARA) stated that the 300 m zoning was created for two main reasons. First, artisanal fishing so close to shore hampers recreational activities, such as swimming and sport fishing; in fact, sport fishing associations submitted letters of complaint.<sup>62</sup> Second, the zone close to shore is a nursing area and thus it needs to be protected.<sup>63</sup> However, when the artisanal fisheries manager was consulted by

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<sup>62</sup> In different opportunities, recreational fishers have had meetings with DINARA's Director and Artisanal Fisheries Unit.

<sup>63</sup> Protecting juvenile fish was the reason given by the Minister of MGAP at that time while explaining the recently created rules (such as the 300 m zoning) during a Parliamentary commission in September 2009.

DINARA's Director (after MGAP proposed the rule), he argued that the no-fishing zone should be smaller (300 meters was too much), and that the measure should not be taken before discussing it with fishers. None of his recommendations was followed. In contrast to what was stated by the manager and one researcher, the second researcher interviewed (Population Biology Division) argued that the 300 m zoning was determined based only on political interests, with no technical or scientific support. In his words,

"If you ask where the technical or scientific reports are, [you will find out] there is none. There's only the vision of the [DINARA] people doing enforcement, who found out that juveniles were being caught with inappropriate gillnets. But there should be a stronger support that [the 300 m] is a juvenile zone, where fishing is not allowed in certain seasons. To me, [the way the 300 m zone was determined] was terrible, and at the end, this creates mistrust in the agency which is in charge of resource management."

The interviews at DINARA showed, then, that there were differing perspectives regarding the aims of the 300 m zoning.

### ***Fishers' mobilization against the no-fishing zone***

As a consequence of growing dissatisfaction regarding the 300 m zoning, fishers from several coastal localities united to complain about it at DINARA. After their initial visit to the general office in Montevideo, meetings were held on coastal localities to discuss the measure among fishers and DINARA representatives until an agreement was reached. Since 2009, artisanal fishing has been allowed within the 300 m zone from April to October (i.e. not in the summer, which is the tourist season). The artisanal fisheries manager, who participated in the meetings, stated that April-October is the time of year when fishers work more closely to the shore. Every year a new regulation has to be passed to "open" the 300 m zone; this is done after Easter Holidays, whose date varies from year to year. Therefore, with the addition of season limitation, the 300 m has become a *de facto* zoning for recreational use.

In Piriápolis I met one fisher who participated in this negotiation process with DINARA and he was satisfied with the agreement they reached. However, 9 out of 15 fishers considered that they should be allowed to fish within the 300 m zone throughout the entire year. They complained that this rule hampers their activity, and proposed either to reduce the zone to 100 m or to define time limits (i.e. recreational activities during the day and artisanal fishing at night). In fact, some fishers have been doing the latter: they go fishing at night during the summer because sport fishers will not report them, and PNN does not enforce. Three fishers, however, stated that the season limit to the 300 m zoning was appropriate because artisanal fishing has to coexist with tourist activities.

## 5.5. TRANSITION IN FISHERS' WAY OF LIFE

The previous sections explored a number of changes that have occurred in the fisheries system, from fishing resources to relationships among fishers and government regulations. This section then looks at the transition being faced by fishers (partly as a consequence of the above changes): the artisanal fishery is no longer enough for making a living; additional or alternative occupations are needed; and fishers wish that their children not work in the fishery. Before looking at these points, however, the section starts by showing the meaning of the fishery as a way of life that fishers have chosen, rather than just a job.<sup>64</sup>

### 5.5.1. Fishing as a way of life

Artisanal fishers in Piriápolis (from under the legal age of 18 to over 70) started fishing when they were children or teenagers, or when they were in their twenties, thirties, or even forties. During informal conversations, fishers referred to four not mutually exclusive reasons to explain why they work in the fishery, which were then used as options in a closed-ended question during semi-structured interviews: they like it; they make good money; they do not have the training for other trades; and they have family members in the fishery (Table 5.6). These findings support the observation that the fishery is not the only occupation fishers can have: most of them have become fishers because they liked it. This is the way of life they have chosen, or as some fishers put it “the fishery is my life”.

**Table 5.6.** Why did individuals interviewed become fishers?

Reasons for working in the fishery <sup>a</sup>	No. Fishers (n=16)
Like fishing	13
Make good money	7
Lack of alternative choices (no training for other trades)	5
Family in the fishery	3 <sup>b</sup>

<sup>a</sup> The question was closed-ended but a given fisher could mention more than one reason for working in the fishery.

<sup>b</sup> Six fishers have family members in the fishery, although only three of them noted that this is one of the reasons for working in the fishery.

In fact, all fishers in Piriápolis gave positive answers when asked if they liked fishing, arguing that they feel free and independent in this job due to a lack of a fixed time schedule and a boss. In addition to this flexibility which enables them to decide whether or not to go fishing on a given day, fishers highlighted that they love the sea and adventure. Two other reasons fishers gave to explain why they like fishing are that it is something they know to do very well because they have fished since they were young, and that they make very good money in certain times of

<sup>64</sup> Most of this section has been published as: Trimble, M. & D. Johnson. 2013. Artisanal fishing as an undesirable way of life? The implications for governance of fishers' wellbeing aspirations in coastal Uruguay and southeastern Brazil. *Marine Policy* 37: 37–44.

the year (earning more than in other trades such as construction). Although not considered as important as the positive dimensions, fishers identified several negative aspects of working in the artisanal fishery: fishers are informal workers (i.e. they do not contribute to a social service fund or a retirement fund); they get back injuries even when young (e.g. from pulling by hand gillnets and long-lines); income is unstable; they spend too much time working (including weekends) and thus lose time with their family.

Women usually like to do shore work related to fishing. One of the reasons why women like to work as *alistadoras* (preparing long-lines) is that they can work while taking care of the children. Women who have informal child care arrangements or who do not have children may have additional occupations such as house cleaning for others, or working in restaurants during the summer. Moreover, the lack of a fixed time schedule is compatible with them being housewives; they can choose whether to do the fishery job at the landing site or at home. The work can be exhausting, however, and with long-lines there is always the risk of pricking oneself with the hooks. These were two reasons given by the very few women who stated that they did not like their job.

### ***Transition in fishers' way of life***

Several fishers explained that as a consequence of resource decline and reduced income (because fish prices have not increased), they have started to look for additional or alternative sources of income. In fact, they stated that the number of fishers in Piriápolis and further coastal localities has been declining over the past few years (e.g. since 2005-2007). Fishers quitting the fishery is now a common topic of conversation in Piriápolis. Several women have also quit their jobs in the fishery. One of them explained that this is because they have found better jobs, whereas another one argued that fishers are increasingly doing their own shore-based activities to avoid paying other people for these tasks.

Resource decline is not the single explanation for this transition in fishers' livelihoods. Two old fishers stated that they stopped going fishing because "now there are no social codes", referring to decreased respect among fishers and frequent gear stealing. Two other fishers, although still working in the fishery, commented that they were willing to quit, one because of health problems (back injuries), and another one because of the transition towards semi-industrial fishing. Fishers' willingness to keep working in the fishery or to quit may vary from day to day, depending on specific conditions, such as catch size, and relationships with fish buyers and government agencies.

The increased number of boats which are not operating (*barcas paradas*) is evidence of the many fishers quitting the fishery. The same is observed in additional coastal localities in Uruguay (e.g. Barra de Valizas and Punta del Diablo – Rocha). Some of the boats owned by fish



buyers in Piriápolis have not been operating because they lack a crew. Even though there are always people interested in entering the fishery, experienced (and trusted) fishers are not many, fishers explained. One part of Piriápolis port is known by some fishers as “the cemetery” because boats in that area go fishing only rarely, if at all. Although most fishers understand why others have quit the fishery or are increasingly doing additional/alternative jobs, they all considered that every boat with a fishing license should be working at sea (if weather allows and there is fish). Each fishing boat means a source of income for 4-6 people (including those working on shore), and thus, if boats do not go fishing, the labour force is reduced, they explained. Moreover, a few fishers stated that it is unjust that these boats hold a fishing license whereas other fishers, living from the fishery, cannot get one.

Four out of sixteen fishers disagreed with the statement that “artisanal fishers must look for alternative trades when there is not fish”, arguing that only those who earn their entire living from the fishery can be considered “real fishers”.<sup>65</sup> Some of these four fishers, as well as others, considered that as part of fisheries regularization, artisanal fishers should be categorized according to their dependence on the fishery (whether they depend exclusively on the fishery or not). For instance, in case of a closed season, only fishers who live entirely from the fishery should receive the government benefit, some argued. Fishers’ categorization is considered in the proposed fisheries law (Section 5.4) although following different criteria (boat size and number of boats).

Construction was the most frequent alternative or additional job named by fishers when talking about their livelihoods transition. One fisher explained that this was because salaries have increased in the construction sector and there are many job opportunities. In 2011 numerous fishers in Piriápolis took an IMO (International Maritime Organization) course offered by the National Institute of Employment and Professional Training, in coordination with the Navy (*Armada Nacional*) and Municipal Government. The course would help fishers in getting alternative jobs but still working at sea (which was highly valued by fishers), such as oil exploration, cruisers, and large-scale fishery. Interestingly, one artisanal fisher that mentioned in 2010 that he would not work on the large-scale trawlers due to the non-selective and bottom-damaging nets, in 2011 he started doing so because he was not making enough money for a living in the artisanal fishery and he could also get medical insurance as a crew member on a large-scale boat. Even though the fisher prefers working in the artisanal fishery, the example shows that material needs may trump subjective preference.

Ecotourism (i.e. fishing boats doing tours) was suggested as a potential additional job by a few fishers, who proposed that they could have a license for fishing in certain seasons and for tourism in the rest of the year (probably in the summer). However, a barrier they identified to achieve this scenario is that current licenses for boat tours are in the hands of a few people who

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<sup>65</sup> Eleven out of 16 fishers interviewed stated they depend entirely on the fishery as their source of income.

have close ties with the Navy. Before these tourism boats existed, fishers would occasionally take tourists onboard, although informally (i.e. with no license).<sup>66</sup>

### 5.5.2. Looking towards the future

In 2010, when fishers were asked if they wanted to keep working in the artisanal fishery in the future, all except one replied affirmatively (Table 5.7). The one who replied negatively stated he wished he could find a better job because “here if you fish you eat, otherwise you don’t” (referring to the income instability in the artisanal fishery; if he does not catch fish to sell, he will not have money to buy food). In 2011, however, of those fishers who had replied affirmatively the previous year, one had already quit the fishery because he found a stable job as night watchman in the port. He said that although he does not make much money he does have a fixed salary every month. However, when asked if he is happy with the new job, he said he is not because he misses fishing (due to his current working hours, he has no chance of combining both activities).

**Table 5.7.** Fishers’ aspirations for themselves and their children

In the future	No. Fishers (n=16)
Would like to keep working in the fishery	15
Would like their children to work in the fishery	2

Furthermore, at least three other fishers who had stated in 2010 that they would like to stay in the artisanal fishery were looking for alternative jobs in 2011. One fisher explained this is because he wants to be close to his family and he is tired of migrating after the fish. Two other fishers stated that they are looking for alternative occupations because the fishery is no longer profitable, as shown above. One also mentioned that “fishers are nobody”, meaning that they lack all the benefits of workers in the formal sector. However, both fishers wished that they could stay in their current occupation because they love it. When they were asked what would need to change so as they could stay in the artisanal fishery, both separately referred to the unsustainable large-scale “fishing model” in Uruguay.

In general it is apparent that artisanal fishers have no hope that the fishery will recover. They feel powerless against the business interests of the large-scale sector: most large-scale coastal trawlers are owned by 4-5 companies, the majority of the catch is exported, and this business has been historically supported by the government. They also feel powerless against fish imports (such as *pangasius* and *tilapia*). Some fishers are afraid that fish imports will keep increasing and thus they will not be able to sell their catch. A few others are afraid that the sea lion population will increase in a way that will make their profession unviable, whereas others

<sup>66</sup> Inland artisanal fishers are also interested in taking tourists for sport-fishing. The limitation they found was that DINARA has no rules for this touristic activity (COOPESA fisher during a session of the Parliamentary commission evaluating the proposed fisheries law, May 2009).

have a similar concern regarding climate change (e.g. increased frequency of storms). In spite of the pessimistic future most fishers foresee, it is worth mentioning that the situation of some of them has improved over the course of this research (e.g. one fisher who in 2010 was saving money to buy his own boat actually did so in 2011, and he was happy to have stopped working for someone else).

### ***Fishers' aspirations for their children***

When fishers were asked if they would like their children to work in the fishery, only two out of 16 said yes, because it would give them independence, and they would enjoy teaching their sons the profession. Three fishers preferred not answering this “difficult question” whereas eleven explained that the fishery is an undesirable future for their children. The reasons for the latter are diverse: fishing resources have been declining; fishing is a dangerous and hard occupation; income is unstable; it is an ugly environment (the port has been increasingly associated with alcohol and drugs consumption); and staying in a hovel away from home “is not life”, as one migratory fisher pointed out. The first reason seems to be the most prominent. As one fisher put it, “I wish the best for them. Fishing is not as profitable as in the past.”

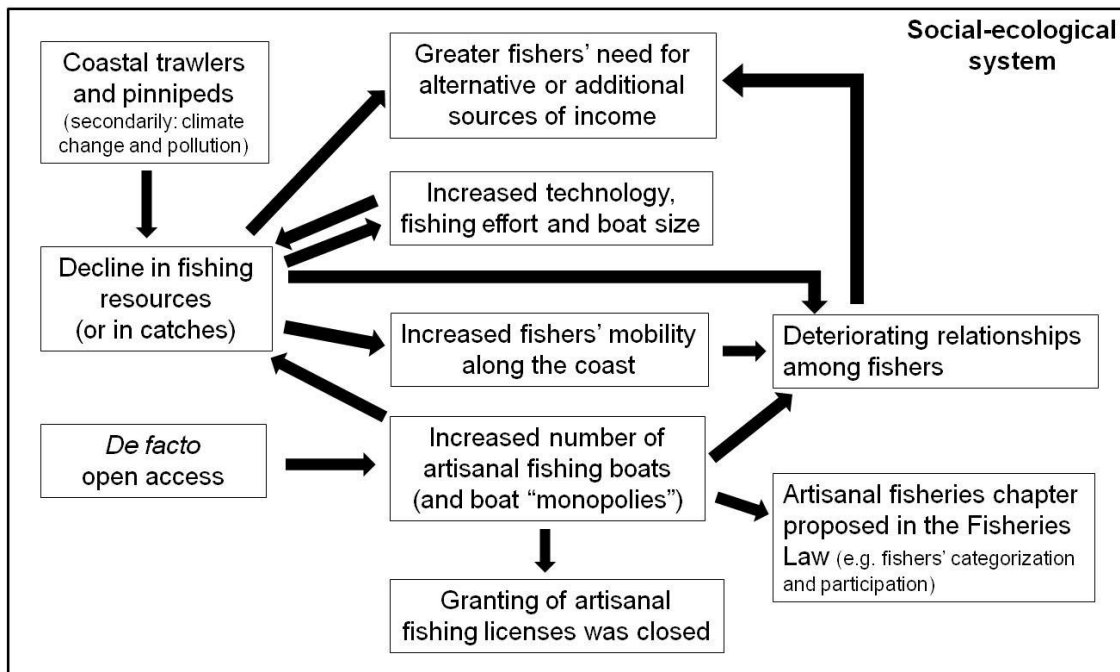
Three fishers were asked which changes could turn the fishery into a desirable future for their children. In addition to changing the national “fishing model”, as mentioned by two fishers above, another said that the artisanal fishery should become important for the government. One said that if there were as many fishing resources as in the past, he would encourage his children to work in the fishery. If the resource base improved, plausibly many fishers would encourage their children to remain in it. Not surprisingly, the observation that fishing is no longer profitable is also what makes fishers think that the fishery is an undesirable future for their children and is why some fishers are looking for alternative occupations. These views about the undesirability of fishing for their children are shared by fishers' wives who want a better future for their children. However, one fisher's wife who is an *alistora*, added that if her two sons decided to become fishers, that would not be bad because they would work among friends.

With regards to the actual future aspirations for their children, fishers wish they could study subjects like computing or work in other fields such as construction, or “whatever they choose”. However, contrary to these aspirations, it is not uncommon in Piriápolis to see fishers' sons and daughters working in the fishery: boys start going fishing once they have acquired shore-based skills like preparing and baiting long-lines, whereas girls work as *alistoras*. Two fisher's daughters work at their father's fish market stall. Fishers' sons and daughters who do not work in the fishery end up doing diverse jobs. Only a minority finish high-school and continue studying. Dropping out of school happens partly due to economic reasons: the household needs income from all its members and it is not easy to study and work at the same time. Curiously, one

of the two fish buyers interviewed stated that he wanted their sons to work in the fishery, although he added that they are not going to do so because they are studying. The second fish buyer, as most fishers, argued that he wanted his children to study rather than to work in the fishery.

## 5.6. DISCUSSION

The research findings showed several of the many intricate connections between the ecological and social (including political and economic) components of the artisanal fisheries system in coastal Uruguay (Figure 5.2). Ecological changes, such as decline in fish resources or in catches and changing climatic conditions have been occurring for decades, although more pronouncedly so since 2000. Corresponding changes in the social system of the fishery followed, like increased fishing effort and fishers' mobility along the coast, as well as fishers' growing need for alternative or additional occupations. Concomitant changes in government policies for artisanal fisheries management, mainly oriented to controlling fishing effort, also took place.



**Figure 5.2. Changes that have occurred in the social-ecological system of artisanal fisheries in coastal Uruguay (mainly since 2000).** The figure was made based on data from interviews with fishers and non-fisher stakeholders (arrows represent cause-consequence relationships).

As expected in social-ecological systems (i.e. coupled human and natural systems), feedback loops in which social components are affected by ecological components (Berkes & Folke 1998, Liu et al. 2007) were found in the studied fishery. For instance, reduced catches led

to increased fishing effort, which in turn contributed to declining catches (although not to a large extent according to fishers) (Figure 5.2). In what follows, these changes are analyzed as part of a “social-ecological crisis”, offering insights into an apparent window of opportunity towards alternative management or governance modes, such as co-management.

### **5.6.1. Social-ecological crisis in coastal artisanal fisheries in Uruguay**

Perceived crises by stakeholders, which may include dwindling resources and inter-group conflicts, were identified as conditions and triggering factors for co-management (e.g. Pomeroy & Berkes 1997, Plummer & FitzGibbon 2004). However, these social and ecological crises can also exacerbate conflicts among stakeholder groups (Olsson et al. 2006), thus representing barriers to co-management. In coastal Uruguay, the fishing resource crisis seems to have exacerbated the conflicts between fishers and large-scale trawlers and/or DINARA. In turn, the social crisis, observed for instance in the increased number of fishing boats (with the concurrent formation of boat oligopolies), increased fishers’ mobility, and deteriorating relationships among fishers, may have aggravated conflicts or differences among them.

The “demographic explosion” in artisanal fisheries in coastal Uruguay during the economic crisis in 2002 marked a before-and-after. Not only was this sector a last resort for unemployed and untrained people (like in other parts of the world, Pollnac et al. 2001, Wilson et al. 2006), but it was also a perfect opportunity for “businessmen” investing in fishing boats, forming the now-observed boat oligopoly (“monopolies” in fishers’ words). The dynamism of the social-ecological system can be illustrated by the fact that, in contrast to what happened in the early 2000s, the number of experienced or “traditional” fishers working in the fishery is declining. In spite of fishers’ job satisfaction being seemingly high as a way of life they have chosen, they are increasingly complementing their fishery work with other occupations, like in construction, although they were clear that the fishery was the job they really liked. In coastal Brazil (see Chapter 9) and Australia (Marshall & Marshall 2007 in Armitage et al. 2012), fishers have also decided to leave the fishing sector after ecological, social or economic conditions became untenable.

The fishing resource crisis in coastal Uruguay was recognized by most fishers, SUNTMA and some DINARA members (not particularly so by the Director and artisanal fisheries manager). Even though resource decline cannot be confirmed from catch decline, the latter is an indicator of a crisis in fishing resources. According to a FAO publication, Uruguay is not an exception to the global fisheries crisis; most fish stocks are fully exploited due to a marked increase in fishing effort during the early 1990s (Defeo et al. 2011). Undoubtedly then, if fishing resources are in crisis, the management system must be questioned. The approach based on single-species management and maximum sustainable yield estimations, although greatly criticized, is still in

use in Uruguay. Common failures of this model are that it ignores interactions within the system (e.g. between fish species and between fish and people) and that it reduces the natural variability of the system (Berkes et al. 2001, Berkes 2010a). This management model, whose focus is on efficiency maximization, has proved to be challenged by the uncertainty, complexity and dynamism of the fisheries system (e.g. Béné et al. 2010, Armitage et al. 2012).

For example, one of the lessons learned by fisheries scientists from the collapse of the Northern cod off Newfoundland was that assessment errors can contribute to overfishing through optimistic assessments which lead to TACs being set higher than they should (Walters & Maguire 1996). Fisheries scientists should have also learned the importance of listening to fishers. Labrador fishers' efforts to warn managers of the impending collapse of the Newfoundland cod were unsuccessful (e.g. see Berkes 2010a). In Uruguay, even though DINARA is open to certain changes in fisheries management (including fisher participation) it does not seem open to leaving behind the MSY model. This is unfortunate considering that "conventional resource models, based on single resources and linear dynamics, are of limited use for the purpose of navigating society towards sustainability" (Folke et al. 2007, p.537).

Addressing the social-ecological crisis in coastal artisanal fisheries in Uruguay has several other challenges, such as the complexities imposed by the nature of the fishing resources and fisher groups, and the influence of external variables (e.g. markets, demographics, large-scale users). How these complexities are addressed will affect policies' success or failure (Liu et al. 2007). First, small size and well-defined boundaries of the resource have been suggested as conditions for collective action (Ostrom 1990, Cox et al. 2010) and (successful) co-management (Pomeroy 2007, Armitage et al. 2009, Gutiérrez et al. 2011). Neither of these two conditions is present for two of the main species of the Piriápolis artisanal fishery (whitemouth croaker and striped weakfish). These species have a wide distribution along the coast of Uruguay (Río de la Plata, Atlantic Ocean) and neighbouring countries (Argentina, Brazil), both inshore and offshore, being exploited by the large-scale industrial fleet of all three countries. In addition, resource boundaries are not clear, partly due to the migratory movements of these species.

Second, small size of the group (Pomeroy et al. 2001; Armitage et al. 2009) and clearly defined boundaries of those authorized to use the resource (Napier et al. 2005, Pomeroy 2007), have been regarded as conditions for both co-management and commons management. In Piriápolis (as in most coastal localities in Uruguay), group size is not small and boundaries are unclear: fishers are mobile as a consequence of resource mobility, illustrating the inter-relationship between resource characteristics and group characteristics. Interestingly, despite fishers' mobility along the coast, there are shared social norms (see Chapter 6).

Third, globalized markets and technological changes might have major impacts on commons management (fostering resource exploitation) (Agrawal 2002, Berkes 2009b).

Commons and co-management literature should give (more) attention to external variables or drivers (Cox et al. 2010). Individuals or companies using the same resources as local people but at a large-scale might represent an additional, often ignored, external variable affecting co-management. In Uruguay, the externalities that the large-scale sector causes to the artisanal sector can be partly explained by their different technologies (as discussed in Section 3.1.1). Studying the embedding of smaller-scale processes in larger-scale processes, and the influences of the latter on the former, is crucial in coupled human and natural systems (Liu et al. 2007). Nonetheless, these cross-scale and dynamic interactions represent new challenges for governance and management of social-ecological systems (Folke et al. 2007). In Uruguay, government privileges for the large-scale fishing sector, often in detriment to the artisanal sector, are still predominant. It is not surprising that centralized resource management privileges the interests of the resource industry (Berkes 2010a). In Uruguay, as worldwide, rent maximization has been the main goal of fishing resource extraction (Charles 1988 in Armitage et al. 2012), privileging export earnings.

#### **5.6.2. Window of opportunity for improved fisheries management**

Significant changes are most likely to occur when (i) recognized problems, (ii) available solutions, and (iii) politics, come together at critical times, providing a *window of opportunity* (Kingdom 1995 in Olsson et al. 2006). These windows of opportunity for improved governance lay in between the preparation phase and the transition phase of a social-ecological system (Olsson et al. 2006). Here I argue that the social-ecological crisis observed in artisanal fisheries in coastal Uruguay represents the first of the above three elements needed for a window of opportunity (i.e. the problems). Nonetheless, conflicting interests leading to polarization among stakeholder groups (Olsson et al. 2006), in other words, lack of shared vision and interests, represent a challenge both for seizing the window of opportunity and for co-management (Plummer & FitzGibbon 2004, Napier et al. 2005, Pomeroy 2007, Armitage et al. 2009).

It has been claimed that perceived or real crises (e.g. caused by external markets, resource failures, new legislation or government policies which do not take into account local contexts) trigger learning, knowledge generation, self-organization, thus opening up space for new management trajectories of natural resources (Berkes et al. 2003, Folke et al. 2007). However, complexities arise when crises or problems are perceived differently by stakeholder groups. For example, in Uruguay boat-owners of the large-scale fishing sector organized to protest against the extension of the non-trawling zone (winning the legal action); sport fishers apparently organized to protest against artisanal fishing close to shore (after which the 300 m zoning was promulgated); and artisanal fishers in turn organized to protest against the latter measure. All these stakeholders' reactions led to changes in government regulations, suggesting

that DINARA should get the different groups together to discuss future management trends (instead of basing fisheries management on groups' protests).

Solutions are the second element of windows of opportunity. Disagreement among stakeholder groups on the actions that should be taken may occur even when there is some agreement on the driving forces behind the crisis (Olsson et al. 2006). In the Uruguay case, artisanal fishers and DINARA seem to agree about the need for criteria to decide who has access to fishing resources (and how these resources are used). Nevertheless, government and fishers' priorities differ. Fishers claimed vigorously that coastal trawling should be totally forbidden (because it is non-selective and bottom-damaging), or at least it should be forbidden in a wider area than 7 nautical miles off shore. DINARA, in turn, even though in some cases recognizing the drawbacks of trawling would be more inclined towards investigating how to increase the selectivity of this gear rather than expanding the non-trawling zone. As has been argued in the literature, when resource depletion and/or conflict over resource access occur at greater than local scales, the community's need for the State increases, opening up space for co-management. In fact, conflicts with trawlers have been addressed by co-management arrangements in some countries such as Thailand and Philippines (Wilson et al. 2006).

The categorization of artisanal fishers based on several criteria (e.g. boat size, number of gillnets, fisheries zone, and degree of dependence on the fishery for a living), was a "solution" or measure proposed both by fishers and DINARA, representing an opportunity for collaborative decision-making or co-management. Fishers' categorization goes hand in hand with defining what *artisanal fishers* are, which will not be an easy task (i.e. the definition of artisanal fisheries varies among fishers). Fishers' desire for exclusion of others, with State support, has shown to support co-management initiatives (e.g. in Philippines and Bangladesh, Wilson et al. 2006). Fishers should definitely participate in this search for "solutions" to the social-ecological crisis. In effect, the artisanal fisheries manager recognized that government policies would not be enough unless resource users are involved in decision-making processes, and fishers stated that solutions to resource crisis should be found in collaboration with DINARA (see Chapter 7).

The third and last element of windows of opportunity is political actions. In Uruguay, the fact that DINARA has recognized artisanal fisheries among its priorities (although Piriápolis fishers still do not think this is the case), represents an opportunity for political actions towards alternative management (and maybe research) approaches which include fisher participation. Moreover, the new fisheries law, with a chapter dedicated to artisanal fisheries management, which proposes the creation of consultative councils and fishers' categorization, constitutes a political action towards addressing the solutions described above. Chapter 7 will focus on the actual and desired fisher participation in decision-making, including the process of creation of this law, whereas Chapter 9 will show a participatory research case involving several stakeholder



groups in Piriápolis. DINARA participation in the participatory research initiative was probably supported by its increased interest in the artisanal sector.

Finally, transformative changes occurring as a result of ecological crises, shifts in the social components of the system, or political-economic change, define and create novel system configurations by introducing new components and ways of governing social-ecological systems (Olsson et al. 2006). In some cases around the world it has been possible to transform governance for improved management in response to crisis (such as in Kristianstads Vattenrike – Sweden, and the Northern Highlands Lake District - USA). However, it was found that many social-ecological systems transform too late, when significant degradation and loss of utility from the system have already occurred, or they fail to seize windows of opportunity when they arise (such as in the Goulburn-Broken Catchment – Australia) – the opportunity for change is often limited to a very short period of time (Olsson et al. 2006).

### **5.6.3. Conclusions**

The changes that have been occurring in artisanal fisheries in coastal Uruguay, such as catch decline, increased fishing effort, fishers' mobility along the coast, and fishers' growing need for alternative or additional occupations, constitute a social-ecological crisis. This crisis represents the first element (i.e. recognized problems) needed for a *window of opportunity* for alternative management. Moreover, DINARA's recognition of artisanal fisheries among its priorities, observed for instance in the proposed fisheries law (Chapter 7), as well as some commonalities found between fishers and DINARA regarding solutions to the crisis, represent further elements of the window of opportunity for the emergence of co-management. Nevertheless, for this window of opportunity to be seized, several barriers or challenges will have to be faced: (i) the size of the resources is large and their boundaries are not well-defined; (ii) user group size is not small and the boundaries are poorly defined -- fishers are increasingly mobile or seasonally migratory; (iii) fishers are looking for alternative or additional occupations; (iv) relationships among fishers have been deteriorating; (v) fisheries management is still based on single-species management and maximum sustainable yield (MSY) estimations; and (vi) there are conflicting interests among sport fishing, artisanal fishing and industrial fishing. Fishery stakeholder groups in coastal Uruguay (DINARA included) should learn from international cases and organize collectively towards a positive transformation, seizing the current window of opportunity before it is too late. Otherwise, the social-ecological system will move further down an unsustainable trajectory toward the degradation of the social and ecological components of the fishery. Networks among stakeholders will be needed for this transformation, and are thus addressed in the next chapter.

## **CHAPTER 6: MULTILEVEL SOCIAL CAPITAL ANALYSIS IN ARTISANAL FISHERIES IN URUGUAY**

### **6.1. INTRODUCTION**

Social capital in natural resources management and adaptive co-management, including fisheries, has received growing interest (e.g. Pretty & Ward 2001, Plummer & FitzGibbon 2007, Armitage et al. 2009, Marín et al. 2012). Robert Putnam (1993) defined social capital as connections among individuals - social networks, and the norms of reciprocity and trustworthiness that arise from them. As Chapter 2 showed, even though there are numerous definitions of social capital in the literature, all of them have “interactions among individuals” as a central component.

The objective of this chapter is to investigate social capital at multiple levels by studying the relationships embedded in the bonding, bridging, and linking networks among stakeholders in artisanal fisheries management in Uruguay (artisanal fishers, fish buyers, national union of seamen, national university, NGOs, government agencies). The bonding form occurs within existing groups (e.g. among fishers, within DINARA); the bridging form refers to horizontal connections among similar but different groups (e.g. among fishers from different localities, between DINARA and the Coast Guard); and linking is concerned with vertical connections among groups at different levels of organization (e.g. between fishers and DINARA).

The main argument of this chapter is that the study of social capital, in the context of natural resources management, necessarily has to be multilevel because of the multiple levels of organization involved in co-management as governance (Carlsson & Berkes 2005). This means that the five types of network connections identified by Pretty & Ward (2001) should be investigated: (i) Local or intra-local connections (bonding at the local level), (ii) Local-local connections (bridging at the local level), (iii) Local-external connections (linking social capital), (iv) External-external connections (bridging at the external level), and (v) External or intra-external connections (bonding at the external level). In other words, both external stakeholders (such as government agencies) and communities should be foci of social capital analysis.

Before proceeding, the term “capital” deserves some attention. The origin of the term lies in the discourses of economics, indicating the presence of tangible assets with particular functions in systems of production and exchange, which can be employed for the creation of wealth (Wall et al. 1998, White & Ellison 2007). Then the concept of capital started to be used to refer to an “overall capacity to mobilize not only economic and political resources but also social and cultural ones” (Mouzelis 1995, p.162, in Wall et al. 1998). Because of the home context of the term capital, some contemporary social scholars prefer the term “social resources” to “social capital” because the character of the former is given by their use, not being fixed values

(abstracted simplistically from their context) (White & Ellison 2007). Even though I do agree that relationships among stakeholders should be considered social resources, I decided to keep using the term social capital because it was that literature which informed the definition of my research. Nevertheless, I consider that the detailed investigation of most of the relationships included in my multilevel social capital analysis is compatible with the conception of relationships as social resources.

In the following sections, first, the bonding and bridging relationships among fishers will be presented. Second, linking social capital between fishers and external stakeholders (i.e. non-fishers) will be analyzed, both from the fishers' and the externals' perspectives. Also, in a few cases, bonding relationships at the external level are explored. Third, bridging social capital at the external level is analyzed. Finally, the findings are discussed focused on the identification of facilitating and hindering factors for co-management.

## **6.2. RELATIONSHIPS AMONG FISHERS: BONDING AND BRIDGING SOCIAL CAPITAL AT THE LOCAL LEVEL**

This section is about relationships among fishers. It starts with a general description of fishers' relationships, including trust and respect. It follows with the analysis of solidarity and reciprocity norms (Section 6.2.1), after which local rules and norms related to fishing resources use are presented (Section 6.2.2). Lastly, fishers' weak organization, including the lack of representatives or formal leaders, is analyzed.

As described in Chapter 3, the Piriápolis area comprises four landing sites (from east to west): Pesquero Stella Maris (SM), Piriápolis Port (PP), Playa Hermosa (PH) and Playa Verde (PV). Within the first three landing sites most fishers stated that they have good relationships amongst themselves (Table 6.1), explaining that they help each other (see Section 6.2.1). However, in PV, fishers who work on the two existing fishing boats do not get along well. They stated that they have "no relationship" but they mentioned a number of conflicts they have had, such as regarding the use of the same fishing spots, stealing nets, and selling fish in the same neighbourhood. Interestingly, the only fisher who considered that relationships in PP are not good indeed stated that they are awful; he added that relationships are better in SM because fishers live at the landing site (in shacks). One PH fisher pointed out that relationships within this site are regular because only very recently fishers started to coordinate departure at the same time (although there were only four boats at that time).

**Table 6.1.** Bonding and bridging relationships among fishers from Pesquero Stella Maris (SM), Piriápolis Port (PP), Playa Hermosa (PH) and Playa Verde (PV) (\*)

<b>Relationship</b>	<b>SM- SM</b>	<b>PP- PP</b>	<b>PH- PH</b>	<b>PV- PV</b>	<b>Bonding SC</b>	<b>SM- PP</b>	<b>SM- PH</b>	<b>SM- PV</b>	<b>PP- PH</b>	<b>PP- PV</b>	<b>PH- PV</b>	<b>Bridging SC</b>
No relationship (**)	0	0	0	2/2	2/16	0	1/9	3/8	1/8	1/7	1/5	7/48
Regular	2/6	1/5	1/3	0	4/16	4/11	1/9	0	0	0	0	5/48
Regular-Good	0	0	0	0	0	2/11	0	0	1/8	1/7	0	4/48
Good	2/6	4/5	2/3	0	8/16	3/11	4/9	2/8	6/8	4/7	4/5	23/48
Very good	2/6	0	0	0	2/16	2/11	2/9	2/8	0	0	0	6/48
No answer	0	0	0	0	0	0	1/9	1/8	0	1/7	0	3/48

(\*) Sixteen fishers (6 from SM, 5 from PP, 3 from PH and 2 from PV) were asked a closed-ended question regarding their relationships with fishers from SM, PP, PH and PV. Prompts followed to understand better the responses. (\*\*) The interpretation of this and the remaining categories by fishers was subjective (i.e. no definition of the categories was provided). For some fishers, “no relationship” meant no dialogue at all whereas for others it meant infrequent conversations. The remaining categories used for this question are the same as the marking system in primary schools in Uruguay (*Regular, Regular-Buena, Buena, Muy buena*). Cases in which fishers responded using a more negative qualification than Regular are clarified in the text.

Fishers from each of the four landing sites also said that they have good relationships with fishers from the other landing sites. Fishers explained that they communicate at sea or by cell phone, they respect others’ fishing spots, and they are supportive. Of special interest is the relationship between fishers from SM and PP, because it is commonly argued by them that they are “the same thing”. During my long stay in the field I could observe a continuous “flow” of fishers and *alistedores* between SM and PP. However, according to one PP fisher, there are conflicts when fishers from SM bring their boats to the port because they moor wherever they want. Curiously, one fisher from PP explained that the relationship between these two sites varies throughout the year depending on fishers’ migration. Out of the fishing season (*zafra*), there is no division between SM and PP because they know everybody, whereas in season the number of fishers increases due to “immigration”. Even though most bridging relationships are good, not every fisher has relationships with the remaining landing sites in the Piriápolis area. The “no relationship” response was most frequent between fishers from the most distant sites: SM and PV. Not only are these sites geographically distant (compared to the others) but also fishers from SM and PV usually go fishing to different spots. Fishers from SM, PP and PH generally mentioned that there are only a few fishers in PV.

### ***Trust relationships***

Approximately half of the fishers stated that they feel high trust in fishers from their own site (i.e. bonding) and from the remaining sites (i.e. bridging; 16 out of 35 relationships, without considering the “no answer” category, Table 6.2). To explain this high level of trust, fishers

referred to the fishery as a source of livelihood for them all, or to not having had stolen fishing gear. Only four fishers (one from SM, two from PP and one from PH) made a difference between trust in the same site and trust in other sites, arguing that the former (bonding trust) is higher than the latter (bridging trust). This is not surprising considering that the amount of time spent with fishers from the same site is higher.

**Table 6.2.** Bonding and bridging trust, respect and solidarity among fishers from Pesquero Stella Maris (SM), Piriápolis Port (PP), Playa Hermosa (PH) and Playa Verde (PV). (\*)

Category	Bonding trust	Bridging trust	Bonding respect	Bridging respect	Bonding solidarity	Bridging solidarity
None	2/16	7/48	0	0	0	0
Low	3/16	10/48	1/16	3/48	0	0
Medium	2/16	2/48	2/16	3/48	2/16	11/48
High	7/16	16/48	10/16	30/48	9/16	22/48
No answer	2/16	13/48	3/16	12/48	5/16	15/48

(\*) Sixteen fishers (6 from SM, 5 from PP, 3 from PH and 2 from PV) were asked a closed-ended question regarding their trust in fishers from SM, PP, PH and PV. Prompts followed to understand better the responses. The bonding values for trust, respect and solidarity are the result of adding the bonding values at each site (SM-SM, PP-PP, PH-PH, PV-PV), whereas the bridging values are the sum of the responses between sites (SM-PP, SM-PH, SM-PV, PP-PH, PP-PV, PH-PV).

There are fishers, however, who stated that they feel no trust in others. In particular, 8 out of the 9 cases of no trust (Table 6.2) come from the responses given by two PP fishers who felt no trust in fishers from the four sites. Why would these and other fishers feel no or little trust in others? Gear stealing, fishers' inherent distrust, and fishers' migration were common explanations. For instance, one fisher who mentioned gear stealing, when explaining his lack of trust in others pointed out that "It's a competitive work; you always want to be the best one. You can trust your life<sup>67</sup> [to other fishers] but not your work!"

### **Respect**

Most fishers considered that they feel a high level of respect for other fishers, either from the same or different sites. In fact, 10 out of 16 fishers stated that they feel high respect for fishers from every site. They explained that respect is important if one wants to be respected, emphasizing the reciprocal nature of relationships. One fisher illustrated this by referring to a local rule: "You have to respect others in order to be respected as well. If they're setting [their gear] there, I won't set [my gear] over theirs." Moreover, some fishers noted that they respected each other as they would respect every person. Nevertheless, some fishers commented that they felt higher respect for old fishers, for instance because they hold more knowledge and they can

<sup>67</sup> He was possibly referring to the norm of giving assistance to others in need at sea (Section 6.2.1).

assist the younger fishers at sea. This is an example of connection between respect and solidarity. Young fishers and migrants are supposed to respect others to a lesser degree than old fishers and non-migrants do. No fisher stated higher levels of respect for fishers from his own site than other sites. However, one fisher who did not answer the question mentioned instead that he respected fishers from his site (PP) more because he knew them better.

### **6.2.1. Solidarity and reciprocity norms**

Fishers stated that solidarity among them is high or medium. Table 6.2 also shows that bonding solidarity tended to be higher than bridging solidarity. However, only two fishers (one from SM and one from PH) stated higher levels of solidarity at their own site than with the rest. In fact, solidarity is a value which characterizes fishers' nature, they explained. Solidarity is also meant to be reciprocal; as one fisher pointed out, "Solidarity [with other fishers] is total because I've received it in full". Nevertheless, when one fisher does a favour to another, nothing is expected in exchange.

Fishers frequently mentioned that at sea solidarity is higher than on land, and the most cited example to illustrate this is towing another fishing boat which is having engine problems. In fact, all fishers agreed that a fisher must never leave another fisher in need of help in the sea, even if they have a bad personal relationship (Table 6.3). Fishers explained that this is a "natural law". Reciprocity is also expected in this norm: "When something happens at sea, no matter how bad he is [the fisher in need] or how treacherous he is, ... I'll have to bring him [to shore]. Why? Because tomorrow or the day after tomorrow that traitor maybe has to bring [i.e. tow] me." Some fishers commented that they have towed boats of fishers with whom they would not talk because of previous conflicts or differences. After these solidarity actions, however, they kept without talking to each other. Although fishers stated that this is common, they recognized that it is curious that relationships do not improve after saving others' lives. Giving oil to another fishing boat which is in need at sea is very frequent too, and it also occurs between fishers who are not acquaintances.

Even though fishers could ask the Coast Guard for assistance when the engine breaks, they never do so and prefer to ask for help from fellows, no matter how far they are from shore. As one fisher stated, "the less contact we have [with the Coast Guard], the better it is". One of the reasons why fishers do not want to call the Coast Guard to assist them is that it will find out that their boats do not have all the required safety equipment (see Section 6.3.4). In fact, another local norm is that fishers must always inform the rest (regardless if they have a good or bad relationship) if the Coast Guard or DINARA is doing enforcement. These are examples of connections between linking and bonding social capital; the problematic vertical linkage between fishers and the Coast Guard seems to be promoting stronger horizontal relationships among

fishers. Occasionally, fishers help each other in their linking relationships with DINARA, such as taking others' fishing slips to the office in Montevideo, or with BPS, in the paperwork required to become formal workers.

**Table 6.3.** Fishers' solidarity norms

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
A fisher must never leave another fisher in need of help in the sea, even if they have a bad personal relationship.	16/16	0	0	0
A fisher must always inform the rest of the fishers if the Coast Guard or DINARA is doing enforcement.	14/16	2/16	0	0
A fisher must always help fishers who are ill, even if they have a bad relationship.	10/16	2/16	3/16	1/16
A fisher must always give some fish to everybody who needs food and cannot afford it.	16/16	0	0	0

In case of storms (*temporales*), solidarity is also very high. In SM and PH, fishers help each other to pull the boats up the beach above the high tide mark. Moreover, if there are long-lines or gillnets at sea while a storm is coming, fishers might ask for assistance from a fisher who works in another boat in order to bring all the gear back to shore as quickly as possible.

Another example of solidarity is helping fishers who are ill or who have had an accident and thus cannot go fishing. In these cases fishers collect money or fish (for selling it) for the one in need. One fisher from PH once had a motorbike accident and fishers from several coastal localities (Montevideo, San Luis, Piriápolis) saved money for him, which illustrates the existence of strong bridging relationships. Receiving support from fellow fishers in case of accidents or illness is particularly important if we consider that most fishers are informal workers, not having medical insurance or unemployment benefit. In contrast to what happens at sea, fishers will not help every fisher who is ill but rather, mostly those who are acquaintances or friends. A few fishers have had accidents and were not helped during their recovery. It is likely that reciprocity plays a role in this regard; for instance, if a fisher is not supportive of others, he might not receive help on land in case of having an accident which prevents him from going fishing.

Giving fish to other fishers, especially to the eldest who do not go fishing anymore, or to people who approach landing sites asking for some fish to eat, occurs almost daily ("It's a tradition"). At landing sites, fish is denied when fishers perceive that the person is asking fish for selling (e.g. when he wants several kilos), not for eating. Fishers also exchange fish for bait, such as *congrío* (conger), which is a by-catch species.

Lending gillnets and long-lines only occurs between close fishers occasionally. Boat engines are lent only rarely because they are expensive and they break often. One fisher argued that fishers are selfish because they do not lend engines even though some of them have two.

More frequently, engines are rented for 20% of the catch, and if the engine breaks, its owner will cover the costs. Lending money also occurs rarely among fishers. If fish buyers refuse to give them money in advance, fishers could ask for it from family members or close fishers.

Exchanging information about the location of fishing spots and catch size occurs daily among fishers from the same and different landing sites. Fishers communicate face-to-face in the former case and by cell phone in the latter cases. Most fishers (13 out of 16) stated that they communicate with fishers from coastal localities other than the Piriápolis area, mainly from four departments: Maldonado, Canelones, Montevideo and San José. They talk about fishery issues but also about personal issues (including their family). One fisher commented that there is friendship in these (bridging) relationships. Connections among fishers from different coastal localities increased greatly after they started to migrate along the coast, they explained.

At sea fishers communicate mainly by cell phone, which they consider better than the radio because they can choose whom to communicate with (e.g. in the past they would use code words while communicating through the radio). Fishers stated that they ask information from those fishers whom they trust the most. Trust is especially important in this “knowledge exchange” because lies are common and largely accepted among fishers. Nine out of sixteen fishers agreed that it is not serious that a fisher lies to another about the quantity he caught and where he did it, while only four of them disagreed. It is frequently mentioned that “a good fisher is one who knows how to lie”. These professional secrets are needed because there is little fish at sea, one fisher explained. However, others stated that lies about location of fishing spots are examples of fishers’ selfishness, or an evidence that respect among fishers has diminished over time. Some fishers are known to be liars (e.g. “we all know who are liars”). However, within groups of close fellows or friends, fishers tell the truth about their fishing spot and catch size.

Some fishers make the decision of whether to go fishing or not on a certain day depending on the information they get from others who went fishing. They are considered “opportunistic fishers” by those who go fishing every day (weather allowing). Occasionally, in order to maximize cost-effectiveness, several boats depart together and look for fish in different areas (using depth-finders); the first one finding a school has to communicate it to the rest. When choosing the spot where to draw their gear, fishers also pay attention to environmental conditions, such as tides, wind direction, and sea temperature, as well as topographical characteristics of the sea floor. Fishers also exchange information about the weather forecast (those who use internet usually inform others).

Migrant fishers depend on knowledge exchange with fishers from other localities to decide when and where to move. Information about the fish is not only exchanged among artisanal fishers but also via fish buyers, coastal trawlers, and sport fishers. As fishers explained, it is useful for fish buyers to let them know which species are being caught, where, and with



which fishing gear. This is one of the several examples showing that the relationship between fishers and fish buyers affects fishing resources use (see Section 6.3.1).

As has been shown above, there are a number of examples of solidarity among fishers. Paradoxically, they commonly identify themselves as individualistic and selfish. This led me to ask them if they agreed with the statement that artisanal fishers are individualistic persons. About half of them (nine out of sixteen fishers) agreed, arguing that they work for their own and look for individual benefits, whereas the rest disagreed and referred to how supportive they are with each other at sea.

## 6.2.2. Local rules and norms related to fishing resources use

### *Individual “floors” (informal ownership of fishing spots)*

Fishers who have traditionally worked in the Piriápolis area have customary sites for drawing long-lines. These sites are called *pisos* (floors). As one fisher explained, “Floors are respected; those are the zones where you work all year long. There are people who don’t respect them.” Similarly, as an old fisher stated, “Old fishers respect [my floor]. New fishers coming from abroad [i.e. from other localities] don’t respect anything.” Individual floors are not only customary but also are acquired daily. For example, if one fisher finds a spot with a good catch one day, the day after that spot will be “his floor”. That will be so until a storm comes, after which new floors will be established. Setting gear parallel (*apariguar*) to the long-lines of the “floor owner” is usually prohibited because it greatly diminishes the owner’s catch. Sanctions include arguing, fighting and/or cutting the long-lines of the offender. Nevertheless, setting long-lines perpendicularly is accepted. Interestingly, when the informal owner of a certain floor does not go fishing, his floor can be used by the fisher who gets there first (i.e. first comer’s rights).

**Table 6.4.** Local rules and norms related to fishing resources use

<b>Rule or norm</b>	<b>Fishing gear</b>	<b>Sanction</b>
Individual “floors” (informal ownership of fishing spots)	Long-lines	Cutting long-lines; fighting
First comer’s rights	Gillnets (and long-lines, when floors’ owners did not go fishing)	Cutting or stealing gillnets; fighting
Giving small fish back to sea	Long-lines and gillnets	None
Offering the first fish of the day to the Virgin during the fishing seasons	Long-lines and gillnets	None
Non-fishing days (February 2 <sup>nd</sup> , Good Friday and November 2 <sup>nd</sup> )	Long-lines and gillnets	None

### ***First comer's rights***

When gillnets are used, first comer's rights is the prevalent norm: the first boat arriving at a certain spot has the right to set his gillnets as he wants. Those arriving later are expected to set respecting a certain distance with the set gillnets, although there is not a consensus about this distance (e.g. 100 meters, one mile, 10 minutes). First comer's rights are not very much respected during the croaker season, when many boats set gillnets at the spot where the school is, leading to frequent conflicts between fishers. Sometimes fishers who have set gillnets at the same spot will pull up their gear at the same time in an attempt to avoid gear damage. This occurs when fishers are acquaintances or friends, but when they do not know each other, they may cut others' gillnets and steal them with all the fish caught in them. Fighting at sea during the croaker season is considered dangerous because some fishers are known to carry guns onboard.

### ***Giving small fish back to sea***

Fishers usually put undersized fish caught in long-lines and gillnets back into the sea. Sometimes they do it carefully, hoping that the fish will stay alive, and other times they do it as fast as possible. Most fishers (14 out of 16) agreed that it is important that all fishers give the small fish back to the sea (one fisher neither agreed nor disagreed, and one did not answer). Two main reasons are behind this norm: resource conservation, and lack of selling opportunities. The first one seemed to be the most prominent one; "If you're a fisher, you have to think about the future". In fact, most fishers (13 out of 16) agreed that fishers have the duty to conserve the fishing resources for future generations (only one fisher disagreed with this statement). Nevertheless, when fishers have caught just small fish, they will keep some for consumption. Second, fishers explained that small fish are infrequently taken by fish buyers, a reason why they prefer to put them back. Non-commercial species, such as rays, are usually returned to the water. Fishers explained that when small fish are already dead, they should not throw them back into the water because that will attract sea gulls, whose calls attract sea lions.

### ***Offering the first fish of the day to the Virgin during the fishing season***

This norm is only respected by religious (i.e. Catholic) fishers (approximately 50% according to them). During the fishing season, either with long-lines or gillnets, they give back to the sea the first fish, offering it to the Virgin who looks after them while they navigate. One fisher explained that this is not only an offering, but also a way of enhancing resource conservation. He

added that this norm is more common in Montevideo than in Piriápolis because prices are lower at the former site. Nevertheless, other fishers stated that this custom is being lost.

### ***Non-fishing days***

Similar to the previous case, this norm is respected only by religious fishers. Only three non-fishing days were identified: February 2<sup>nd</sup> (Virgin's day, Yemanjá), Good Friday and November 2<sup>nd</sup> (All Souls Day). Fishers who respect this norm understand others who do not believe in it. Moreover, some religious fishers might go fishing on February 2<sup>nd</sup>, Good Friday or November 2<sup>nd</sup> if they do not have money to eat.

### **6.2.3. Weak organization and collective action**

A recurrent theme in conversations with Piriápolis fishers is their lack of unity; "Fishers aren't united", "We are a species which has never united". Fishers explained this lack of unity by arguing that they do not act collectively to improve their situation but rather just worry about themselves. For example, they do not organize: (i) to defend their fishing spots from large (but still small-scale) boats coming from La Paloma, (ii) to become formal workers with social insurance, (iii) or to protest against the low prices paid by fish buyers. When fishers have organized strikes, there always have been fishers who did not stop selling fish at low prices. Fishers usually commented that if they were united, they would have their own cold room and would have direct marketing. An old fisher stated that in 1988 fishers in Piriápolis tried to form a cooperative for the purpose of marketing but its rules or statute were rejected. No further attempts followed. Nowadays, after the unsuccessful experience of cooperatives in other coastal localities (Pajas Blancas in Montevideo and San Luis in Canelones), Piriápolis fishers believe that "cooperative is a bad word". Unsuccessful experiences of organization have made fishers think that they will never be united and organized. According to them, this lack of unity is a common trait along coastal Uruguay, except for Punta del Este, where they see that fishers are more united.

Nevertheless, occasionally a few fishers would argue that they are united to some degree, illustrating this with the norm of giving assistance at sea even to their enemies. More frequently, fishers gave examples of uniting during crises or tragedies; "When tragedies occur, there's much unity", "The only moment in which artisanal fishers are truly united is during storms". Fishers are aware of their potential to act strongly as a collective. An example of fishers uniting is the fishing boats demonstration that they organized against the privatization of Piriápolis port, which remained state-owned. Occasionally, fishers unite to make collective decisions when catches are very scarce or when they lack selling opportunities. At one of the

landing sites (SM), when fish buyers do not buy fish or buy only very little, sometimes fishers take turns to go fishing or they go fishing six of them in one boat (instead of three as usual).

Despite the above examples of unity, most fishers (13 out of 16) agreed that more unity is needed among fishers (one fisher disagreed, another one neither agreed nor disagreed, and one fisher did not answer). When fishers were asked how would be possible to achieve greater unity, some argued that this is impossible and there will never be unity among them. Others, however, stated that meetings would help because nowadays “we don’t meet to try to improve anything”. In fact, except for two fishers, the rest (14 out of 16) agreed that they should meet regularly to look for solutions to the problems of the fishery. One of the two fishers who disagreed stated that he does not like meetings, whereas the second one claimed that they do not need to meet because they talk about the problems of the fishery on a daily basis. Besides meetings, fishers mentioned three other initiatives which would have the potential of uniting them: (i) direct marketing, (ii) a cull of sea lions, and (iii) government pressure on them to become formal workers. The last one is an example of how linking relationships could affect bonding relationships at the local level.

Some fishers wished there was an association or union of artisanal fishers in Piriápolis. Nonetheless, they identified a number of barriers for getting together and working collectively: (a) there are differing interests between fishers who sell to fish buyers and those who sell to consumers, and between those who depend on one fish buyer and those who do not have a dependence relationship (e.g. the former fishers do not want to take any action against fish buyers) - this is an example of linking-bonding interconnection; (b) interests also differ between fishers who own one boat and those who own several boats, (c) and between fishers who make their living exclusively from the fishery and those with additional sources of income; (d) old and young fishers have different interests; (e) fishers are selfish, and there is rivalry when competing to get the biggest catch. One fisher explained that relationships among fishers are more complex in Piriápolis than in other localities because of all the above differences. He stated that:

“Fishers will never be really united, less [probably] in this port [referring to the Piriápolis area] ... The problem of this port is that there are many things at stake. There are fishers who go fishing and sell the catch to survive; there are fishers who own many boats and a [fish] stall, and make much more; there are fishers’ family members or ex-fishers who own fish markets or restaurants. So, in addition to being fishers, there are many economic interests, that’s why there’s no way to get together. Every time there’s a meeting of us together, there are disagreements.”

### ***Fishers’ representatives***

Besides a need for greater unity, fishers frequently stated that they should have representatives. They explained that these representatives would be in charge of attending meetings (e.g. with government agencies) and expressing the voice of the group (or of most fishers) rather than the individual’s. In PP and SM, but not in PV and PH, there have been

fishers' representatives. Occasionally they were elected during informal meetings organized by fishers and, at least once, representatives were elected in a meeting organized by the Coast Guard, for which participation was compulsory, as fishers explained. It seems that the linking relationship with the Coast Guard have had the effect of enhancing the bonding connections among fishers. In any case, it is common knowledge that fishers who do not participate in the elections are then dissatisfied with the representatives.

In May 2010, immediately after I initiated fieldwork in Piriápolis, I informed fishers about a National Meeting of Artisanal Fisheries in Carmelo (Colonia), organized by the NGO Cultura Ambiental. They had to choose who would represent them because only two of them would be able to participate. Fishers in PH stated that they had no representative, and given that only one of them was motivated to participate (of the eight fishers at that time), the decision was easy. Fishers in PV were not informed about the meeting because I had not yet initiated contact with them. In PP and SM, several fishers named one SM fisher as the individual who always participates in meetings. After knowing that other fishers had proposed his name, this "natural representative" accepted to participate in the national meeting. I then organized two informal meetings, one in PH and one in SM, to discuss in group the topics about which the two participating fishers would have to talk in Carmelo, such as the characteristics of their fishery, the main problems, and changes that have occurred over time<sup>68</sup>. Once the two fishers returned to Piriápolis after the weekend meeting in Carmelo, they shared with the rest (one in PH and the other in PP and SM) their opinions about the meeting, the exchange they had had with fishers from other localities, and the comments given by DINARA's Director (e.g. fishers have to become organized).

Throughout my two-year fieldwork in Piriápolis, the SM fisher who went to Carmelo was recurrently identified by others as a *de facto* representative (fishers did not use these terms but explained that he represented the group by attending every meeting). However, some fishers argued that he talked too much, that he misinterpreted the information provided at meetings, and/or that he participated only for individual benefits. This fisher was aware of others' last concern but stated that his interest in improving the fishery was genuine, arguing for instance that he wanted his sons and youth to keep working as fishers. In fact, this was appreciated by several others, who noted that given that he lives exclusively from the fishery, he will fight for the best in the fishery.

The most recent election of fishers' representatives (or delegates) took place in March 2011 at SM, triggered by a conflict with the Local Government, which had stopped providing them with electricity. The meeting took place at one of the shacks, without prior notice to all SM fishers (e.g. the *de facto* representative was not informed). A 60-year old migrant fisher, originally

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<sup>68</sup> These topics had been selected by the organizers (NGO Cultura Ambiental) but were casually related to my research.

from Montevideo, was one of the elected representatives (although he had preferred a younger fisher taking that role). The second elected representative was a 40-year old non-migrant fisher from Piriápolis, part of the most powerful fishing family (i.e. local elite). This family not only owns many boats, several fish stalls and restaurants, but also has intimate relationships with local politicians, making these family members “the untouchables”, as fishers from PP and SM would explain. Moreover, this local elite is totally against the fishers’ migration that takes place from other localities to Piriápolis. In fact, this led the second representative to suggest at a meeting with the Local Government (of which the older representative was not notified) that all fishers should need to show a document proving their address as a requirement to go fishing. The Local Government then asked the Coast Guard to require that document before allowing fishers’ departures, and the latter proceeded. Given that SM is an informal settlement, fishers living or staying temporarily at that site would not have a valid address and thus, they were not allowed to go fishing.

At this time of the story, SM fishers had already found out that they had been cheated by the second representative, who had also manipulated the older (and highly respected) representative. The latter resigned his commitment as representative, and as a consequence, a commission composed only of fishers and fishers’ family members owning fish stalls at SM was formed. In turn, this worsened the conflict between the least and the most powerful fishers at SM. At the same time, the *de facto* representative contacted the national union (SUNTMA), to which he is affiliated, asking for support to sort out the problem with the Coast Guard (which was not allowing them to go fishing). SUNTMA contacted the Local Government and claimed that fishers’ migration could not be prevented, after which the Coast Guard was informed by the Local Government to finish with the procedure. This example illustrates the complexities of local relationships embedded in power imbalances, closely interconnected to vertical relationships and horizontal connections at the external level (Local Government, Coast Guard and SUNTMA).

Similar to the differing interests that fishers identified as barriers for getting together and working collectively, they stated that it is difficult to have representatives. This is because they all think differently, and fishing is an individualistic job, in which each fisher looks first for his own benefit, they explained. On the one hand, some fishers said they were tired of hearing DINARA telling them that they have to organize themselves, as if this was easy. On the other hand, the lack of fishers’ representatives in the Piriápolis area has led the local government, NGOs, and academic groups, to identify “reference fishers” (*referentes*). Sometimes only these fishers are notified about meetings. For example, in 2010 a local NGO (Ecópolis) organized a meeting to discuss “What kind of port do we want?”, inviting the Port Authority, Local Government, Coast Guard, and three “reference fishers” whom they knew from previous activities. These fishers participated but apparently did not inform others about this public event. This is one of the reasons why some fishers complain about local organizations having their “reference fishers”.

### **6.3. RELATIONSHIPS BETWEEN FISHERS AND EXTERNAL STAKEHOLDERS: LINKING SOCIAL CAPITAL**

This section is about fishers' linking connections with external stakeholders: fish buyers or middlemen, SUNTMA, National University (UDELAR), NGOs, the Coast Guard (PNN), the Port Authority (DNH), Municipal Government, and DINARA. This is not an exhaustive list of external stakeholders (that would likely make a multilevel social capital analysis unviable) but rather it includes those I considered most relevant in the context of fisheries management in Piriápolis and in fostering the conditions for co-management.

Piriápolis fishers were asked closed-ended questions regarding their relationships with, trust in, and respect for these external stakeholders (Table 6.5). Additional questions followed to understand their responses. As well, this section benefited greatly from participant observation both in Piriápolis landing sites and in meetings at DINARA and at PNN and Municipal Government offices, among others. Most external stakeholders were asked open-ended questions regarding their relationships with fishers (these questions were closed-ended with fish buyers because I used a similar interview guide as with fishers). Given that fishers are not formally organized, I did not ask external stakeholders their level of trust in (individual) fishers. Nonetheless, trust could be analyzed from the interviewees' answers. Bonding relationships at the external level were only studied within DINARA, between fish buyers, and to a minor degree within PNN. These findings (although not part of linking social capital) are included in this section for practical purposes.

In what follows, fishers' relationship with each of the stakeholders shown in Table 6.5 is analyzed. Each sub-section starts by presenting fishers' perspective of the relationship, and is followed by the external stakeholder's perception. Moreover, in a few cases, the perspective of additional stakeholders of a certain relationship is included (e.g. DINARA's perspective about relationships among fishers and fish buyers). It is worth mentioning that the findings from the question about level of respect asked to fishers have not been included in the text because I found out that this was a culturally conditioned answer. Being a respectful person seems to be a cultural value, and thus it is very unlikely that fishers would have stated low respect for external stakeholders even if they were disrespectful with them. In fact, it was normal for fishers to voice medium and high levels of respect for all external stakeholders. Also, this was a difficult question for fishers to answer (which led to a high number of "no answers", Table 6.5).

**Table 6.5.** Relationships between fishers and external stakeholders (linking social capital) (\*)

	Fish buyers	SUNTMA	UDELAR	NGOs	Coast Guard	Port Authority	Local Govt.	DINARA
<b>Relationship</b>								
No relationship	0	10/16	6/16	9/16	1/16	5/16	8/16	6/16
Regular	2/16	0	0	0	2/16	1/16	2/16	0
Regular-Good	1/16	1/16	0	0	0	0	0	0
Good	11/16	5/16	6/16	4/16	8/16	9/16	4/16	10/16
Very good	2/16	0	3/16	1/16	5/16	1/16	1/16	0
No answer	0	0	1/16	2/16	0	0	1/16	0
<b>Trust</b>								
None	3/16	5/16	1/16	3/16	3/16	3/16	4/16	4/16
Low	2/16	2/16	2/16	1/16	0	0	2/16	3/16
Medium	3/16	4/16	1/16	1/16	3/16	3/16	3/16	3/16
High	6/16	1/16	7/16	3/16	9/16	4/16	3/16	3/16
No answer	2/16	4/16	5/16	8/16	1/16	6/16	4/16	3/16
<b>Respect</b>								
None	0	0	1/16	0	0	2/16	1/16	2/16
Low	3/16	3/16	0	0	2/16	0	0	1/16
Medium	2/16	4/16	2/16	3/16	1/16	2/16	6/16	3/16
High	5/16	3/16	7/16	4/16	7/16	5/16	3/16	4/16
No answer	6/16	6/16	6/16	9/16	6/16	7/16	6/16	6/16

(\*) Sixteen fishers (6 from SM, 5 from PP, 3 from PH and 2 from PV) were asked closed-ended questions regarding their relationships with, trust in, and respect for the external stakeholders included in the table. Prompts followed to understand better the responses.

### 6.3.1. Fishers' relationship with fish buyers or middlemen

Most fishers sell their catch (entirely or partly) to fish buyers, who set the fish price. Only a few fishers have freezers to conserve their catch and wait for higher prices. There are a total of five fish buyers working in Piriápolis all year long. Additional fish buyers come to town only during the croaker season. They sell the fish to processing plants and to consumers (e.g. in fish markets in Piriápolis, Montevideo and other cities). Some fishers sell a small part of their catch to restaurants (as fillets) or directly to the consumer (whole/gutted, fillets). The latter fishers go door-to-door (having clients already), or sell fish from formal (in PP and SM) or informal stalls (in PH, only during the summertime). Undoubtedly, the highest income per kilo of fish comes from



selling fillets. Nevertheless, there are fishers who dislike dealing with consumers and prefer to sell the entire catch to fish buyers. Some fishers sell by-catch species to a local conservationist NGO (SOS), which needs fish to feed sea lions under rehabilitation and other marine animals.

Permanent fish buyers in Piriápolis are also boat owners, marketing the catch of their boats, as well as others' sometimes. Fishers working on the fish buyers' boats see them as the boss, considering themselves as "employees" (a term rarely used by fishers who do not work for a fish buyer), and are informally forced to give all the catch to the owner, who will sell it afterwards. Fish buyers, either boat owners or not, provide fishers with bait, oil, advances, and loans (sometimes). When catches are low, fishers become indebted (owing from 200 to over 1000 USD). There is an informal agreement between the fish buyer and the fisher, in which the fisher is expected to sell the catch to his (permanent or temporary) "supplier". Most fishers have a stable fish buyer, to whom they are committed. However, if fishers are dissatisfied with the fish buyer they are working with (e.g. because he does not pay on time), they can choose another one. This would be particularly difficult in situations where fishers' dependence on fish buyers is extreme, such as one PH fisher who lives at a house that the fish buyer lends him. A minority of fishers does not have a stable relationship with a fish buyer but, rather, are continuously changing buyers depending on the fish prices they are offering. On a given day, if a fisher asks for bait or oil from a certain person, he will sell the catch (or most of it) to him. Occasionally, however, fishers get bait or oil by their own means, and thus, can choose more freely what to do with the catch.

Fishers frequently defined fish buyers as a necessary evil ("*mal necesario*"). Most of them agreed with that statement (Table 6.6), arguing that they always need fish buyers because they provide them with oil and bait, and buy their catches even when these are low (although occasionally fishers would complain that buyers do not want to take one or two boxes of fish).

**Table 6.6.** Fishers' perceptions about their relationship with fish buyers and fish price setting

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Fish buyers are a necessary evil ( <i>mal necesario</i> ).	13/16	1/16	1/16	1/16
It is justifiable that a fisher lie to the buyer about the quantity he caught.	4/16	7/16	2/16	3/16
Fish buyers agree with each other to fix the fish price.	13/16	0	0	3/16
The State should intervene in fish price setting.	10/16	2/16	1/16	3/16
Fishers should unite so as to stop depending on fish buyers.	12/16	1/16	1/16	2/16

Some fishers usually lie to the fish buyer telling him that the catch size was smaller, so as they can keep fish to sell at higher prices (to stalls, to consumers, or event to other fish buyers). However, nearly half of the fishers disagreed that it is justifiable that a fisher lie to the

buyer about the quantity he caught (Table 6.6), explaining that they should not lie because “[the buyer] will later find out”, “when you need him, he is there for you”, and “it’s a matter of ethics”. Fishers who agreed with the above statement explained that the fish they have caught, before being sold, are theirs, not the buyers’ (unless they are owners of the boat).

Most fishers stated that they have a good or very good relationship with fish buyers, with high or medium trust in them. Fishers who stated high levels of trust in fish buyers appreciated their availability and support (bait, oil, advances) during the entire year. One fisher who does not have a stable relationship with any particular buyer said that he asks for loans to the one he feels the highest trust in. Nonetheless, 5 out of 16 fishers stated low or no trust in fish buyers, arguing that they always look for their own advantage and for higher profits.

In fact, fishers frequently complained about the low prices set by fish buyers, knowing that they later sell the fish at much higher prices to consumers or processing plants (see Table 6.7 for a comparison between prices paid to fishers and prices paid by consumers). This is why fishers feel that they are “exploited” by fish buyers. Moreover, fishers stated that fish buyers collude with each other to fix fish prices (Table 6.6). One fisher explained that when one buyer wants to pay a higher price, he is pressured by the rest. Another fisher stated that the relationship among fish buyers “is like among fishers. First they quarrel, but then they are together. They agree to set the price and they exchange fish”. According to fishers, the relationship among fish buyers in Piriápolis explains why all of them pay the same price most of the time.

**Table 6.7.** Fish prices in Piriápolis (\*)

<b>Species</b>	<b>Price paid to fishers by fish buyers (UR\$ per kilo)</b>	<b>Fillets price paid by consumers (UR\$ per kilo)</b>
<i>Brótola</i>	35-87	180-220
<i>Corvina</i>	20-26	110-140
<i>Pescadilla</i>	15-22	120-160

(\*) Data come from informal conversations with fishers and from fish stalls in the Piriápolis area. (Note: 20 UR\$ = 1 USD as of 2012)

In addition to the prevailing low prices paid by fish buyers, fishers explained that another reason for conflict is when prices fall dramatically overnight even though prices to consumers do not change. The norm is that fish buyers should notify them about price changes at least one day in advance, but this norm is not always respected. Fishers feel powerless in these situations, and they stated that there is nothing they can do to protest. When fish buyers come from other localities to Piriápolis and offer higher prices, fishers can either sell part of their catch to them or negotiate better prices with their usual fish buyer. These occasional fish buyers are sometimes referred to as “ghost fish buyers” because of their sporadic appearances. Most fishers felt that the State should intervene in fish price setting (Table 6.6), for instance, by determining a percentage that fish buyers should earn.

Even worse than low prices is when fish buyers stop buying fishers' catches arguing that domestic demand has been supplied (in the case of *brótola*) or that processing plants are not buying fish (croaker for exports). Usually, when fish buyers stop buying fishers' catches, they keep buying the catch of their own boats. Some fishers considered that imported fish (such as *pangasius*) is responsible for this, and their concern about market competition seems to have increased from 2010 to 2012. Other fishers, however, argued that they should not be using so many long-lines and gillnets; if they used less fishing gear, they could sell all of their catch. The catches of large-scale vessels also affect artisanal fishers' opportunities for selling fish; for instance, sometimes artisanal fishers wished that industrial fishers would go on strike so that they could supply the entire domestic market.

The above paragraphs help understand why fishers' relationships with fish buyers are usually stressful. Moreover, the provision of bait (the cost of which is deducted from the payments to fishers) is problematic. Sometimes fish buyers bring it late, sometimes they do not bring it at all (e.g. when they are planning to stop buying fishers' catch), and other times they bring it rotten (which is less effective). The latter has become so frequent that in 2011 fishers started to add vanilla to the bait to try to prevent the strong smell from repelling the fish.

Selling fish to fishers with a stall helps to avoid some of the conflicts of the relationship with fish buyers: prices paid by these alternative buyers are usually higher (sometimes they are set even by the fisher who is selling) and bait is provided in good condition. Fishers who also act as buyers are not suppliers; they give bait only when they have it, and they do not provide oil. Most fishers considered that they should unite so as to stop their dependence on fish buyers (Table 6.6), although some added that this would be impossible. They would like to sell directly to processing plants, but in order to do so they would need to form a fisher association or cooperative and get financial capital (e.g. for a cold room and a truck). As it was shown in Section 6.2.3, many barriers would need to be overcome to form such an association.

### ***The fish buyers' perspective***

The two interviewed fish buyers work with two and seven fishing boats respectively. Similar to what fishers stated, fish buyers considered that they have a good relationship with fishers. They only give advances or loans to specific fishers, those whom they expect will give the money back in the form of fish (i.e. it seems that advances are given to trustworthy fishers). One fish buyer illustrated this dependent relationship as follows: "Fishers who are fishing with [i.e. for] you, will always ask you for money. There's a relationship of dependence. [Giving] is always from us to them, never from them to us!" Even though fish buyers identified a good relationship with fishers, they complained about fishers' behaviour and a "lack of social codes" or norms; "There aren't many social codes [that fishers respect]. If you don't get there in time, they

will sell to another.” Some fishers have not respected the norm of selling the catch to the bait supplier. Consequently, as a sanction, fish buyers may decide to stop providing them with bait for a while. Fish buyers know that sometimes fishers lie to them regarding the catch size. One buyer explained that fishers might say that they caught nothing but he later finds out that the fisher sold the catch to another fish buyer. According to the buyers, it is not easy to find “stable and committed fishers” to work on their boats (i.e. they change from boat to boat). One of them stated that the relationship with fishers “has gotten worse. [Fishers’] commitment is lacking. Fishers are very selfish; they just think in the moment and they forget that you’ve given them a boat with everything [engine, fishing gear].”

The two interviewed fish buyers stated that prices are set by supply and demand. In the case of croaker, which is exported, processing plants set the price (in dollars). Even though fish buyers did not admit that they set prices after talking with others (e.g. one stated that he only gets to know through fishers how much others are paying), their ability to adjust prices in coordination suggest close bonding connections. In fact, the two stated that they have good relationships with other fish buyers (e.g. they exchange fish when one needs a certain species), although they recognized that there is competition among them to get “more boats”. One fish buyer complained about fish buyers who come from other localities (such as Punta del Este) during the summer and pay incredibly high prices with which it is impossible to compete.

#### ***How does DINARA perceive the relationship between fishers and fish buyers?***

DINARA’s Director and members of the Artisanal Fisheries Unit are totally aware of the dependent relationship that fishers have with fish buyers, as well as the embedded conflicts. An artisanal fisheries manager, during an inter-institutional meeting, stated that “Middlemen are useful for fishers because they finance the activity. ... It’s unthinkable to try to modify this situation.” However, another member of the Artisanal Fisheries Unit identified fish buyers as a “necessary evil” and stated that forming a fisher cooperative for marketing purposes would be an alternative. Similar to the former, DINARA’s Director, during a meeting at his office, opined that fish buyers have to exist because fishers only know how to fish<sup>69</sup>, and it is thanks to the buyers that fish do not rot. Nevertheless, during an interview he stated that fishers should organize and form a cooperative to sell their catches collectively, something he perceives very difficult given that fishers usually disagree with each other. Regarding fish price, DINARA’s Director pointed out that intervention in price setting is not a State policy (the State does intervene in milk price setting but this is supported by an organization of milk producers, he added).

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<sup>69</sup> As it was shown in Chapter 5, fishing is a way of life fishers have chosen, and not the only thing they know how to do (Trimble & Johnson 2013).

### 6.3.2. Fishers' relationship with the National Union of Seamen (SUNTMA)

The National Union of Seamen was created in 1985 (previous to that, the union was focused on maritime transport workers). It was only in 2007 that SUNTMA incorporated the artisanal fisheries sector. A quarter of the interviewed artisanal fishers in Piriápolis (two from PP and two from SM) were affiliated to SUNTMA in 2010, paying a monthly fee of 50UR\$. Two of these fishers became members of the union when they worked in the industrial trawlers, whereas the other two did it when the artisanal fisheries sector was incorporated to SUNTMA. One of the latter fishers stated that he is affiliated “because the government said that if we don’t get together, they won’t pay attention to us”, whereas the second one pointed out that “I’m affiliated to show the strength that artisanal fishers have. It’s to show them that there are more people working in the fishery! [in addition to the industrial sector]”. However, this fisher then stopped paying the monthly fees; in 2011 he stated that he was no longer affiliated to the union (possibly because of SUNTMA’s low attention to artisanal fisheries – see below).

Most interviewed fishers (10 out of 16) stated that they have no relationship with SUNTMA because they are not affiliated, whereas five fishers recognized a good relationship (only three are members, and another one was about to become affiliated because he works on coastal trawlers). Fishers explained these good relationships by arguing that the union fights for improving (industrial) workers’ situation, and also, that it protects artisanal fishers when they are in need (e.g. SUNTMA helped them solve the conflict with the Municipal Government and Coast Guard, which were not allowing them to go fishing). One affiliated fisher stated, “I defend the union; it’s needed; it’s our only tool”. Nevertheless, affiliated and non-affiliated fishers agreed that SUNTMA focuses only or mostly on the industrial sector, the reason why several artisanal fishers have no relationship with this union and do not want to be part of it. As one fisher pointed out,

“I’m not affiliated and I’ve never gone there. I disagree with the union because it defends people from the trawlers. ... It’s the same thing as the meeting that took place at DINARA the other day [i.e. Fisheries Advisory Meeting]; who went there? Trawler people. If you [i.e. artisanal fishers] don’t move for yourself, the union doesn’t do anything. The union is very problematic.”

In addition to SUNTMA’s greater attention to the industrial sector, a few fishers commented that they do not believe in unions (in general) because they do not work as they should. In fact, it is common knowledge among fishers in Piriápolis that there is an elite within SUNTMA (some members earn very good salaries by pulling strings, and have contacts in fishing companies). Furthermore, affiliates in Piriápolis frequently complained of not having been informed by SUNTMA about important events, such as fishers’ meetings and elections, and of not having been sent the union’s newspaper (*El Timón*). As one affiliate (who had commented that SUNTMA is their only tool) stated, “There was even an election at the union and we didn’t hear of it all. We weren’t called to vote, much less to form a voting list. However, an artisanal

fisher from Salto [inland Uruguay] came out as representative and we didn't even hear!" This makes me think whether SUNTMA has been directing more attention to inland artisanal fisheries than coastal as also seems to be the case with DINARA.

Nearly half of the fishers (7 out of 16), including two affiliates, stated that they feel no or low trust in the National Union, referring to the above criticisms, whereas five fishers (curiously including three non-members) recognized medium or high trust. One of the latter fishers stated that "The union is, well or badly, the one who is going to defend you". Nonetheless, the differences between the industrial and the artisanal sectors make fishers doubt about SUNTMA's potential to represent them. As one fisher stated (in agreement with other fishers' thinking), "Artisanal fishers should have a different type of organization. They [SUNTMA] cannot represent us because we are very different."

### ***The SUNTMA's perspective***

The secretary of organization (member of SUNTMA's Directorate), during an interview at SUNTMA's office (Montevideo), stated that artisanal fisheries were incorporated into the union because they wanted to contribute to organizing artisanal fishers. Given that SUNTMA's statutes establish that the union comprises only workers having a dependence relationship with the companies, the statutes were modified in order to be able to incorporate artisanal fishers who are boat owners. Through the radio, newspapers and meetings at landing sites of artisanal fishers (coastal and inland), SUNTMA invited them to become affiliated. A national meeting of artisanal fishers was also organized by the union. The artisanal fisher from Salto, who was elected as representative, is a member of SUNTMA's Directorate. The estimated number of artisanal fishers affiliated to SUNTMA in August 2010 was 230.

The secretary of organization recognized that they have faced several difficulties in incorporating artisanal fishers into the union. As he stated,

"The main difficulty we have had was to unite artisanal fishers. There are different settlements on the coast and inland, each with its peculiarities. There is a tendency to be nomads because artisanal fishers follow the resources, and resources have a migratory cycle. [During fishing seasons] boats compete with each other, so fishers are competitive, making them individualists. This makes it more difficult for them to become united to act communally."

Moreover, this SUNTMA's representative commented that during fishing seasons, every fisher is at sea and nobody comes to meetings. When he was explaining some of the barriers for incorporating the artisanal sector, he made no reference to fishers' concerns or criticism regarding SUNTMA's prevailing focus on the industrial sector.

The secretary of organization stated that fish buyers are negative players in artisanal fisheries because of the dependence they create and the low prices they offer, and he also commented that fish buyers prevent fishers from acting collectively. As a consequence of this,

SUNTMA has been working on a project to create, in coordination with Municipal Governments, a system like *cofradías* (fisher organizations) in Spain, where artisanal fishers could sell their catch at good prices through auction. However, besides government support, the interviewee opined that fishers' individualism has been the biggest barrier.

***How do additional stakeholders perceive the relationship between SUNTMA and artisanal fishers?***

SUNTMA is not seen as a representative institution of artisanal fishers by additional stakeholders, which is not surprising looking at the history of the union and the very recent incorporation of the artisanal sector. DINARA's Director, two DINARA researchers, and the coordinator of the inter-institutional program Ecoplata, during individual interviews, questioned SUNTMA's role in artisanal fisheries. For example, DINARA's Director commented that "SUNTMA says that it represents artisanal fishers" but he appeared to be doubtful about that. The two DINARA researchers stated that only a few artisanal fishers are affiliated. Nonetheless, according to one of them, the incorporation of this sector into the national union was an important step. Lastly, Ecoplata's coordinator stated that SUNTMA does not represent artisanal fishers at all because it is focused on the industrial sector.

**6.3.3. Fishers' relationship with the National University and NGOs**

Many researchers and students from the National University have come to Piriápolis to conduct studies since the 1980s. The majority of researchers from the Faculty of Sciences focused their studies on specific species (e.g. *brótola*, croaker, mussels, sea turtles, sea lions, franciscana dolphins), but a few anthropological studies were also conducted (Faculty of Humanities). More than half of the fishers (9 out of 16) stated that they have a good or very good relationship with the University, whereas six of them had no relationship with it, explaining that they did not know the University but they wished they did. Fishers with a very good relationship with the University were usually those who have participated (as collaborators or assistants) in several research projects over the years, which they valued as learning experiences. Fishers with a good relationship with the University have either collaborated in some research projects or met people from the University; they appreciated that this institution was interested in the fishery. Another fisher who identified a good relationship with the University was actually referring to a biologist from a NGO, Karumbé, oriented to the conservation of sea turtles.

Despite the fact that nine fishers recognized a good or very good relationship with the University, several drawbacks were mentioned: too many studies are being conducted and too much money is invested in them; students or researchers cannot influence decision-makers; and

there is little or no coordination among researchers coming to Piriápolis. In fact, fishers explained that these are some of the reasons why there are fishers unwilling to collaborate with researchers. Distrust about the ultimate goal of the information collected was another reason. For example, some fishers were afraid that if they gave information to the researchers about dolphins being by-caught in their gillnets, they would be later penalized. Fishers' trust in the University was generally high, arguing for instance that it is a renowned institution, or that it has the potential for changing policies. One fisher who identified high trust in the University claimed, however, that it should get much more involved with the fishery. Another fisher stated that he feels low trust in the University "because I don't know it and it has never come to see what we need."

Only five fishers (out of 16) stated that they have a relationship with NGOs. In four cases this relationship was categorized as good, and fishers referred to Karumbé and in one case also to SOS. As was shown in Section 6.3.1, fishers sell by-catch species to the latter NGO, to feed the animals being rehabilitated. Fishers explained that in the past, they would give fish to SOS free of charge, but after they were asked to pay the entrance fee to the rehabilitation center, they decided to start charging for the fish. SOS does not have a good reputation among several fishers in Piriápolis (e.g. it is known to care more about the profits from the rehabilitation center than about the animals themselves). The one fisher who recognized a very good relationship with NGOs explained that this is because he is a member of Karumbé. In fact, he is the link between the NGO (based in Montevideo and other coastal localities but not Piriápolis) and other fishers.

Nine fishers responded that they do not have a relationship with NGOs. However, one fisher argued that Karumbé members introduce themselves as University people, the reason why he included his relationship with Karumbé as University and not as NGO. It is likely that other fishers of the nine have thought that Karumbé is not a NGO.<sup>70</sup> Noticeably, several fishers commented that there was no NGO oriented to the fishery *per se* or fishing resources. For instance, one fisher wondered why dolphins and turtles were being studied but not the "important resources" like the croaker, which is declining. Fishers' trust in NGOs varied from none to high. In this regard, it is worth mentioning that NGOs have a somewhat bad reputation (both among fishers and the general public in Uruguay) partly because of a lack of financial transparency. This was one reason given by fishers who did not trust NGOs, whereas others mentioned that the lack of trust was a consequence of not knowing NGOs. Nevertheless, some fishers who did trust NGOs had stated they had no relationship with them, which make me think that trust is not necessarily associated with the relationship they have.

Even though the perspectives of University researchers and NGOs working in Piriápolis were not investigated in detail through interviews, some considerations can be made from informal conversations with them. First, researchers observed, especially at the beginning of their

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<sup>70</sup> The close connection between university graduates and NGOs made me decide to include fishers' relationships with the two in this section. For instance, most members of the NGO Karumbé did university studies (graduate and undergraduate) or are still doing them.



work, that fishers were distrustful about their projects, and even about the link between them and DINARA<sup>71</sup>. Second, they perceived that fishers had expectations that were broader than (or different from) the projects' goals (e.g. fishers expected changes in policies - such as the State resuming the sea lion cull, or State support for artisanal fishers). Moreover, researchers perceived that fishers disliked both the projects' discontinuity and the fact that there were a number of studies with no change in the fishery afterwards. With regards to the NGOs' perspective, Karumbé members on different occasions referred to their close and collaborative relationship with fishers, as these are a key for sea turtle conservation. On other occasions they showed their concern about the damage to sea turtles and marine mammals caused by fishers' gillnets. They claimed that the transition from artisanal fishing to aquaculture would be a good alternative. Finally, the perspective of SOS about the relationship with fishers can be found in Chapter 8, given that this NGO became involved in the participatory research initiative.

#### **6.3.4. Fishers' relationship with the Coast Guard (PNN)**

The Coast Guard<sup>72</sup> (National Navy Prefecture – Prefectura Nacional Naval, PNN), under the Ministry of Defense, acts as a maritime police, provides (and renews every two years) the navigation permit (*matrícula*) to fishing boats fulfilling certain requirements (including the safety equipment: lifejackets, VHF radio, flares, compass, among others), and controls the boats' entries to and exits from the ports. PNN is in charge of safety at sea. The area where boats are allowed to operate depends on the boat's characteristics (e.g. length, engine) and the skipper's navigation license (*libreta*), ranging from 500 meters (when the boat has no engine) to 15 nautical miles (7 nm is the most common in Piriápolis). PNN is in charge of enforcing this and other navigation regulations. Moreover, as Section 6.4 shows, PNN enforces some of DINARA regulations (e.g. making sure that every boat has the fishing license for a certain area).

Most fishers (13 out of 16) stated that they have a good or very good relationship with the Coast Guard (similar to their relationship with fish buyers; Table 6.5). The most common explanation for this response was that they have not had problems with PNN. Other fishers explained that the relationship with the Coast Guard is good “as long as you are legal” (i.e. as long as you fulfill all the legal requirements to navigate). Some fishers commented that the relationship with PNN has always been good, whereas others recognized that it has improved recently, arguing that the Coast Guard is now closer to fishers and it is doing more enforcement of navigation regulations (something which is not appreciated by some). Noticeably, PNN allows

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<sup>71</sup> In 2011, one Master's student from the Faculty of Sciences doing her research on heavy metals in franciscana dolphins had trouble in finding fishers willing to collaborate with her study because at that time she was also working at DINARA (Artisanal Fisheries Unit), and thus, fishers did not trust her, she explained.

<sup>72</sup> Although “Coast Guard” seems to be the most accurate translation for PNN, it is worth mentioning that this government organization also acts in inland waters (e.g. Río Uruguay, Río Negro).

fishers to go farther than 7 nm, which they value because there are times of the year in which fish schools are not found close to shore. More than half of the fishers stated that they feel high trust in the Coast Guard, and three recognized medium trust, being PNN the external stakeholder which fishers trust the most. One fisher explained this high trust as follows: “When one needs them [PNN], there they are. And they are even too tolerant.” Interestingly, most of the fishers who recognized high trust in PNN, referred as well to problems they have had with it. This is worth mentioning because it seems that relationships are considered good and trust in PNN high regardless of existing conflicts (expanded below).

The lack of capacity of PNN because of their little experience at sea was a recurrent theme raised by fishers. One fisher stated, “I proposed [Lieutenant’s name] that we should take onboard the [Navy seamen] in windy days, but a civilian cannot instruct”. Similarly, one fisher referred to the issuing of navigation licenses as top-down decision-making; “You cannot make a decision for the poor being up there. It’s like when we’re given the navigation license by a [Navy seaman] who doesn’t have knowledge about it, who has never been onboard a fishing boat.” Moreover, several fishers considered that the Coast Guard should at least inform them about the regulations because it usually happens that they find out the rules (either new or not) after breaking them (when PNN fines them). Another fisher pointed out that in order to respect fishers, PNN should consult them before making decisions, because fishers have been by the sea since before the PNN existed.

Even though nine fishers disagreed that doing paperwork for the Coast Guard is a problem (Table 6.8), fishers complained very frequently about specific paperwork. For example, fishers argued that renewing the boat’s navigation permit is complicated because it takes a long time for the inspectors to come, and also because the PNN asks them even for the bill of sale for the engine. Moreover, they claimed that the paperwork the PNN requires for migration to another port takes a long time, as well as the swimming test needed to get the navigation license for the first time. The paperwork that fishers complained the most about was registering the crew of a boat every time it changed in composition. Fishers are not allowed to go fishing on a boat if the PNN is not informed first. This means that the boat’s skipper must go to the Coast Guard’s office before 2 pm to inform the office of the new crew. Fishers explained that this is a problem because they are usually working at that time of day and, also, because crews are sometimes flexible; when one fisher does not come to the landing site for any given reason, another one can take his place. Also, there are fishers who do not work always on a specific boat but rather, usually ask around to be taken onboard. It would be easier for them if the paperwork at PNN was not required. One old fisher commented that a long time ago, they only needed to show their ID to the PNN in order to go fishing, without stating on which boat they would go fishing.

**Table 6.8.** Fishers' perceptions related to the Coast Guard

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
Doing paperwork in PNN is a problem.	6/16	9/16	1/16	0
The State should give support to artisanal fishers so as they can get the safety equipment required by the Coast Guard.	14/16	1/16	0	1/16
There should be less corruption in the Coast Guard to improve fisheries situation.	5/16	5/16	0	6/16

Furthermore, fishers frequently complained about the Coast Guard enforcing that they have all the safety equipment, because these are expensive. In addition, some fishers stated that PNN does not enforce safety regulations in tourist boats, but only in fishing boats. Most fishers agreed that the State should give support to them for getting the safety equipment, although it once gave support but only a few fishers benefited from it (including one fish buyer). During 2011, the Coast Guard went patrolling several times and fined fishing boats for a number of reasons, which led fishers to speak negatively about PNN. For example, one fishing boat was fined for 25,000 UR\$ for having three lifejackets instead of four, having the radio off, and having non-registered fishers on the boat. However, after writing a letter to the lieutenant, the skipper was able to reduce the fine to 5,000 UR\$, to be paid within a month. During that period the boat could still go fishing. If this had been the first fine for this boat, it would not have been necessary to pay it. Interestingly, a few fishers noted that the relationship with low-ranking officers at the PNN is worse than with high-ranking officers because, given the hierarchical nature of PNN, the former want to be promoted. Nevertheless, some low-ranking PNN officers are known to inform fishers in advance that they are intending to go patrolling.

Corruption in PNN was also mentioned by fishers. Fish buyers and other boat owners (part of "the untouchables") would be treated differently by the Coast Guard; for instance, their boats would not be inspected properly because they would give bribes to PNN. In fact, one of the fish buyer I interviewed commented that he actually "bought" a 10 year navigation license from the PNN back in 2003. Fishers who disagreed with the statement "There should be less corruption in the Coast Guard to improve fisheries situation" explained that the PNN is not involved with fishing resources (at least not in Piriápolis). Other fishers found this question disrespectful and preferred not answering.

Fishers' relationship with the Coast Guard varies according to the lieutenant in charge. For instance, in November 2011, the lieutenant who had been in charge for six years in Piriápolis moved to Atlántida (Canelones), and a new lieutenant came. Fishers did not seem satisfied with this change because the new lieutenant was stricter with the rules. However, in November 2012, the same fishers commented that the new lieutenant was better than the former because he was more open to dialogue with them. This shows how dynamic relationships are. Moreover, fishers

who have migrated along the coast commented that each PNN station has its own rules (e.g. some stations are known to be more flexible than others).

### ***The Coast Guard's perspective***

According to the lieutenant I interviewed in 2010, the relationship with fishers is good. As he stated, "We are always working to give fishers a hand; his safety is our concern". He added that the relationship with fishers from the different landing sites in the Piriápolis area is the same, although he recognized that relationships are easier with local fishers compared to migrant fishers coming sporadically because the latter know neither the rules in Piriápolis nor the particularities of the sea in the area. Moreover, he commented that fishers' migration causes problems because some migrants disrupt quiet areas like Piriápolis.

With regards to the relationships within the PNN, the lieutenant in Piriápolis stated that there is a permanent and good communication with PNN officers from other coastal localities, particularly with regard to fishers' migration and their safety when moving to other localities. Curiously, when asked if the rules that fishers had to respect were the same at the different jurisdictions of PNN, he replied affirmatively (contradicting fishers' opinion).

Similarly, the Chief of PNN staff interviewed in Montevideo in 2010, stated that the PNN maintains good relationships with fishers because they are in constant touch (e.g. for departures and arrivals at ports). Also, the courses that PNN requires for fishers are an additional mode of interaction. As he stated, "We have a very important relationship and that is beneficial for both of us [fishers and PNN]. *Prefectura* provides a service to ensure people's safety."

In 2012, during a brief course that the Piriápolis Coast Guard organized for POPA and its volunteers, the lieutenant in charge stated that courses like this enable PNN to get closer to fishers (which he valued) and to learn from one another. He added that the Coast Guard not only teaches the course but also learns from fishers' experience. Nevertheless, during the course, another PNN representative underestimated fishers' use of landmarks for orientation arguing that if they had an accident, it would be hard to find them. Moreover, he showed to be aware of fishers' tricks, such as lending one another lifejackets for the day of the boat inspection, explaining that these are some of the reasons for "permanent fighting" (i.e. arguing) with fishers.

### **6.3.5. Fishers' relationship with the Port Authority (DNH)**

The Port Authority (*Dirección Nacional de Hidrografía* – DNH), under the Ministry of Transport and Public works (MTO), is in charge of controlling the functioning and maintenance of ports in Uruguay, among other duties. According to the DNH website<sup>73</sup>, Piriápolis has a sports

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<sup>73</sup> <http://www.puertosdeportivos.com.uy/puertos/index.php?Id=6&Info=l>

port, and there is no mention to the artisanal fisheries boats which operate from there. DNH in Piriápolis also owns the fish stalls located in front of the port (concessionaires pay a rent), but it is not in charge of enforcing hygiene regulations (part of the Municipal Government's duties).

On the one hand, according to nine fishers (out of the 16 interviewed), the relationship with the Port Authority is good. They explained that they have known the Port chief for a long time, or that they have not had troubles when doing the paperwork to bring their boat to the port. Four of the five fishers who stated they had no relationship with the Port Authority are from SM, PH and PV, and they have not brought their boat to Piriápolis port. On the other hand, nearly half of the fishers recognized that they feel medium or high trust in the Port Authority because this organization does not bother artisanal fishers, or that "It doesn't get into fisheries issues, same as the Municipal Government". The latter fisher then added that DNH should get involved in artisanal fisheries but that the Port chief knew anything about the activity. Three fishers stated that they feel no trust in the Port Authority. These as well as additional fishers referred to a number of irregularities within this organization, such as corruption; the Port Authority is known to be willing to charge for every service provided, and to charge them without giving any receipt.

The most frequent fishers' complaints about the Port Authority are with regards to the buoys: most buoys are for yachts; powerful boat owners have preference (e.g. they get as many buoys as they want); and in summer fishers have to move their boats to an uncomfortable part of the port to leave room for more tourist boats. Regarding the last complaint, one fisher stated, "I don't know why they kick us out if we have the port. They say it's a sports port but fishers have always been there. I don't know if this is happening at every port, but here we're increasingly having less space". Most fishers (10 out of 16) agreed that "Piriápolis' port should grant more buoys for artisanal boats (and fewer for yachts)". They explained that a bigger port, or an exclusively fishing port, was needed. Nonetheless, a few fishers stated that the number of buoys for yachts could remain high as long as there were more for fishers.

In early 2012, the National Director of DNH informed publicly that the port in Piriápolis would be renovated with the purpose of providing more buoys, for bigger tourist boats (up to 25 meters long), including small cruisers. Fishers became annoyed and hopeless with this news. In late 2012, DNH's Director informed that of the three new marinas that would be created, one would be oriented to artisanal fishing boats. Nonetheless, there is still discontent among some fishers, who argued that the marina will mean a smaller area for artisanal fishing boats at the port.

### ***The Port Authority's perspective***

The current Port chief in Piriápolis has held his position for more than 25 years (the other three permanent positions at the port have also been held by the same people for many years).

Curiously, before he started working at DNH, the Port chief had worked for two years in the artisanal fishery (with his uncle for some time, who is one of the fishers I interviewed). When I asked him about his relationship with fishers, he replied “I bear it” and named several conflicts, while referring to fishers as bandits. He argued that fishers never cleaned the area where they worked, leaving the port dirty, and that they broke everything. He added that the situation is much more problematic when fishers migrate from other localities to Piriápolis port because the number of boats doubles. The Port chief stated that he has no relationship with fishers from SM and PH, and referred to the former as criminals and drug dealers.<sup>74</sup>

Moreover, when the chief was telling me the number of buoys in the port (60 to recreational boats and 12 to artisanal fishing boats – although mentioning that there were nearly 40 artisanal boats at that time), he explained that only the sports boats bring revenue to the Ministry (MTO). Artisanal fishers do not need to pay for the buoy, except when boats bigger than 9 meters come from other ports to Piriápolis. As the Port chief stated, “In summer I have a verbal agreement with fishers; they move to the Southwest breakwater and I occupy the buoys [with tourist boats]. ... During the winter I let them stay because they have the right to work.”

### **6.3.6. Fishers’ relationship with the Municipal Government**

Municipal Governments (*Municipios*) in Uruguay were created by the Law 18.567 in September 2009, aiming at government decentralization and citizen participation. Municipal Governments, composed of one Mayor (*Alcalde*) and five councilmen (honorary), represent a third level of organization, below the departmental and national government levels. As stated in the fifth article of the law, each Municipal Government will create mechanisms for citizen participation through information, consultation, initiatives and control of issues of their competence<sup>75</sup>. The Municipal Government in Piriápolis started working in July 2010, replacing the *Junta Local*, a local government organization with less power than the *Municipio*. Nevertheless, Departmental Governments (*Intendencias*) are still in charge of certain mandates (e.g. environmental protection and sustainable development of natural resources within their jurisdiction), although Municipal Government can act coordinately with them.

Half of the fishers stated that they have no relationship with the local government (i.e. *Municipio* or *Junta*)<sup>76</sup>, explaining that it does not intervene in fisheries issues, although it should.

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<sup>74</sup> Even though I did not ask the Port chief how much trust he felt in artisanal fishers, in February 2012, during the organization of the Artisanal Fisheries Festival in Piriápolis, he grumbled because I had given the keys of the DNH venue to one POPA fisher, and he asked me not to do it again (order which I did not follow because the keys were POPA’s responsibility).

<sup>75</sup> However, as of December 2012, Piriápolis Municipal Government has not created mechanisms for citizen participation (as far as I am aware).

<sup>76</sup> At first I would also ask fishers about their relationship with the Departmental Government but given that most did not differentiate this from the Local Government (*Junta local*), I kept asking only about their relationship with the latter.

One fisher pointed out, “I’ve never heard that [the local government] became interested in something of the fishery”. Likewise, the two fishers who identified a regular relationship with the local government argued that it should pay more attention to fishers; if that happened, relationships would be better. Nonetheless, four fishers recognized that the relationship with the local government is good, arguing that they know the Mayor (who has been a neighbour of some of them) although they mentioned that this organization has not done any work directed to fisheries. Curiously, the only fisher who identified a very good relationship with the local government explained that it is because he works there (as a transit inspector), and he is allowed to change his working hours in order to go fishing.

Fishers’ trust in the Municipal government varied from none to high. Fishers who identified no, little or medium trust commented, again, that this organization has done nothing for the fishery. Nevertheless, one fisher stated that trust needs to be high because it is the city government. All fishers agreed that “The municipality cares more about tourism than about artisanal fisheries”. Most of them explained that the fishery should be a tourist attraction. Nonetheless, as they added, the local government does not perceive this because it does not know the fishery and just looks at the garbage some fishers leave at the port. However, a couple of fishers understood the local government’s perspective and even pointed out that the fishery is detrimental for tourism (e.g. because of the irregular settlements on the coast).

In 2011, fishers from SM described their relationship with the Mayor and Municipal government as very problematic. In several occasions the Municipal government stopped providing them with electricity, arguing that they were using too much energy. Fishers, for their part, claimed that it is the fish stalls and the restaurant which consume the most electricity, not them (who do not have freezers). When fishers told the Mayor that they would protest in summer time (high tourist season), the electricity service was restored. Even though they had claimed that they were willing to pay for the electricity, the service continued to be free. Fishers wished that SM were a touristic site for visitors, and for this to happen, they know that they have to tidy up the landing site on their own, without government support.

### ***The Municipal Government’s perspective***

The Mayor in Piriópolis was previously the President of the *Junta local*. Long time ago, like the Port chief, he worked in the artisanal fishery, “although not professionally”, he explained. Similar to fishers’ comments, the Mayor stated that the fishery is not within the local government’s duties; “We don’t have a direct mandate over the fishery; DINARA, the Port Authority and the Coast Guard do.” This statement is particularly curious when considering that during the same interview he claimed that “One of the specific tasks [of the Municipal Government] is to promote everything which is local development. The other mandate of the

*Municipios* is to articulate with the different State bodies and the different [Departmental governments] with the purpose of agreeing plans and work.” It is striking that the Mayor would not consider the local fishery within the government duty of promoting local development. However, he does believe that although there seems to be a contradiction between the fishery (unclean activity) and the presence of tourists, the former could be transformed to become a tourist attraction of Piriápolis (including gastronomic initiatives). The Mayor pointed out that the Port Authority has been limiting the fishery activity by conceiving the port as only sports.

Regarding his relationship with fishers, the Mayor stated, “If we lived in Alabama, things would be easier; in Alabama there’s still death sentence, but here there isn’t [using his sense of humour]. I have an excellent relationship with fishers, the *Municipio* doesn’t.” He explained that Pesquero Stella Maris (SM) was nasty and needed to be improved, something that he had been talking with fishers the same day I interviewed him. The Mayor complained about fishers stealing electricity cables and other things. Nonetheless, he commented that the relationship with PH fishers is not problematic because the irregular settlement in PH is located on private land, whose owner allowed fishers to stay.

Two years later, during informal conversations with the Mayor in 2012, it was evident that the relationship with SM fishers was still problematic. He mentioned that one way of solving the conflict would be to ask the Coast Guard to evacuate fishers who are not from Piriápolis. Another way, proposed by a councilman, would be to use a bulldozer over SM. The Mayor then decided to ask POPA if it could mediate in this conflict and develop a project for improving SM as soon as possible (see Section 8.3.3).

It is worth noting that during a meeting with a representative of the Productive Development division of the Departmental Government, while POPA was looking for support for the First Artisanal Fisheries Festival, he stated that “fishers are all rebellious”. He commented that SM fishers had boycotted projects from his division (including the one to make SM a touristic place) and that they were problematic, similar to the Mayor’s perspective.

### **6.3.7. Fishers’ relationship with DINARA**

DINARA (National Directorate of Aquatic Resources), within the Ministry of Livestock, Agriculture and Fisheries (MGAP), is the agency in charge of fisheries management and enforcement (sometimes in coordination with PNN). Its mission is to regulate and promote the sustainable use of fishing resources and aquaculture. Fisheries research is also among DINARA’s duties. As shown in Chapter 5, DINARA issues artisanal fishing licenses, which fishers have to renew every four years (presenting the boat navigation permit and fishing slips).

During my two-year fieldwork in Piriápolis, DINARA commonly resembled a “bad word”. The most frequent complaint raised by fishers was that artisanal fisheries have always been



ignored by the government. Fishers usually commented that they never heard about the “P” of the Ministry (MGAP), that is, about fisheries (*Pesca*), and some even proposed that there should be a Ministry of Fisheries separate from the Ministry of Livestock and Agriculture. Almost all fishers agreed that the State cares more about the industrial fishery than the artisanal fishery (Table 6.9). Fishers explained that this is so because the artisanal catches are much smaller than the industrial catches, and also, that they are informal workers, not contributing to the State. Moreover, fishers referred to industrial fisheries as a mafia, where Navy military own fishing companies, and they are connected very closely to DINARA (e.g. trawlers’ skippers have worked in DINARA). It is common knowledge among fishers in Piriápolis that DINARA employees receive bribes from coastal trawlers, in order to use under-sized trawl nets (locally known as *condón*), or to fish within the 7 nm, among others. Fishers considered that there should be less corruption in DINARA to improve the fisheries situation (Table 6.9).

What are the opportunities for interaction between fishers from Piriápolis and DINARA? Fishers commented that DINARA come once a week to take water samples<sup>77</sup>, or more sporadically to collect data of their catch. Also, there have been meetings with DINARA in Piriápolis, Punta del Este, and Montevideo, of which fishers have participated. Fishers sometimes go to DINARA’s office in Montevideo to deliver the fishing slips. At least once during my fieldwork DINARA came to control that all boats had a valid fishing license. Despite DINARA visiting Piriápolis port occasionally, fishers argued that they are never consulted (see Chapter 7).

**Table 6.9.** Fishers’ perceptions related to DINARA

Statement	Agreed	Disagreed	Neither agreed nor disagreed	No answer
The State cares more about the industrial fishery than the artisanal fishery.	14/16	1/16	0	1/16
There should be less corruption in DINARA to improve fisheries situation.	7/16	1/16	1/16	7/16 (*)
Doing paperwork in DINARA is a problem.	5/16	7/16	0	4/16
Artisanal fishers should fill out the fishing slips ( <i>partes de pesca</i> ) with true information so that DINARA can assess the status of fishery resources.	11/16	1/16	0	4/16
There should be meetings with DINARA more often.	14/16	0	1/16	1/16

(\*) The high number of “no answer” makes me think that fishers preferred not to talk about DINARA’s corruption while I was taking notes; during informal conversations they talked much more about this.

In contrast with the frequent complaints about DINARA, more than half of the fishers (10 out of 16) stated that they have a good relationship with this agency. A few explained that they have not had any problem with their fishing license (even when it expired). Another fisher

<sup>77</sup> Water samples are meant to be used to detect red tides, but fishers believe that DINARA make these red tides coincide with Easter holidays (high tourist season) in order to import shellfish.

mentioned that his relationship with DINARA is good because he phones the office every time he wants to ask something, although he recognized that DINARA is unilateral, not consulting fishers. Curiously, a few fishers stated that their relationship with DINARA is good because they do not go to the office in Montevideo. Nonetheless, one of these fishers had recognized a regular relationship with DINARA in a previous conversation. Furthermore, three other fishers (different from the 16), during the initial interviews I conducted in Piriápolis, stated a regular relationship with DINARA as well. They argued that DINARA has not done anything for the artisanal fishery, or that “they come one day and say something but then they do something else”. They stated that the relationship with DINARA has not changed over time, and that DINARA employees are the same that they met long time ago.

DINARA's bureaucracy was identified as one of the factors hampering the communication between fishers and the agency. Indeed, some fishers agreed that doing paperwork in DINARA is a problem (Table 6.9). For instance, one of them explained that “It's complicated because we live abroad [i.e. not in the capital]. We have to go to Montevideo. Sometimes *Prefectura* does the paperwork but it might take one year!”. Fishers mentioned that the most complicated paperwork at DINARA is when they want to move to a different fishing zone (i.e. when they migrate).

Fishers' trust in DINARA varied from none to high. One of the fishers who stated high trust in DINARA explained that someone in this agency solved a problem he had with his fishing license in just one week. Fishers' lack of, or low trust in DINARA arose numerous times during informal conversations with additional fishers to those interviewed. A common explanation given by them was that every time they have complained about a problem, they have been told by DINARA “We'll see what we can do” without any change afterwards. Other fishers explained that their lack of trust in DINARA was because they did not know anybody from the agency or anybody who was trustful. One fisher stated, “I feel low trust [in DINARA] because the times we've gone [to meetings] they haven't listened to us. There's much talking but little *acting*. They don't tell us why *yes* to this or why *no* to that [referring to decision-making].” Other fishers explained that their lack of trust was a consequence of DINARA allowing trawling.

One illustrative example of fishers' distrust in DINARA is the filling out of fishing slips (*partes de pesca*). Most fishers do not fill this catch report after each fishing trip<sup>78</sup>, and especially during the fishing season (when catches are high) they do not want to say the real catch. Several reasons were given by fishers to explain this behaviour: (a) filling out the form is tedious (although for others it is easy because they use the receipts provided by fish buyers stating the catch size); (b) they are afraid that, if the government finds out the amount they actually make during the fishing season, they will have to pay taxes as well as social contribution; (c) the Coast

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<sup>78</sup> In 2007, only 129 out of the 378 artisanal boats in the fishing zone E (where Piriápolis is located) filled out fishing slips (Puig et al. 2010).

Guard sometimes does not have fishing slips for them to fill; and (d) the Coast Guard has lost fishers' fishing slips. Nevertheless, most fishers agreed that they should fill out the fishing slips with true information so that DINARA can assess the status of fishing resources. One fisher pointed out that if they recorded what they catch, they would have proofs to show DINARA that the croaker has been declining. Other fishers noted that collecting catch data on the fishing slips would be useful for them because they would be able to compare catches over time, although others noted that all that data is in their minds already. The one fisher who disagreed with the above statement, argued that "It's not good [to fill out the fishing slips with true information] because we don't trust DINARA! It's never good to give information to the State because it doesn't know what we do".

During the first fishers meeting of the participatory research initiative, I asked the four participants to help me interpret the apparently contradictory findings of good relationship with DINARA but low trust in it. They explained that the relationship is good because they only renew fishing licenses at DINARA, but trust is low (if any) because of two main reasons: (i) in DINARA they are asked to make up catch data to fill out the fishing slips (if they have not filled them), and (ii) decisions are made without prior fisher consultation. As one fisher explained the former reason,

"Personally, my interaction with DINARA is with regards to the fishing license. I go [to the office] and say, 'Look, I want to renew my license'. 'Have you filled out the fishing slip?' [imitating a DINARA employee] 'No, I forgot'. 'OK, fill out these 4 or 5, quickly' [DINARA employee]. Thus, they are very good, but at the same time I remain distrustful because he's telling me to fill out [the forms] quickly, with different dates in them. So, DINARA is very good but I don't trust it at all!"

Fishers in Piriápolis frequently commented that they wished there was a better relationship with more frequent communication with DINARA. When I asked them how the relationship could improve, they suggested meetings. Almost every fisher agreed that there should be meetings with DINARA more often, although some of them commented that they lack time for that. One fisher stated that it would be better if DINARA had employees at Piriápolis port (e.g. paperwork would be easier). Another fisher recognized that DINARA does not approach fishers but they do not do that either, suggesting that they should have a more pro-active attitude.

### ***The DINARA's perspective about the relationship with fishers***

DINARA employees generally agreed that this agency has cared more about industrial fisheries than artisanal fisheries. They explained that the Fisheries Development Plan back in the 1970s was oriented to the industrial sector. An artisanal fisheries manager gave the following explanations to DINARA's prevalent interest on industrial fisheries:

"First, there has been a lack of vision of the national importance, mainly social but also economical, of artisanal fisheries. And the second explanation is the relevance of capitals

from the industry, compared to those from artisanal fisheries. Also, the organization of industrial fisheries, with the Chamber of Boat owners, and other chambers, has a different presence than 1,000 atomized guys [i.e. artisanal fishers], who are not able to get together even in groups of ten to do a common proposal.”

This manager as well as other DINARA interviewees stated that it was only recently (in 2005 or 2007) that this agency started to recognize the social importance of the artisanal fisheries sector (Chapter 5). For his part, DINARA’s Director was uncomfortable when I asked his view about the extended opinion that the agency has cared more about the industrial fishing sector. He said that he did not know why it is considered so, adding that

“Historically, fishing licenses for artisanal fisheries have been issued. Maybe the paperwork [fishers do at DINARA] is a more complex topic, but it should be also recognized that artisanal fishers’ situation, or even their formation [referring to low formal education], doesn’t help. There are a number of complexities.”

The Director showed to be aware that artisanal fishers see their relationship with DINARA as problematic. The artisanal fisheries manager was asked about his relationship with fishers, given that his Unit or division is the one in charge of doing the link between artisanal fishers and DINARA’s Direction. He identified a good relationship:

“To me, it is difficult to say [how the relationship with artisanal fishers is] because if one of them doesn’t stand me, he certainly will not come to tell me so. ... From my perspective, it is a good relationship. I’ve never had a problem. We talk to each other in a clear and sincere way, I think, which is one of the keys.”

The manager explained that this was the case with fishers in general and in Piriápolis:

“When I go to Piriápolis, there are people for whom it’s easier to approach me and talk to me about something, and there are others who don’t say two words. ... It depends on how they are personally. There are people whom I have an excellent relationship and we talk for three hours, but others with whom it’s only ‘hello’ and just that.”

Interestingly, the manager stated that the interaction with skippers, boat owners, and women is easier than with crew members:

“The interaction with skippers or boat owners is normal. They are people whom you can talk in a concrete way. The most difficult [interaction], the one which has been the hardest for us, is with the boats’ crew. It’s like they are afraid of raising topics when the skipper is present. This relationship has been more complicated [than with skippers / boat owners]. Then, with women is easier than with men because they have a different way of viewing things, and probably, another level of education [i.e. higher].”

Lastly, the manager stated that with boat owners who are also fish buyers, “we have a good relationship, but they tell you what they want and they tell the part of the story which is of interest to them”. Even though I did not ask the manager about his level of trust in these different groups (crew members, skippers, owners, fish buyers), from his last comment it seems that he would not trust buyers very much.

Moreover, both DINARA’s Director and the artisanal fisheries manager commented that the information provided by fishers in the fishing slips is not accurate. The two of them explained

this by arguing that fishers are afraid that if they say the actual catch, they will have to pay social contribution and taxes (BPS, DGI). It is remarkable that DINARA's perspective is similar to fishers' when explaining why accurate information is not provided. The manager gave three additional explanations: (i) fishers' distrust about the ultimate goal of the collected information; (ii) fishers' rebellious; and (iii) DINARA's fault, "We haven't been able to explain fishers what we need the fishing slips for. We haven't got to explain them this well, and they don't understand very well either." He added that fishers should understand that, through the data collected from the fishing slips, it would be possible to show that the catch from the artisanal sector is about 30% of the industrial catch. This, together with emphasizing that profits are divided more equally in the artisanal sector, would contribute to achieving greater State attention, he explained.

A measure taken by DINARA a few years ago to promote fishers to fill out the fishing slips was to make this a prior step to other paperwork, such as license renewal. When a boat does not fill out fishing slips, it means that it is not operating, and thus, the license expires. This measure was not focused on promoting the provision of accurate information. Nevertheless, a DINARA researcher in charge of evaluating resource stocks commented that the fill-out of fishing slips has improved over the years:

"I think that fishers' awareness has been crucial in this regard, because they realized that as fishing resources decline it is fundamental to have a good data base to know which the main variables leading to resource decline are, whether it's basically the fishing effort, or climate change, or other variables not associated with the fishery. Thus, I think that fishers have provided more information in the fishing slips and it was more truthful."

Despite the fact that the artisanal fisheries manager recognized a good relationship with fishers, he stated that their "excessively low socio-cultural level" is a hampering factor. The manager also recognized that it would be good if the relationship with fishers improved. For this to happen, he said that fishers' organization was needed; "These guys have to organize somehow so as we can talk from organization to organization, or from institution to institution. That's the only way. Otherwise, we have to keep visiting ports and beaches to talk to 20 guys in one day, face to face."

Similarly, DINARA's Director referred to fishers' lack of organization as a problem of artisanal fisheries. In fact, this was a recurrent theme in every meeting I attended and DINARA participated. In inland waters, however, after several meetings with fishers that DINARA organized in coordination with local governments, fishers' groups and associations were formed, selecting representatives to interact more frequently with DINARA. DINARA's priority in working with inland fishers was because most of them did not even have a fishing license. In 2011, the manager mentioned that another possibility for facilitating the linkages between fishers and DINARA (especially in the localities where there are numerous fishers) would be through a third

party between the two, such as a NGO. It is worth mentioning that fishers are welcome to visit the Artisanal Fisheries Unit office (in Montevideo) at any time (from 9 am to 5 pm).<sup>79</sup>

The member of the Fisheries Technology Lab, who is not in frequent touch with fishers, except when he participates in a certain project, recognized a problematic relationship between fishers and DINARA. As he stated, “In every project where DINARA participates, when you go to a meeting, fishers first talk to you about all the problems they have with DINARA!”. This specialist identified a problem originated in DINARA which had not arisen in other interviews, and this is the lack of dissemination of DINARA reports to fishers:

“DINARA generates lots of information, normally in technical reports. ... Many times it’s easier to download these reports from the internet, in Singapore, than the access that fishers have to them. It happens that many things remain stored in desk drawers. ... That’s a problem we have with everyone, with skippers, with crew members, and sometimes with [fishing] companies. I see it as a general problem of the research [conducted in DINARA].”

Likewise, the artisanal fisheries manager stated that DINARA should disseminate to the general public the technical reports and further information produced by this agency, through the website.

### ***How are the relationships within DINARA?***

During interviews with DINARA members, three weaknesses within the agency arose frequently. First, a low number of employees (to give an idea: the Artisanal Fisheries Unit has 6 employees – 4 of which work in Montevideo, the Marine Mammals Department has 2 employees, and the Population Biology Division has 52).<sup>80</sup> For example, a population biology researcher stated that more employees were needed in order to develop research oriented to resource management. However, the artisanal fisheries manager argued that DINARA would improve its functioning as organization if its employees dedicated to their jobs as expected.

Second, the interviewees claimed that there is little information exchange within DINARA (especially between different departments), either of technical reports or projects’ progress. The manager stated that “Sometimes you don’t even hear about the work is being done in a different floor [of the building]”. According to one population biology researcher,

“[This is] because the political dynamic given to [DINARA]. It’s not a research institute but still, in order to do resources management you have to develop research, mainly related to resources evaluation. Many times immediate results are sought and they want an answer for a determined conflict, without a long-term vision. ... Responses to problems are given without much scientific consistency, like the fish that have been dying and it was said that it was because of cold waters.”

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<sup>79</sup> In several opportunities I went to this office, I came across fishers from Montevideo, Canelones and Maldonado, who had enquiries about their fishing licenses or boats’ enlargement.

<sup>80</sup> DINARA’s Director, during a session of a Parliamentary commission (July 2011), recognized that more staff was needed in the agency.

However, according to another population biology researcher, information exchange among DINARA employees has improved over time.

Third, the interviewees identified a lack of collaborative relationships between certain DINARA divisions. For instance, the artisanal fisheries manager stated that the relationship between his unit and the enforcement group was so surly that they decided that Enforcement should ask at the Registration office the list of boats instead to the Artisanal Fisheries Unit. The friction, according to the manager, was because the Enforcement group acted without any consultation to the Artisanal Fisheries Unit. Another example is the lack of connection between the Marine Mammals Department and the Artisanal Fisheries Unit. A biologist from the former department stated (in a letter to the Director, at the beginning of the participatory research initiative in Piriápolis) that collaborative work among DINARA divisions was needed “to understand the relationship fishers-preys-sea lions”. Also, he requested the final report of a project about sea lion management funded by DINARA. This supports the observation that there is not indeed a good information flow within the agency.

Nonetheless, several examples of collaborative relationships between different groups and divisions within DINARA were provided by the interviewees. The artisanal fisheries manager stated that his unit has a good and permanent communication with the Registration office, which issues the fishing licenses, and with Fleet & Catch because it receives the fishing slips. The Fisheries Technology employee identified collaborative relationships with other groups of the Population Biology Division, with whom they do research based on data collected by the Lab from the VMS on industrial fisheries.

Finally, I could observe that the relationship between the Artisanal Fisheries Unit and DINARA’s Direction is not as good as the manager wished. For instance, he commented that fishing licenses issuing or additional paperwork were taking long because they were stuck in the Direction. Once, after the manager got numerous phone calls from Rocha fishers asking news about their licenses’ application, he suggested them either to communicate directly with DINARA’s Direction or to organize a public demonstration to get media attention (the latter happened). During an interview with the Director, he recognized that the agency’s functioning and actions should improve but he did not give further details.

#### **6.4. RELATIONSHIPS BETWEEN EXTERNAL STAKEHOLDERS: BRIDGING SOCIAL CAPITAL AT THE EXTERNAL LEVEL**

This section is about bridging relationships between external stakeholders, which were mostly analyzed in the form of dyads. It is worth noting that not all the external stakeholders from the previous sections were included in this analysis. Special attention was given to DINARA’s

bridging relationships with other external stakeholders: SUNTMA, Coast Guard, Port Authority, and Local Government. Then, the relationships among the three government agencies located in Piriápolis (involved in fisheries management to different degrees), PNN - DNH - Local Government, are explored. In all these cases, the perspectives of the two members of the dyad are shown. Lastly, Section 6.4.5 looks at inter-institutional relationships among government agencies from a broader angle.

#### **6.4.1. Relationship between DINARA and SUNTMA**

According to the artisanal fisheries manager, DINARA has a good relationship with the National Union of Seamen. He stated that there are meetings with SUNTMA often, although he questioned whom this union represents:

“We have a good relationship with SUNTMA. I've been many times there [at SUNTMA's office] and we've had meetings. The thing is that they need to decide something internal, who do they represent? Boat owners or boat owners' employees? Nowadays SUNTMA represents boat owners, and says it represents employees, but at the meetings which I've attended there were boat owners and no employee.”

One of the differences between DINARA and SUNTMA, as the Director of the agency explained, is that SUNTMA considers that DINARA should lower fish prices to consumers, whereas DINARA considers that this is not possible unless fishermen make less in their jobs. SUNTMA's Secretary of Organization stated that the interaction with DINARA has always been fluent, although the consultative meetings (*Mesas Asesoras*; Section 7.3.1) were infrequently called. In his words,

“Always, in the different administrations, [the interaction with DINARA] has been fluent. The union's claims have always been listened by DINARA, with different results, sometimes successful, sometimes not, depending on the administration. I think the previous [DINARA] administration was the most complex period, paradoxically, having a government as we have [i.e. left-wing party], and a Director who was a seaman, a skipper, and a manager of fishing companies, that is, with knowledge. But we had low receptivity [with him]. ... Given the complaints we brought to the meetings [organized by DINARA], it wasn't good for them and they stopped calling [these meetings]. In the previous administration, we claimed this again and it was called only twice.”

As the SUNTMA representative stated, these meetings would help address the main problem identified by the union: the lack of a State fisheries policy, because the country is still under the Fisheries Development Plan (1974), which has been disastrous for country's fisheries. The SUNTMA representative also mentioned two complaints that the union has posed to DINARA regarding artisanal fisheries. First, SUNTMA has claimed that a maximum number of fishing licenses per person should be set (e.g. nowadays, one person may hold 10 licenses). Second, DINARA has detected that fishing boats were enlarged (getting catches like those of industrial vessels) but it has not yet taken any measure.



## 6.4.2. Relationship between DINARA and the Coast Guard (PNN)

### *The DINARA's perspective*

DINARA and PNN are the two main government agencies involved in fisheries management and enforcement.<sup>81</sup> As mentioned by DINARA's Director,

“We have a very good relationship [with PNN] when joint activities are conducted. We have an agreement with the Ministry of Defense, since the previous administration. ... We are in permanent coordination with them. Two days ago I had a meeting with [artisanal fisheries manager's name] and the *Prefecto Nacional Naval* [Chief of PNN staff]. The two institutions work together.”

DINARA's Director explained that PNN enforces some regulations (e.g. the 300 meter zoning). Moreover, as stated by a Fisheries Technology specialist in DINARA, the monitoring of industrial vessels (through the VMS) is done in coordination with PNN. For his part, the artisanal fisheries manager recognized that there is a good relationship between DINARA and PNN, but he was critical about it. He stated that even though this relationship has improved over the years, it still needs to improve. According to him, coordinated actions with PNN are agreed verbally but are not then put into practice, questioning PNN performance. Several reasons were given by the manager to explain this: (i) PNN is not interested in fisheries (i.e. not committed to it); PNN would rather DINARA was in charge of everything related to fisheries; (ii) PNN, due to its military nature, does not like to receive instructions from DINARA; and (iii) usually only the high-ranking positions participate in the meetings between DINARA and PNN. The manager stated that local lieutenants should participate in meetings with DINARA Artisanal fisheries Unit if coordinated actions are to be taken effectively.

PNN is frequently an information mediator between fishers and DINARA. When DINARA passes a new regulation, representatives of the Artisanal Fisheries Unit visit every PNN station to provide them with informative notices to give to fishers, and also ask them to inform fishers through the VHF radio. Examples of these were: the establishment of the 300 m zoning, the census of fishing boats, and most recently (in 2011), fishers' application for fishing licenses in zone E. According to the fisheries manager, PNN does not perform very well its task of informing fishers because the lieutenants, whom they meet when visiting local PNN stations, do not pass the information to the rest of employees. Nonetheless, he stated that there are differences between PNN along the coast; some work better than others (as fishers had stated).

Unsuccessful experiences of coordination between PNN and DINARA seem to have created mistrust in the manager regarding the PNN performance. For instance, instead of waiting that PNN in Piriápolis sent him the fishing licenses' application forms, he preferred to pick them up personally. The interaction between DINARA and PNN regarding the fishing slips represents

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<sup>81</sup> The close relationship between DINARA and PNN was also recognized by fishers.

an unsuccessful experience of coordination. The manager explained that several months usually pass by before PNN decides to send the slips to DINARA, if ever (something also noted by fishers); this is why he tries to go to Piriápolis to pick them up.

Another example of unsuccessful experience is with regards to PNN task of controlling fishing licenses to make sure that the boats coming to Piriápolis are allowed to fish in zone E. In April 2011, weeks after one fisher phoned DINARA to complain about the presence of boats from La Paloma in Piriápolis, the manager visited the port and found out that four out of the six of these boats did not have an appropriate license. He thus notified PNN, which ordered the boats to leave the port. It is curious that the manager preferred to come to Piriápolis instead of asking PNN or DNH to give him the names of the boats. Although fewer, there have been experiences of successful coordination between DINARA and PNN. For instance, a few years ago DINARA asked PNN to start measuring the boats' length when doing the inspection required for renewing the navigation permits. The information provided by PNN enabled DINARA to estimate that nearly 50% of the boats had been enlarged (illegally).

### ***The Coast Guard's perspective***

Similar to DINARA's Director, the Chief of PNN staff stated that there has always been a very good relationship with DINARA, being the latter the agency with which PNN has the closest relationship. To illustrate this permanent interaction, he explained that PNN receives fishing slips from fishers and sends them to DINARA. Moreover, PNN enforces mesh size regulations (in inland waters) and no-take areas.

For his part, Piriápolis lieutenant stated that the interaction with DINARA has always been good and fluent (like the manager but without identifying any conflict). As an example, he said that PNN takes water samples for DINARA (probably for determining red tides). He also mentioned that PNN in Piriápolis is in permanent contact with the Artisanal Fisheries Unit (e.g. sometimes they coordinate to do enforcement jointly). One of DINARA regulations which PNN is in charge of controlling is boats' fishing licenses, when they arrive at Piriápolis and when they leave to other ports, he stated. Nonetheless, when I asked the lieutenant about the boats which had come from La Paloma, he said that they left because there was no fish in Piriápolis waters (not because their fishing licenses did not include zone E). It is likely that he did not want to admit that PNN had not controlled these boats' licenses, or that he was not accurately informed by the second lieutenant who communicated with DINARA's manager. PNN is capable of fining fishers when they break DINARA regulations, but the lieutenant explained that it is DINARA which sets the amount of the fines. Furthermore, he claimed that PNN does not want to get into DINARA's duties, meaning that each agency has to respect others' "turfs".

### **6.4.3. Relationship between DINARA and the Port Authority (DNH)**

According to DINARA's Director, "the interaction [with DNH] is fluent but their competences are totally different." He showed to be aware of the problems with the number of buoys at Piriápolis port in summer, when lots of yachts come. When I asked the Director whether the interaction between DINARA and DNH needed to improve, he replied that "what should improve is the interaction fishers - DNH - PNN". He explained that fishers usually complain at DINARA about the buoys availability in Piriápolis but that it is not its competence.

The artisanal fisheries manager also referred to the relationship between fishers and DNH:

"DNH is the owner and keeper of all the ports and has made fishers crazy, as fishers have done with DNH. The thing is that there is no port which has been thought for this activity [i.e. artisanal fisheries] and, certainly, an Argentinian, Brazilian or Uruguayan yacht moored at the port, is much more profitable and less problematic than a fisher."

The manager stated that there has been no interaction with DNH; in opportunities where DINARA invited it for meetings, DNH did not respond. He added that DNH is only interested in the buoys, not in the fishery. In fact, the manager met the Port chief at the Artisanal Fisheries Festival in 2012 for the first time, which is surprising if we consider that both of them have been working at DNH and DINARA, respectively, for more than 25 years.

Similarly, the Port chief recognized that there is no relationship with DINARA (he did not even know who DINARA's authorities were at the time of the interview). In his words, "DINARA doesn't even visit us. ... A hundred percent of greater interaction [with DINARA] is needed because a port is to be managed by the different public bodies." The Port chief argued that DINARA should be daily at the port, while also questioning the performance of the agency (e.g. DINARA does not know either the number of fishers in the country or that several boats have been enlarged). The Port chief stated that he is in charge of checking the fishing license of the boats coming to Piriápolis. Nevertheless, when La Paloma boats came in 2011, DNH charged them daily for staying at the port, even knowing that they were not allowed to fish in this area.

### **6.4.4. Relationship between DINARA and Local Governments**

DINARA's Director stated that he had received several complaints from coastal local governments regarding fishers' misbehaviour of throwing fish guts on the beach. He added, however, that this is not among DINARA's duties. For his part, the artisanal fisheries manager commented that DINARA usually invited local governments to meetings but they do not attend because they are interested in other things (not the fishery). He considered that the decentralization law by which Municipal Governments were created could help improve to some degree the relationship between DINARA and local governments:

“We already had interaction with the *Juntas Locales*. Now, the *Municipios* and Mayors would supposedly have another [i.e. higher] weight. ... Anyways, this is a process which has just started and it will probably be very long. In an immediate term, I don’t think this [decentralization reform] will contribute much more than by having a clearer reference in the territory, by making the Mayors understand what artisanal fisheries are, because generally they have no idea. ... Decentralization and governance are processes which take years. This is not something you create by law and in ten minutes.”

When the Mayor was interviewed, he stated that he had not yet established connections with DINARA due to a lack of time. However, he opined that during the previous DINARA administration, while he was working at the *Junta Local*, he asked DINARA’s Director to come to Piriápolis in order to explain fishers the analysis the agency performs to determine red tides. In other words, the Mayor wanted to make fishers understand that red tides were not a government excuse to import shellfish during the high tourist season.

#### **6.4.5. Relationship among PNN, DNH and the Local Government in Piriápolis**

As stated by the lieutenant, Port chief and Mayor, there is a close connection between PNN, DNH and the Local Government in Piriápolis. It is especially so between PNN and DNH: they are in permanent touch because of the similarities between the duties of the two (and also, their offices are only two blocks from one another). For instance, before one boat leaves the port, it has to show at the PNN station that there is no debt with DNH. Both the lieutenant and the Port chief stated that they have a good relationship (the latter indeed referred to a “friendship”).<sup>82</sup> The Port chief explained that “The government agency with which we are most connected is PNN. ... There’s like a marriage between DNH and PNN. PNN is the maritime authority and DNH is the administrative authority”.

With regards to the relationship between PNN and the Municipal Government, the Mayor referred to their good will as a determining factor: “In this moment we have an excellent interaction with PNN, but when the relationship is not regulated, it depends on the good will of the people involved. I get along well with everybody.” Both the lieutenant and the Chief of PNN staff commented that one concern of local governments was fishers’ migration. In 2011, the Municipal Government, through the collaboration of PNN, prevented fishers without a permanent address in Piriápolis from going fishing (Section 6.2.3). When I asked the lieutenant about this event, he explained that it had been because of “misinformation” (without giving further details). He added that PNN then decided to let fishers depart normally, and if the *Municipio* wanted to continue asking fishers to prove their address, that agency would have to be in charge of that (not via PNN). This is an example of apparent conflict between PNN and the Municipal Government, which affected fishers’ activity.

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<sup>82</sup> It is uncertain how is the relationship between the Port Chief and the current lieutenant (who assumed in November 2011).

Lastly, the interaction between DNH and the Municipal Government, although good or excellent according to the Port chief and Mayor, would not be frequent. According to the Port chief, “The relationship [with the *Municipio*] is good but functionally there is not much because we are like opposite poles; we are in the water and they are on land”. He added that no problem arises when they need help from one another.<sup>83</sup>

#### **6.4.6. Inter-institutional linkages among government agencies**

Most of the interviewees (DINARA, PNN, DNH, *Municipio*) recognized that given the numerous government agencies involved in artisanal fisheries, meetings in which they can address the problems jointly are needed. It was also stated that there is no one agency which can solve problems of the fishery by itself, a reason why inter-institutional connections should be strengthened. It is worth remembering that fishers had also identified deficiencies in coordination among agencies. A recurrent example of complex (or wicked) problem in artisanal fisheries in coastal Uruguay is fishers’ migration. Not surprisingly, each agency is most concerned about a different facet of this problem: DINARA is concerned about fishers moving to fishing zones other than those allowed by their license; PNN is concerned about fishers’ safety when they migrate; DNH is concerned about the potential “over-population” of the ports; and the municipal governments are concerned about the irregular settlements formed on the beaches. As the artisanal fisheries manager stated,

“Local governments and PNN can limit certain actions, but not fishers’ migration. One fisher who has a license for zone E can fish from Punta del Este to Santiago Vázquez, wherever he wants at sea. Once fishers get to land, that’s another problem, which is not our jurisdiction, when they form shacks, settlements, or whatever. That’s when they have to respond to the normative of each local government regarding beach use, and DNH regarding the port.”

DINARA interviewees referred to Ecoplata Program as an inter-institutional arena in which artisanal fisheries issues have been discussed. Additional participants of Ecoplata executive board are PNN, coastal departmental governments, the Ministry of Housing, Planning and Environment, and the University, among others. During an interview in 2010, the Ecoplata coordinator stated that, after its origin in 1997 with Canadian funding, the program has focused on integrated coastal management. Regarding artisanal fisheries, the first phase of Ecoplata was oriented to fish resources, including the “social component” only in a later phase. A thematic group focused on artisanal fisheries worked in 2007 with the participation of the different agencies which are part of Ecoplata. Nevertheless, as the coordinator stated, after this period it was difficult to find a concrete action to develop because the DINARA’s Artisanal Fisheries Unit

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<sup>83</sup> Nonetheless, a municipal councilman, during an informal conversation stated that dealing with the Port chief was very complicated.

had only two employees and they were overwhelmed. For his part, the artisanal fisheries manager claimed that Ecoplata diverted to additional topics (e.g. environmental education) which were easier to address than artisanal fisheries.

In 2010 Ecoplata supported the NGO Cultura Ambiental in its initiative of developing an "inter-institutional table" to address artisanal fisheries issues, in the context of a project funded by IUCN. The objective of this table was "to generate a meeting ground for State agencies and social organizations [NGOs] related to artisanal fisheries, so as to contribute to improving fishers' quality of life and promoting a better management of fish resources." The lack of coordination among government agencies was one of the problems identified by the participants of this table (DINARA, PNN, University, Cultura Ambiental, and two other NGOs). After the third meeting, I interviewed the coordinator from Cultura Ambiental, who stated that one of the weaknesses of the table was its non-governmental origin. She argued that PNN would have participated more actively and with more consistency over time (sending always the same representative) if the table had been a State initiative. She also explained that fishers were not invited to these meetings because it would not be useful for them to see the institutional and inter-institutional deficiencies. Nonetheless, at least one participant (a University member) disagreed with that, arguing that fishers should participate in the discussion about fishery problems.

For his part, the artisanal fisheries manager considered that the inter-institutional table would not transcend,

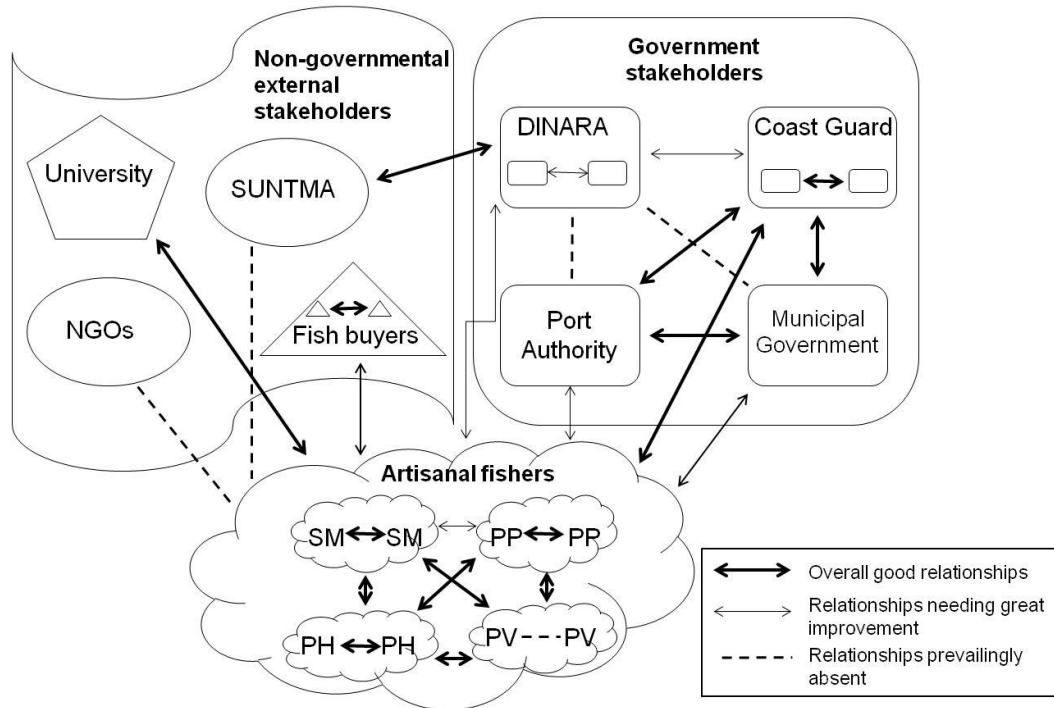
"because it has the same fault as all the programs and projects with international funding, and that is that they are momentary things lasting one year, two years, and then it's over. In one or two years you contribute with almost nothing to this type of processes. Even more, many times they are counterproductive."

In fact, after three or four meetings in 2010, the table dismantled. Successful inter-institutional connections do not seem easy to achieve. In 2012, fifteen years after its origin, Ecoplata started planning a strategy to improve the coordination among government agencies regarding fishers' migration and on-shore fishing activities.

## **6.5. DISCUSSION**

Horizontal and vertical linkages constitute social networks, which are of significant importance for dealing with the dynamics and uncertainty of social-ecological systems. Social networks that span multiple levels are necessary in order for stakeholders to have access to the knowledge which is dispersed among individuals and organizations (Olsson et al. 2007). The information, knowledge, funding, among other resources which are accessed through social networks, can strengthen the community ability to adapt to change (Olsson et al. 2007). My research consisted of a qualitative study of the relationships embedded in the bonding, bridging,

and linking components of social networks in artisanal fisheries management in Uruguay. Figure 6.1 suggests that several linking relationships and bridging external relationships should be established or greatly improved, in the same way as two of the possible relationships among fishers. The implications of these findings for co-management are discussed below, after addressing the contributions of this research to the analysis of social capital.



**Figure 6.1. Graphic representation of the multilevel social capital analysis in coastal Uruguay.** Bonding relationships among fishers, and within external stakeholder groups (fish buyers, DINARA, Coast Guard) were studied, in addition to bridging relationships at the local level (i.e. among fishers from the four landing sites, SM, PP, PH, PV) and external level (i.e. between external stakeholders). Linking relationships are those between fishers and external stakeholders (governmental and non-governmental). The state university (UDELAR) is an autonomous institution, co-governed by its professors, students and graduates. (Note: the absence of arrows or dotted lines indicates the connections that were not studied).

### 6.5.1. Contributions of the multilevel social capital analysis

Given that social capital is important for co-management (e.g. Armitage et al. 2009, Gutiérrez et al. 2011) and co-management as governance implies multiple levels, with linkages of institutions horizontally and vertically (Carlsson & Berkes 2005, Marín & Berkes 2010), the study of social capital should necessarily be multilevel or multidimensional. Given that the intra-external and external-external connections have been poorly addressed in the literature, investigating bridging relationships at the external level represents one of the contributions of the social capital

analysis in coastal Uruguay. Leahy & Anderson (2010), in their study of social capital in the Kaskaskia River Watershed in Illinois investigated, although briefly, the relationships within a government agency (US Army Corps of Engineers) and between agencies. The latter relationships were weak and the interviewees expressed a desire to enhance this type of network, similar to Uruguay findings. It is worth mentioning that studying bonding connections at the external level was the hardest part of the multilevel social capital analysis, and this remains as a gap for further research.

The combination of multiple dimensions of social capital was claimed to be important for solving problems (e.g. Pretty 2003, Jones et al. 2009). Pretty & Ward (2001) argued that in general, the more linkages the better, and two-way relationships are better than one-way, whereas Jones et al. (2009) stated that all types of social networks (bonding, bridging, linking) should be dense. In particular, Marín et al. (2012) found correlations between the linking and bridging social capital of fisher organizations in Chile and the performance of co-management (e.g. diversified livelihoods, management capacities).<sup>84</sup> In Uruguay, the multilevel social capital analysis enabled the identification of facilitating and hampering factors for co-management (see below). Another contribution of my research is with regards to the interconnections between different social capital components, such as the interconnection between bonding and linking social capital. As claimed by Jones et al. (2009), these interconnections should be taken into consideration when studying social capital. Furthermore, methodological considerations arising from the social capital analysis in Uruguay are presented in the final chapter (Section 10.4.2).

### **6.5.2. Fishers' bonding, bridging and linking (interconnected) relationships**

Bonding and bridging relationships among fishers from the four studied landing sites in the Piriápolis area (SM, PP, PH, PV) were predominantly good and trustful, encompassing a number of respected social norms (e.g. solidarity, reciprocity) and local rules related to fishing resource use. Trust and norms are interrelated, for instance trust can arise from norms of reciprocity. Also, trust, reciprocity norms, networks and successful cooperation are mutually reinforcing (Putnam 1993). Trust is an essential component of social capital; as claimed by Putnam (1993, p.171), "Trust lubricates cooperation. The greater the level of trust within a community, the greater the likelihood of cooperation. And cooperation itself breeds trust". Generalized reciprocity was seemingly extended among fishers in Piriápolis (e.g. doing favours without expecting something immediate in return; helping someone at sea expecting that they will be assisted in the future if in need), possibly because of the repeated exchange among them.<sup>85</sup>

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<sup>84</sup> It is worth noting that Marín et al. (2012) did not include bonding connections in their analysis.

<sup>85</sup> General reciprocity can be defined as a continuum relationship of exchange that is at any given time unrequited or imbalanced, but that it involves mutual expectations that a benefit granted now should be repaid in the future (Putnam 1993, p.172).



This is remarkable because the norm of generalized reciprocity is a highly productive component of social capital: it is supposed to help restrain opportunism and resolve problems of collective action (Putnam 1993).

Furthermore, fishers' bridging relationships go beyond the Piriápolis area; most fishers communicate with fishers from additional coastal localities, which facilitate exchanging information about fish resources needed for migration. In fact, it has been suggested that these weak acquaintance relations would have a strong role for social integration and collective action, for instance, by providing individuals with access to information and resources beyond those available in their own social circles (Granovetter 1973, Putnam 1993, Ramirez-Sanchez & Pinkerton 2009).

In turn, self-organization of stakeholders and collective action are considered vitally important for adaptive co-management (Olsson et al. 2004). Even though social capital is commonly associated with collective action (e.g. Uphoff & Wijayarathna 2000, Bodin & Crona 2008), this relation should not be interpreted as being straightforward (e.g. Ramirez-Sanchez & Pinkerton 2009; Section 2.2.2). Fishers in Piriápolis, like in the Caribbean (Sandersen 1998 in Jentoft 2000b), do not have a history of associations, and they have little training in collective action, representation, and deliberation, identifying a gap for further interventions. Fishers' weak organization, or lack thereof, can be thus a barrier to co-management, such as in coastal Brazil (Chapter 9; Kalikoski et al. 2009) or Asia (Wilson et al. 2006). Despite there not being a fisher organization, Piriápolis fishers have shown the capacity to act collectively when facing crises, such as when protesting against the port privatization. This is an example of interconnection between bonding and linking social capital. As Anthony & Campbell (2011) argued, threats of government action can trigger the development of cooperative behaviour (States can also facilitate cooperative behaviour through the provision of tangible resources).

In addition, in the context of environmental policy instruments, it was argued that higher levels of institutional trust (i.e. towards government bodies) can facilitate citizens' collaboration and a subsequent increase in the level of generalized social trust (Jones et al. 2009). However, linking relationships may affect negatively bonding connections. Jentoft (2000b) stated that management systems which are distant from communities (i.e. top-down) erode solidarity among resource users by weakening their social bonds, traditional values and sense of social responsibility. It could be hypothesized, therefore, that the prevalent top-down management conducted by DINARA have caused artisanal fishers' disunity after decades of powerlessly seeing the agency's primary focus on industrial fisheries and companies' exports. There is a risk of fishers becoming selfish profit-seeking individuals, more like the social actors Hardin portrayed (Jentoft 2000b).

The National Union of Seamen in Uruguay (SUNTMA) does not seem to represent artisanal fishers' interests, who stated low trust in it. Similarly, external stakeholders (DINARA

included) do not perceive SUNTMA as an organization representing the small-scale sector. This is significant because delegating responsibility to existing organizations might be regarded negatively by fishers (Jentoft 1989), bringing about additional conflicts between the State and fishing communities. The establishment of a fisher organization in Piriápolis, as well as in other coastal localities in the country, should take place before the delegation of responsibility for management functions. As claimed by Jentoft (2000b), when communities are not ready, competent, and/or willing to handle co-management responsibilities, the management system should invest in searching opportunities to overcome these barriers. This would be a good advice for DINARA, but DINARA is expecting fishers to organize themselves before convening them to participate (see Chapter 7). Thus, the intervention of an additional actor could be helpful in this context. Particularly, NGOs have proved to be an important facilitator of fishers' organization for co-management in different parts of the world (e.g. Wilson et al. 2006, Seixas et al. 2009). NGOs are also meant to facilitate co-management processes by linking different levels and knowledge systems (Olsson et al. 2007). The lack of NGOs working with fishers in Piriápolis (besides those focused on fauna conservation) implies, therefore, a challenge for co-management.

Looking at the problem from a different perspective, if co-management started and fishers were still weakly organized, we could expect the process of co-management itself to augment community integration, necessary for fishers to become effective agents of collective action (Jentoft 2000b). Similarly, Leahy & Anderson (2010) argued that government agencies may develop social capital through involving the local community in collaborative management of natural resources. Very importantly, the issue of power at the local level must not be ignored when initiating the co-management process because there is a danger of entrenching existing power differentials. In the same way as power can be used in a positive and constructive way, it can serve as a negative and disruptive force such as when captured by special interest groups (Jentoft 2007). In fact, a study of coral reef systems in five countries across the Indo-Pacific, found that co-management is largely successful at meeting social and ecological goals but it tends to benefit wealthier resource users, suggesting that it can contribute to social inequity by creating opportunities for local elites to control resources (Cinner et al. 2012, p.5220). Local elites, like "the untouchables" in Piriápolis (who used their close linking networks with local politicians to harm migrant fishers), might turn to their advantage the delegation of management responsibilities to the community, strengthening themselves in so doing (Davis & Bailey 1996). This risk emphasizes the need of investigating local elites while studying social capital (part of its downside or negative side; Dahal & Adhikari 2008, Adhikari & Goldey 2010).

Trusting relationships between fishers and external stakeholders (i.e. linking connections) are as important for co-management as bonding and bridging local networks. Trust is crucial for the workability of fisheries co-management (Jentoft 1989). My case study in coastal Uruguay showed that fishers' trust in other fishers is higher than their trust in some external

stakeholders, such as DINARA and the Municipal Government (trust in these two is lower than in the Coast Guard, University, and fish buyers). This finding agrees with Putnam's (1993, p.174) observation that "vertical flows of information are often less reliable than horizontal flows, in part because the subordinate husbands information as a hedge against exploitation." Patron-client relations, characterized by dependence instead of mutuality, are an example of this; they involve interpersonal exchange and reciprocal obligations, but the exchange is vertical and the obligations asymmetric (Putnam 1993). This is, in fact, what characterizes fishers' relationship with fish buyers in Piriápolis.

Patron-client relationships have the potential of affecting local relationships, a further example of interconnection between linking and bonding social capital. In this regard, D. Johnson (2010) found that these vertical patron-client relationships in Junagadh (India) undermined fishers' horizontal relationships and reinforced rent maximization behaviour, hampering fishers' ability to organize. In coastal Uruguay, bonding relationships among fishers are partly affected by their linking relationships with fish buyers, affecting fishers' capacity to organize as a group. Piriápolis fishers who do not have a stable relationship with a fish buyer are more enthusiastic about forming a fisher association or cooperative which enables them to sell their catch at a better price (e.g. to processing plants, to consumers). However, these fishers are a minority. Moreover, the stressful relationships that fishers hold with fish buyers could also hamper a co-management process by making fishers less motivated to participate in meetings with the government (particularly so if short-term benefits are not evident).<sup>86</sup> Nonetheless, it could also mean an opportunity for working towards increasing fishers' unity through market-oriented initiatives (i.e. direct marketing would have the potential of uniting fishers). In addition, by linking fishers to markets, fish buyers shape exploitation patterns (e.g. Olsson et al. 2007), an example of interconnection between the social and ecological components of the system, and a further reason for highlighting the importance of considering this relationship when investigating social capital for co-management.

Fishers' trust in DINARA is of special interest given that institutional trust is supposed to influence citizens' attitude towards a proposed policy, an argument why social capital could be considered as an explanatory factor for the differing levels of success of environmental policies (Jones et al. 2009). For example, the successful implementation of command and control instruments, prevalent in coastal fisheries in Uruguay, will depend on institutional trust because of the significant dependence of the instrument on State institutions. A high level of institutional trust (not present in Piriápolis) is a pre-requisite for a significant level of compliance (Jones et al. 2009). When a formal rule is defined, initial information is provided through linking networks (e.g. from DINARA or PNN to fishers) and is further diffused among fishers through bonding and

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<sup>86</sup> Stress from conflictual relationships with fish buyers was indeed a reason why one fisher did not participate in certain workshops during the participatory research initiative in Piriápolis.

bridging connections. Jones et al. (2009) also argued that even during the application of voluntary instruments, such as co-management, institutional trust will influence the level of participation.

Therefore, it is likely that fishers' low trust in DINARA will represent a barrier to DINARA's co-management initiatives, like the fisheries zonal councils (Chapter 7). Nevertheless, these councils could serve to bring together fishers and DINARA, among other stakeholders, with the possibility of increasing mutual trust. This would be a case of those many described by Singleton (2000) in which co-management arrangements are implemented in the context of long-standing conflictual and hostile relationships between the State and the community. In any case, it should be borne in mind that "Social capital is not automatically created from association, trust *does not* magically emerge from repeated interaction, and representation of the poorest is difficult to secure even through decentralized institutional structures" (Cleaver 2005, p.904).

### **6.5.3. Government social capital: bonding and bridging at the external level**

Additional barriers to co-management arose from analyzing relationships within DINARA. In particular, the five behavioural biases or tendencies of government agencies identified by Yaffee (1997) and further analyzed by Pinkerton (2007) seemed to be present in DINARA to some degree: (i) preference for short-term rationality over long-term rationality; (ii) preference for competition over cooperation; (iii) fragmentation of interests and values (e.g. being "captured" by the industrial sector and fishing companies); (iv) fragmentation of responsibilities and authorities (by the structuring of agencies into divisions); and (v) fragmentation of information and knowledge (e.g. reports are poorly shared). As Pinkerton (2007) pointed out, these five tendencies would make adaptive co-management impossible. A suggested measure is that government officials should work in the same area for a long time ("going local" and reducing their rotation) (Pinkerton 2007). In fact, changes in the composition of network actors is one of the destabilizing factors of networks (Olsson et al. 2007), and it has been argued that a stability of players, by a relatively low turnover of personnel in the relevant agencies, would more likely lead to cooperative relationships between the State and communities (Singleton 2000). Both DINARA and the Piriápolis Port Authority have had a low turnover of personnel (unlike PNN), but regardless exceptions, fishers did not recognize trusting relationships with them, suggesting that there are a number of variables in place.

Several government interviewees identified good relationships with other agencies, which at first sight would be a good starting point for co-management. Nonetheless, in practice, some of these relationships lacked coordination, leading to conflicts. The relationship between DINARA and the Coast Guard (PNN) is the best example to illustrate this. As seen above, trust facilitates cooperation and cooperation enhances trust. Experiences of unsuccessful cooperation

with PNN (regarding fishing licenses and fishing slips) have made DINARA's artisanal fisheries manager distrust that the former agency can act effectively. The level of trust in bridging networks among agencies, and cooperation among them, affect the effectiveness of their activities (Jones et al. 2009). An additional and related problem to the lack of coordination arises when agencies behave as if they had no or little competence in fisheries, such as the Port Authority and the Municipal Government in Piriápolis. In particular, support from local governments was found to be key for co-management in Asia (Wilson et al. 2006). In Uruguay, the fisheries zonal councils provide an opportunity for involving local governments in co-management. Moreover, the decentralization law, an enabling policy for citizen participation, is still to be implemented in practice.

The weaknesses observed in the relationships among government agencies may be considered alike the organization weakness found in fishers' relationships. Each agency has proved to be focused on its mandates (e.g. PNN does not want to "get into" DINARA's mandates), and this would be one of the reasons why inter-institutional coordination has been difficult to achieve. According to Poteete (2012), coordination problems across government agencies arise both from the need for agreement, and from failing to acknowledging each other (so that actions taken within the context of one agency competes with actions and decisions taken within the context of other agencies). In co-management as in multilevel governance, institutions that straddle the multiple levels need to be devised (Berkes et al. 2007), which might be easier said than done. For instance, Ecoplata, an inter-institutional program among government agencies and the University in Uruguay, fifteen years after its origin still faces the challenge of inter-institutional coordination. It could be argued that an inter-institutional strategy with legal recognition would be helpful in this regard. If the barrier of weak coordination was overcome, Ecoplata's potential of a boundary organization (linking scientists and decision-makers, Cash & Moser 2000) could transform the program in a bridging organization with local actors also invited to the table. This is particularly relevant because bridging organizations can stimulate, facilitate and sustain adaptive co-management, such as in the Kristianstads Vattenrike Biosphere Reserve (KVBR) in Sweden (Olsson et al. 2007).

#### **6.5.4. Conclusions**

The multilevel social capital analysis conducted in coastal Uruguay enabled the identification of facilitating and hampering factors for co-management, although very few of the former and many of the latter. Among the facilitating factors are the favourable and well-established bonding and bridging relationships among artisanal fishers, as well as their capacity to act collectively when facing crises. Moreover, the decentralization law, if implemented entirely in practice, would represent an enabling policy for citizen participation (in which category fishers are included). These few "opportunities", however, seem to be outweighed by numerous

challenges or hampering factors for co-management: (i) fishers are not formally organized and legitimate representatives are rare (but it is significant that government stakeholders do not perceive SUNTMA as representative of the artisanal sector); (ii) fishers' relationships with fish buyers might be hindering their ability to organize; (iii) fishers' linking relationships with government agencies (such as DINARA) need to improve; (iv) there is no NGO working with fishers in Piriápolis (despite those dedicated to the conservation of marine fauna); and (v) bonding and bridging connections at the government level are weak, lacking coordination, which usually leads to conflicts. Co-management in which there is participation of multiple stakeholders could facilitate dialogue and deliberation, thus enhancing an improvement of relationships, among other potential positive impacts. Nevertheless, while co-management can reorder relationships among stakeholders, conflicts might continue rather than be resolved. The next chapter analyzes stakeholders' perceptions about fisher participation in Uruguay, as well as government initiatives towards this direction.

## **CHAPTER 7: ARTISANAL FISHER PARTICIPATION IN DECISION-MAKING PROCESSES IN URUGUAY**

### **7.1. INTRODUCTION**

Since the 1980s, citizen or user participation has been increasingly recognized as an important contribution for addressing natural resources crisis and complex environmental problems (e.g. Walker & Daniels 2001, Berkes 2007a). In addition to democratic arguments (i.e. the opinion of all stakeholders must be considered for making decisions), another argument for participation advocates that the plurality of perspectives (from experts and “non-experts”) can lead to improved decisions (Fiorino 1990), and thus, to a better governance of natural resources. Fisheries management is not an exception on this trend. Fisher participation in co-management arrangements with State actors has been progressively acknowledged for the successful implementation of management policies, increasing efficiency through greater legitimacy and reduced costs (e.g. Jentoft 1989, Wilson et al. 2006, Varjopuro et al. 2008). Given that fisheries are complex social-ecological systems, user participation is valuable for enhancing the capacity of the system to deal with uncertainty and adapt through change. Fishers’ knowledge about fishing resources and local conditions has much to contribute in this regard (e.g. Berkes et al. 2000, Moller et al. 2004).

In Uruguay, following the worldwide trend and the FAO Code of Conduct for Responsible Fisheries (of which one principle is to make decision processes more open and democratic by including stakeholders), there is an intended government transition from top-down decision-making to participatory management of artisanal fisheries. Therefore, the objective of this chapter is to analyze stakeholders’ perceptions about fisher participation in management, as well as government initiatives for fisher participation in Uruguay. The main argument is that despite some worthwhile opportunities, such as an enabling legislation in progress, numerous challenges or barriers need to be overcome to move from participation in the discourse to meaningful participation in practice.

In what follows, I first explore the stakeholders’ perceptions about fisher participation (Section 7.2), after which I analyze government initiatives for fisher participation in the country (Section 7.3). In the latter section, special attention is given to the proposed fisheries law before the Parliament. In spite of other incipient co-management arrangements in the country, the most exciting development is in the proposed law, which includes the implementation of consultative councils with fisher participation, an innovation in a historical top-down fisheries management. The barriers to co-management and particularly to these councils, from the perspective of fisher and non-fisher stakeholders, are explored in Section 7.4. Lastly, the Discussion directs attention to opportunities and challenges for artisanal fisheries co-management in Uruguay.

## 7.2. STAKEHOLDERS' PERCEPTIONS ABOUT FISHER PARTICIPATION

This section is about the perceptions of fishery stakeholders regarding user participation in management and the inclusion of local knowledge in this process, in addition to scientific knowledge. Arguments given by fishers are analyzed first, followed by the perspectives of non-fisher stakeholders.

### 7.2.1. The fishers' perspectives

There are several indications that artisanal fishers in Piriápolis would like to be involved in decision-making processes. First, all of them (16 interviewed fishers plus additional fishers during informal conversations) agreed that "DINARA should take into consideration fishers' knowledge about the fishery when it comes to making decisions." Fishers explained that DINARA should consult them because they know the local reality of the fishery by being day after day at sea (e.g. "DINARA has research [findings], we have practice"). Also, fishers commented that a more fluent communication with DINARA is needed if local knowledge is to be considered.

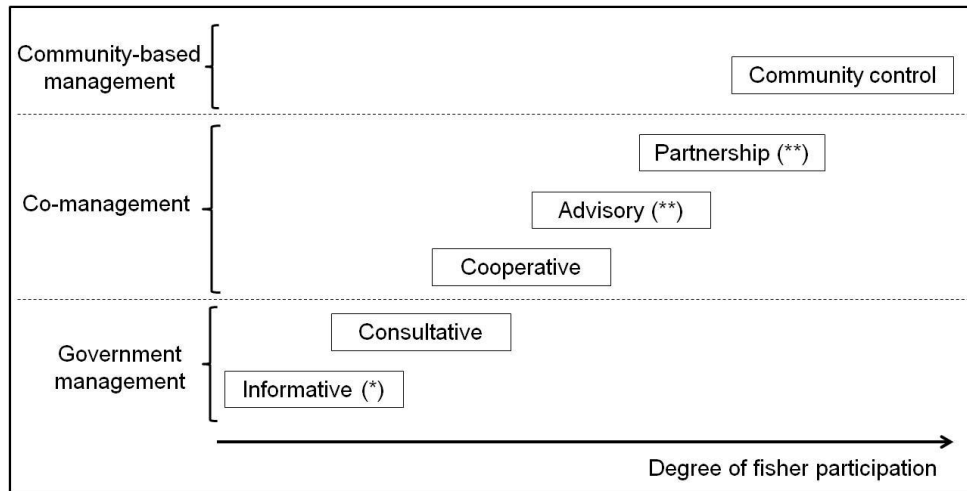
Second, most fishers agreed that "Government and fishers should seek solutions together for the decline of fishing resources". Nevertheless, some of them believe that collaborative activities between fishers and DINARA would be hard to achieve because "artisanal fishers are at the bottom of the totem pole". In contrast, a few fishers stated that it is the State who has to reverse the resource crisis, whereas another fisher opined that every stakeholder (not only those directly affected) should participate in looking for solutions, including consumers. This perspective is consistent with the conception of co-management as governance.

Third, when fishers were asked about the degree of participation they wanted to have (Figure 7.1), the advisory and partnership co-management types were the most frequently mentioned (Table 7.1). In other words, fishers wish to have a significant involvement in decision-making processes. They explained that the first category represents the current situation: they are informed about decisions that DINARA has already made. For example, as one fisher stated, "DINARA decides everything and makes the laws. DINARA does not accept advice from fishers. Why? Because fishers don't get together [referring to their low organizational capacity]". Some fishers commented that they are not even informed about new regulations created by DINARA (including the 300 m zone, Section 5.4.2). Moreover, fishers generally stated that they do not know how new regulations are made.

The Consultative and Cooperative categories were identified by nearly a third of the fishers as the best type of interaction between them and DINARA. One fisher claimed that DINARA should have the obligation of consulting fishers before passing a decree or law, while others referred to the importance of being consulted because of the knowledge they hold about



the fishery. Likewise, fishers' practice and experience at sea were arguments to advocate the Advisory and Partnership categories. Interestingly, one fisher chose the Advisory mode "as long as fishers are listened and taken into actual consideration; otherwise, I'd say that [fishers and DINARA] should be equals [i.e. Partnership mode]". This concern about the actual influence that fishers' advice, knowledge and opinions could have in decision-making arose recurrently.



**Figure 7.1. Possible and expected degrees of fisher participation in decision-making.**

Co-management only includes the categories with significant fisher participation and two-way knowledge exchange between fishers and the government (i.e. consultative processes are not co-management – same as stated by Jentoft 1989).<sup>87</sup> (\*) indicates the current situation in Piriápolis (like in most coastal localities in Uruguay), whereas (\*\*) shows the degree of participation fishers want to have (see Table 7.1).

**Table 7.1.** Degree(s) of participation considered most appropriate by fishers

Which of the following would be the best type of interaction between fishers and DINARA? (*)	Fisher # (**)
<i>Informative:</i> fishers are informed about decisions that government has already made.	0
<i>Consultative:</i> DINARA consults fishers' opinion and makes all decisions.	3/17
<i>Cooperative:</i> fishers have input into resource management.	3/17
<i>Advisory:</i> fishers advise DINARA of decisions to be taken and DINARA endorses these decisions.	8/17
<i>Partnership:</i> fishers and DINARA are equal partners with joint decision making.	5/17
<i>Community control:</i> fishers make decisions and inform DINARA of these decisions.	2/17

(\*) This question was based on the levels of co-management proposed by Berkes (1994) and Sen & Raakjaer-Nielsen (1996). See Figure 7.1.

(\*\*) Seventeen fishers were asked this question (one in depth-interview plus 16 semi-structured interviews) but some of them marked more than one option.

<sup>87</sup> "Co-management is to be distinguished from 'consultative' arrangements which, for instance, have been in existence for several years in Norway as well as in many other countries like Canada and the USA. Such arrangements usually involve an advisory board, in which representatives of the fishing industry are consulted by the government before regulations are introduced. In contrast, co-management means that fishermen's organizations not only have a say in the decision-making process, but also have the authority to make and implement regulatory decisions on their own." (Jentoft 1989, p.144).

The Community control category was preferred only by two fishers; the rest considered that the State must have more weight than fishers in decision-making. One of the fishers aiming at Community control recognized, however, that “For a first movement, DINARA should consult us, which it does not do now.” A dynamic conception of co-management is implicit in this quote, opening up a possibility for higher degrees of participation in the future.

## **7.2.2. The perspectives of non-fisher stakeholders**

### ***Use of multiple sources of knowledge***

In agreement with fishers’ responses, all non-fisher stakeholders<sup>88</sup> stated that DINARA should combine scientific knowledge with fishers’ knowledge to achieve an improved fisheries management. DINARA interviewees gave examples of cases in Uruguay in which the two sources of knowledge have been integrated (e.g. Norbis 1995), whereas others stated that the agency should progress markedly in this direction. In any case, the predominant argument given by external stakeholders to advocate the use of multiple sources of knowledge was that fishers hold rich knowledge about fishing resources and environmental conditions. They explained that this ecological knowledge is valuable for stocks evaluation. For example, one interviewee referred particularly to the long databases fishers can have in their minds (e.g. from 20-30 years of experience, much longer than researchers’ databases). Nonetheless, another interviewee argued that fishers’ knowledge is not as rich or comprehensive as in the past because the fishery has been a last resort for untrained people.

A second and related argument given by external stakeholders was that considering fishers’ knowledge saves time and financial resources (e.g. for evaluating stocks). As the artisanal fisheries manager explained,

“Even though we know practically all places where fishers are, and where they work, research on the water depends on fishers’ knowledge. ... Costs double [when doing research without fishers], and also, many times it is them who guide the research somehow and [who tell us] what we need to know.”

Likewise, one DINARA researcher argued that many times scientific knowledge is inappropriate, and fishers can explain how certain phenomena occur and how to proceed. Under a similar train of thought, DINARA’s Director recognized a weakness of the agency and valued fishers’ knowledge; “I think that fishers have much knowledge of some things, and I think that many of us here [at DINARA] lack field experience and detailed knowledge of those things.” Moreover, the Lieutenant in Piriápolis stated that both types of knowledge should be considered

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<sup>88</sup> Seven DINARA members, Piriápolis Mayor and Lieutenant, Ecoplata coordinator, one UTU member, one University member (Technology of Fish Products, IIP), two members of NGOs (Cultura Ambiental and SOFLUMA), and two fish buyers.

because DINARA is in charge of fisheries research but fishers are the ones who best know the problems of the fishery.

Interestingly, in a publication by the Artisanal Fisheries Unit, after explaining that artisanal fishing licenses stopped to be granted because of an increased demand, and based on the FAO precautionary principle, the authors stated that:

“Due to the above, a model called ‘adaptive participatory management’ was chosen. This model is based on making management decisions by combining the existing scientific-technical knowledge with the empirical knowledge of fishers, and with the precautionary approach. In this way, as information originates, the fishery regulations will be adjusted according to new realities” (Puig et al. 2010, pp.27-28).

In other words, the Artisanal Fisheries Unit believes that fishers’ knowledge is an important element for the adaptive component of co-management. In fact, this was further explained by the manager during a Fisheries Seminar organized by the University, where he stated that resources dynamism implies that fishery regulations are modified over time, for which fishers’ knowledge is fundamental.

Even though external stakeholders were open to knowledge pluralism, at least one barrier was elucidated from the responses of DINARA’s Director, one DINARA’s researcher, and one NGO member: the non-scientific nature of local knowledge. They referred to the need of verifying and corroborating fishers’ knowledge through scientific research. In other words, the validity of fishers’ knowledge is questioned for not having been produced under the systematic and strict scientific method. Furthermore, the interviewees were not clear about how local and scientific knowledge should be combined or articulated. The artisanal fisheries manager identified two potential ways for so doing: (i) DINARA works with a fisher organization (discussing and addressing topics together); or (ii) DINARA works with one or two “trustworthy fishers” (or referents of a certain area). Similarly, a DINARA researcher stated that the agency should be conducting studies in collaboration with fishers, tackling fishery problems. Nevertheless, one NGO representative questioned DINARA’s capacity for using multiple sources of knowledge, and one University member stated that this institution (rather than DINARA) should be in charge of knowledge integration.

### ***Fisher participation in management***

Similar to fishers, external stakeholders pointed out that the current situation is one in which DINARA first makes decisions and then informs fishers (i.e. Informative category). All the interviewees<sup>89</sup> agreed that artisanal fishers should participate in management. Two of them, however, gave a conditional response: (i) the Piriápolis Mayor stated that only fishers with deep

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<sup>89</sup> Seventeen interviewees: the 16 to whom the question about knowledge combination was asked plus one member of the University Extension Service.

knowledge of the fishery should participate in management (he indeed named old fishers whom he considered fulfilled this condition); and (ii) a DINARA researcher argued that fishers should participate “as long as they have representatives”.

Among external stakeholders, the most common argument for fisher participation was fishing resource-oriented: if fishers participate in management, their awareness about resource conservation will increase and they will respect the new measures or regulations, while also participating in enforcing them. The limited enforcement capacity of the State was recognized. For example, DINARA’s Director pointed out that “DINARA cannot have, and will not have, one person in charge of enforcement at every place where there are artisanal fishing boats.”

The second most common argument was knowledge-oriented: fishers know the resources, as well as the dynamic and problems of the fishery, better than anyone else. Curiously, one DINARA researcher who had stated that fishers’ knowledge needed to be verified was also one of the interviewees saying that fishers’ knowledge is “better than anyone’s”. Moreover, he was the only interviewee raising the issue of the participation of additional stakeholders (not just fishers) in management (i.e. co-management as governance). In his words,

“Fishers and other social actors related to coastal management should participate [in fisheries management]. Fishers are the most direct stakeholders in the sustainability of the fishery production. They know better than anyone the dynamics of their work, the species they catch, and this knowledge is basic both for fishers’ maintenance over time and for appropriate resource management. There are usually contrasting interests among fishers, government, and other people willing to conduct other coastal activities – not fishing. Thus, an interactive process needs to be developed, which I don’t know how is called, maybe governance.”

A normative argument for fisher participation was given by this researcher and other interviewees. They explained that fishers should participate to have a greater role in decision-making processes because they are direct stakeholders, and they use fishing resources and benefit from them. Finally, one DINARA interviewee gave a community-oriented argument: fisher participation will increase social cohesion in fisher groups, and leadership will potentially arise.

A few external stakeholders were also asked the degree of participation fishers should have. Fish buyers, the only interviewees with whom the closed-ended question was used, responded similarly to fishers, opting for the Advisory and Partnership modes (Figure 7.1). Likewise, a DINARA researcher stated that fishers should have “voice and vote”, and a NGO member argued that fishers should be equal partners with the government, both suggesting, then, a Partnership mode. This NGO member as well as another DINARA researcher stated that in the long run fishers should be totally in charge of decision-making regarding resource use in their community (i.e. Community control). DINARA’s Director, nevertheless, stated that he did not foresee a scenario in which the decisions made by a board with fisher participation were binding. The artisanal fisheries manager, for his part, argued that the degree of fisher participation will

depend on fishers' capacity of making proposals, although he also commented that the State will have the last word because resource conservation is its duty.

To sum up, fishers and external stakeholders advocated for participatory management schemes in which local knowledge plays an important role. Nonetheless, as expected, fishers' and DINARA's perspectives differed to some degree. The instrumental argument (i.e. fishers will comply with the new rules and will participate in their enforcement) was only found among external stakeholders.

### **7.3. GOVERNMENT INITIATIVES FOR FISHER PARTICIPATION**

"Participatory management" has been among DINARA's goals since the creation of the Artisanal Fisheries Unit in 2007, based on the assumption that if fishers participate in decision-making, they will respect the regulations and will use resources sustainably. During a National Fisheries Meeting in 2010, DINARA's Director stated that the use of fishing resources involves the "tragedy of the commons" (in the same way as posed by Hardin in 1968). Thus, he claimed that access to resources should be restricted, which he could do either from his desk or with fisher participation. In several opportunities, DINARA members informed fishers about the agency's intentions of developing participatory management. In fact, as Chapter 5 showed, there have been cases of joint definition of regulations between DINARA and inland artisanal fishers, although there are still cases of top-down decision-making.

There is not a single conception of *participation* within DINARA. In 2010 the artisanal fisheries manager stated that, in spite of the intended transition towards participatory management, there were no participation instances for artisanal fishers because they are not organized (he explained that individual fisher participation – without representatives – is unviable). Similarly, in 2011 the manager recognized that the agency had done only little progress in that direction. In contrast, DINARA's Director referred to several instances for fisher participation when interviewed in 2010:

"Since 2005 [year when he assumed the Direction], there have been numerous meetings [with artisanal fishers]. The Artisanal Fisheries Unit was created with this purpose (...). Besides, [there has been fisher participation] through invitations to the Fisheries Advisory Table (...). All the development of the bill of responsible fisheries and aquaculture promotion, which is now before the Parliament, was very participatory, and artisanal fishers from the entire country participated."

The DINARA initiatives mentioned by the Director were mostly developed in the context of the Program "Fisheries management in Uruguay" (UTF/URU/025/URU), which took place from September 2007 to August 2011 with Government funding (4.584.659 USD), administered by the

FAO through a Unilateral Trust Fund (UTF).<sup>90</sup> The Program included competitive funding for a research project focused on coastal artisanal fisheries management, promoting co-management. Nevertheless, the resulting project entitled “Artisanal Fisheries Development”, in charge of the NGO SOFLUMA, was considered unsuccessful by most of the research team (Box 7.1).

**Box 7.1. An initiative towards co-management: the case of the project  
“Artisanal Fisheries Development” in coastal Uruguay**

This project was developed between February 2009 and March 2010 in three coastal localities: San José, Piriápolis and La Paloma. It was coordinated by SOFLUMA, a NGO which was created by technicians who work at UTU (Labour University of Uruguay) with the underlying purpose of applying for government funding. The research team, in addition to SOFLUMA/UTU, included DINARA members (Artisanal Fisheries Unit and Fisheries Technology Lab) and University members (Extension Service and IIP-Fisheries Research Institute-Faculty of Veterinary Medicine). In order to conduct a general evaluation of the project, in 2010 I interviewed eight members of the research team (of a total of 22, as stated in the final report, SOFLUMA 2012).

According to the coordinator, the project was successful because fishers from the three localities participated in co-management meetings, and also, because a co-management process to be continued by DINARA was initiated. Nonetheless, the DINARA interviewees as well as UTU and University members, all part of the research team, did not consider the project successful. For example, they explained that even though DINARA’s initiative of co-management was introduced in a couple of meetings, “co-management meetings” did not take place. The concept of co-management was neither discussed by the research team. Furthermore, they explained that coordination was lacking among the project components (fisheries management; social component; fish products; education and training) and among the organizations involved. Interviewees also identified financial and timeline limitations. For example, the members of the social component, in charge of the socio-productive characterization of the fishing communities, quit the project because they were not paid, among other reasons. Another explanation provided to label the project as unsuccessful was that the courses that had been planned for fishers (about navigability, first aids, etc.), in coordination with the Coast Guard, did not take place in Piriápolis and La Paloma. According to one UTU interviewee, these courses were important for co-management because they would enable longer interactions between fishers and government organizations.

In Piriápolis I was able to investigate fishers’ opinions about the project. Even though some fishers were not aware of it, and complained that meetings usually happen when they are at sea, others became quite interested in DINARA’s intentions of co-management. Nevertheless, several fishers stated that after the two or three meetings they attended, they did not hear about the project again, although the initiatives of organizing courses and reconverting the artisanal fishing fleet had been discussed. DINARA did not resume the work initiated by SOFLUMA.

This external intervention in Piriápolis is among numerous others which have contributed to fishers’ reluctance to participating in meetings: a barrier to co-management (see Section 7.4).

<sup>90</sup> As stated in a document of the Program, the goal was to contribute to the sustainable development of fisheries and aquaculture in Uruguay through: (i) restructuring and modernizing DINARA’s institutional structure, (ii) improving capacity of the productive sector focusing on ensuring quality and excellent sanitation and hygiene in fish products; (iii) implementing a robust aquatic resource management system that includes the application of modern fisheries science that contributes to increase efficiencies and reduced by-catch and diversified catch, (iv) redefining the artisanal fishery sub-sector including the implementation of a new institutional management structure; and (v) developing aquaculture as an alternative source of production.

The evaluation report of the UTF Program also states that the above project meant almost no progress towards co-management and the intended National Plan of Artisanal Fisheries (which would include the institutionalization of artisanal fisheries co-management; Vasconcellos et al. 2011a). In what follows, I first analyze the fisheries consultative meetings organized by DINARA (Section 7.3.1) and then the proposed fisheries law (Section 7.3.2), both from the angle of stakeholder participation.

### **7.3.1. Fisheries Consultative Meetings**

The “Fisheries Advisory Table” (*Mesa Asesora de la Pesca*) was formally implemented in 2003 by DINARA-MGAP, but no meeting was held between 2004 and 2006. In 2007, with the support of the UTF Program “Fisheries management in Uruguay”, meetings began to take place (eight meetings were held between April 2007 and October 2010), addressing diverse topics such as the status of coastal resources, government regulations, fish marketing and fleet renewal (Vasconcellos et al. 2011a). DINARA’s Director argued that the implementation of these meetings was based on the FAO Code for Responsible Fisheries, which encourages governments to create participatory opportunities with stakeholders.

In the meeting I attended in June 2010 at DINARA main office in Montevideo, entitled “Status of the common hake, whitemouth croaker and stripped weakfish, and fishery perspectives”, several stakeholders were sitting around the table: SUNTMA, SUDEPPU (Union of skippers), CENTMAQ (Chamber of vessel drivers), CIPU (Chamber of fisheries industries) and CAPU (Chamber of large-scale ship-owners), in addition to DINARA members. Other participants in the room included about eight artisanal fishers from inland and coastal communities (San Luis and Punta del Este), as well as a representative of the Coast Guard (PNN). The meeting was facilitated by one DINARA member (a Director’s assistant), who explained that stakeholders who were invited by the agency to sit at the table had priority to talk. Thus, while the participation of large-scale fishery stakeholders (SUNTMA, SUDEPPU, CENTMAQ, CIPU, CAPU) in this meeting can be labeled as “consultative”, the participation of artisanal fishers was more of the “informative” type (Figure 7.1). In fact, during the meeting, artisanal fishers (and all attendees) were *informed* about DINARA statistics regarding the three main fish species of the country. It is worth noting, however, that one of these species is not targeted by the artisanal sector (the common hake) and none of them is targeted by inland fishers. Most of the meeting, which lasted two hours, consisted of presentations by DINARA researchers, with only little time for stakeholders’ interventions. Therefore, the *Mesa Asesora de la Pesca* should be translated as “Fisheries Consultative Meeting”: (i) “Consultative” instead of Advisory because DINARA gathers stakeholders’ opinions without commitment to using them to any degree for decision-making,

creating discontent among stakeholders; and (ii) “Meeting” instead of Table because only little deliberation takes place among stakeholders.

During the early stages of my fieldwork in Piriápolis, no artisanal fisher had heard that this consultative meeting would be held at DINARA, not even those who were affiliated to the national union. After the meeting, when I informed them the topics addressed and the stakeholders who attended, a few fishers complained because “DINARA invites whom it wants”. They wished they were invited to meetings at DINARA regularly, and that the travel expenses to Montevideo were covered. When I interviewed DINARA’s Director, and enquired about the artisanal fisher convening to the consultative meetings, he stated that:

“A big problem of artisanal fisheries is the lack of representatives. There are no organizations. If I have to convene fisheries entrepreneurs, I know that there are two chambers where about 70% of them are reunited [i.e. CAPU and CIPU]. But if the rest [of stakeholders] are not organized, I don’t convene them, I don’t call them. Those sitting at the table are those who are organized, those who are representing someone.”

The Director explained that for the meeting in June 2010, DINARA decided to invite only artisanal fisher organizations (i.e. cooperatives or associations). Nevertheless, as pointed out above, the artisanal fisher representatives were not sitting at the table, even though they were representing an organization. Moreover, considering that there are not many fisher organizations in the country, only a few fishers were invited by DINARA to attend the consultative meeting (i.e. most fishing communities were not represented). It is noteworthy that, during the meeting, the SUNTMA’s President claimed that artisanal fisheries issues needed to be discussed, which suggests that artisanal fishers’ concerns can be brought to the table, to some extent, by the national union. During the National Fisheries Meeting, DINARA’s Director suggested to artisanal fishers that they should elect a single representative to sit at the table of the consultative meetings. Fishers responded that doing so was impossible because of the many differences between localities. One fisher proposed electing three representatives (for inland waters, Río de la Plata, and Atlantic Ocean, respectively), and the Director agreed.

Not being invited to attend the consultative meetings, or to sit at the table, is not the only cause of artisanal fishers’ discontent with DINARA. Fishers who attended the meeting in June 2010 argued that industrial fisheries have always been the focus of the discussions, and they claimed for an “artisanal fisheries table”. In particular, inland fishers asked for an opportunity to discuss the problems of freshwater fisheries. DINARA’s Director responded that the meeting was not focused only on industrial fisheries because two of the three species are also targeted by coastal artisanal fisheries (i.e. croaker and weakfish). He added, however, that artisanal fisheries in general would be among the topics addressed in future meetings.<sup>91</sup>

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<sup>91</sup> This has not occurred as of April 2013, but zonal councils for artisanal fisher participation have been implemented in some localities (see Section 7.3.2).



During an interview, SUNTMA's representative was very critical with the "Fisheries Advisory Table". SUNTMA wished that the Advisory Table took place systematically to discuss a State fisheries policy. During the meeting in June 2010, DINARA stated that from there on meetings would be held once every two months (but this has not been the case as of April 2013). Furthermore, SUNTMA criticized the methodology of the table, arguing that discussions do not take place in an organized way, and also, that the participants' contributions are not taken into consideration after the meetings.

A similar observation regarding the negative consequences of disregarding participants' opinions was conducted by a CAPU representative at the Parliament Commission of Livestock, Agriculture and Fisheries (while the proposed fisheries law was under discussion):

"DINARA created a consultative table about fisheries, in which entrepreneurs, workers and everyone related to the sector were represented. We have been convened and we have participated. During the previous Administration, the table was held twice and we reached agreements, but then these were discarded because these meetings are not binding. Thus, there were no further meetings; when conclusions disagreed with the Administration's wishes, they were discarded. By not being binding, nothing is done from the decisions coming up from the table, creating participants' unbelief in the efficiency of this type of instruments."

In fact, the evaluation team of the UTF Program made DINARA aware of the risks being faced by the Table, arguing that "it could result counter-productive if deliberations are only declarative, and opinions do not integrally transform into policies, norms or management decisions" (Vasconcellos et al. 2011a, p.6). The Table's periodicity was also advised in the program's evaluation report.

### **7.3.2. New fisheries law**

In the first part of this section I analyze the development process of the proposed fisheries law, based on interviews with DINARA members and official documents. I also present a general description of the law, with emphasis on the articles regarding fisher participation. In the second part of this section, the opinions of fishers and external stakeholders regarding the law are explored.

#### ***Development and characteristics of the proposed fisheries law***

The need for new fisheries legislation was raised by stakeholders during the first meetings of the "Fisheries Advisory Table" in 2003 and was later addressed by DINARA. The development of the law began in 2007 under the "Institutional framework" component of the Program "Fisheries management in Uruguay". The main drivers leading to new legislation were that the existing law (Nº13.833, from 1969) was outdated, and that most fishing resources were

fully exploited. Whereas the goal of the existing law was to promote resource use and fisheries development, the goal of the proposed law was to ensure resource conservation and sustainable development (ROU 2009). A DINARA lawyer was in charge of developing the proposed law, with assistance of other DINARA members, one FAO consultant, and consultations to fisheries stakeholders during small meetings and two national workshops in 2008 (see Table 7.2 for a summary of the development process of the law and its revision before the Parliament).

**Table 7.2.** Stages towards the Law of Responsible Fisheries and Aquaculture Promotion

Date	Events
2003	The need for a new fisheries law was identified by stakeholders during the “Fisheries Advisory Table” at DINARA, and by a FAO consultant.
2007	DINARA started to prepare a new fisheries law in the context of the Program “Fisheries management in Uruguay” (UTF/URU/025/URU), with government funding, administered by FAO.
2008	Government and non-government stakeholders were consulted during meetings at DINARA and two national workshops at the Parliament building. The participants of the first national workshop, according to the report, were: DINARA, MGAP, MSP, MTSS, National Administration of Ports-ANP, National Army, Municipal Government of Rocha; CAPU, CENTMAQ, CIPU, SUNTMA, SUDEPPU, organizations of inland artisanal fishers – including five cooperatives, and Society of Veterinary Medicine of Uruguay - SMVU (*)
2009	DINARA finished the development of the bill with the assistance of a FAO consultant. The Ministry (MGAP) submitted it to the General Assembly. The bill (N° 3437/009) entered the National Parliament in August. In September, it was presented by MGAP and DINARA authorities at the Deputies’ Commission of Livestock, Agriculture and Fisheries.
2010	Due to the national elections and changes in the composition of the above commission, the project was presented again in June. From August to December, the Deputies’ Commission convened different stakeholders to know their opinion about the proposed law (SUNTMA, SUDEPPU, CENTMAQ, DINARA Population Biology researchers, CAPU, CIPU, SMVU, Uruguayan Association of Fisheries and Aquaculture Veterinarians – AUVEPA – within SMVU, inland artisanal fishers from the Nuevo Berlín cooperative – COOPESNUBE, Society of Aquatic Farmers, National Army).
2011	In July, the Deputies’ Commission received DINARA’s Director to comment on the critiques and suggestions made by stakeholders during 2010. In October the Commission sent letters inviting these stakeholders to submit suggestions for the articles of the law. During November and December the Commission discussed on a weekly basis all the articles proposed in the law, receiving occasionally extra information from DINARA’s Director. In November CAPU was received by the Commission, posing similar questionings to the first time.
2012	In March, DINARA’s Director attended the Deputies’ Commission to provide his opinion about the revised version of the bill (resulting from the analysis conducted by the commission in 2011). In April the Commission voted the approval of the proposed changes to the bill and submitted it to the Chamber of Deputies, which approved it on April 18 <sup>th</sup> . Earlier that day SUNTMA visited the Commission and expressed disagreement with the revised version. The bill (N° 0387/12) entered the Chamber of Senators in June. Even though the law has not yet been passed, the Fisheries Zonal Councils started to be implemented in 2012.

(\*) Aquaculture associations and University members also participated in the development of the proposed law (ROU 2009).

The participatory nature of the development process of the law, which took nearly two years, was highlighted by DINARA's Director. He explained that the Director at that time and him (who used to be the Director's Assistant) did not participate in the meetings to avoid conditioning the stakeholders' interventions. DINARA's Direction did not provide the reports of the participatory meetings and workshops for the present research, arguing that there was no report or that these were confidential. However, through the facilitators of the first national workshop (IIFAC<sup>92</sup>) I could have access to their report (Rubio & Battegazzore 2008). That workshop took place during a weekend in February 2008, in a Parliamentary venue. Participants worked in five thematic groups proposed by DINARA to provide inputs for the development of the law: (i) fisheries management; (ii) monitoring and enforcement; (iii) aquaculture; (iv) sanctions and infractions; and (v) inter-institutional coordination. It is striking that there was no coastal artisanal fisher among the participants, although fishers from inland communities attended.<sup>93</sup>

After the first workshop, DINARA held smaller meetings with stakeholders to continue discussing suggestions for the law, and in June 2008 the second national workshop took place. Preliminary articles of the law were then discussed. It was after this workshop when the document similar to the bill submitted to the Parliament was developed by DINARA. As the lawyer stated, given the peculiarities of artisanal fisheries, meetings were conducted in Montevideo and other parts of the country to *introduce* the law project to them (ROU 2009). This supports the observation that artisanal fishers from several localities did not participate in the *development* process (in contrast with the Director's statement that "artisanal fishers from the entire country participated"). According to one DINARA researcher, the lack of fisher organizations meant a problem when identifying whom to invite to the meetings.

The proposed "Law of Responsible Fisheries and Aquaculture Promotion" entered the Parliament in August 2009, close to the end of one government term. It had a total of 92 articles under 11 chapters: (I) General provisions; (II) Fisheries and aquaculture administration; (III) General measures of fisheries and aquaculture management; (IV) Access regime to fishing activity; (V) General regime for artisanal fisheries; (VI) Record, information and control; (VII) Development, promotion and access regime to aquaculture; (VIII) Processing, transport and commercialization; (IX) Inter-institutional coordination and cooperation; (X) Infractions and sanctions; and Chapter XI (untitled), regarding the derogation of opposing laws, and the establishment of 180 days for the enactment of regulations of the law.

The DINARA's Director, artisanal fisheries manager and population biology researchers emphasized the following main contributions of the proposed law: (i) it contains an artisanal fisheries chapter; (ii) it institutionalizes consultative boards, such as zonal councils for artisanal

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<sup>92</sup> International Institute for Facilitation and Change ([www.iifac.org](http://www.iifac.org))

<sup>93</sup> The DINARA lawyer stated that 100 people participated in the first workshop (ROU 2009) but only 45 participants are listed in the report, although the number of participants in one of the groups is not mentioned (Rubio & Battegazzore 2008).

fisheries; (iii) the concept of food sovereignty is introduced; (iv) it includes the FAO precautionary principle (Code of Conduct); and (v) greater autonomy is given to DINARA. For example, as the Director explained in a Parliament session (ROU 2011), DINARA will be able to determine closed seasons or areas (*vedas*) without the Ministry (MGAP). The DINARA's lawyer stated that this greater autonomy of the agency would address stakeholders' concern about the slowness of administrative procedures. Nonetheless, I noticed that this goes against the suggestion made by one of the thematic groups during the first workshop: urgent measures like *vedas* should be taken after previous consultation (Rubio & Battegazzore 2008, p.10).

Two of the eleven chapters (II and V) deserve particular attention because they include articles about stakeholder participation in fisheries management (Box 7.2). On the one hand, one national representative of artisanal fishers will become a member of the Fisheries Consultative Council, a national advisory board. On the other hand, two artisanal fisher representatives will participate in their respective Fisheries Zonal Council, a regional advisory board formed in DINARA zones of artisanal fishing (Chapter 5, Figure 5.1). As shown in Box 7.2, additional stakeholders to DINARA and fishers will participate in the national and zonal councils, such as departmental governments and the Coast Guard in the latter case.

Two clarifications regarding the fisheries zonal councils are worthwhile. First, even though they are meant to be implemented at DINARA's fisheries zones (thus the name "zonal councils"), at a Parliament session the agency's Director stated that these councils could also be implemented in certain communities (i.e. at a local level)<sup>94</sup> with the ultimate goal of contributing to the national council (ROU 2012). The relationship between the zonal and national council, however, is not specified in the law. Second, the Director explained that additional stakeholders to those specified in the law might need to participate in some zonal councils. For example, the Port Authority would have to participate when the Piriápolis council is implemented in order to address fishers' problems with that agency. Furthermore, DINARA's Director considered that the conflict with sea lions should be tackled in the zonal councils.

In any case, the councils or advisory boards proposed by the new law will be consultative, and the resolutions or proposals arising from them will not be binding on DINARA. For instance, as the lawyer explained, the Fisheries Consultative Council has the capacity to submit proposals and analyze different topics, but the ultimate decision is on the Administration (ROU 2009). Artisanal Fisheries Zonal Councils will be "much more formal" than the Fisheries Advisory Table, the Director argued during the latter meeting. However, in a Parliament session he stated that the Fisheries Consultative Council will be similar to the Advisory Table (ROU 2012). Given the criticisms raised by stakeholders who participated in the latter meetings (Section 7.3.1), the legitimacy of the implementation of the proposed participatory mechanism (i.e. the consultative council) is a challenge.

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<sup>94</sup> This has actually been the case (see Box 7.4).

### **Box 7.2. Articles of the proposed fisheries law including artisanal fisher participation**

#### Chapter II - Fisheries and Aquaculture Administration

#### **Art. 12.- Duties and powers of the National Directorate of Aquatic Resources (DINARA)**

It concerns the National Directorate of Aquatic Resources:

- 1.- The orientation, promotion and development, in all aspects, of the activities related to the responsible use of hydrobiological resources, ecosystems containing them, and derived industries, at public and private levels.
- 2.- The promotion of active participation in the administration of hydrobiological resources of all the interested people, through the Fisheries Consultative Council, Aquaculture Consultative Council, and Fisheries Zonal Councils.

#### **Art. 13.- Fisheries Consultative Council**

The Fisheries Consultative Council is created as an advisory board of the Executive Power in all subjects related to fisheries.

The Council will become a sphere of participatory exchange of ideas and proposals, without them being binding on the Administration.

#### **Art. 14.- Members of the Fisheries Consultative Council**

The Fisheries Consultative Council will function under the Ministry of Livestock, Agriculture and Fisheries, and will be integrated by:

- 1.- DINARA's General Director, who will act as President
- 2.- One representative of the Ministry of Defense
- 3.- One representative of the Ministry of Foreign Affairs
- 4.- One representative of the Ministry of Housing, Planning and Environment
- 5.- One representative of industrial vessel-owners
- 6.- One representative of artisanal fishers
- 7.- One representative of the companies dedicated to the transformation of fish products
- 8.- One representative of the fisheries labour sector.

The Council will be able to convene the bodies and dependencies with specific duties linked to fisheries, when their advice is required.

The designated members will participate in a voluntary basis.

#### Chapter V – General Regime for Artisanal Fisheries

#### **Art. 50.- Fisheries Zonal Councils**

As DINARA initiative, Fisheries Zonal Councils will be established with the objective of participating in resource co-management in each fisheries zone. Their decisions will not be binding on the Administration.

They will be integrated by:

- 1.- One representative designated by DINARA
- 2.- One representative of the Government of the Department(s) corresponding to the zone
- 3.- One representative of the Coast Guard [*Prefectura Nacional Naval*]
- 4.- Two representatives of fisher groups.

The designated members will participate in a voluntary basis.

The term co-management appears once in the proposed law, and refers to the objective of Fisheries Zonal Councils (Art. 50, Box 7.2), but it is not at all defined. Even though it is unknown which concept of co-management is behind the zonal councils, the intended degree of fisher participation is one of the lowest (i.e. consultative, Figure 7.1). As DINARA's Director stated, "The councils do not aim at co-management, or only at co-management, and as I said, they are consultative". It is worth clarifying that he explained that *fishery resource co-management* was not the single goal of zonal councils; rather, issues related to land-use (e.g. fishers' irregular

settlements) and fish marketing would also be tackled. The low degree of intended participation contrasts with the Director's statement at a Parliament session:

"These Zonal Councils are thought in a way that fishers are the protagonists of research, evaluation and management, jointly with DINARA. That is not something we invented. [Co-management] has been successful in several countries. It is being applied in bordering countries like Brazil. (...) We believe that this is a way to better control the fishing activity in our waters" (ROU 2010a).<sup>95</sup>

For his part, the artisanal fisheries manager raised an interesting point regarding the degree of fisher participation: fishers would have "a voice and a vote" in the zonal councils. The propositions voted would be submitted to DINARA's Direction and would be taken as suggestions (i.e. the Direction is not obliged to implementing the councils' proposals), thus the non-binding nature. In other words, decision-making power will be shared among the council members through voting, but the final influence of the council's decisions on DINARA's decisions is uncertain because it will depend on DINARA's Direction. Nevertheless, if management suggestions emerge from zonal councils, of which fishers participate, and they are taken into consideration by DINARA, these could be cases of actual co-management.

When I investigated the drivers for including advisory boards in the proposed legislation, DINARA's Director provided two main reasons. First, the FAO Code of Responsible Fisheries suggests that all stakeholders have to participate in management, and second, DINARA cannot have enforcement officers in all parts of the country where artisanal fishing takes place. In particular, the artisanal fisheries manager stated that his Unit proposed the creation of councils based on the difficulties they have been facing to get "spontaneous fisher participation". The implementation of the councils means that artisanal fishers will have to elect representatives. The manager explained that the composition of the zonal councils was discussed during meetings and workshops with fishers and it was not easy: fishers wanted only their representatives and DINARA as members of the councils; they did not want the Coast Guard and local governments to participate. In that case, DINARA's argument was that the Coast Guard had to participate because it is the maritime authority, in charge of enforcement, and local governments also needed to be at the councils because they are the government authority in charge of the land where fishers usually settle. The manager stated that agreement could not be reached between fishers and DINARA in those meetings, and thus, the list of participating stakeholders of zonal councils (Article 50) resulted from a decision made at the agency. Nonetheless, he explained that the number of fisher representatives was defined after negotiation and consensus building: the initial composition of the zonal councils had only one artisanal fisher, which created discontent because fishers wanted to be as much represented as government agencies. Given that three government agencies were present (DINARA, Coast Guard and local government), fishers

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<sup>95</sup> Similarly, in March 2013, DINARA's Director publicly stated that the zonal councils are "consultative, deliberative and proactive" (*consultivos, deliberativos y propositivos*).

expected to have three representatives. The final agreement (two fisher representatives) still made some fishers unhappy, the manager commented.

From 2010 to early 2012, the Commission of Livestock, Agriculture and Fisheries of the Chamber of Deputies analyzed the bill. While so doing, most of the stakeholders who had participated in the national workshops were called up in order to give their opinions about the bill (Figure 7.2). Among these stakeholders were artisanal fishers representing cooperatives of inland waters, but, again, not so coastal artisanal fishers. The President of the Commission stated that they invited artisanal fishers without discriminating if they were coastal or inland “because these are aspects we do not know” (ROU 2010b). After minor revision by the above Commission (Box 7.3), the Chamber of Deputies approved the bill (N° 0387/12)<sup>96</sup>. Since June 2012 it has been before the Chamber of Senators.

### ***Stakeholders' viewpoints about the proposed fisheries law***

When fishers were interviewed in Piriápolis, only 5 out of 16 knew that there was a proposed fisheries law before the Parliament. Except for one fisher who explained that the law was made by the government, the rest did not know who made it. Nevertheless, this fisher was unsatisfied because “their voice” (SUNTMA’s voice) was not taken into consideration by DINARA (it is curious that other fishers affiliated to the union did not know about the law). Moreover, except for that one fisher, the rest did not know anyone who had participated in its development, and most importantly, they wished they had been informed and consulted.<sup>97</sup> The same trend was observed during informal conversations with fishers at landing sites. Therefore, apparently Piriápolis fishers never heard about the meetings and workshops organized by DINARA, which creates an accountability and legitimacy problem for the new law. The two fish buyers interviewed in Piriápolis did not know either that a fisheries law was before the Parliament.

The few Piriápolis fishers who knew the law, as well as inland artisanal fishers and other stakeholders (during interviews and Parliament sessions) raised a number of concerns (Figure 7.2). Other interviewees, such as the UTU member, the EcoPlata coordinator, and one DINARA researcher showed discontent for not being invited to participate in the development of the law. Paradoxically, stakeholders who did participate in this process (inland artisanal fishers, SUNTMA, CAPU, and DINARA researchers) were unhappy with it, because they did not find any or most of their contributions in the resulting bill submitted to the Parliament. This suggests that actual or truly participation did not take place; it was more of the largely criticized consultation (Fiorino 1990, Rowe & Frewer 2000). For example, as the representative of an inland fisher cooperative stated during a Parliament session,

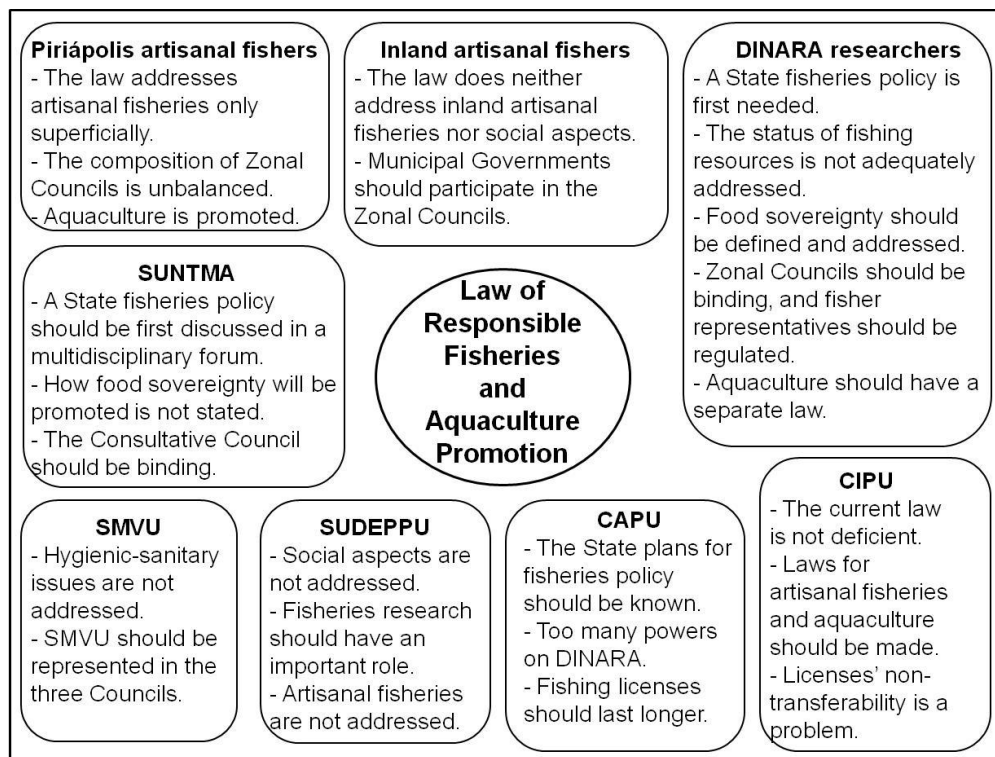
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<sup>96</sup> [http://www.diputados.gub.uy/informacion/pl\\_47III/0387-C3437-09.htm](http://www.diputados.gub.uy/informacion/pl_47III/0387-C3437-09.htm)

<sup>97</sup> After the interviews with fishers, I handed out copies of the bill, and most fishers showed interest in it.

“This bill does not reflect the work we, as inland fishers, have done, and thus we feel excluded. (...) Inland artisanal fishers are not at all addressed in this law. (...) We were invited [to participate in meetings] but the opinions we gave were not taken into account in any part of the project. (...) It seems that a document presented by people with university studies is more important than the contribution from a fisher who only has experience from living by the river” (ROU 2010b).

Inland artisanal fishers also commented that during meetings and workshops, when the law was being developed, discussions focused on industrial fisheries. For his part, a representative of the Chamber of large-scale ship-owners (CAPU) stated that “We feel that nothing of what we proposed has been taken into consideration in this bill, not even things in which there was consensus with other stakeholders who participated” (ROU 2010c). When he complained about this in DINARA, he was told that the workshops were not binding. Likewise, a DINARA researcher, in another session of the Deputies’ Commission, pointed out that “We only participated sporadically in workshops. We did not participate in the development of the bill. We participated in the public consultations which took place” (ROU 2010d). This quote suggests that *consultation* is not the same as *participation*. Interestingly, two DINARA researchers commented that they received the version of the bill which had been submitted to the Parliament only when the Deputies’ Commission called them up.



**Figure 7.2. Stakeholders’ objections to the proposed fisheries law.** (Note: not all objections are shown in the figure). (SUNTMA: National Union of Seamen, SMVU: Society of Veterinary Medicine of Uruguay, SUDEPPU: Union of skippers, CAPU: Chamber of large-scale ship-owners, CIPU: Chamber of fisheries industries).



Even though the institutionalization of stakeholder participation through the proposed law was highlighted by the evaluation team of the UTF Program, it was also noted that the bill could benefit from further discussions with stakeholders. The evaluation team pointed out that “DINARA’s Director recognizes that the main problem of this law is that not everyone agrees with its current version. In that regard, although the discussion of the text was broad, the lack of consensus represents a critical aspect” (Vasconcellos et al. 2011a, p.30). In this report, it was thus recommended that DINARA-FAO should include all fishery stakeholders during the process of approval and/or implementation of the law. During an informal conversation with DINARA’s Director in 2012, he commented his disagreement with the above evaluation report, and argued that not everyone’s contributions can be incorporated. He explained further his view of participation (in the same way as in 2010): “The fact that [the bill] was developed in a participatory manner does not mean that everything that each person proposed became part [of it]. The synthesis is political, as in any law, and the final verdict will be given by legislators, as in any law.” Nevertheless, it is worth remembering that stakeholders complained for not findings in the law any or most of their suggestions.

Of particular interest are the stakeholders’ opinions regarding the fisheries zonal councils. All artisanal fishers and external stakeholders interviewed in 2010 appreciated this initiative. However, several concerns arose and suggestions were provided. Some fishers were concerned about the “unbalanced number of votes” in the zonal councils, of what they saw as three government representatives vs. two fisher representatives (e.g. “that way they’ll always win”). This view of fishers and government being opponents is consistent with the existing conflictual relationships between them (Chapter 6). Following a similar train of thought, other fishers stated that an observer (*veedor*, neither a government member nor a fisher) should participate in the council. This neutral role could be actually taken by an independent facilitator, of particular relevance for effective participatory mechanisms (Rowe & Frewer 2000). Other fishers, although satisfied with the proposed composition of the councils, suggested additional stakeholders to participate: the University, more government agencies (such as the Port Authority), a representative of coastal trawlers, and NGOs. Nevertheless, other fishers opined that the participation of the Coast Guard was not necessary.

It is noteworthy that the degree of participation that fishers want to have (Table 7.1) is higher than the intended participation through zonal councils. In particular, a few fishers commented that they wished these councils were binding on DINARA, or in other words, that their proposals were taken into actual consideration. Finally, fishers identified their lack of representatives as a barrier to zonal councils (see Section 7.4).

Other stakeholders made suggestions regarding the composition of zonal councils. Inland artisanal fishers suggested replacing the representative of the Departmental government for a representative of the Municipal government (ROU 2010b). UTU and University members

suggested including University representatives in the councils; the Piriápolis Mayor and Lieutenant suggested including the Port Authority; the SOFLUMA member suggested the inclusion of local fish buyers, and the Ecoplata coordinator identified the Ministry of Social Development (MIDES) as a necessary player to address fishers' social problems. Also, UTU and SOFLUMA members recognized that the Coast Guard should not be part of the councils because of its coercive role.

Furthermore, several external stakeholders questioned the degree of participation to be achieved through non-binding zonal councils, and identified limitations related to fishers' low organization (Section 7.4). An example of the former comes from a DINARA researcher's quote:

"I think [zonal councils] should be binding because it would be different. When you attend meetings in which you propose things, and after two or three times you see that they are not taken into consideration, you feel unwilling to attend. It doesn't give you responsibilities either. In contrast, if it was binding, you'd feel responsible because you'd have to bring solid proposals and interact with the different stakeholders."

Similarly, the non-binding nature of the Consultative council caught the attention of SUNTMA and CAPU. As a SUNTMA representative claimed during a Parliament session,

"We have conceptual differences even in the title [of the Consultative council]. We understand this is a council of political discussion which must have decision power, where there must be agreement or consensus in policies to be applied in the fisheries by DINARA in the medium and long-term" (ROU 2010e).

Likewise, a CAPU representative found similarities between the Consultative council and the Advisory Table: he explained that it is frustrating that after deliberating and reaching agreements, it is DINARA who makes the decisions. Minor revisions were made to the composition of the national and zonal councils by the Deputies' Commission (Box 7.3). Even though the law has not yet been passed, Fisheries Zonal Councils started to be implemented in May 2012 in the context of the project "Piloting of an Ecosystem-based Approach to Living Aquatic Resources Management", developed by DINARA with financial support from GEF and logistical support from FAO (Box 7.4). As the evaluation team of the UTF Program pointed out, after this project ends in 2013<sup>98</sup>, if the fisheries law is passed, DINARA will need a greater number of trained professionals to the implementation of co-management in the rest of the country (Vasconcellos et al. 2011a). The next section of this chapter analyzes barriers to co-management from the perspective of fishery stakeholders.

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<sup>98</sup> The project has been extended until early 2014.

**Box 7.3. Changes made at the Parliament to the bill submitted by DINARA-MGAP**

In March-April 2012, the Commission of Livestock, Agriculture and Fisheries of the Chamber of Deputies, after having consulted fishery stakeholders and after discussions with DINARA's Director, made only minor changes on the bill. This meant that only a few of the objections expressed by stakeholders (Figure 7.2) were taken into account by the Parliament representatives.

Of special interest are the changes made to the Consultative Council and Zonal Councils: a representative of the Society of Veterinary Medicine of Uruguay (SMVU) was included in the former, and the Mayors of the municipal governments of the respective fishery zone were included in the latter, in addition to one representative of each departmental government. Before making these changes, the Deputies' Commission consulted DINARA's Director. He argued against the inclusion of SMVU (even though he is a member of it): he explained that only major organizations would participate in the Consultative Council, and that there are additional professionals related to fisheries. However, the President of the Commission highlighted the importance of including the vision of University professionals, and DINARA's Director agreed. This may create discontent among professionals from other University divisions. The fact of SMVU being included in the Consultative Council suggests the greater power that organized professionals can have compared to atomized professionals (who were not called up by the Deputies' Commission).

Moreover, DINARA's Director gave ambiguous opinions regarding the changes proposed to the Zonal Councils. On the one hand, he explained that DINARA had been trying to get a balanced composition of these councils so that fishers were not under-represented compared to the government, and thus suggested that one representative of departmental governments and another of local governments should be members of zonal councils. On the other hand, when Deputies discussed the problem that departmental/local governments would have for selecting the representatives (e.g. because there are several *Municipios* in one fishery zone), DINARA's Director agreed, stating that "We are interested in the greatest possible participation because, in my opinion, as more people become involved, the better will be the solutions". Nevertheless, the number of fisher representatives was not questioned.

**Box 7.4. “Piloting of an Ecosystem-based Approach to Living Aquatic Resources Management” (GEF-DINARA-FAO)**

This three-year project began in June 2010, aiming at fisheries sustainable development through introducing principles of ecosystem-based management as well as implementing marine protected areas and co-management. The scientific coordinator stated that this project was one of the starting points to implement several approaches proposed in the fisheries law, such as the fisheries zonal councils. DINARA’s objectives through co-management are: (i) to reduce or stop the negative trends of fishing catches; (ii) to improve fishers’ socio-economic situation; (iii) to develop new governance modes; and (iv) to conserve the structure and function of aquatic ecosystems (DINARA 2011).

The project has been carried out in four pilot sites: Barra del Chuy-La Coronilla (Rocha; where the yellow clam co-management took place in the late 1980s), Punta del Diablo (Rocha), Canelones (Río de la Plata coast), and San Gregorio de Polanco (Rincón del Bonete, Tacuarembó - inland Uruguay). The general coordinator, when interviewed in 2010, stated that fishers from the first and last sites would be better prepared for co-management because of their previous experience with fisheries researchers and DINARA. He also stated that participatory research focused on stock evaluation and monitoring would be used in all the sites, except on coastal Río de la Plata, where the status of fishing resources is already known because they are targeted by the large-scale sector.

In 2010, a Fishing Agreement, serving as a basis for developing a co-management experience, was produced by fishers from San Gregorio de Polanco, whereas at Barra del Chuy-La Coronilla fishers signed a Letter of Agreement, committing to respect certain measures for collecting clams (DINARA 2011). In 2011, during a Parliament session, DINARA’s Director referred to these two sites as places where co-management was taking place. For example, in San Gregorio de Polanco, DINARA replaced undersized gillnets for appropriate gillnets, and agreed with fishers on the maximum number of gillnets allowed (ROU 2011). It was at this site where the first Fisheries Zonal Council was implemented in May 2012.

On the Río de la Plata coast a single zonal council (under the name of “local council”) has been implemented (as of April 2013). From October 2012 to January 2013 the council (*Consejo Local de Pesca de la Costa*) has been meeting on a monthly basis in coastal Canelones, with representatives of artisanal fishers from Arroyo Pando and Ciudad de la Costa, DINARA, PNN, departmental government (*Intendencia de Canelones*), municipal governments (Paso Carrasco, Ciudad de la Costa, Salinas), and GEF Project. The topics discussed included the renewal and issuing of fishing licenses, boats’ size, maximum number of gillnets, electricity services, etc. From what I could observe, in the council’s sessions, decisions are not generally made through consensus building after deliberation but rather through voting. The members of the council (two fishers, DINARA’s artisanal fisheries manager, Lieutenant of Ciudad de la Costa, four local/departmental representatives, and general coordinator of the GEF project) have voted proposals to submit to DINARA’s Direction. Additional fishers and DINARA members participate in the discussions of the council’s sessions but do not vote. Members of other government agencies (e.g. MIDES) have been invited when the topics to be addressed are of their competence.

In March 2013, DINARA’s Director stated that the agency aims at implementing two more zonal councils during 2013, and two more every year, covering all the country. Nevertheless, he stated that the national consultative council will not be implemented until the fisheries law is passed.

#### 7.4. BARRIERS TO THE TRANSITION TOWARDS CO-MANAGEMENT

A number of barriers to the emergence of artisanal fisheries co-management in Uruguay were identified by fishers and non-fisher stakeholders. These were grouped in two main categories: related to fishers, and related to external stakeholders, although they are noticeably interconnected (Table 7.3).

The most recurrent barrier to co-management was fishers' difficulty of forming organizations and electing legitimate representatives. DINARA members emphasized that they cannot talk with all fishers, and argued that the agency needs to work with fisher representatives. During a Fisheries Seminar of which a few fishers attended, the artisanal fisheries manager stated that DINARA needs that fishers work as a group with the capacity to negotiate the topics of their interest. Several stakeholders associated fishers' lack of organizations with their predominant individuality, the latter being another recurrent theme. Not surprisingly, fishers' difficulty in electing legitimate representatives was pointed out by fishers and additional stakeholders as an obstacle to the implementation of zonal councils. Similar to the barriers for collective action seen in Section 6.2.3, fishers explained that it would be difficult to elect representatives for these councils because of: (i) distrust among them; (ii) differing viewpoints or beliefs; (iii) individual interests; (iv) too much responsibility when representing other fishers; (v) no perceived benefits from participating; and (vi) lack of a reliable precedent of the government approaching the fishers.

Regardless of these several obstacles, 12 out of 13 fishers considered that it would be possible for them to form a group or organization to participate in zonal councils. Similarly, DINARA's Director and artisanal fisheries manager stated that zonal councils constitute a triggering factor for the establishment of fishers' organizations. A University member identified a further obstacle for the identification of fisher representatives: heterogeneity among fishers and relationships of dependence among them (e.g. with boat owners). In this regard, one fisher suggested that representatives should be elected in the different ranks: *alistas* (onshore workers), crew members, boat operators, and boat owners who are also fish buyers. Curiously, another fisher suggested that representatives should be appointed by DINARA or PNN. It is evident, thus, that fishers' views regarding the role the government should have in their organization differ.

**Table 7.3.** Barriers to artisanal fisheries co-management identified by stakeholders (\*)

	Fishers	Fish buyer	DINARA	Ecoplata	UDELAR & UTU	NGOs
<b>(A) BARRIERS RELATED TO FISHERS</b>						
- Lack of fisher organizations	√		√		√	√
- Critical social context			√	√	√	
- Low level of education	√		√	√	√	
- Lack of participation capacity	√		√			√
- Mobility along the coast	√		√		√	
- Lack of a fishing tradition			√			
- Unawareness about their impact on fishing resources					√	
- Competition for fishing resources		√				
<b>(B) BARRIERS RELATED TO EXTERNAL STAKEHOLDERS</b>						
- Numerous external interventions	√		√		√	
- Fishers' distrust in DINARA, and DINARA's bad reputation	√	√	√			
- Fishers' reluctance or lack of interest in participating	√		√			√
- Conflicts with coastal trawlers; fishing boats from other countries; and pinnipeds	√		√			√
- State bureaucracy			√			√
- State view of artisanal fisheries as a problem rather than as a productive activity			√			
- Dual role of DINARA as the promoter of co-management and enforcement agency				√	√	
- DINARA's flaws (low number of employees, weak coordination within DINARA)			√	√	√	
- Weak coordination among government agencies			√		√	
- Lack of financial resources	√				√	

(\*) One fish buyer, eight DINARA members, Ecoplata coordinator, three members of research and education institutions (UDELAR & UTU), and two NGO representatives (Cultura Ambiental & SOFLUMA) were asked what barriers to co-management they identified (two PNN interviewees did not answer clearly this question). Fishers' perspectives (on the second column of the Table) come from interview questions regarding the proposed fisheries zonal councils, and informal conversations about fishers' low participation in meetings with the government (total n = 25 fishers).

One barrier to co-management identified by external stakeholders was fishers' critical social context. The posed argument was that fishers have more urgent problems to address than resource co-management, such as their informal nature as workers or their lack of basic services (e.g. electricity, running water). Related to fishers' critical social context is their low level of formal education. About 65% of fishers from Piriápolis and La Paloma took only primary school education (SOFLUMA 2012). This would hamper fishers' ability to participate actively in meetings, stakeholders explained. Particularly, some fishers stated that their low level of education does not enable them to communicate their thoughts during meetings. Fishers' lack of capacity for participation was reiteratively identified as a barrier to co-management by external stakeholders. It is worth noting, however, that when I asked DINARA and NGO members whether external stakeholders also needed capacity for participation, they replied affirmatively and referred to DINARA, PNN, local governments, and researchers.

Fishers' mobility along the coast was another main barrier to co-management, and in particular, to the zonal councils. With regards to the latter, some interviewees wondered whether it was migrant and/or non-migrant fishers who would participate. The scientific coordinator of the GEF project in charge of the initial implementation of zonal councils stated that the most sedentary fishers of a certain locality would be those participating. For his part, one non-migrant fisher argued that fishers not staying in Piriápolis all year long might not be willing to participate in meetings in this locality.

A major reason of concern is the negative impact that external interventions (of government agencies, University and NGOs) have had on fishing communities in coastal Uruguay. These interventions have been so numerous, and without direct positive outcomes to fishers, that they have created unbelief and skepticism in further interventions, representing a barrier to co-management. Fishers from Piriápolis recurrently mentioned that there have been projects in this area but nothing came out of them, thus a main reason for being unwilling to participate. In fact, most fishers are no longer interested in attending meetings organized by DINARA or other government agencies. Based on personal or fellows' negative experiences, fishers believe that attending a meeting will mean a waste of time. One University member explained fishers' fatigue as a consequence of a prevailingly "extractive approach": government agencies, University and NGOs have been extracting fishers' knowledge for years, without giving them anything back. Therefore, positive outcomes will be needed in the short-term of a co-management process if fishers are to become willing again to interact with the government.

Nonetheless, given fishers' distrust in DINARA, which fishers associated with its inadequate fisheries management and with unsuccessful meetings, increasing fishers' motivations in dialoguing with DINARA might not be so easy to achieve. DINARA's bad reputation in fishing communities is well known by DINARA members, who stated that sometimes that reputation is due to negative experiences and other times it is "just in case". The recognition

of the agency's reputation can be seen as an opportunity towards initiating more positive and trusting interactions with fishers. Nevertheless, the existing conflict between the artisanal fishing sector and coastal large-scale trawlers means that the interaction between artisanal fishers and DINARA in a co-management scheme cannot be perceived in isolation from the rest of the fisheries system. This adds more complexity on the path towards co-management. For instance, some external stakeholders stated that artisanal fishers will not be willing to agree with measures for reducing their fishing effort as long as DINARA do not take measures to limit coastal trawling. The dual role of DINARA as the promoter of co-management and as enforcement agency was another identified barrier, suggesting that a different organization should be in charge of initiating or enhancing a co-management process.

Fishers' reluctance or lack of interest in participating in meetings with the government is not only due to unsuccessful experiences and distrust in DINARA. First, some fishers explained that the lack of interest is a consequence of the poor information they receive about the meetings, or information charged with a negative meaning (e.g. one fisher talking badly about a project or initiative might be enough for turning the rest of the fishers unwilling to participate). Second, a few old fishers stated that young fishers are not at all interested in participating in meetings in which fishery issues are discussed. Third, fishers' interest in participating might vary according to their rank (e.g. boat owners are more interested than the crew members). Fourth, fishers' interest in participating depends on the person: some fishers like it and others dislike it (e.g. because of shyness), they explained. Participating in meetings, thus, is like fishing; you will do it only if you like it. Lastly, other fishers stated that they no longer participate in meetings because arguments among them arise when opinions differ, or because some bring up topics unrelated to the meeting's objective. It is worth reminding that fishers' interest in participating in government meetings will also depend on the influence they perceive to be having.

Fishers also referred to additional reasons when explaining why only a few of them participate when there are meeting opportunities with the government. Sometimes they are not invited or informed about meetings until they already happened; agencies usually invite fishers who are their "referents", they explained. Other times fishers are invited but they later forget the date and/or time of the meeting. Moreover, other times meetings take place when fishers are working, either at sea or onshore (a reason why meetings should be during storms), or when they are doing other activities. Nevertheless, if meetings with the government were associated with potential positive outcomes, fishers would likely prioritize them over other activities. Regardless of fishers' numerous reasons to explain why there is low participation in meetings, in 2010 most of them (16 out of 19) stated that they would participate in a research project jointly with other fishers and researchers to investigate measures for fisheries improvement. However, as will be shown in the next chapter, only a few fishers actually engaged in the participatory research initiative in Piriápolis (see Section 8.2.1).



Several of the barriers to co-management identified by stakeholders are closely related to government agencies. In addition to some of the barriers seen above, State bureaucracy; State view of artisanal fisheries as a problem rather than as a productive activity; low number of DINARA employees; weak coordination within DINARA; and weak coordination among government agencies, were mentioned. These aspects were discussed in the multilevel social capital analysis (Chapter 6). Stakeholders noted that weak coordination among government agencies has in turn negative consequence on fishers, who become unconfident to participate. This is an example of the connections between the barriers to co-management (Table 7.3). Finally, the need for financial resources for transportation was raised by fishers and the UTU member. Fishers explained that sometimes they did not attend meetings because they could not afford the bus costs or they lacked their own means of transport. In sum, fishers and non-fisher stakeholders are aware of numerous challenges for the transition from top-down decision making to co-management.

## **7.5. DISCUSSION**

Studying stakeholders' perceptions about fisher participation, and investigating government initiatives towards this direction, enabled the identification of opportunities and challenges for fisheries co-management in Uruguay. These are particularly relevant because of the current transition in the country from the pre-implementation phase<sup>99</sup> of co-management towards the implementation phase, in which new management will be tried out (McConney et al. 2007).

### **7.5.1. Opportunities for fisheries co-management**

Considering that in Uruguay, until recently the government had not shown willingness to devolve authority, and there was no policy that could facilitate co-management, the most striking opportunity is the enabling legislation being discussed at the Parliament, which includes the participation of fishers and other stakeholders in consultative boards or councils, both at the national level (i.e. Consultative Council) and regional/local level (i.e. Zonal councils). As mentioned in Chapter 5, this law constitutes a political action, which is the third and last element of windows of opportunity (Olsson et al. 2006). Enabling policies and legislation can be considered the classical example with regards to the formal component of co-management (Olsson et al. 2004, Pomeroy 2007, Plummer 2009). It has been claimed that both the national and regional policy environment should explicitly support collaborative management efforts

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<sup>99</sup> Stakeholders realized that change was needed; they discussed change and developed new management.

(Armitage et al. 2009). Enabling legislation has also been associated with long-lasting and successful examples of fisheries co-management (e.g. in Japan and Norway, Jentoft 1989). Therefore, if the fisheries law which is being evaluated by the Uruguayan Parliament is passed, it will enhance the co-management process in the country, although this will also depend on how the law and the above councils are implemented (see the next section).

Furthermore, given the composition of the national Consultative Council, it might represent a good starting point for initiating discussions, and hopefully deliberation, among fisheries sectors, with the added potential of bringing to the table contributions originated in the Zonal Councils. The former characteristic needs to be highlighted because stovepipe consultative arrangements, in which the government agency meets with one sector at a time (such as DFO in Canada, with over than 50 of these arrangements), have been criticized. Reasons for critiques are that they have a top-down configuration (although stakeholders are involved), that different sectors fish the same species, and that they are costly and unproductive (e.g. decisions made at one board may conflict with the sector of another board) (Pinkerton 2007). Ideally, national and zonal fisheries councils to be created in Uruguay, with time, should constitute arenas in which collaboratively problem-solving or conflict management can take place (Olsson et al. 2004, Plummer & FitzGibbon 2004, Pomeroy 2007). These arenas would also be important as a way of promoting collaborative or social learning among participants (Olsson et al. 2004). The potential of the councils to become bridging organizations, which stimulate adaptive co-management by connecting institutions across levels and scales to enhance their capacity to deal with change (Olsson et al. 2007), should be evaluated.

The agreement found in the opinions of different stakeholder groups regarding fisher participation and use of multiple sources of knowledge represents another opportunity for the emergence of co-management in Uruguay. The value of investigating stakeholders' perceptions about on-going co-management arrangements cannot be denied (e.g. Gelcich et al. 2005, Napier et al. 2005, McConney et al. 2007). Likewise, in contexts where co-management is just emerging, the need to investigate stakeholders' perceptions and their rationale about the core of this approach should be recognized. This can help elucidate challenges, opportunities and guidelines for co-management. The case study in coastal Uruguay showed that except for DINARA's Director, artisanal fishers and stakeholders from DINARA and education and research institutions, advocated substantial or meaningful participation in which fishers' contributions actually influence decision-making. This scenario resembles the Cooperative, Advisory or Partnership types of co-management. The diverse stakeholders interviewed also agreed on the importance of including local knowledge for achieving better management decisions, in complementation with scientific knowledge. Stakeholders' rationale for fisher participation and use of multiple sources of knowledge coincided with the arguments found in the literature on participation, co-management and local/traditional (ecological) knowledge: better understanding

of complex systems; democratic decision-making; better decisions based on a plurality of perspectives; and greater compliance of rules. Nevertheless, since in Uruguay the notion of participation is becoming a catch-all concept (as worldwide), these arguments are probably easier said than done.

Given that government agencies generally lack detailed knowledge of local circumstances in their jurisdiction, recognizing the potential of fishers' knowledge has led to delegate management responsibility to fisher organizations in several countries (e.g. the main reason for introducing co-management in Lofoten in the 1980s was the importance of local knowledge, Jentoft 1989). In Uruguay, the artisanal fisheries manager particularly referred to the importance of fishers' knowledge for adapting regulations or measures over time (i.e. "adaptive participatory management"). This needs to be highlighted because management systems should be dynamic, not inertial as usually (Liu et al. 2007). As the implementation of co-management progresses in Uruguay, it should be investigated how and to what degree fishers' knowledge is indeed considered.

Fishers' knowledge was historically disregarded for fisheries management around the globe, and it is still today in many places. Therefore, taking into account different sources of knowledge in a new era of management not only contributes to better decisions but also to fishers' empowerment (e.g. Ayles et al. 2007). In places where this transition is taking place, it might be useful for managers, researchers and fishers, to look at different areas of complementarity between science and local knowledge. For example, Moller et al. (2004), based on case studies from Canada and New Zealand (looking at traditional ecological knowledge), identified five areas of complementarity: (i) diachronic (long time series of resource users) - synchronic (short time series of science); (ii) complementary foci on averages (science) vs. extremes (resource users); (iii) interplay between quantitative and qualitative information; (iv) traditional knowledge for better hypotheses, science for a better test of mechanisms; and (v) complementarity of objectivity and subjectivity. Nevertheless, it is likely that the inclusion of local knowledge will face some difficulties, partly arising from the different worldviews of scientists and resource users. In Arctic Canada, for instance, imbalances between traditional knowledge and scientific knowledge still remain, although the recognition of traditional knowledge was required under the Inuvialuit Final Agreement signed in 1984 (which established a co-management system of living resources, Ayles et al. 2007).

Even though numerous barriers to fisheries co-management were identified by stakeholders (some of which are discussed below), this fact can also be considered an opportunity. Stakeholders' awareness of several challenges that a co-management process could face, might enhance their reflection and analysis of actions to be taken to counterbalance them (e.g. capacity building of all stakeholders).

### 7.5.2. Challenges for fisheries co-management

This research showed that stakeholder consultation instances in Uruguay are minimal, and when they take place, stakeholders' opinions are disregarded afterwards. In other words, despite government discourse advocating fisher participation, there is little evidence that meaningful participation has been developed in coastal Uruguay. In fact, a big challenge has to do with the definition of *participation* per se. Even though this research did not analyze the meaning of participation according to stakeholders, some differences among them were observed (e.g. DINARA's Director stated that there have been several opportunities with fisher participation, unlike the artisanal fisheries manager, who recognized the pitfalls). The meaning of participation can indeed vary enormously among the different actors (Cornwall 2008).

Considering the criteria proposed by Rowe & Frewer (2000) to evaluate participatory processes, at least three pitfalls arise from previous participatory initiatives of DINARA ("Fisheries Advisory Table" and development process of the fisheries law), which constitute challenges for new initiatives: (i) Lack of influence: stakeholders' contributions did not influence the decisions made after the meetings, creating frustration and skepticism among them. (ii) Lack of an independent facilitator (e.g. to make sure that deliberation is balanced): except for one national workshop during the development of the law, which was facilitated by specialists (IIFAC), the rest of the meetings were facilitated by DINARA members. (iii) Incomplete representation: coastal artisanal fishers have been poorly (or not at all) represented in the meetings, creating a legitimacy challenge (Jentoft 2000a).

The poor representation of coastal fishers is partly associated with their difficulty of forming organizations and electing legitimate representatives. However, this should not be simply regarded as a consequence of fishers' "individualism" (a common argument posed by external stakeholders). Rather, additional elements, such as fishers' conflictual relationship with DINARA and fish buyers (Chapter 6), need to be taken into account in order to envisage ways of promoting or facilitating fishers' organization. Fishers explained that some of the reasons why they find it difficult to elect representatives are the lack of perceived benefits from participating and successful precedents of government initiatives. Therefore, considering the negative impact that external agents have had on fishing communities, which generated fishers' reluctance or lack of interest in participating, it is imperative that external stakeholders re-think their future interventions. Moreover, the research findings regarding fisher low participation in meetings suggest that special attention needs to be paid when convening fishers to meetings, and during the entire participatory process, in order to avoid direct and indirect forms of exclusion (Peterson 2011). In this regard, if DINARA faces the problem of fisher low participation during the implementation of co-management, its causes should be investigated and addressed instead of just thinking that "fishers are not interested in participating".

An implementation gap of fisheries councils in Uruguay is that it is unclear what the basis for representation is; i.e. whether it will be mainly functional, territorial or virtual, or a combination of these (Jentoft et al. 2003). The implementation of co-management should be informed by the contributions of social and political scientists to themes such as representation and deliberation. As well, Uruguay should learn from the advisory boards and committees developed in numerous countries for resources and environmental management. For example, the Fisheries Advisory Committees (FAC) in Barbados are expected to advise fisheries ministries on management, but they have limited power to effect change, and their members want to transform it from consultative to collaborative (McConney et al. 2007).

Given that fisheries co-management should aim to approach the democratic ideal that affected interests ought somehow to be involved, it could be argued that sport fishers should participate in the national Consultative Council (although sport fishers have far less at stake than commercial fishers, Jentoft et al. 2003). One of the dangers when involving all the affected interests is that stakeholders may try to increase their power by building alliances with others, or to show that their demands are more urgent. Environmental groups in Norway are an example of this. They obtained representation on the Regulatory Council (the national fisheries management board) by stressing the urgency of conservation and by siding with small-scale fishers against the bigger offshore operators (Jentoft et al. 2003). In Uruguay, a similar case may have been the inclusion of the Society of Veterinary Medicine (SMVU) in the national Consultative Council. The representation of the SMVU was important for the President of the Parliament's Commission analyzing the bill, and the fact that DINARA's Director is a member of SMVU might have influenced too.

Since mere consultation is not co-management, there is a risk that low degrees of participation will prevail during the early stages of implementation of consultative boards in Uruguay (co-management is mentioned in the law but not at all defined). According to Sen and Raakjaer Nielsen (1996), when co-management is initiated following a top-down approach, it is more likely that its type will be instructional or consultative, as opposed to advisory when the origin is bottom-up. Nonetheless, as long as the co-management process is dynamic (as it should be) and there is government openness to higher degrees of fisher participation, actual co-management could emerge. In fact, power-sharing should be seen as an outcome rather than a starting point of co-management (Carlsson & Berkes 2005).

Capacity building of all stakeholders will be needed for successful co-management processes in coastal Uruguay, something indeed noted by the interviewees when describing barriers to co-management. Certain skills and capabilities, technical and rhetorical (the command of words and arguments), are needed for the act of representing, and thus, when these are learned, stakeholders' ability to become effective co-managers increases (Jentoft et al. 2003). It is worth mentioning that despite the lack of formal education, there will always be fishers who

have the rhetoric talent and skill, although other skills are as well needed for deliberation (e.g. to listen; Jentoft et al. 2003).

The pre-implementation phase of fisheries co-management in coastal Uruguay has taken over six years (since 2007), including the long period for development and revision of the proposed fisheries law. It is known that co-management processes take time (e.g. Sen & Raakjaer Nielsen 1996), and several years may be needed to progress from one phase to the next (McConney et al. 2007). However, time can be a particular challenge when the fishery is facing a social-ecological crisis, as discussed in Chapter 5. Time will not only be needed for the transition from pre-implementation to implementation of co-management but also to achieving positive outcomes. Two studies based on statistical analysis of co-management cases in several countries, using different methodologies, got to apparent contradictory results. On the one hand, Cinner et al. (2012) found that time affected the co-management outcomes on users' livelihoods; the most successful cases were those where people have long been involved in co-management. On the other hand, Gutiérrez et al. (2011) found no significant relationship between the time elapsed of co-management arrangements and their success (without considering the pre-implementation phase). These findings are unexpected given the dynamic characteristic of co-management.

The issue of financial resources is related to the time constraints or challenges: co-management requires financial resources sustained throughout the entire and long process (Olsson et al. 2004, Napier et al. 2005, Pomeroy 2007). In Uruguay, the implementation of Zonal Councils in pilot areas has been financially and logistically supported by a three-year GEF project, which will end in early 2014. Given that achieving co-management may take much longer than that, it is uncertain, then, what will happen (e.g. in terms of financial and human resources) after that project. It should be warned that even though getting support from external agents (e.g. NGOs, academic or research institutions) has been regarded as a condition for co-management (Napier et al. 2005, Pomeroy 2007), while providing support, external agents might create dependence, and thus, the co-management process could not be self-sustained over time.

Additional barriers to co-management identified by stakeholders in Uruguay were already discussed in previous chapters, such as fishers' mobility and conflict with coastal trawlers (Chapter 5), or weak fisher organization and fishers' distrust in DINARA (Chapter 6). It is noteworthy that this is the first research which investigates barriers to the emergence of fisheries co-management in Uruguay, possibly because this is a very incipient theme in the country.

### **7.5.3. Conclusions**

In Uruguay, instances of fishery stakeholder consultation are still scarce. The analysis of the Fisheries Advisory Table organized by DINARA and the development process of the proposed fisheries law showed several flaws, such as a lack of influence of stakeholders' opinions, which have been mostly disregarded, and incomplete representation of stakeholder groups, particularly of coastal artisanal fishers. These, as well as unsuccessful external interventions in fishing communities (a reason for low fisher participation in meetings) constitute challenges for the implementation of co-management, among many others, including the lack of stakeholders' capacity for participation. Nonetheless, the law which is before the Parliament can be considered an enabling legislation because it proposes the creation of consultative boards at the national and regional/local levels (Consultative council and Zonal councils, respectively), although there is a risk that low degrees of participation will prevail during the early stages. The agreement found in stakeholders' opinions regarding fisher participation and use of multiple sources of knowledge can be considered a further opportunity for co-management. The following chapter is about a participatory research initiative in Piriápolis. Its contributions to capacity building of participating stakeholders, and co-production of knowledge between experts and "non-experts", are investigated, as well as other elements needed for co-management.

## **CHAPTER 8: PARTICIPATORY RESEARCH IN THE PIRIÁPOLIS ARTISANAL FISHERY**

### **8.1. INTRODUCTION**

Participatory research has become increasingly common in the context of natural resource management (e.g. Wilmsen et al. 2008, Shirk et al. 2012), including fisheries (Conway & Pomeroy 2006, Hartley & Robertson 2006, Wiber et al. 2009). Numerous positive impacts have been attributed to participatory research, such as increased trust in the research process, two-way knowledge flow, mutual learning and understanding among participants, trust/confidence building, improved interactions among participants, conflict resolution, capacity building, and empowerment of the community (Cornwall & Jewkes 1995, Chuenpagdee et al. 2004, Opondo et al. 2006, Arnold & Fernandez-Gimenez 2007, T. Johnson 2010).

Many of these potential positive impacts of participatory research have been identified as conditions or variables affecting the co-management process (Pinkerton 2003, Armitage et al. 2009). Even though several authors have referred to participatory research as a strategy to facilitate or improve co-management (e.g. McConney et al. 2007, Berkes 2009c), there is little empirical evidence as to how participatory research may function in this regard. In this dissertation, participatory research has been conceived as a knowledge production approach in which there is an action-oriented component based on local interests and concerns, in which local people participate in the entire research process, and whose final aim is community empowerment (Cornwall & Jewkes 1995, Fals Borda 1987). Nevertheless, participatory protocols that devolve real decision-making to communities in terms of choice of projects are rare (Wiber et al. 2009).

The objective of this chapter is to analyze the participatory research project involving fishery stakeholders in Piriápolis (described in Section 4.4), evaluating it as a participatory process and investigating its role in creating conditions that can facilitate the emergence of fisheries adaptive co-management. The main argument of this chapter is that participatory research among stakeholders is a deliberative process that contributes to adaptive co-management by building capacity, institutions, and trust relationships; by exercising power-sharing through collective decision-making during problem-solving; and by facilitating learning and co-production of new knowledge.

In the next section, an evaluation of the participatory research initiative based on a series of process and outcomes criteria coming mostly from the literature is presented. Section 8.3 addresses specifically the contributions of this participatory research case to co-management, using as analytical framework the seven faces of co-management discussed by Berkes (2007b). In Section 8.4, the contributions of participatory research to overcome the barriers to co-management that were identified in previous chapters are discussed. Frequent reference to



interview question numbers (e.g. Q1, Q2) is made throughout the text (see Appendix 8 for the interview guide). The potential challenges for POPA (the group formed during this project in Piriápolis), as well as the challenges for broadening the application of the participatory research approach and its repercussions for co-management, are also discussed in the final section.

## 8.2. EVALUATION OF PARTICIPATORY RESEARCH

This section focuses on the evaluation of the participatory research initiative in Piriápolis. Evaluation criteria were defined based on some of the literature on public participation evaluation (Rowe & Frewer 2000, Stephens & Berner 2011<sup>100</sup>), a key article about participatory research evaluation comprising an extensive literature review (Blackstock et al. 2007), and the experience in Piriápolis (leading to new criteria or modification of the existing ones). Table 8.1 lists the 17 criteria used, 9 of which relate to the process and 8 to the participatory research outcomes.

**Table 8.1.** Criteria used to evaluate the participatory research initiative in Piriápolis

<b>PROCESS CRITERIA</b>	<b>OUTCOMES CRITERIA</b>
1.1. Problem or topic to be addressed of key interest to local and additional stakeholders	2.1. Achievement of objectives
1.2. Participation of all stakeholder groups in the selected problem/topic (Stakeholder diversity)	2.2. Outcomes and process perceived as successful
1.3. Participants' representativeness	2.3. Co-production of knowledge
1.4. Involvement of all stakeholder groups in every research stage	2.4. Learning
1.5. Independent facilitation	2.5. Strengthened social networks
1.6. Collective decision making through deliberation and consensus building	2.6. Conflict resolution
1.7. Appropriate information management	2.7. Legitimacy
1.8. Adaptability through iterative cycles of planning, acting, observing and reflecting	2.8. Influence and impacts of the results
1.9. Cost-effectiveness of the process	

In the two following sub-sections, each of these criteria is defined and then applied to the Piriápolis case. Frequent reference is made to Table 8.2, which presents a brief description of each of the nine workshops conducted in 2011, as well as the positive and negative aspects that participants identified during their evaluation. Tables 8.3 and 8.4 (at the end of the section) show a summary of the degree of achievement of the criteria in Piriápolis as well as similar evaluation criteria found in the revised literature. Lastly, I present the evaluation of participants' perceptions about participatory research in general, its comparison to conventional research, and its

<sup>100</sup> One of the articles reviewed by Stephens & Berner (2011) is Rowe & Frewer (2000). Therefore, when the former authors cite only the latter article when defining a criterion, I just cite Rowe & Frewer (2000) instead of Stephens & Berner (2011).

applicability for addressing environmental problems, shedding light on some of the challenges to widen the use of this approach.<sup>101</sup>

### **8.2.1. Evaluating participatory research through Process criteria**

#### ***Problem or topic to be addressed of key interest to local and additional stakeholders***

Participatory research aims at involving stakeholders in looking for solutions to local problems, contributing to their empowerment. Therefore, the origin of a participatory research project necessarily has to be based on a local interest to address a certain problem or improve a specific situation. This represents a criterion that has not been found in the reviewed literature about evaluation criteria. The origin of the process may vary. The topic can either be identified by local stakeholders, who then contact additional stakeholders (e.g. academics, government, NGOs) to be part of participatory research, or by external stakeholders who recognize a problem and then assess local stakeholders' perceptions about it and their interest to participate (e.g. through interviews or workshops). In other words, external stakeholders should not assume that a certain topic is a problem of interest to locals before dialoguing with them. In addition to local interest in the selected topic or problem, there must be interest in addressing it by means of participatory research (instead of other means). Regardless who selects the general topic, all stakeholders should participate in defining the specific problems or research questions to be addressed. Self-initiated participatory research (by locals) is more likely to originate in communities or societies with an advanced culture of participation, whereas support from external agents stimulating or promoting these processes would be more necessary in societies in which the culture of participation is developing.

In Piriápolis, as the external agent initiating the participatory research process, I facilitated the stage of selecting the local problems to be addressed. As shown in Section 4.4.2, after most fishers stated in informal interviews that the sea lion problem was the most urgent, additional stakeholders were invited and all of them together defined the specific research question to answer. While doing this, participants made clear that the study had to contribute to solving the problem. Addressing a second local problem arose on the way: fishers expressed their concerns about market competition from imported *pangasius*, and the rest of participating stakeholders became interested in discussing it. All participants' interest in the two topics was evaluated and confirmed throughout the process during individual interviews.

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<sup>101</sup> Most of the findings presented in Sections 8.2.1 and 8.2.2 were included in the article: Trimble, M. & M. Lázaro (*Under review*). Evaluation criteria for Participatory Research: Insights from a case study in Piriápolis' artisanal fishery (coastal Uruguay). Environmental Management.

**Table 8.2.** Summary of the workshops conducted in 2011 during the participatory research process

In the case of the first four workshops, the data presented in the last two columns come from individual interviews with participants (who were asked about workshop's success, perceived positive and negative aspects, and expectations achieved / not achieved), whereas for the 5<sup>th</sup> to the 9<sup>th</sup> workshop data come from plenary evaluations done at the end of the meetings.

Date (2011)	Participants (*)	Brief description of the workshop	Positive aspects	Negative aspects
May 16 <sup>th</sup> (1 <sup>st</sup> workshop)	4 fishers, 5 scientists, DINARA, Ecópolis, SOS	The participatory research approach was introduced, followed by a series of power point presentations (with discussion time after each one) about fishers' and scientists' knowledge on the interaction between sea lions and artisanal fisheries. Several activities were suggested to be initiated by the group: (a) To investigate sea lion impact on long-lines during autumn; (b) To investigate if the conflict is caused only by a small number of sea lions (which have learned to follow artisanal boats); (c) To test alternative fishing gear to avoid sea lions, such as fish traps; (d) To assist fishers in getting their complaints about <i>pangasius</i> to DINARA; (e) To organize a multi-stakeholder workshop about resource decline and its causes.	<ul style="list-style-type: none"> <li>- Appropriate venue and duration</li> <li>- Diversity of participating stakeholders</li> <li>- Respectful dialogue; good facilitation; everybody interacted</li> <li>- Participants' openness to others' points of view; fishers changed their perspective; scientists revised their data after listening to fishers</li> <li>- Participants learned from each other</li> <li>- Scientists were more focused on people (i.e. fishers), not just on sea lions</li> </ul>	<ul style="list-style-type: none"> <li>- Low fisher participation (but, according to scientists, participating fishers were proactive)</li> <li>- DINARA's Marine Mammals Department and Director did not participate. (Note: the latter was not invited to the workshop).</li> <li>- Little debate</li> </ul>
June 20 <sup>th</sup> (2 <sup>nd</sup> workshop)	4 fishers, 5 scientists(**), DINARA, Ecópolis, SOS	The scientific method was introduced, followed by a collective discussion of the study methods to answer the research question: <i>What is the current interaction between sea lions and long-lines?</i> A protocol used by scientists was improved based on all participants' suggestions. The use of alternative fishing gear was discussed. Marking sea lions at Piriápolis port to recognize them individually was discussed as a tool to find out whether the conflict is caused by a small number of individuals. The second major problem, <i>pangasius</i> market competition, started to be addressed. Participants shared the information they had found about <i>pangasius</i> , followed by a brainstorming exercise on which actions the group could take. The idea of organizing an artisanal fisheries festival was proposed	<ul style="list-style-type: none"> <li>- Stakeholder diversity</li> <li>- Other fishers participated</li> <li>- Nice environment, respectful dialogue</li> <li>- Interesting discussion, understanding and getting to know others' viewpoints better</li> <li>- The topics (protocol to study sea lion impact, and <i>pangasius</i>) were discussed as planned</li> <li>- Participatory activities were settled</li> <li>- Tasks were divided</li> <li>- Participants' enthusiasm was maintained</li> </ul>	<ul style="list-style-type: none"> <li>- Low fisher participation</li> <li>- Progress went more slowly because of "new" fishers.</li> <li>- Not everyone was interested in collecting data onboard</li> <li>- Fishers' viewpoint was biased towards sea lion cull</li> <li>- A common agreement of what to expect with this participatory research is still needed.</li> <li>- Neither the protocol nor the action to take regarding <i>pangasius</i> was totally defined</li> </ul>

		by scientists.		- DINARA will not take any action regarding <i>pangasius</i>
<b>Date (2011)</b>	<b>Participants</b>	<b>Brief description of the workshop</b>	<b>Positive aspects</b>	<b>Negative aspects</b>
July 26 <sup>th</sup> (3 <sup>rd</sup> workshop)	3 fishers, 2 scientists, Ecópolis	The protocol to study sea lion impact, which resulted from participants' contribution in the previous workshop, was handed out and analyzed collectively. There was disagreement about the relevance of collecting some of the data. It was decided to try to mark sea lions and also find out how fish traps have functioned in this area. A communication strategy (or public campaign) to promote artisanal fisheries and artisanal fish consumption started to be planned. The social scientist led the group discussion focused on the questions: (a) Who will communicate?, (b) Whom will we communicate with?, (c) How, when and where will we communicate?, (d) What do we want to tell them?, and (e) Why do we want to communicate with them? While doing this, the need of having a group name arose.	<ul style="list-style-type: none"> <li>- Stakeholder diversity</li> <li>- More productive than previous workshops (partly because of the low number of participants)</li> <li>- Opinions were exchanged, getting to common agreements and making decisions towards the proposed objectives</li> <li>- Fishers were critical during discussions</li> <li>- The resulting protocol was more advanced.</li> <li>- The communication exercise structured on the <i>who, what, how, why</i> questions was very useful</li> <li>- Participants are enthusiastic about participating and communicating with the public</li> </ul>	<ul style="list-style-type: none"> <li>- Low fisher participation</li> <li>- Participating fishers' rotation</li> <li>- Other stakeholders' absence</li> </ul>
August 16 <sup>th</sup> (4 <sup>th</sup> workshop)	2 fishers, 4 scientists, DINARA, Ecópolis	The rain prevented trying to bleach-mark a sea lion in the port. We started planning the "First Artisanal Fisheries Festival in Piriápolis". The workshop finished by forming sub-groups in charge of different tasks (to be conducted before the next workshop): to look for funds and support from different organizations; to think of ideas for the brochures and find out printing costs; to contact restaurants and chefs to offer local fish tasting during the festival; to start planning the photo exhibition; to invite the primary and secondary schools to address topics of the Piriápolis artisanal fishery.	<ul style="list-style-type: none"> <li>- Lots of progress was done (Festival organization)</li> <li>- The topic discussed was less controversial than sea lions</li> <li>- Pleasant dialogue and environment</li> <li>- Activities started to be settled (Festival, marking sea lions)</li> <li>- Tasks were assigned</li> <li>- The group was united and organized</li> </ul>	<ul style="list-style-type: none"> <li>- Low fisher participation (i.e. most participants are not fishers)</li> <li>- SOS did not participate</li> <li>- More things could have been defined</li> <li>- Task division was not fair</li> <li>- The sea lion topic was not addressed</li> <li>- Participants lacked information about fishers' local reality (e.g. complexities of fish selling)</li> </ul>

Date (2011)	Participants	Brief description of the workshop	Positive aspects	Negative aspects
September 20 <sup>th</sup> (5 <sup>th</sup> workshop)	3 fishers, 4 scientists, DINARA, Ecópolis, SOS	<p>The group already has a name: POPA – <i>Por la Pesca Artesanal</i> (this name was chosen through email exchange and conversations with participants after the 4<sup>th</sup> workshop).</p> <p>Before the workshop, one fisher, two scientists and DINARA manager tried to bleach-mark a sea lion at the port.</p> <p>We continued planning the First Artisanal Fisheries Festival, reaffirming collectively its objectives and concept. SOS suggested bringing sea lions to the Festival, which created a polemic discussion.</p> <p>Two secondary school teachers came to invite the group to participate in a documentary about artisanal fisheries.</p>	<ul style="list-style-type: none"> <li>- Stakeholder diversity</li> <li>- Everyone was motivated with the Festival</li> <li>- Nice interaction among participants; everyone shared his ideas</li> </ul>	<ul style="list-style-type: none"> <li>- Low fisher participation</li> <li>- Progress was little</li> <li>- The rules for good dialogue were not always respected</li> <li>- Those who did not participate in the previous workshop should have read the summary</li> </ul>
October 25 <sup>th</sup> (6 <sup>th</sup> workshop)	8 fishers, 1 fish vendor, 4 scientists, DINARA, Ecópolis, SOS	<p>The group identity and objectives were collectively defined in order to produce a presentation page and strengthen the group.</p> <p>The rules for a functioning group (which had been suggested individually) were agreed upon by the group.</p> <p>The decision to show an informative poster about sea lions at the festival was taken by consensus.</p> <p>As the Festival planning progressed, six new subgroups were formed (funding, logistics, brochures, poster, media), in addition to the existing three (photo exhibition, logo of POPA, primary school activities)</p> <p>The contact initiated by Ecópolis representative with WSPA (World Society for the Protection of Animals), expressing his concern about sea lions being shot by fishers, was discussed.</p> <p>Five undergraduate biology students taking the course “Science and Community activities” (Faculty of Sciences) attended the workshop.</p>	<ul style="list-style-type: none"> <li>- Many fishers participated (i.e. about half participants were fishers)</li> <li>- Respectful dialogue (despite differing viewpoints)</li> <li>- The Festival was becoming a great initiative</li> <li>- The sea lion topic was brought back to the group discussions and we reached some agreement</li> <li>- Young students approached POPA</li> </ul>	<ul style="list-style-type: none"> <li>- An employee of the Local Development Department (<i>Intendencia de Maldonado</i>), who had been invited, did not participate</li> </ul>

<b>Date (2011)</b>	<b>Participants</b>	<b>Brief description of the workshop</b>	<b>Positive aspects</b>	<b>Negative aspects</b>
November 15 <sup>th</sup> (7 <sup>th</sup> workshop)	7 fishers, 2 scientists, DINARA, Ecópolis, SOS	Each subgroup commented on its progress. A work timetable was defined. The group chose three fishers as spokespeople for the media. Criteria to evaluate whether the Festival's objectives would be achieved were discussed.	- Group members are increasingly getting to agreements	- Many things (for the Festival) are yet to be defined or settled, which was making the group anxious
December 6 <sup>th</sup> (8 <sup>th</sup> workshop)	4 fishers, 1 fish vendor, 1 scientist, Ecópolis, SOS	Participants worked in three subgroups: (1) to revise the brochures' content, (2) to discuss ideas for fliers and stickers, (3) to revise the content of the sea lion poster. A plenary session followed to make decisions collectively. Strategies to get 200 kg of fish for the tasting during the Festival were discussed. Two new subgroups were formed to produce posters about: (1) local species and <i>pangasius</i> , (2) fishing gear used in Piriápolis (gillnets and long-lines).	- Differing viewpoints were exchanged (e.g. kilos that sea lions eat, percentage of fishing trips with sea lion interaction) - Several things were finished (e.g. sea lion poster)	- Low fisher participation - Absence of several POPA members - Unequal work of group members (some were overburdened) - Communication via email from workshop to workshop was not possible for everybody
December 21 <sup>st</sup> (9 <sup>th</sup> workshop)	6 fishers, 5 scientists, DINARA, SOS	The progress each subgroup had achieved was shared with the rest (e.g. the sea lion poster, fliers and photos were all printed). A timetable until the day of the Festival was defined. Group objectives for next year (2012) were discussed, and studying the sea lion problem was prioritized. Alternative ways of group functioning for 2012 were discussed given that the organization team would not stay in charge. A group farewell to 2011 was held at the end of the workshop.	- More fishers participated (compared to the initial workshops) - Stakeholders were getting closer (such as fishers and DINARA Artisanal Fisheries Unit) - Respectful dialogue - Everyone made contributions - Many things were completed - POPA is a group which is fighting for something, and its objectives are being consolidated - We talked about POPA next year	- Feeling of nervousness because the Festival was getting closer

(\*) "DINARA" refers to the Artisanal Fisheries Manager, whereas "Ecópolis" and "SOS" refers to the representative of these NGOs who participated.

(\*\*) A biologist who participated in the first workshop did not attend this time, but a Master student in Communication and Culture interested in artisanal fisheries joined the participatory research process.

### ***Participation of all stakeholder groups in the selected problem/topic (Stakeholder diversity)***

Once the topic to be addressed in a participatory research initiative is defined, the involvement of all stakeholder groups should follow (e.g. academic institutions, government organizations, NGOs, in addition to local people). Improving the discussion of the selected topic by combining multiple understandings and forms of knowledge is one of the key elements of participatory research (i.e. its substantive nature). *Stakeholder diversity* is sometimes considered within the representativeness criterion (e.g. diversity of views, Blackstock et al. 2007, Stephens & Berner 2011), which also refers to the degree to which participants represent their group. However, I have considered the latter as a distinct criterion (presented next).

Primary stakeholders who were invited to the experience in Piriápolis consisted of the management agency in charge of fisheries and marine mammals (DINARA), University scientists and biodiversity conservation-oriented NGOs. DINARA's Artisanal Fisheries Unit, five University scientists and one NGO (SOS) accepted the invitation, valuing the opportunity of being part of a multi-stakeholder participatory research together with fishers. Nevertheless, DINARA's Marine Mammals Department and two NGOs could not participate. Of special interest is the former's response, whose manager stated that solving conflicts is not part of their duties. Secondary stakeholders who were invited included additional government organizations (Coast Guard and Port Authority), fish buyers, and a sustainable development-oriented NGO (Ecópolis). All except for the latter could not participate, due to a variety of reasons (shown in Table 4.8).

During the final interviews, 10 out of 15 participants identified additional stakeholders that should have participated in the process: (1) fishers named the Coast Guard (if this agency participated, paperwork at this office would become easier), Port Authority, local government (*Municipio de Piriápolis* and *Intendencia de Maldonado*), DINAMA (National Directorate of the Environment) and SUNTMA (arguing that not only trawlers' workers are affiliated to this union but also artisanal fishers); (2) scientists named DINARA's Marine Mammals Department and "someone else" from this agency; (3) DINARA manager also recognized that the Marine Mammals Department should have participated; and (4) NGO representatives named the Coast Guard, Port Authority, local government, and additional conservation-oriented NGOs. Despite the fact that additional stakeholders should have participated, stakeholder diversity was valued during workshop evaluations recurrently (Table 8.2). Moreover, they stated that the diversity of stakeholders motivated their participation at the beginning of the process. For example, the presence of a DINARA representative was appreciated by fishers, scientists and NGOs. In some cases, participants' previous experience with other stakeholder groups (e.g. fishers-scientists) was also a motivator at the beginning.

### ***Participants' representativeness***

Representation is a criterion found in the literature usually referring to the spread of representation from affected interests, including how legitimate is seen the representation (Rowe & Frewer 2000; Blackstock et al. 2007, Stephens & Berner 2011). This evaluation criterion is particularly relevant when the participatory process is linked to policy decision making (Rowe & Frewer 2000). In the case of participatory research, the degree of participants' representativeness might affect the legitimacy of the outcomes and process, as well as the influence and impacts of the results (two Outcomes criteria). In order to favour local stakeholders' representativeness, it is useful to unravel at a former stage the complexities of local relationships within the community.

In Piriápolis, the diversity of local stakeholders (e.g. full-time and part-time fishers, migratory and non-migratory fishers, on-shore workers, boat owners) and the relationships among them were studied in 2010 (Chapter 6), providing useful information for the convening stage of participatory research the following year. Even though a continuous effort was made throughout the process to invite all kind of local stakeholders, only a few fishers participated in group activities, such as workshops. In fact, fishers' low participation was repeatedly identified by the four stakeholder groups as a negative aspect (Table 8.2). As one scientist stated regarding this low participation, "the 'participatory' character [of the process] is lost in a way because the idea [of participatory research] is that those directly involved [i.e. fishers] have to be present."

Nevertheless, in several opportunities during workshops, fishers pointed out that they represented the rest. After each workshop, some of them would share with other fishers the progress that was being done, complementing the task of the organization team of distributing a printed summary of workshops at landing sites. Fishers who did not attend workshops participated in other ways throughout the process, from deciding which topic should be addressed at the beginning, through contributing with their knowledge about sea lions' impact, to giving ideas and support for the organization of the First Artisanal Fisheries Festival. The organizational team was the nexus between these fishers and the participatory research group. Participants valued the increased number of participating fishers over time. Still, during final interviews, participants from the four stakeholder groups commented that more fishers should have participated.

Not only fishers' representativeness was questionable but also DINARA's. Throughout the process, the participating manager would sometimes identify himself as the DINARA representative, whereas at other times, he would state that he was participating because of personal interest in the project. Not surprisingly, this created confusion among participants, mainly fishers and scientists. It also explains why some scientists expressed that someone from DINARA's leadership (Direction), or other Department with more power than the participating



manager, should have participated. Regardless of the confusion among participants, considering that DINARA was formally invited to the participatory research initiative, by submitting a file at the beginning and via emails to the manager (copies to the Director) for every workshop, I believe that DINARA was represented by the Artisanal fisheries manager.

Several participants of the four stakeholder groups did not disseminate the process among their fellows (e.g. fishers, scientists, members of the participating NGOs and DINARA officers). Thus, it is likely that a legitimacy challenge for the participatory research initiative will arise from participants' inappropriate attitude as representatives. Nonetheless, when participants were asked if their group or organization would appreciate the Festival that we had just started to organize, most replied affirmatively, although with uncertainty.

### ***Involvement of all stakeholder groups in every research stage***

Participatory research requires that the whole process is developed collectively by participants (as co-researchers), including objectives' definition, methodology design / planning of activities, data collection / development of activities, analysis and evaluation. This criterion sets one of the most remarkable differences between participatory research and conventional research (i.e. experts' research) or even research projects which give low degrees of participation to local stakeholders (e.g. when the objective is defined by scientists and the community is asked to assist in data collection). Thus, this criterion might be the one creating the most disagreement among academics, who usually advocate public participation for instrumental reasons. Early involvement of participants (as early as possible) was proposed by Rowe & Frewer (2000) as a necessary criterion if participation is to be effective rather than just a means to let stakeholders know of decisions that were already made (such as the common critiques to public hearings). Participatory research requires early and continuous involvement of all stakeholders in the process of problem solving and knowledge co-production.

This criterion structured the participatory research initiative in Piriápolis. The multi-stakeholder group collectively defined a research question (sea lions' impact on long-lines) and the study methods (protocol to fill out collaboratively during fishing trips). Moreover, participants from three stakeholder groups (fishers, scientists and DINARA) tried to bleach-mark a sea lion at the port, an initiative that had been agreed by all participants to recognize the animals individually.<sup>102</sup> Another example of the involvement of all stakeholder groups at every stage was the organization, development, evaluation (including the evaluation planning) and diffusion of the Festival. Even though sub-groups were formed during the Festival's organization for practical purposes, each of them was composed of participants of two or three stakeholder groups (e.g. fishers, scientists and the DINARA manager worked on brochures; fishers, scientists and one

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<sup>102</sup> Neither of the two NGO representatives could participate because of time constraints.

NGO representative produced the sea lion poster). Furthermore, sub-groups would always consult the rest of the group before making final decisions.

The generation of the protocol to study sea lions' impact is especially useful to illustrate this criterion, in addition to being the first time that fishers participated in defining the methodology of such a study in Uruguay. When participants were asked to comment on the collective generation of the protocol, opinions differed among stakeholders, although they were always positive. First, fishers stated that full participation of all members was a must because that is how groups work. Also, fishers explained that data would be more precise and unbiased. Second, scientists appreciated that fishers suggested collecting new data (which scientists had not collected in their previous studies) and stated that by participating in the methodology stage, fishers would later believe in the study findings. Lastly, DINARA and NGO representatives highlighted the complementarity of everyone's viewpoints and contributions. For example, as one NGO representative stated, "I think it's fundamental that everybody participates because otherwise, if contributions came only from academics or fishers, something would be missing. On the contrary, when everyone participates, more comprehensive work is done." According to scientists, however, the challenge is to find fishers who are motivated to participate in every stage, not just taking them onboard the boats. As one scientist stated:

"I think we'll need more fishers, not of those 'I take you fishing', but more fishers being part of the whole process, [deciding] which data, how to collect them... Even for interpreting the results it would be good if there were more fishers participating."

### ***Independent facilitation***

In order to achieve a balanced dialogue between different forms of knowledge, with no hierarchies or dominant stakeholders, it is essential that the participatory research process is facilitated by someone who is not involved in the selected topic. The independence criterion found in the literature (e.g. lack of bias from whoever is promoting or facilitating the process) advises that no stakeholder group should have more power when decisions are made (Rowe & Frewer 2000). The facilitator should be in charge of promoting mutual respect and tolerance among participants (e.g. respect towards others' viewpoints and knowledge) and ensuring that interventions during discussions are balanced, key elements if decisions are to be made collectively (next criterion). Who should assume the facilitator role is not an easy question. In fact, the creation of a new sector of "angels" (consultants) who mediate between a disenchanting public and the institutions of science, industry and policy making has been criticized (Bauer et al. 2007). In addition to the professionals who have the capacity to facilitate participatory processes (e.g. within the STS sphere – Science, Technology and Society), Universities should be capable and willing to assume this role (as institutions) and facilitate dialogue and collaboration among stakeholders (Fuller 2002).

In Piriápolis, after the facilitator role was introduced in the first workshop, participants were asked to comment on it during individual interviews. Participants' opinions were all positive, valuing several aspects: its impartial nature, of special relevance when the topic discussed is complex and controversial (such as sea lions); its role of making sure that everybody participates and nobody monopolizes conversations; its task of keeping the discussions focused and the workshop timetable. Moreover, participants associated the respectful dialogue and pleasant environment, a recurrent theme during evaluations (Table 8.2), with the facilitator's role and the rules for good dialogue (Box 4.1), which were explained at the beginning of each workshop. Participants' positive observations about the workshops' facilitation are especially important if we consider that four out of five scientists and one NGO representative had participated in previous meetings with fishers in which the facilitator did not do a good job, leading to chaotic and disrespectful dialogue among participants. As one scientist stated,

“[The facilitator in Piriápolis] was impartial. ‘Well, I’m here, I don’t have an opinion about the topic, I’m just to put order’ [imitating the facilitator], and not ‘I don’t want you to talk longer because that’s not convenient to me’ [imitating an inappropriate facilitator].”

It is worth noting, however, that one of the members of the facilitator team (myself) had done research on sea lion behavioural ecology, knowing the participating scientists from before. After an initial stage in which there was confusion about the purpose of my thesis (some thought that it was about sea lions' impact on the fishery) and my role, I believe that the facilitation of the process was perceived as totally independent. As the process progressed and the group's capacities were strengthened, meetings started to be facilitated by participants.

Managing and resolving conflicts that arise during the participatory research process is another important task of facilitators. Three conflicts in the Piriápolis case were: (1) a disagreement between one scientist and participating fishers after the former stated that investigating sea lions' impact was not in her (academic) interest; (2) the suggestion of the SOS representative to bring live sea lions to the Festival, provoking an argument with fishers and concerns among scientists; and (3) the contact initiated by the Ecópolis representative with WSPA (World Society for the Protection of Animals), without consulting the rest of the group, expressing his concern about sea lions being shot by fishers, which shocked fishers and other participants (except for the SOS representative). The first conflict was not resolved during the workshop but with time, most fishers noticed that the scientist was actually committed to the participatory research initiative. The second conflict was resolved by asking each participant how to include the sea lion topic in the Festival and then reaching a consensus on producing an informative poster. The third conflict was resolved by discussing it respectfully at a workshop: fishers commented that only a few of them shoot sea lions, and that the contact with WSPA should have been initiated only if all participants agreed to do so. The Ecópolis representative explained that he thought WSPA could provide financial support for trying fish traps to avoid sea

lions' impact, but recognized that he should not have contacted WSPA on behalf of the group. It was at this workshop when the rules for a functioning group (Box 4.2) were confirmed.

### ***Collective decision making through deliberation and consensus building***

In participatory research, where problem solving is done collaboratively by all stakeholders, decision making throughout the process must be collective. For this to happen, sharing all participants' perspectives and collectively evaluating the exposed arguments should occur before the final step of making decisions. Similar criteria are found in the literature, such as: the quality of decision making (Blackstock et al. 2007), referring to the establishment and maintenance of agreed standards of decision making; or structured decision making, emphasizing appropriate mechanisms for structuring and displaying the decision-making process (Rowe & Frewer 2000). I consider that transparency on how decisions are made (Rowe & Frewer 2000, Blackstock et al. 2007) is linked to the quality of collective decisions.

While evaluating every workshop in Piriápolis, participants identified positive aspects which relate to this criterion, such as opinions exchange (including differing viewpoints), openness to others' points of view, and getting to common agreements. One fisher pointed out that a workshop was successful because "opinions about everything were exchanged, and then we all agreed." Interestingly, scientists and fishers noted that dialogue became nicer and reaching consensus easier when the second major problem (*pangasius*) started to be addressed, because it was less controversial than sea lions. One scientist explained this as follows:

"I perceived that we were discussing a less controversial topic. We'd have different opinions sometimes, but we were all on the same page. ... There was not this idea of biologists *for* sea lions and fishers *against*. ... It was nicer, and everyone would comment and accept better others' opinions, changing his own perception."

During the final interviews, all participants stated that the opinion of every member of the group had been considered during the participatory research process. Examples given to illustrate this included everything related to the Festival (e.g. posters generation, the proposal by one NGO representative of bringing sea lions), an individual's initiative in contacting the WSPA, the decision of marking sea lions at the port, the creation of the group's logo. As the DINARA manager commented,

"I think all the process is an example [of considering everyone's opinion]... We could talk about that change of objective [we did] when we realized that the long-line fishing season, and the interaction with sea lions which interests fishers the most, had passed. Changing our view to other activities [is an example]; there were people who proposed activities that were taken into account, there were people who didn't but support them."

A methodological consideration deserves a brief mention. When there were time constraints for making decisions through consensus during workshops, the organization team would ask participants their opinion about the pending topics in individual interviews. In the

following workshop, a summary of their responses would be presented and after reaching group agreement, decisions would be made.

### ***Appropriate information management***

Rowe & Frewer (2000) proposed the criterion of resource accessibility for evaluating public participation processes linked to policy-making, including information resources (summaries of the pertinent facts), human resources (e.g. access to scientists), material resources (e.g. overhead projectors/whiteboards), and time resources (participants should have sufficient time to make decisions). In participatory research, fulfilling appropriate information management depends on achieving the participation of the main stakeholder groups in the process, which would make available and share information and knowledge with the rest. This information should be of appropriate quality and quantity to the participatory research needs. First, communication among participants needs to overcome the barriers imposed by jargon and technical terms, and second, information from stakeholder groups should be balanced. If a stakeholder group does not participate in the participatory research process, its arguments should be known and considered by participants. Means of communication among participants (when not face-to-face) should be appropriate to participants' available resources. What I have defined as a single criterion, Blackstock et al. (2007) presented it as two distinct criteria: access to resources (i.e. provision of support to allow participants to engage and meet expectations for their roles) and quality of information.

During individual interviews in Piriápolis, participants appreciated the information that others had shared at workshops. For example, fishers found the presentations done by scientists about sea lions during the first workshop interesting, whereas scientists appreciated getting to know characteristics of the local fishery through fishers. There were times at the first workshop during which scientists would exchange comments among themselves, for example, questioning others' study methods. In spite of the facilitators' effort in asking participants to explain the jargon they used, during individual interviews some fishers stated that they could not understand a few terms used by scientists. Interestingly, differing views were found among fishers regarding information management. For example, one of them was happy that scientists had explained their study methods (i.e. how they got to the data or conclusions they were presenting), whereas another found that unnecessary for the first encounter and too academic. In turn, scientists were not sure if fishers had totally understood what they presented (e.g. one scientist stated that it was difficult to adapt the academic language so that fishers and everyone could understand). On several occasions during workshops, fishers also had to explain their terminology (e.g. long-lines nomenclature) to the rest of participants.

There are at least two examples of information management weaknesses. First, most participants (all except for the scientists involved in the project) could not access the report of a research project funded by DINARA to contribute information for sea lion management. The scientist in charge explained that the group had to wait until DINARA approved the final version of the report.<sup>103</sup> Second, one fisher identified as a negative aspect that other participants lacked information about their local reality:

“The only thing I see as negative is that other stakeholders should have more information [in addition to their good will]. ... The Festival is going to help us, it's positive, but it won't change our way [of selling fish – referring that most fishers sell to fish buyers rather than directly to consumers].”

In terms of communication means, since July 2012, participants started to communicate via e-mail, at the beginning sporadically and later on too frequently (as they stated). E-mail became, then, an additional means for exchanging information that participants found between workshops (e.g. about *pangasius* and fisheries festivals in other countries) and for exchanging opinions (e.g. about the name that the group should have). Most participants valued the use of this technology, except for one fisher and the two NGO representatives, who had limited access to internet and could not follow all e-mail discussions. Three fishers who had no internet access did not complain about it, possibly because they were kept updated by fellow fishers and the organization team. During the final interviews, two scientists identified the different means of communication participants would use (some cell phone, some internet) as a weakness of the participatory research process.

### ***Adaptability through iterative cycles of planning, acting, observing and reflecting***

Participatory research as an iterative process of finding solutions for local problems involves several stages, which can be summarized as follows: planning (e.g. identifying the problem, defining research questions); acting and observing (e.g. defining the study methods, collecting data and information, analyzing); and reflecting. These stages, which Kemmis & McTaggart (2005) conceptualized as part of a spiral of self-reflective cycles, should be guiding principles rather than strict steps to take. In fact, they argued that these stages overlap (Kemmis & McTaggart 2005). Very importantly, adaptability needs to be present during the entire process: both the facilitator and participants should be open to new topics and research questions which may arise while reflecting on actions already taken. Although they might go off the starting point, these new topics can be of interest to all participants, something that should be ensured.

Adaptability is evident in POPA's process since the beginning of the participatory research process. Already in the second workshop, stakeholders who had been reunited to

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<sup>103</sup> In October 2012, POPA still cannot have access to the report of this project which took place in 2009-2010.

address the sea lion problem in the fishery together, started to address a second problem (*pangasius*), initially seen as unrelated to the former. Participants' perceptions about this transition varied among stakeholder groups. Fishers stated that the second problem was more important than the first one, although they added that the group should not leave the sea lion problem unattended. Scientists appreciated the transition towards *pangasius* and the Festival for two main reasons: (i) It would unite the group because the topic is less controversial (one scientist explained that fishers would realize that biologists are not only interested in sea lions). (ii) If fishers got to sell more fish to consumers and/or at a better price (i.e. getting a better income), they would perceive the sea lion problem as less marked (or less important). In other words, economic losses due to sea lions would be counteracted. For his part, the DINARA manager was not much concerned about the topics being addressed but about the process itself, which would build trust among participants. Finally, addressing the second problem was perceived by NGO representatives as an opportunity to contribute to improving fishers' quality of life, with the ultimate goal, according to one of them, of decreasing the conflict with sea lions (following the same train of thought as scientists).

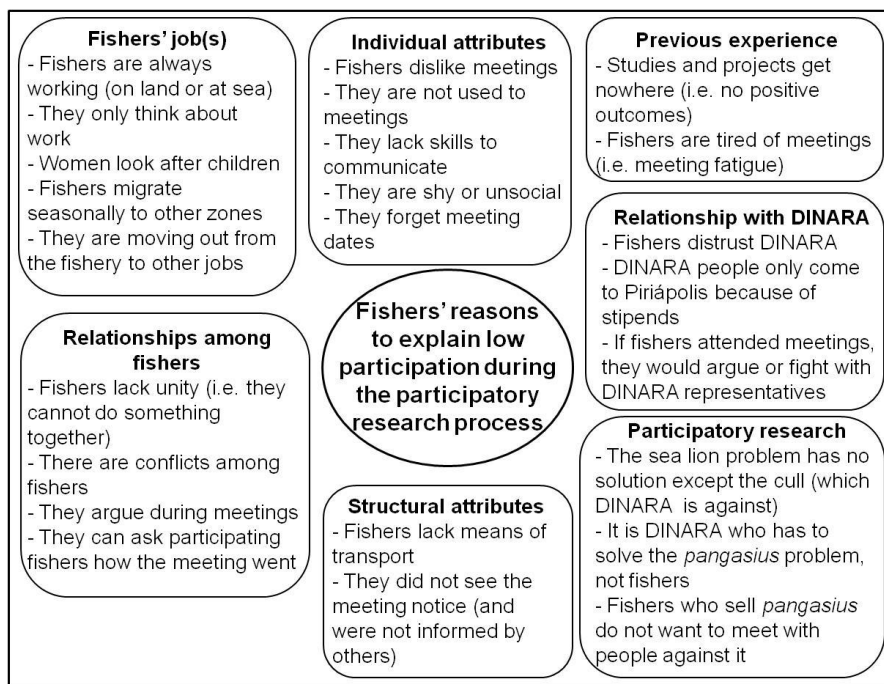
### ***Cost-effectiveness of the process***

Understanding the ratio between all possible costs of participatory research processes (e.g. economic costs, time, effort) and the process' effectiveness (e.g. perceived benefits, successful actions) is crucial for their applicability and replicability. Blackstock et al. (2007) referred to this criterion as the improvements created through the process in relation to the costs accrued, whereas Rowe & Frewer (2000) defined cost-effectiveness based only on economic costs. I argue that it is important to consider, as well, the personal evaluation (or weighing) of efforts and benefits that participants do to decide whether to participate in the process. In other words, what are participants (and their respective organizations) willing to sacrifice for which achievements? Understanding stakeholders' evaluation of the cost-effectiveness ratio can be useful for the organization team when trying to fulfill other criteria (e.g. stakeholder diversity and participants' representativeness). Moreover, the support that the organizations being represented are willing to provide, such as financial resources, human resources and infrastructure (i.e. costs), will likely affect the intended participatory research.

Even though this criterion was not purposefully evaluated in Piriápolis, some observations can be made. All participants sacrificed time to participate (e.g. time with their families, time for their jobs). Scientists and the manager would come from Montevideo for workshops (3 hour-round trip). Sometimes fishers would come to workshops tired after fishing trips, sacrificing sleeping time, and occasionally they would sacrifice a fishing trip. As one fisher stated,

“If I have to give up setting my gear once a month, I do it, no problem. I won’t be neither richer nor poorer. I’ve always thought that having participation was good, and once there is [a participation opportunity], I won’t miss it.”

In addition to the manager’s time, DINARA provided financial support to the Festival by printing 5,000 brochures. Except for one biologist and one fisher who participated in the first workshop and then gave up because of lack of time, the rest kept participating, becoming part of POPA. During the final interviews, the formation of the group (POPA) was a frequent response given by participants of the four stakeholder groups to explain what had motivated them to continue participating. They highlighted the commitment and motivation of other group members, the diversity of stakeholders, and the respectful dialogue among them. Nevertheless, some participants sacrificed more than others for the group, and that individuals’ dedication fluctuated over time (as expected). An example of the latter comes from one NGO representative, who at one workshop stated that he was ready to give up the group because the sea lion topic was being left unattended. When he noticed that the group was still interested in working on that topic, he resumed his dedication to the group (although minimally, as the rest perceived). Likewise, the cost-effectiveness criterion helps understand fishers’ low participation. POPA fishers explained that one of the reasons why others were not interested in the participatory research initiative was that they did not perceive any direct benefit from participating. Numerous other reasons were provided by POPA fishers and non-participants to argue why there was low participation in workshops/meetings and/or why the latter did not participate (Figure 8.1).



**Figure 8.1. Fishers’ reasons for low participation during the participatory research initiative in Piriápolis.** Data come from informal conversations with 31 non-participating fishers. Most of the reasons shown in the figure were also given by participating fishers to explain why others did not participate.



As the figure shows, some of the reasons for not participating had to do with fishers' job(s), individual attributes, unsuccessful projects in Piriápolis, and conflict-laden relationships with DINARA or between fishers. Undoubtedly, it was a combination of these reasons which led many fishers not to participate.

## **8.2.2. Evaluating participatory research through Outcomes criteria**

### ***Achievement of objectives***

The achievement of objectives at the level of individuals, stakeholder groups, and ideally of the formed group, is a key aspect to evaluating participatory research initiatives. This can be a determining factor for stakeholders' continuing participation and commitment to the process. Moreover, considering that the development of shared vision and goals is expected during participatory research (an evaluation criterion by Blackstock et al. 2007), which can be enhanced by the role of an independent facilitator, the relationship between individual and group objectives should be evaluated as the process progresses.

In Piriápolis, during the final interviews several participants noticed that stakeholders' interests changed from being individual to being collective. One scientist's quote illustrates this: "I think that each participant entered [the participatory research] because of a personal interest. ... Later on, I think that for everybody the group had more weight than the personal interests [except for a NGO representative]." Some participants were surprised with this change because they thought it would not be possible to integrate everybody's interest, whereas others were expecting this shared group vision to arise. Very importantly, all participants stated that their personal objectives had been integrated into the group objectives. Nevertheless, one of the group objectives, to study the sea lion impact on long-lines, was not accomplished. Conversely, almost all participants agreed that the objective of promoting artisanal fisheries through the Festival was noticeably achieved, although two fishers stated that the *pangasius* problem should have been addressed more explicitly (e.g. informing Festival's visitors how to distinguish this species from local fish). Even though one group objective was not accomplished, participants highlighted additional achievements, as will be shown in the next criterion.

### ***Outcomes and process perceived as successful***

In addition to evaluating the degree to which objectives have been achieved, it is important to evaluate how participants value other outcomes of the participatory research process. These will also affect participants' continuity. As a related criterion, Blackstock et al. (2007) defined ownership of outcomes, referring to whether there is an enduring and widely

supported outcome. Furthermore, considering that participatory research success depends on the progress of the process (e.g. Kemmis & McTaggart 2005), participants' evaluation of the process (not just of the outcomes) is also needed.

When asked about participatory research success during the final interviews in Piriápolis, participants identified elements of success related to the outcomes and to the process itself. First, participants of the four stakeholder groups referred to the Festival as a main accomplishment of the group, for several reasons: many people attended; artisanal fisheries were called to the attention of the public and different organizations; and it enhanced fishers' unity and increased fishers' self-esteem. Moreover, this accomplishment was perceived to have strengthened the group, which is now more ready to investigate the initial topic (sea lions). However, not studying sea lions' impact made the participatory research not fully successfully. Second, as additional successful elements of the participatory research process, participants highlighted the honest and respectful dialogue, as well as the group continuity throughout several months (with a defined direction between the two topics). Similarly, group cohesion, trust, respect, honesty and tolerance, together with a closer relationship between fishers and other stakeholders (scientists, government, NGOs) were the main strengths of the process, according to participants. On the other hand, the main weaknesses, as they stated, were the low number of participating fishers, the difficulty of all participants' attending workshops, and the obstacles when dividing tasks, among others.

### ***Co-production of knowledge***

This criterion refers to the epistemological foundation of participatory research. Involving stakeholders in all the research stages, from the very beginning, helps to create a climate favourable to address and solve local concerns and problems. This is about the substantive argument proposed by Fiorino (1990): participation is advocated because the contribution, vision, opinion and knowledge of the public (or lay citizens) are useful for achieving a better understanding of environmental problems (e.g. "non-experts" see issues that experts miss). Therefore, one of the expected outcomes of participatory research is new knowledge which will have been co-produced by the encounter of a diversity of stakeholders and their perspectives. Blackstock's et al. (2007) criterion of emergent knowledge referred to the influence of local knowledge on the outcomes of the research. I consider, however, that evaluating knowledge co-production means analyzing the knowledge that has been produced from the convergence of all stakeholders (without main characters).

During the final interviews in Piriápolis, all participants recognized that co-production of knowledge took place. They gave examples of new approaches or strategies generated by the group, such as: (i) the process of collective production of the data collection protocol in the sea

lion study; (ii) approaching the sea lion problem considering its connection to additional fishery problems, such as *pangasius* imports and the relationship between fishers and fish buyers; (iii) the First Artisanal Fisheries Festival as an strategy to promote artisanal fish consumption and fishers' valorization; and most importantly, (iv) participatory research as an approach to address a problem, working in a group with a common goal, respecting other stakeholders' opinions, and learning from each other. Furthermore, all except one participant (a fisher) stated that there were situations in which local and scientific knowledge were integrated. Examples of these situations included the collective production of the data collection protocol, the poster about sea lions, brochures, and captions for the photo exhibition during the Festival. However, one fisher explained that both forms of knowledge did not integrate at all, for example, the topics of disagreement were avoided in the brochures and poster:

"I don't know if [local and scientific knowledge] got to integrate. They haven't mixed too much yet. I think that's for the next stage [data collection of the sea lion study]. ... I think that everybody's knowledge have not integrated at all. In the sea lion topic, one says something, another says something else. 'Don't put that in the brochure [poster] because fishers say that' and 'don't put something else because scientists say a different thing'. Somehow we got to [contents] that don't [annoy] anybody."

A topic on which scientists and fishers still differed (when generating materials for the Festival) was the quantity of fish that sea lions eat a day. During a workshop, scientists and fishers agreed on the information that the poster would contain in that regard: "It is estimated that the daily food requirement of this species [sea lions] is between 6 and 12 kg, although fishers state that this figure is higher." It is noticeable that fishers' knowledge has less weight than scientists' in this sentence. It could have been worse, though. During initial e-mail exchanges when producing the poster, one scientist had suggested saying "Sea lions eat between 6 and 12 kg per day but fishers perceive that they eat more". Nevertheless, another scientist disagreed with this and made two interesting comments: (1) it is yet not known how much sea lions eat per day; 6-12 kg is just the estimated daily food requirement (given the animals' weight and other characteristics of the species); and (2) by saying "fishers perceive...", their knowledge has less validity, so this term should not be used.

### ***Learning***

In addition to the new knowledge which contributes to understanding or solving a local problem, learning among participants is another key aspect of participatory research. Learning can be analyzed from many lenses. Two criteria proposed by Blackstock et al. (2007) fit my criterion: capacity building (i.e. developing relationships and skills to enable participants to take part in future processes or projects), and social learning, referring to the way that collaboration

has changed individual values and behaviour, influencing in turn collective culture and norms.<sup>104</sup> The learning criterion I propose comprises all of these aspects and includes learning about the problems addressed given the interaction of different viewpoints and knowledge. The complexities and uncertainties of managing environmental problems highlight the need for stakeholders' learning and adaptation. Thus, social or collaborative learning should be considered not only as a valuable by-product of participation but also as a goal in itself (Lázaro 2009).

During the final interviews in Piriápolis, all participants stated that they had learned throughout the participatory research process (see Section 8.3.5 about participants' learning). Learning varied among stakeholder groups. For instance, fishers learned to listen to others (who might think differently), to relate with other people, and the importance of integrating knowledge. Scientists stated that they learned the participatory research methodology, the importance of fishers' and other stakeholders' inclusion, and to communicate more carefully (e.g. with fishers) about a controversial topic such as sea lions. NGO representatives stated that they learned how to carry out a discussion (or debate) in an organized way, by means of a facilitator, and to prioritize the group interest over the individual. For his part, the DINARA manager pointed out that he learned to participate:

“The main learning is to participate... Many times one is not used to meetings... with people DINARA sees as the opponents [the fishers]. Participation is something that is to be learned and practiced. As you practice it, it gets easier, and you feel more comfortable, which in turn creates more participation.”

### ***Strengthened social networks***

Another expected outcome of participatory research is improved relationships among stakeholders and the establishment of new connections, in other words, strengthened social networks. Blackstock et al. (2007) referred to the relationships criterion to evaluate issues of social capital by analyzing existing and new social networks (developed during the process), including relationships of trust, reciprocity and collaboration. This criterion can also be linked to the capacity of institutionalizing collaborative practices for natural resources management.

During the participatory research case in Piriápolis, new relationships were built between participants from the four stakeholder groups. Moreover, the majority of existing relationships improved and trust among participants increased over time (see Section 8.3.3 about social capital building during participatory research). The multi-stakeholder group that was formed can be perceived as the result of the consolidation of participants' relationships, working together for common goals. The challenge of this institution's continuity will be discussed in Section 8.4.

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<sup>104</sup> Curiously, Rowe & Frewer (2000) did not initially include learning in their evaluation criteria, but added it later (Rowe et al. 2004) when participants highlighted learning when evaluating a participatory process.

## **Conflict resolution**

Related to social networks, another criterion to evaluate participatory research is with regards to its capacity to resolve conflicts between stakeholder groups. This criterion, found in Blackstock et al. (2007) and Stephens & Berner (2011), refers to conflict abatement among participants and the way in which conflicts were resolved. Moreover, it should be considered how this conflict resolution extends to other stakeholders who have not been involved in the participatory research process.

Three main conflicts were present at the beginning of the participatory research in Piriápolis: (1) between fishers and DINARA, for instance because fishers perceive that resource management is not appropriate; (2) between fishers and scientists, because fishers see scientists as the sea lion protectors and scientists see them as the “villains of the drama”, killing sea lions; (3) between fishers and the conservation-oriented NGO (same as the conflict fishers-scientists). These three conflicts were allayed to some degree during the participatory research process. First, the conflict between fishers and DINARA had a turning point during the Artisanal Fisheries Festival and its organization process, when fishers noticed that the manager was very committed to this group activity (e.g. he stayed in Piriápolis for five days, working full-time). Second, the conflict between fishers and scientists was allayed when the group started to work on the second problem (*pangasius*). It is uncertain, however, if the conflict between these two parties is only dormant and will be evident again when the sea lion study is resumed. Finally, the conflict between fishers and the NGO was minimized or at least managed. For example, fishers who had initially stated that they could not exchange a word with the NGO representative because of their opposing interests got to work with him and be part of the same group.

Nevertheless, most participants recognized that the change in their relationships with people in the group had not influenced their opinion about the organization they belong to, arguing that they cannot judge the organization based on a person. For example, except for four participants (two fishers, one scientist, one NGO) who stated that their opinion about DINARA did change in a positive way, the rest replied negatively. One fisher's quote illustrates the latter:

“It didn't change. My relationship with [manager's name] changed because as a fisher I was more in touch with him. But with DINARA, I don't know. This is not to say that he doesn't represent DINARA; on the contrary, he has weight within DINARA. ... But in its basis, [DINARA] didn't change. In fact, DINARA could have done lots of things about *pangasius* and it doesn't because it's not willing.”

He added that DINARA's director did not allow POPA to talk about *pangasius* on the brochures being produced for the Festival. This situation (at the end of 2011) made re-emerge the conflict between fishers and DINARA. The findings about stakeholders not changing their opinion about participating organizations are not surprising if we consider that one organization's goals, structure and functioning do not depend on one representative. In fact, previous studies in

natural resources management found that community members differentiate their trust in government agencies from their trust in agency personnel (e.g. Leahy & Anderson 2010).

### ***Legitimacy***

One advantage of participatory research, if process criteria are met, is that its outcomes will be legitimate to all participating stakeholders. Legitimacy can be evaluated both at the internal level (i.e. participants) and the external level (non-participants from the same stakeholder groups and others). Legitimacy, as argued by Blackstock et al. (2007), refers to whether the outcomes and process are accepted and seen as valid by stakeholders (criterion also found in Stephens & Berner 2011).

First, the participatory research process in Piriápolis seems to have been validated by participants. During the final interviews, they considered appropriate to promote this approach to address environmental problems (see Section 8.2.4). Second, the study that the group intended to carry out about sea lion impact did not get to the data collection phase, and thus, it is unknown whether its findings would be legitimate to all. However, some observations can be made. All the participating biologists had had previous experiences in which fishers would not believe in their study findings, and thus, one of the characteristics of participatory research they most highlighted was that fishers would accept the results after having participated in all the stages. Moreover, when talking about previous experiences, biologists would comment that fishers usually overstate figures (e.g. number of sea lions feeding from their gear), a reason why biologists could not trust them. When the group was defining the methodology to study sea lion impact, in individual interviews biologists stated that they would only trust the data collected by fishers they knew from before and participating fishers. One scientist stated that:

“If [fishers] are committed and they participate in workshops when the study is planned, I believe that they’ll collect the data properly because it’s something collective. But I don’t know if the others [i.e. non-participating fishers] will do it too.”

The link between findings legitimacy and participants’ relationships arose several times in scientists’ discourse. Regarding the second action taken by the group, there are some indications that the Festival was seen as valid, not only by the group, but also by non-participating fishers. During the Festival, fishers who had not participated in the process offered help to the organization, and after the event, other fishers made positive comments about it. Even one fisher who had not participated in the process because he sells *pangasius* at his fish market was very happy with the Festival; he was surprised that it was for artisanal fisheries and not against *pangasius*. External legitimacy of the process and its outcomes (in the Piriápolis fishing community, DINARA and other government agencies, University, NGOs) is yet to be investigated.

### ***Influence and impacts of the results***

Considering that participatory research results should have real impact on the political decisions made regarding the topics and problems addressed, this needs to be evaluated, as proposed by Rowe & Frewer (2000) for public participation mechanisms in policy decision making. This is particularly important given that one of the main problems of participatory processes is that they are perceived as a means to legitimate decisions or as an apparent consultation (which in fact is not considered when making decisions), creating skepticism among the public (Fiorino 1990). Throughout a participatory research process, participants influence internal decision-making (within the group), which can be evaluated under process criteria (i.e. collective decision-making). However, the capacity to influence additional stakeholders who have not participated is a key factor for its legitimacy and sustainability. This is part of the Opportunity to influence criterion by Blackstock et al. (2007), and also related to Recognized impacts, referring to whether participants perceive that change occur as a result of the participatory process. The potential of a participatory research initiative to influence government decision making will likely depend on the country's context or experience in participatory mechanisms. In the long term, it could be evaluated whether the decisions made with the input from participatory research improved in quality (Stephens & Berner 2011). Under this criterion, the influence and impacts of participatory research in the rest of the community and/or broader society can be of interest.

In Piriápolis, this criterion should be evaluated when a certain period of time after achieving results has elapsed. However, during the final interviews participants stated that they expected the participatory research to impact on DINARA, fishers, scientists, and the broader society. First, the impacts that participating fishers, scientists and NGO representatives expect on DINARA include: increased interest in artisanal fishers and increased support for this sector; fisher participation in addressing problems and making decisions; solutions or alternatives to the two problems addressed (sea lions and *pangasius*), taking into consideration the group's inputs. Second, the impacts that participants from the four stakeholder groups expect on fishers include an increased and continuous participation in the participatory research initiative (e.g. after having perceived the group's accomplishments); increased support, recognition and strength before government agencies by being organized in a group with other stakeholders; improved socio-economic conditions, and minimized losses caused by sea lions. Lastly, participants expect that other scientists can develop this approach (participatory research), and that the society increases its knowledge about artisanal fisheries, consuming more local fish, among others. It is worth noting that participants stated that some impacts were already achieved through the Festival because this was a successful event of which the society, Municipal Government, DINARA and other fishers participated.

### **8.2.3. Summarizing the evaluation of the participatory research initiative**

Seventeen evaluation criteria were applied to the participatory research case, 8 of which can be considered as fully achieved and 7 as partially achieved, whereas the remaining two were not evaluated in detail (Tables 8.3 and 8.4). The differences in perceptions observed among participants in Piriápolis confirm that the selection of criteria is important, but it is also important how participants construct these criteria, illustrating the subjective nature of evaluating participatory research (Blackstock et al. 2007). Even though the criteria were categorized under Process or Outcomes, some outcomes criteria (e.g. learning, co-production of knowledge, strengthened social networks) can be evaluated throughout the process. In fact, Blackstock et al. (2007) suggested that, depending on the purpose of the evaluation, the same criteria could be used to measure both process and outcome (e.g. in a formative evaluation, capacity building can be a process criterion, whereas in an ex post evaluation it can be an outcomes criterion).

As Tables 8.3 and 8.4 show, a high proportion of criteria were achieved. This could be partly related to the fact that most process criteria (all except for cost-effectiveness) were used as guidelines by the organization/facilitator team. In spite of this, not all criteria could be achieved to the maximum degree: not all invited stakeholders decided to participate; DINARA's representativeness was confusing; and there was information that participants could not access. These are examples of constraints faced during the participatory research initiative which did not depend on the abilities of the organization/facilitator team.

The next section looks at the arguments given by participants of the four stakeholder groups to advocate for participatory research to address environmental problems. It also analyzes the advantages and disadvantages of this approach to research, contributing to the understanding of some challenges and opportunities for widening its use.



**Table 8.3.** Process criteria to evaluate participatory research and degree of achievement in the Piriápolis case

Evaluation criteria	Related (or same) criteria found in the literature	Degree of achievement in Piriápolis	Data sources
1.1. Problem or topic to be addressed of key interest to local and additional stakeholders	(New criterion)	<i>Fully achieved</i> The two topics (sea lions and <i>pangasius</i> ) were of interest to artisanal fishers, scientists, DINARA and NGOs.	What do you think about investigating sea lions' impact on long-lines? What do you think about doing a festival and other communication activities to promote artisanal fisheries as opposed to <i>pangasius</i> ?
1.2. Participation of all stakeholder groups in the selected problem/topic (Stakeholder diversity)	Representation (Blackstock et al. 2007; Stephens & Berner 2011)	<i>Partially achieved</i> Fishers, DINARA's Artisanal Fisheries Unit, University scientists and NGOs, participated. Additional stakeholders (e.g. DINARA's Marine Mammals Department, Coast Guard, Port Authority, Local Government) should have participated.	Do you think that other persons or institutions, government or non-government, should have been present in this participatory research? Who/Which and Why?
1.3. Participants' representativeness	Representativeness (Rowe & Frewer 2000) Representation (Blackstock et al. 2007; Stephens & Berner 2011)	<i>Partially achieved</i> Low fisher participation was frequently mentioned by all stakeholder groups, but some participating fishers behaved as representatives of the rest. Even though DINARA was formally invited to this participatory research, the manager was not clear about his role as representative.	Data from fieldnotes and interview questions about workshops' success
1.4. Involvement of all stakeholder groups in every research stage	Early involvement (Rowe & Frewer 2000)	<i>Fully achieved</i> The actions taken to address the two topics were all done collectively (e.g. generation of the protocol to study sea lions' impact; organization, development, and evaluation of the Artisanal Fisheries Festival), which was valued by participants.	What do you think about the protocol that was created collectively? How important was for you to define jointly the study methods?

<b>Evaluation criteria</b>	<b>Related (or same) criteria found in the literature</b>	<b>Degree of achievement in Piriápolis</b>	<b>Data sources</b>
1.5. Independent facilitation	Independence (Rowe & Frewer 2000)	<i>Fully achieved</i> The facilitation team was not involved in the topics addressed, and participants appreciated the role of the facilitators.	What do you think about the workshop's facilitation?
1.6. Collective decision making through deliberation and consensus building	Quality of decision-making (Blackstock et al. 2007) Structured decision-making (Rowe & Frewer 2000) Transparency (Rowe & Frewer 2000; Blackstock et al. 2007)	<i>Fully achieved</i> The facilitation team ensured that participants exchanged opinions and made decisions through consensus.	Do you think that the opinion of every member of the group, including yours, was considered (or listened to) throughout this participatory research process? Which situations would you give as examples?
1.7. Appropriate information management	Access to resources (Blackstock et al. 2007) Quality of information (Blackstock et al. 2007) Resource accessibility (Rowe & Frewer 2000)	<i>Partially achieved</i> Participants valued sharing information among them. Access to some information was restricted. The different means of communication participants would use was a weakness (e.g. not all participants could use internet).	What do you think about the information shared by fishers / scientists in the workshop?
1.8. Adaptability through iterative cycles of planning, acting, observing and reflecting	(New criterion)	<i>Fully achieved</i> Stakeholders who had been initially reunited to address the sea lion problem soon started to address the market competition from imported <i>pangasius</i> . Participants valued this transition.	Data from fieldnotes and interview questions about participants' interest in addressing each of the two topics
1.9. Cost-effectiveness of the process	Cost-effectiveness (Rowe & Frewer 2000; Blackstock et al. 2007; Stephens & Berner 2011)	<i>Not evaluated in detail</i> (The process seemed cost-effective for participating stakeholders but not so for non-participating fishers).	(*)

(\*) Suggested interview questions to evaluate this criterion: What are you sacrificing (e.g. time, effort, financial resources) to participate in this process? What benefits do you perceive from participating? What is the ratio between the two (i.e. costs and benefits)?

**Table 8.4.** Outcomes criteria to evaluate participatory research and degree of achievement in the Piriápolis case

<b>Evaluation criteria</b>	<b>Related (or same) criteria found in the literature</b>	<b>Degree of achievement in Piriápolis</b>	<b>Interview questions</b>
2.1. Achievement of objectives	Develop a shared vision and goals (Blackstock et al. 2007)	<i>Partially achieved</i> The objective of promoting artisanal fisheries through the Festival was noticeably achieved, but not so the objective of studying sea lions' impact.	Do you think that in this participatory research the group and individual objectives were achieved? Which ones?
2.2. Outcomes and process perceived as successful	Ownership of outcomes (Blackstock et al. 2007)	<i>Partially achieved</i> The Festival was evaluated successfully and perceived as the main accomplishment of the group. Honesty, respect and group cohesion were successful elements and strengths of the process. Sea lions' impact was not studied. Fisher participation during the process was low.	Do you think that the participatory research conducted by POPA has been successful? Why? What do you think were the strengths and weaknesses of the participatory research process?
2.3. Co-production of knowledge	Emergent knowledge (Blackstock et al. 2007)	<i>Fully achieved</i> New approaches and strategies were generated by the group (e.g. the process of collective generation of the data collection protocol in the sea lion study; the First Artisanal Fisheries Festival). The data collection protocol was also an example of a situation in which local and scientific knowledge were integrated.	Do you think that new approaches, strategies and/or knowledge have been generated by the group? Which and How? Do you think that there were situations in which scientific knowledge and fishers' knowledge were integrated? Which situations?
2.4. Learning	Capacity building (Blackstock et al. 2007) Learning (Stephens & Berner 2011) Social learning (Blackstock et al. 2007)	<i>Fully achieved</i> Participants learned about participatory research and the topics addressed, participation skills, among others.	Do you think that you have learned during this participatory research process? Could you give us examples of the learning you have had?

Evaluation criteria	Related (or same) criteria found in the literature	Degree of achievement in Piriápolis	Data sources
2.5. Strengthened social networks among participants	Relationships (Blackstock et al. 2007)	<i>Fully achieved</i> New relationships were built between the four stakeholder groups, and existing relationships improved.	Reflecting on how your relationships with other group members have been evolving throughout the participatory research process: With whom have your relationships improved / worsened / or not changed?
2.6. Conflict resolution	Conflict resolution (Blackstock et al. 2007) Reduction of conflicts (Stephens & Berner 2011)	<i>Partially achieved</i> The existing conflicts among stakeholder groups (fishers-DINARA, fishers-scientists, fishers-NGO) were partially allayed by working together, but in most case participants' opinion about the respective organization did not change.	In which way has the change in your relationships with or trust in people of the group influenced your opinion about the institution they belong to? Why?
2.7. Legitimacy	Legitimacy (Blackstock et al. 2007; Stephens & Berner 2011)	<i>Partially achieved</i> Internal legitimacy of the process (participatory research as an approach to address environmental problems) and of the outcomes (the Festival) was achieved. External legitimacy is yet uncertain.	Do you think it is appropriate to promote participatory research to address problems originating from the interaction between environment and society? Why?
2.8. Influence and impacts of the results	Influence (Rowe & Frewer 2000) Opportunity to influence (Blackstock et al. 2007) Quality of decisions (Stephens & Berner 2011) Recognized impacts (Blackstock et al. 2007)	<i>Too early to be evaluated</i> Participants expect the participatory research to impact on DINARA, fishers, scientists, and the broader society. Some Festival's impacts were already perceived because of the success of this event.	(**)  (Only expected impacts were evaluated: Whom do you expect this participatory research to impact? Which impacts in particular?)

(\*\*) Suggested interview questions to evaluate this criterion (after some time has elapsed since participatory research results were achieved): Whom do you think the results from this participatory research have impacted? Which impacts have you noticed? Which of the expectations that you had (in terms of impacts from this participatory research) were fulfilled and which were not?

#### 8.2.4. Applicability of participatory research

Most participants stated that it is appropriate to promote participatory research to address problems originating from the interaction between environment and society (from now on, “environmental problems”), whereas four participants considered that it would be so only in certain cases (see below). The three arguments to advocate for citizen participation – normative, substantive, and instrumental (Fiorino 1990, Blackstock et al. 2007) arose in participants’ responses (Table 8.5).

**Table 8.5.** Arguments to advocate for participatory research to address environmental problems (Q3; n=15 interviewees, POPA members)

Argument	Fishers	Scientists	DINARA	NGOs
<b>Normative</b> Citizens are the best judge of their own interests, and thus, they should participate in decisions that affect them (Fiorino 1990). Encouraging social and individual learning enriches both society and individual citizens (Blackstock et al. 2007).	√			√
<b>Substantive</b> Public judgments are as sound as or more so than those of experts (e.g. “non-experts” see problems and solutions that experts miss) (Fiorino 1990). Encouraging multiple perspectives improves understanding of the issues, and thus, the selection of appropriate solutions (Blackstock et al. 2007).	√	√	√	√
<b>Instrumental</b> Effective participation makes decisions more legitimate and leads to better results (Fiorino 1990). Encouraging collaborative relationships assists with implementation and with defusing conflict (Blackstock et al. 2007).	√	√		

The substantive argument was common to participants from the four stakeholder groups, emphasizing the importance of multiple understandings, perspectives and judgements. For instance, one fisher argued that participatory research should be promoted to address environmental problems “because everyone participates, [including] scientists and the people who have the problem, looking at it from different eyes. You’ll achieve something, you’ll sort out something that maybe a scientist alone cannot”. The substantive argument is also supported by two characteristics mentioned by participants from three or four stakeholder groups when they were asked to define participatory research (Table 8.6): (i) different stakeholders related to the problem/topic participate, and (ii) each participant contributes with his knowledge. Similarly, two advantages of participatory research mentioned by both fishers and scientists are compatible with the substantive argument (Table 8.7): it is more comprehensive than conventional research because the problem is understood from the viewpoints of all participants, and everyone’s knowledge and opinion contribute to the research.

**Table 8.6.** How did participants define Participatory Research? (Q1B; n=15 interviewees, POPA members) (\*)

	Fishers	Scientists	DINARA	NGOs
<b>Process characteristics</b>				
A societal (or community) problem is addressed.		√		
Different stakeholders related to the problem/topic (which is of interest to all) participate.	√	√	√	√
All stakeholders participate in every stage of the process.		√		
Different opinions are considered.	√			
Each participant contributes with his knowledge.	√	√		√
It takes place in a nice and respectful environment.				√
<b>Outcomes characteristics</b>				
Participants learn from each other.	√			√
All participants accept the results better.		√		
The truth of what is being studied is found.	√			

(\*) Note: the characteristics identified by participants are presented under the same categories as evaluation criteria - Process and Outcomes).

The instrumental argument was particularly frequent in scientists' discourse (although it was also mentioned by one fisher). Scientists argued that participatory research should be promoted to address environmental problems basically because by participating, citizens become more involved in the problem and the research process, and they will later comply with the new policies:

“It's the society which is directly influencing [or creating] environmental impacts. So, if [lay citizens] participate [in research], they'll become more involved in the topic being addressed. Also, they can discuss it [with scientists], without creating enmities between scientists and society.” (Scientist)

The instrumental argument is related to two advantages of participatory research identified both by fishers and scientists (Table 8.7); first, that results are valid to all participants, and second, that government agencies will consider the results (after having participated). However, fishers' and scientists' viewpoints regarding results' validity differed. Scientists argued that valid results are only those coming from an objective and systematic scientific process, whereas fishers considered that the cooperative process of doing research (in which they would participate) leads to data more similar to the truth or reality.

The normative argument was the least frequently observed when participants were asked whether it was appropriate to promote participatory research to address environmental problems. As one NGO representative pointed out, “Yes, I think it's very positive, [because] it gives the opportunity for lay people to meet with academics and then together try to look for solutions to the topic being addressed.”

Lastly, two fishers and two scientists expressed that it would only be appropriate in certain cases to promote participatory research to address environmental problems. One scientist stated that “there are more technical topics which should be addressed from a more

scientific perspective, although it could be accompanied by participatory research”. The second scientist explained that local stakeholder participation in research would be needed when they are directly involved in the topic, in which case the longer timeline of the participatory research process will be offset by the benefits from participation (e.g. legitimate decisions). Two disadvantages of participatory research can be observed in these scientists’ opinions: less scientific rigour and longer timelines. In fact, it was mainly scientists who identified the disadvantages of this approach (Table 8.7).

**Table 8.7.** Advantages and disadvantages of participatory research, compared to conventional, expert-driven research (Q2B; n=12 interviewees, POPA members) (\*)

	<b>Fishers</b>	<b>Scientists</b>
<b>Advantages</b>		
A societal problem is addressed (instead of the study being dissociated from real life).		√
It is more comprehensive because the problem is understood from the viewpoints of all participants.	√	√
Everyone’s knowledge and opinions contribute to the research.	√	√
Data are collected objectively.	√	
Mistakes are better corrected collectively.	√	
Participants learn from one another.	√	
Results are valid to all participants.	√	√
Government agencies will consider the results (after having participated).	√	√
<b>Disadvantages</b>		
It has less scientific rigour.		√
Research questions might not be of scientific interest.		√
Research questions might be more difficult to answer, and an adaptive methodology might be needed.		√
It takes longer, and these longer timelines might not be considered by donor agencies.		√
Results might be detrimental to local stakeholders.	√	

(\*) Only fishers’ and scientists’ responses are shown in this table because the manager stated that participatory and conventional research are complementary, and the NGO representatives did not identify advantages or disadvantages.

The arguments of the two fishers who stated that participatory research would be appropriate only in certain cases were different to scientists’ and among themselves. One fisher argued that participatory research should be implemented when scientists considered it useful because it is they who promote research projects, which suggests that fishers do not imagine themselves initiating such a project. The second fisher referred to two challenges of participatory processes, inter-personal dialogue and low participation: “The problem is that [participatory research] means that several people will be trying to dialogue. ... And also, if we’re dealing with the environment, there is a lot to do but we’re only few.” Similarly, DINARA manager had stated that participatory research is more complex than conventional research because it involves establishing relationships among stakeholders and looking for common goals.

### 8.3. PARTICIPATORY RESEARCH FOR ADAPTIVE CO-MANAGEMENT

This section is about facilitating progress towards adaptive co-management through participatory research.<sup>105</sup> I argue that participatory research involving Uruguay artisanal fishers, government and other stakeholders can be a key stimulus towards co-management. I build this argument by considering “seven faces” by which co-management can be analyzed: (1) as power sharing, (2) as institution building, (3) as social capital building, (4) as process, (5) as social learning and knowledge co-production, (6) as problem solving, and (7) as governance (Berkes 2007b, 2009c). In what follows, each of these faces is analyzed in a sub-section. Two faces (3 and 5) are addressed in more detail because the contributions of participatory research to social capital building and social learning were main interests of my dissertation. Before the chapter discussion, there is a brief sub-section about the elements that participants identified as lacking for fisheries co-management in Piriápolis.

#### 8.3.1. Participatory research and co-management as power sharing

It is generally agreed that mere consultation is not co-management (Pinkerton 2003) and therefore co-management requires some degree of power and responsibility sharing between government agencies and resource users. In the early concept of co-management, power sharing was regarded as the starting point of the process and a target. However, power sharing should perhaps best be seen as an outcome rather than a starting point (Carlsson & Berkes 2005). As Borrini-Feyerabend et al. (2004, p.175) argued, “participatory management needs participatory roots’, i.e., some measure of effective dialogue, discussion of issues and participatory democracy ...” Participatory research could be part of the participatory roots needed for co-management, given that it involves power sharing for decisions, from defining the research question to deciding on the dissemination of findings. Thus, the exercise of sharing power amongst stakeholders during participatory research is likely important for future power sharing in management.

As shown in Section 8.2.1, all participants considered that the opinion of every member of the group had been considered during participatory research (Q7A). Moreover, all participants replied affirmatively when asked if it was important to consider everyone’s opinions and interests equally within the group (Q7D). As one fisher explained,

“It is the way things are done in a group, everyone has to participate. And opinions are respected equally... I didn’t see any [participant] more [important] than any other, despite one being from DINARA for example... We’d discuss, but everyone would give his opinion, and then we’d get to an agreement.”

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<sup>105</sup> Most of this section has been published as: Trimble, M. & F. Berkes. 2013. Participatory research towards co-management: Lessons from artisanal fisheries in coastal Uruguay. *Journal of Environmental Management* 128: 768-778.



Similarly, one scientist argued that “Given the fact that [this research] is participatory, all opinions have to be valid, and I don’t think that biologists’ opinions, or fishers’ opinions, or [NGO representative’s] opinions should be prioritized. I think they are all valid.”

The case study also shows that one of the reasons why participants from the four stakeholder groups considered that participatory research contributed to the emergence of co-management is that the study about sea lions’ impacts on the fishery will serve for decision making (Table 8.8).

**Table 8.8.** Stakeholders’ opinions regarding the contributions of participatory research to the emergence of co-management (Q3; n=15 interviewees, POPA members)

<b>Participatory research contributions to co-management (*)</b>	Face of co-management	Fishers (n=7)	Sci. (n=5)	DINARA (n=1)	NGOs (n=2)
Previous stage for decision-making in management	Power-sharing	1	1	1	1
Fishers’ capacity building and fishers’ organization	Institution building	1	3		
Bring closer fishers and DINARA	Trust building	3	1		1
Mutual learning between fishers and DINARA	Social learning	1			
Increased attention to fishers by different segments of society	Governance	1	1		

(\*) Categories shown in this column were created from participants’ responses to the open-ended question 11A of the interview guide, and are shown in the same order as the faces of co-management discussed in the text. Columns to the right indicate the frequency of each category (or face of co-management) in participants’ responses (Note: more than one category could be found in one response).

One scientist remarked,

“When we do it, when we finish it [the study on sea lions], it will contribute [to co-management]... By definition, if co-management is about stakeholders or locals participating with the government to generate a regulation or something like that, this [participatory research] is a clear example where we’ve been working for a while. It will be two years [from the beginning of the participatory research] when the study is finished, more or less, where DINARA is working next to fishers, and fishers are being part of that. So, I think it will [contribute] as long as DINARA considers [the participatory research] relevant and incorporates it when the time of making decisions comes. DINARA can put it in a drawer and it won’t be relevant then.”

Thus, in terms of power sharing, participatory research could be thought of as a preparatory stage for co-management, but as the scientist notes, there is a perceived risk of the government making decisions in a top-down manner regardless the participatory nature of the research process that preceded it.

### 8.3.2. Participatory research and co-management as institution building

Co-management does not occur between individuals; it occurs between institutions. Although the management interactions take place among individuals, these individuals are leaders or representatives (Seixas & Davy 2008). Thus, preparation for co-management often involves capacity and institution building at both local and government levels. Initially, institution building in the co-management literature focused on “educating” for community capacity, with the argument that local institutions were unprepared for the responsibility of joint management with government. However, it appears that often government agencies are also not ready to work with local users if there is no prior practice of shared decision making. The “two to tango” metaphor (Pomeroy & Berkes 1997) emphasizes the capacity- and institution-building needs of all parties towards co-management. Participatory research is significant in this regard because it can enhance the capacity of all stakeholders, for instance with respect to participation/interaction skills, and collective decision-making towards a common goal.

When participants in Piriápolis were asked about the contributions of participatory research to co-management, one fisher and one scientist argued that it did contribute by enhancing fishers’ organization. Two scientists stated that it did this by building fishers’ capacity for co-management (Table 8.8). As one of them stated,

“It totally [contributed to co-management] because it represented for fishers a path for dialoguing, consisting of meetings, taking into consideration everyone’s opinions. ... I think that if co-management arises in the near future, they will be standing differently, ..., they will be more diplomatic in a way. They won’t be against [DINARA], but rather they will know that solutions are found collectively.”

Given that the lack of unity among fishers is a common topic in Piriápolis (as shown in Chapter 6), participants were asked whether they considered that participatory research had helped increase unity (Q20). All participants replied affirmatively, except for two fishers who thought participating fishers were already united. One fisher expanded on the former as follows,

“Yes, [it increased unity] because I think that we got to know each other and we shared many hours... To me, trust was reaffirmed, and the ability to deliberate freely too, [so as] not to be always afraid of what others will say if I say something wrong.”

This is an example of participation/interaction skills that were built during participatory research. Moreover, eight participants added that unity not only increased among participating fishers but also among fishers in general, from Piriápolis and other localities, referring to the support received during the Festival, and the interest of other fishers to join the group. The DINARA manager stated:

“I think that although more fishers have to participate, ... there were many people behind this [the Festival] apart from the four, five or six who attended the meetings... There were people that hadn’t attended meetings but cared about the fish [referring to the fish tasting at the Festival].”

Institution building was accomplished specifically by the creation of a multi-stakeholder body (POPA) in which fishers, scientists, a government manager and NGO representatives share a common vision and goals for the group after months of working collaboratively. As mentioned in Section 8.2, except for some who thought that one of the NGO representatives was there just for his own benefit, the rest perceived that everyone's objectives became integrated into the group interests (Q4D).

### **8.3.3. Participatory research and co-management as social capital building**

Co-management is also a matter of building trust between the parties as a prelude to developing a working relationship (Singleton 1998). Trust is an essential part of the social capital that needs to develop among a group of people trying to solve a problem, and trust lubricates collaboration (Pretty & Ward 2001). Trust and respect make effective partnerships possible, in part because they are important for communication among the parties. In fact, trust appears to be a determinant of success in many cases of co-management (Berkes 2007b). Participatory research can be the required prelude for building trust relationships among stakeholders needed for co-management, through facilitating respectful communication in moving towards a common goal.

The Piriápolis case showed three findings related to relationships, trust and respect. First, most relationships between and within stakeholder groups improved (including relationships formed during the participatory research) and none became worse (Q14) (Table 8.9). In other words, the different forms of social capital (bonding, bridging and linking) were strengthened. Second, trust increased especially among participants who established a new relationship and/or shared more time or group work, whereas it did not change in relationships that were already close, and decreased only in two relationships of one scientist (i.e. her trust in another scientist and one NGO representative decreased over time) (Q15). Third, according to four participants (one fisher, one scientist and two NGO representatives), respect towards other group members increased (Q16). The one fisher stated that his respect increased towards the manager (as he got to know him) and towards the participating fishers,

“[Respect] increased in those fishers who committed to this crusade and gave all they could. This has given me hope that the rest of the fishers could follow this example. [Before] I thought that nobody [no fisher] would change, nobody would do anything [for the fishery].”

However, most participants responded that they always respected everyone equally anyway because every person deserves respect. As the manager explained,

“Respect is a basic value, independent of whether the person is a fisher, a scientist, someone who works at the Municipal government or at SOS. When you get to know them, in addition to respect, you can have feelings towards them.”

**Table 8.9.** Changes in relationships among participants during the participatory research process (Q14; n=15 interviewees, POPA members)

<b>Relationships among fishers</b>	
Bonding social capital between fishers from the same landing site (i.e. intra-local connections)	Relationships were already good (before participatory research) but as a consequence of the group work, communication became more frequent.
Bridging social capital between fishers from different landing sites (i.e. local-local connections)	Existing relationships improved (e.g. between fishers from SM and PP) and new relationships were formed (e.g. with the fisher from PV).
<b>Relationships between fishers and external stakeholders (Linking social capital; local-external)</b>	
Fishers - DINARA	Relationships improved (some fishers had little contact with the manager previous to the participatory research initiative whereas one had a bad relationship).
Fishers - Scientists	New relationships were formed and most of them improved over time (except for participants who were absent in workshops and the Festival).
Fishers - NGOs	Some relationships were formed and improved, whereas others did not change (including two fishers who are still reluctant to their interaction with SOS and Ecópolis, respectively).
<b>Relationships between external stakeholders</b>	
Scientists - Scientists	Most relationships among biologists did not change, whereas a relationship between them and the social scientist was formed and improved with time.
NGO - NGO (SOS - Ecópolis)	The relationship between the NGO representatives improved; they now have a closer contact.
Scientists - NGOs	Some relationships between scientists and Ecópolis were formed, whereas the relationship between them and SOS did not change.
Scientists - DINARA	Some relationships improved and others did not change.
NGOs - DINARA	A relationship between the manager and Ecópolis representative was formed and improved, whereas in the case of SOS it did not change.

The relationship between fishers and DINARA, which improved according to all participating fishers and the manager, is of special relevance to co-management. As one fisher pointed out,

“My relationship with [manager’s name] improved 90%. ... It wasn’t good and now it is. For me he was a government employee who wasn’t useful for anything. ... Now I see that he does [useful] things! [possibly referring to the manager’s commitment to the Festival].”

During the participatory research process, fishers had the chance to talk with the manager about fishery issues every time the group met, and later on also via cell phone. One of the most common topics fishers would raise while dialoguing with the manager was the fishing licenses (e.g. how to renew it, how to apply for one). Moreover, many of the times that the manager came to Piriápolis for workshops, he would visit the port, interacting with the fishers who were there (e.g. he tried to encourage fishers to be more precise when filling out the fishing slips for catch and effort data). In other words, the frequency of DINARA’s visits to Piriápolis increased during

the participatory research initiative. According to three fishers, one scientist and one NGO representative, participatory research contributed to co-management by bringing together fishers and DINARA, facilitating their dialogue, and enabling a more direct relationship (Table 8.8). As one fisher stated:

“I think [it contributed to co-management] because DINARA was in meetings with fishers... I think this brought them closer, at least in Piriápolis. And I guess that they [DINARA] soaked up a little of the problems in Piriápolis [fishery].”

However, the relationship between fishers and DINARA could have become closer if fishers had taken advantage of the opportunities brought up by the manager. For example, in a few workshops where additional fishery problems arose, beyond those being addressed by the group, the manager would tell the fishers that he could come with DINARA's Director to meet with them and other fishers, to discuss whatever they wanted (e.g. fishing licenses, maximum number of gillnets). Another time, before starting a workshop, the manager told a fisher that there was a possibility of analyzing together (DINARA with two fishers from each coastal community) the applications for the fishing licenses, to make sure that the new licenses are issued to actual fishers, a common local concern. Unfortunately, fishers never responded to any of these offers, and DINARA's Director did not come to meet with them. Curiously, the relationship established between the manager and participating fishers caused distrust in at least one non-participant, who argued that the manager would have preference towards “POPA fishers” when analyzing the applications for licenses.

The establishment and improvement of relationships among fishers (i.e. bonding and bridging social capital at the local level) are also relevant to co-management, especially if we consider that fishers from Piriápolis are not formally organized. As shown in the previous subsection (8.3.2), most fishers considered that unity among them increased during the participatory research process. Building bridging relationships between fishers from different landing sites in the Piriápolis area would be an important first step towards their organization. An example of this comes from a quote by a fisher from SM:

“[The relationship with a fisher from the port] improved when we started to collect the fish for the Festival [tasting]. We analyzed it from several viewpoints and we coordinated what to do. Also, he showed me many things that I didn't know.”

### ***How was the improvement in relationships facilitated over time?***

Changes in relationships among participants were gradual. The theoretical model of the role of social capital in the co-management process proposed by Plummer & FitzGibbon (2006) helps illustrate how relationships progressed along three consecutive stages: unarticulated, formulation, and conjoint. The unarticulated stage, in which each participant had an amount of inherent social capital with participants from the same and different stakeholder groups, was evident at the first workshop (May 2011). Then, the face-to-face interaction among participants

during workshops, led to the formulation stage, where a cyclical process gradually built social capital. After the fourth and fifth workshops (August-September 2011), participants noted that the interaction among them was nicer and more relaxed. At least one fisher and one scientist associated this change to the nature of the second problem being addressed (*pangasius*). As the fisher stated, "This is happening because we have proposed a common goal which doesn't affect anybody negatively. That's good." Another fisher, in September 2011, stated that he was surprised (and happy) that fishers and DINARA were already working as part of the same group. As Plummer & FitzGibbon (2006) proposed in their model, after many iterations of the formulation phase, during the organization of the Festival, participants entered the conjoint stage, characterized by undertaking shared actions and learning. The Festival can be considered, then, as a materialization of the conjoint stage of POPA. Social capital is expected to keep increasing as iterations keep taking place (Plummer & FitzGibbon 2006).

Nevertheless, it is worth noting that relationships did not improve exponentially throughout the process. Conflicts along the way challenged the improvement of relationships. For example, fishers' opinion of the manager would change depending on his behaviour during workshops (e.g. whether he showed commitment, whether he was representing DINARA). Moreover, when DINARA's Director asked POPA to omit information in the Festival's brochures about *pangasius*, aquaculture, and non-selectivity of coastal trawlers, fishers felt disappointed and were unsure about the manager's interest in the group work (e.g. "he was a scapegoat"). However, when fishers saw that he spent five days working full-time with them and other group members for the Festival, they confirmed that the manager was actually committed to the initiative and the group.

As participants explained during the final interviews, numerous factors facilitated the improvements in relationships, most of which are linked to the frequency and characteristics of their interactions (Q17A) (Table 8.10). For instance, one fisher explained that "By meeting all the time, the opinion that each one had about others changed. Otherwise you'd keep the first impression others made on you." Another fisher stated that "Working step by step, day to day, meetings, group work [facilitated changes in relationships]. By working together we got to know us better." Similarly, one scientist pointed out that relationships changed

"by seeing each other more often, as in workshops, which always worked well, with respect for everyone's opinions. I think that helped. And [did this] more strongly the last days, during the Festival. [Group interactions changed] from meeting once a month, to spending the whole day together. I think that contributed greatly."

I could also observe that two related factors facilitated the improvement in relationships. First, most stakeholders participated consistently throughout the process, making possible a frequent interaction among them. Second, the group was relatively small (i.e. 15 committed participants). It is likely that if the group would have been larger, more time would have been needed to notice an improvement in most relationships. I suggest that relationships could have

improved more noticeably before the Festival if more opportunities of informal interaction (similar to the farewell to 2011) had taken place.

**Table 8.10.** Factors which facilitated and hindered changes in relationships during the participatory research process in Piriápolis (Q17A and B; n=15 interviewees, POPA members)

<b>Facilitating factors</b>	<b>Hindering factors</b>
- Inter-participant communication and exchange, getting to know each other and others' points of view	- Lack of exchange or meetings with some group members (e.g. some were absent in workshops; others were not open to interpersonal exchange)
- Frequency of meetings	- Little time elapsed since the participatory research started (one year) and low frequency of meetings (once a month)
- Time spent working together during the preparation of the Festival	- Personal lack of time to participate
- Individual commitment towards a common goal (the Festival)	- Concentration of responsibilities (among a few members)
- Consideration of everyone's opinion equally	- Preconception towards one of the NGOs
- Horizontal and respectful dialogue	- Lack of honesty from some members
- Relaxed talks during workshops breaks and car rides (Montevideo-Piriápolis)	- Not all participants live in Piriápolis

Participants also identified several factors which hindered changes in relationships (Q17B), some of which are opposite to the facilitating factors (e.g. low frequency of interaction among participants). As one NGO representative stated, "I think that relationships didn't change that much with those who didn't come often or lived in a different city because communication is not as easy as with those who live here in Piriápolis." A similar observation comes from observing participants' responses to the question about changes in relationships: most participants did not change their relationship with the fishers who were participating very little, explaining that they had only a few or no opportunity for interaction.

Very importantly for the group sustainability, all participants stated that they wished to maintain the relationships they established in the group (Q19). For example, the DINARA manager pointed out:

"Yes, I'm interested in [maintaining relationship with all], first because [the group] showed that it's possible to do something good, productive, and successful [referring to the Festival]. And also, at this time I feel that it would be a shame not to take advantage of the base that has been built, to continue with the sea lions topic which is the trigger [of participatory research], and other topics that will come up [in this participatory research]."

In fact, the group continued meeting after the Festival, and at the end of 2012 submitted a research proposal to be financially supported by DINARA-ANII. Despite the fact that relationships improved, most participants explained that the change in their relationships with people in the group had not influenced their opinion about the organization they belong to (as was shown in Section 8.2). However, even though participants did not change their opinion of Ecópolis (arguing that they only met one representative), two other representatives of this NGO valued the work done by POPA. One of them stated that Ecópolis' initial interest in having a

closer contact with fishers had been accomplished, and the other, during and after the Festival, invited fishers to participate in Ecópolis meetings (one fisher actually did so in 2012).

The good relationships established within POPA had repercussions in the Municipal Government of Piriópolis. After the Festival, the Mayor proposed POPA that should act as a consultative board, addressing the conflict of the irregular fisher settlement at one of the landing sites (SM). His main argument was that POPA, given its technicians, good relationship with fishers and organizations, and support obtained from numerous organizations, could act as a mediator between the Municipal Government and the fishers. During a group meeting, nevertheless, it was decided that this was not part of POPA's objectives for that year. In particular, fishers from SM stated that they would rather the group not get involved in this endless conflict.

#### **8.3.4. Participatory research and co-management as process**

Co-management should be regarded as a process, often long and continuous, rather than an endpoint. It is frequently the result of extensive deliberation, rather than a fixed state, in which parties constantly negotiate their positions and change their activities (Carlsson & Berkes 2005, Evans et al. 2011). Similarly, participatory research should also be understood as a deliberative process in making decisions among stakeholders. The success of participatory research often depends on the progress of the process to enable the development of skills, capacities and knowledge, as well as empowerment, rather than on the information gathered as a result of the research (Kemmis & McTaggart 2005). Therefore, the process as well as the findings of participatory research is important in leading to co-management.

When participants were asked to evaluate the success of the participatory research in Piriópolis, the degree to which the objectives of the group had been achieved, and the strengths/weaknesses (Q6), almost all of them highlighted the process of group formation, increased cohesion and trust among members, even though the sea lion study was not taken to completion. As one scientist stated,

“At the process level, I think it was a very rich process in which we got to know each other. Maybe it was even necessary. Maybe it was better that we didn't do long-line fishing trips... [to collect data]. It seems to me that somehow trust was gained, maybe not with the entire group but with some members...”

Moreover, deliberation throughout participatory research, enhanced by the facilitators, was valued by participants. All participants except for one could not remember any situation in which someone's opinion had not been considered. To explain this, a scientist referred to the role of the facilitator: “It seems to me that all opinions were listened to and debated with sufficient time, and the role of the facilitator was important in letting everyone express themselves. I think



nobody can complain about that because you were able [to talk].” For his part, the DINARA manager stated that participatory research was part of co-management:

“I consider participatory research as part of the process leading to a participatory management or co-management... I prefer [the term] ‘participatory management’, not ‘co-management’ because that’s not true. We are not going to co-manage things; DINARA will manage things. The idea is [to do that] with strong participation of them [fishers]. But in short, all the process of administrating a fishery ends in a resolution by the General Direction [of DINARA], or in a resolution by the Ministry [MGAP], or in a ministerial or presidential decree, and none of those take the signature of fishers, despite their intervention in the process and so on. I think that their participation is interesting, the exchange [between fishers and DINARA], we can explain them what we see and they can explain to us what they see, and together get something clear. But then, once [the new regulation] is out of the Artisanal Fisheries Unit, for instance, it gets into a political route in which fishers don’t have participation. And I don’t think it would be good for them to have it.”

### **8.3.5. Participatory research and co-management as social learning and knowledge co-production**

Co-management and adaptive management have been evolving towards a common ground: adaptive co-management (Armitage et al. 2007). Management processes can be improved by making them adaptable and flexible through the use of multiple kinds of knowledge and diverse perspectives. Bridging organizations and knowledge co-production seem to be two important characteristics of successful co-management (Berkes 2009c). Participatory research is of key importance as a learning platform in which stakeholders learn from each other, partly by enhancing participants’ openness to other points of view. Throughout participatory research, stakeholders learn to participate and to integrate different sources of knowledge, leading in many cases to co-production of new knowledge.

Considering that bridging organizations are those that link actors across multiple sectors (Brown 1991) to provide an arena for knowledge co-production, trust building, sense making, learning, vertical and horizontal collaboration, and conflict resolution (Folke et al. 2005), the group which was created in Piriápolis, POPA, could be thought of as a bridging organization linking fishers, universities, government agencies and NGOs. The diversity of stakeholders in the group motivated fishers who realized that they were not alone in their concerns. As one fisher put it in response to the question about the contribution of participatory research to co-management,

“DINARA, as far as I know, never came to the coast or never called on artisanal fishers... I think this [participatory research contributing to co-management] is because we have a strong group [POPA] which can help us get to DINARA. The group has biologists, one DINARA officer, one officer of the Municipal government [referring to Ecópolis representative who works at the government], and what we [fishers] want is to integrate ourselves to DINARA.”

Participatory research contributed to co-management, as another fisher pointed out, because there was mutual learning between them and DINARA (Table 8.8). In fact, all

participants learned information and skills throughout the participatory research process (Tables 8.11 and 8.12). Some participants learned about the need to integrate different sources of knowledge; others emphasized that participatory research actually put it into practice (Q8A). Furthermore, as was shown in Section 8.2, all participants recognized that co-production of knowledge took place.

### **What did participants learn?**

When participants were asked about personal skills they gained, most named communication and relational skills. For example, scientists learned to relate and communicate with fishers, whereas both fishers and scientists learned to listen to others respectfully. In particular, communication skills were those learned by the majority of participants (of the four stakeholder groups), including the skill in dialoguing with specific objectives and the ability to reflect on their own opinions after listening to other views (Q23) (Table 8.11). In turn, all participants learned specific information during the process. The three main topics that came up during the open-ended question about information they gained were sea lions (e.g. population abundance, impact on the fishery), *pangasius* (e.g. imports, competition with local fish), and the Piriápolis' fishery (e.g. fishing gear, local problems). An example comes from a scientist's quote: "I particularly learned about fishers, their complaints, how they live, the problems of selling fish and *pangasius*, more specific things about fishing gear. ... Information that I didn't know." During the closed-ended question, learning about *pangasius*, the problems in the fishery, and the work done by scientists, were the most frequent (Table 8.12).

**Table 8.11.** Participants' learning of personal skills during the participatory research process (Q23)

<b>Moderate to Much learning</b>	<b>Fishers</b>	<b>Scientists</b>	<b>DINARA</b>	<b>NGOs</b>	<b>Total</b>
a) Communication skills	6/6	5/5	1/1	2/2	14/14
b) Skills in dialoguing with specific objectives	4/7	4/5	1/1	2/2	11/15
c) Skills in relating with people who are in different professions and/or in organizations	4/7	2/5	1/1	1/2	8/15
d) To be more tolerant of the different views of other participants about a given theme	4/7	3/5	1/1	1/2	9/15
e) Reflecting on their own opinions and conceptions after knowing (or listening to) others' views	4/6	5/5	1/1	2/2	12/14
f) Skills in exchanging opinions until reaching a consensus in the group	2/7	3/5	1/1	1/2	7/15
g) That the common good, of the group, takes priority over personal interests	1/7	2/5	0	2/2	5/15
h) To be more self-confident	2/7	4/5	1/1	0	7/15

**Table 8.12.** Participants' learning of information during the participatory research process (Q25)

Moderate to Much learning	Fishers	Scientists	DINARA	NGOs	Total
a) The problems in Piriápolis' artisanal fishery	1/7	5/5	1/1	1/2	8/15
b) Sea lions	1/7	1/5	0	1/2	3/15
c) <i>Pangasius</i>	3/7	5/5	1/1	2/2	11/15
d) The nutritional properties of fish	2/7	2/5	0	1/2	5/15
e) The job done by fishers in Piriápolis, including their fishing practices	0	3/5	0	0	3/15
f) The work done by scientists	4/7	1/5	0	2/2	7/15
g) The work done at DINARA's Artisanal Fisheries Unit	0	0	--	2/2	2/14
h) Administrative procedures or paperwork	1/7	1/5	1/1	1/2	4/15
i) Technical language or scientific jargon	0	0	0	1/2	1/15
j) The language or terms used in the artisanal fishery	--	2/5	0	0	2/8

Participants' learning throughout a participatory research process can also be analyzed by investigating whether there were changes in viewpoints about the problems addressed (in this case, sea lion impact and market competition from *pangasius*). First, eight participants changed their perception of the sea lion problem and/or the solutions to it. For example, of two fishers who used to advocate a sea lion cull, one now thinks that sea lions should be exported to other countries instead (e.g. for zoos), whereas the other thinks that there is no solution to the problem. Similarly, one NGO representative who used to think like the former fisher (because he thought that there were too many sea lions) now thinks of alternative fishing gear, such as fish traps, as possible solutions. Two scientists now consider that by solving other fishery problems (such as fish selling), the conflict with sea lions will be minimized. For his part, the manager stated that he changed his understanding of how to address fishery conflicts:

“When one sees [the conflict] only from one side, it's very difficult to understand what the real situation is for all the parties. ... If sea lions eat 30 *brótolas* [codling], a scientist could say that it's not much, but from the fisher's side, if the sea lion eat 30 out of the 35 he caught, he wants to die. So, it changed the way to understand how to manage these problems and conflicts. Figures are not enough...”

Second, most participants changed their perception about the *pangasius* problem. For example, the perception of two scientists and the manager changed from being focused just on *pangasius* (as “the enemy”) to paying more attention on the artisanal fishery itself (e.g. problems of fish marketing; benefits of artisanal fish). Similarly, in terms of the solutions to the problem, the perception of these two scientists and one fisher changed from being more radical (against *pangasius*) to thinking that there are alternative solutions (instead of taking actions against it). As the fisher explained,

“It changed in the sense that we always address the problems through protests, and this time we did it by promoting our production. It was a different approach. ... Let's wrestle with it [*pangasius*] but not criticizing it. ... We compete with quality and price, not with bad information [about *pangasius*].”

This kind of alternative action was also shared by other participants (e.g. the manager stated that direct marketing would be the solution). However, some fishers stated that the only solution is to stop *pangasius* imports.

All participants considered that their daily work would be enriched by the learning they had during this participatory research process, and most of them were willing to communicate their learning and/or the experience to the organization or group where they belong. First, fishers stated that next time there is an opportunity for participation (e.g. meetings), they will be more open-minded and they will relate with others with respect, as in this participatory research initiative. Moreover, they explained that they wanted to share this experience with other fishers in order to achieve a higher participation as well as fishers' unity. Second, scientists recognized that the new approach for doing research they learned would be useful in their work, as well as their improved communication skills. As an example of the former, a biologist who was about to start a research project for studying sea lions' impact in another fishing community, stated that she was trying to do it in a participatory manner so that fishers later believed in the results. Another scientist showed interest in bringing the participatory research experience in Piriápolis to the classes she teaches at the Faculty of Sciences. Third, the manager argued that his work at DINARA, such as relating with fishers from the entire coast, would be enriched after this experience. He would communicate the Piriápolis experience both to the Director and his colleagues in DINARA, and when doing so, he would emphasize that when there is good will and no vested interests, this kind of processes with very good results can be achieved. Interestingly, the manager compared the participatory research in Piriápolis to other participatory processes which are not truly participatory:

“Many times these processes are initiated in reverse. There's a problem, a solution is sought, and [people from State agencies] go to the communities to apply the solution in a semi-participatory manner. These false participation experiences initiated by State agencies, in which almost everything is resolved since the beginning, are common.”

Lastly, the NGO representatives also stated that their work would be enriched after the participatory research experience (e.g. being more tolerant), and that they would transmit this to their organizations. For example, one of them considered that the functioning of his NGO could improve by following the way in which POPA worked.

### ***How was learning facilitated?***

Considering that participatory research can be seen as a learning platform, it is of interest to know how learning was enhanced. Participants identified a number of factors that facilitated learning (Q28A), such as the exchange among them during workshops, the diversity of participating stakeholders and the respectful dialogue, among others (Table 8.13). Curiously, several of these facilitating factors were also identified as factors facilitating relationship

improvement (as was shown in Table 8.10). A similar observation comes when comparing the hindering factors of learning (Q28B) and changes in relationships, both of which partly have to do with the amount of interaction time among participants shared.

The connection between relationships and learning (i.e. social capital and social learning) was purposely addressed during interviews with participants (Q29). Most participants stated that relationship improvement facilitated learning because closer relationships and higher levels of trust enhanced more exchange and dialogue, and helped them be more open when listening to others. For example, one scientist explained that “When you feel more trust [in someone] you also feel freer to comment, and you are more willing to listen to others or incorporate their opinions.” Likewise, one fisher argued that “When the relationship is more positive, it opens your mind. If you think negatively of someone, although he might be right, you won’t believe him; you’ll neither listen to him nor understand him.”

**Table 8.13.** Factors that facilitated and hindered participants’ learning during the participatory research process (Q28A and B; n=15 interviewees, POPA members)

<b>Facilitating factors</b>	<b>Hindering factors (*)</b>
<ul style="list-style-type: none"> <li>- Workshops (e.g. exchanging opinions, power point presentations)</li> <li>- Diversity of stakeholders</li> <li>- Commitment towards a common goal</li> <li>- Consideration of everyone’s opinion equally</li> <li>- Respectful dialogue, listening to each other</li> <li>- Planning and organization of the Festival</li> <li>- Participation in local radio podcasts</li> </ul>	<ul style="list-style-type: none"> <li>- (Low) Frequency of meetings or amount of time together – related to the distance between participants in Piriápolis and in Montevideo (and fisher migration)</li> <li>- Not having participated in certain activities: workshops, the Festival or radio podcasts.</li> <li>- Diversity of tasks and unequal distribution among participants</li> <li>- Participants’ different means of communication: some would use email but not all</li> </ul>

(\*) Only five out of 15 participants (two fishers and three scientists) identified factors that hindered a greater learning throughout the PR.

As participants stated, learning among them also facilitated the improvement of relationships, supporting the feedback loop between social capital and social learning I had proposed in the rationale of my research. This can be illustrated by a manager’s quotation: “There is no doubt that each of them [learning and relationships] fosters the other. As you have better relationships you’ll be more open to listen to others and to learn. As you learn from others you’ll feel certain trust in them. ... There’s a synergy.” For his part, one fisher gave a specific example from his experience: “As I learned that [manager’s name] wasn’t the person I thought, I felt freer with him and more communicative. So, [the relationship] would improve.”

### **8.3.6. Participatory research and co-management as problem solving**

Management decision making implies making choices between different alternatives, while problem solving has to do with the process of generating these alternatives. Co-

management evolves over time and is very much a result of deliberate problem-solving (Carlsson & Berkes 2005). Participatory research is an iterative process of finding solutions for local problems in a collective manner, by planning, acting and reflecting. If the problem being addressed is related to resource management, then participatory research can contribute directly to co-management by generating those alternatives. If it is not, given that the ability to solve problems collectively evolves over time (Olsson et al. 2004), participatory research can contribute indirectly to co-management because the exercise of doing iterative problem-solving may be important for strengthening stakeholders' capacities as well as for motivating them.

In Piriápolis, the first problem-solving exercise consisted of addressing the conflict of sea lions and the long-line fishery, and only the first phase of the participatory research cycle (i.e. planning) was conducted. While this first cycle was taking place, a second problem-solving exercise began to address the market competition from imported *pangasius*. This soon led the group to the action phase of participatory research by organizing the First Artisanal Fisheries Festival in Piriápolis. However, the two problems were linked (Section 8.2).

### **8.3.7. Participatory research and co-management as governance**

Co-management is a kind of governance in which there is a diversity of parties, including public and private actors, linked to one another through a variety of relationships. Good governance requires effective user participation, and for some, problem solving at the level of organization closest to the people affected -- the subsidiarity principle (Follesdal 1998). Participatory research is compatible with the subsidiarity principle because it is about addressing local problems by local people. In participatory research, as conceived in this dissertation, a diversity of actors from different levels (i.e. all stakeholders in the problem to be addressed) must participate, whereas the original conception of participatory research only involved the community (or powerless people) and the social scientists/activists working with it (Fals Borda 1987). The inclusion of other relevant stakeholders is important for contributing to the emergence of co-management as governance.

Non-fisher participants of the case study were invited to the participatory research process because they were stakeholders in the research topic that fishers had initially chosen (sea lions). As one fisher explained when he was asked to define participatory research,

“[Participatory research] is something that takes into account all the interested parties, about a specific topic. If we're going to investigate the sea lions topic, you say, 'whose concern is that topic?' Fishers, biologists, DINARA, MGAP. All the interested people have to participate, without excluding anyone. Everyone who has something to do with the topic has to participate. That is participatory and democratic.”

Similarly, one scientist pointed out the importance of stakeholder inclusion in research as part of her learning during the participatory research process:

“[I learned] how to get fishers to take ownership of the results [of the study], and not just ‘you do that [the study] and I take you fishing’ [i.e., what a fisher would say to her in conventional research]. It seems that the scale or scope of the results is different. [Participatory research] takes time, ... but it’s very important to include the fishers, mainly in this specific problem [sea lions], and other actors in society.”

Another scientist mentioned that her opinion about the need to integrate different sources of knowledge changed throughout the process by noticing the contributions from all parties in this more inclusive concept of governance. Furthermore, one fisher and one scientist considered that the participatory research contributed to co-management by promoting, through the Festival, increased attention to fishers by society at large, broadening the concept of governance (Table 8.8). As the scientist explained, “If fishers are accepted and valued, [and seen as people] from whom you learn ... then [they become] an accepted group in society [and] won’t be a [stigmatized] minority group when it comes to sitting at the negotiation table.”

The Festival provided an opportunity for interaction and collaboration between POPA and other fishery stakeholders (primary and secondary). For example, when fishers were in charge of collecting fish for the tasting, they asked two fish buyers to let them preserve it in their cold rooms. The fish buyers agreed but in the end their support was not necessary because one biologist loaned her freezer for the purpose of the Festival. However, one fish buyer donated ice for the two days of the Festival, which was much appreciated. Moreover, the Festival provided the opportunity for direct interaction between fishers and two local restaurants which participated in the local fish tasting. It is worth mentioning that these restaurants do not use *pangasius* and are interested in promoting local fish consumption. A further example is the interaction between the group and the Municipal government, which provided logistical support, contracted the music bands, among others. In this regard, the Ecópolis representative who works at the *Municipio* was an important link between that organization and POPA. It can be hypothesized that the networks that were formed among primary and secondary fishery stakeholder during the Festival have the potential to be strengthened, for instance, through the coming actions of the group.

Even though the case study in Piriópolis suggests that participatory research is relevant to the different aspects or faces of co-management, the next sub-section shows that several changes are needed before fisheries co-management can emerge.

#### **8.3.8. What is lacking to achieve fisheries co-management in Piriópolis?**

The response to the question of what was lacking (Q11B) varied among stakeholder groups. All fishers made reference to DINARA: more communication and participation of fishers were needed, and DINARA’s willingness for co-management was lacking. One fisher suggested that there should be a DINARA office in Piriópolis; another fisher called for an increased dialogue between DINARA and artisanal fishers, not with SUNTMA (union which represents mostly the

large-scale fisheries sector). One fisher identified fishers' mistrust in DINARA as a barrier to co-management:

"[Achieving co-management] is very complicated because not all [fishers] are believers [in DINARA]. DINARA is a nuisance to fishers because it has the power to regulate things but it doesn't. It has other interests, such as approving *pangasius* imports, allowing trawling where there should be closed areas... So, bad management diminishes fishers' trust towards this agency."

For his part, the DINARA manager identified co-management needs both at the fishers' level (i.e. their lack of organization) and in DINARA:

"Much is lacking for co-management. First, fishers' organization... [with] elected representatives in front of DINARA... DINARA can't go ask to each of the 300 people [the number of fishing licenses in DINARA Zone E where Piriápolis is] what they think about something, how they see the sea lion problem... And the agency [DINARA] should seek the way to make that happen [fishers' organization]... Another thing needed [for co-management] is a change in DINARA's mindset to understand that now, when it comes to take a measure, [DINARA] will have to ask those who will suffer the measure, what they think."

Scientists mentioned that fishers' organization (i.e. representatives, cohesion and common interests) was lacking, and that an improved interaction between DINARA and fishers as well as the agency's willingness to promote co-management were needed. Finally, the one NGO representative who replied to this question identified fishers' mobility along the coast as a barrier to co-management.

## **8.4. DISCUSSION**

Participatory research in which fishers hold decision making power is rare (Wiber et al. 2009) and little is known about what actually transpires in the participatory research process. The Piriápolis case is significant in that it was possible to analyze the actual details of interactions, in a process in which additional stakeholders to scientists and resource users were involved (i.e. fisheries agency and NGOs), fostering an expanded breadth of social learning (Hartley & Robertson 2006).

### **8.4.1. Lessons from evaluating the participatory research initiative**

The formative evaluation helped understand how the process can contribute to specific outcomes, tackling the lack of attention given to experiences and relationships involved in the co-generation of knowledge (Blackstock et al. 2007). The Piriápolis case also contributed to the scarce literature on how to develop, implement and evaluate participatory research (Blackstock et al. 2007, Shirk et al. 2012). Using Bigg's (1989) modes of participation (contractual, consultative, collaborative and collegiate), the participatory research in Piriápolis could best be



defined as collegiate because scientists and fishers (i.e. professional and community researchers) worked together as colleagues with different skills to offer, in a process of mutual learning, generating knowledge on a constraint of mutual importance (Cambell & Salagrama 2001). This represents another meaningful contribution to the literature if we consider that empowering or collegiate participatory research are difficult to achieve (Cornwall & Jewkes 1995, Arnold & Fernandez-Gimenez 2007).

Therefore, the process criteria used to evaluate the participatory research in Piriápolis could be considered conditions to promote an empowering or “truly participatory research”. Nevertheless, as was mentioned in Section 8.2.3, the fulfillment of some criteria cannot be ensured by the organizers or facilitators, and it will ultimately depend on stakeholders’ perceptions. Process and outcomes are closely interrelated, and thus, ineffective processes (e.g. fishers as collaborators of scientists rather than as co-researchers, or unbalanced power sharing during decision-making) might lead to undesirable outcomes, such as increased distrust or conflict by participants (Fisher 2000, Blackstock et al. 2007).

Interestingly, Shirk et al. (2012) found that the outcomes of participatory research are likely more attributable to design choices regarding the quality of participation (i.e. extent to which a project’s goals and activities align with, respond to, and are relevant to the needs and interests of public participants) than they are to the degree of participation (i.e. extent to which individuals are involved in the process of scientific research, from asking a research question through analyzing data and disseminating results). However, these authors also found that co-created projects, designed jointly by scientists and public participants, and for which the latter are actively involved in most or all stages of the research process, have proved to be more successful in affecting policy decisions than contributory projects, generally designed by scientists and for which public participants primarily contribute data (Shirk et al. 2012). The former finding of Shirk et al. (2012) supports the relevance of one of the two “new evaluation criteria” proposed in this dissertation, which establishes that the problem or topic to be addressed needs to be of key interest to local and additional stakeholders.

Moreover, considering that some of the expected outcomes of participatory research are needed for co-management (e.g. learning, co-production of knowledge, strengthened social networks, and influence of the results), by evaluating the participatory research process, the Piriápolis case study contributed to identifying several criteria that could facilitate co-management: participation of all stakeholder groups of the selected problem/topic; participant representativeness; involvement of all stakeholder groups in every research stage; independent facilitation; collective decision-making through deliberative and consensus-building processes; and appropriate information management.

#### 8.4.2. Participatory research for transitioning to adaptive co-management

Participatory research has been said to pave the way for co-management, yet it has not received much attention in the literature (Chuenpagdee et al. 2004; Wiber et al. 2009). The Piriápolis case contributes to filling this gap by analyzing the impact that participatory research had on the various faces of co-management: (1) *power sharing*: power was shared during the research process; (2) *institution building*: a multi-stakeholder group (POPA), with a common vision and goals, was created; (3) *trust building*: trust among participants increased; (4) *process*: the process of group formation was considered important by participants; (5) *learning*: stakeholders learned numerous skills for participation; (6) *problem solving*: two problem-solving exercises were conducted; (7) *governance*: a diversity of stakeholders of the initial problem identified by fishers participated in the process.

Of course, many of these faces are inter-related and have cross-cutting elements. For example, learning is a cross-cutting component of the different faces of co-management: (1) learning is needed if the exercise of sharing power during participatory research is to be important for future power sharing in management; (2) participation/interaction skills, which are part of capacity building, are learned during participatory research; (3) one of the factors that facilitated relationship improvement and trust building among participants was communication and knowledge exchange; (4) learning (e.g. the development of skills, capacities and knowledge) is one of the elements of success when participatory research is conceived as a process; (5) learning is part of the problem-solving iterative cycle which characterizes participatory research (i.e. planning, acting, learning and reflecting); and, (6) to achieve co-management as governance, the importance of stakeholder inclusion should be learned.

My findings emphasize that participatory research is of key importance as a learning platform. Stakeholders learn from each other, learn to participate and to integrate different sources of knowledge, and appreciate fishery management as a “people problem” and a commons dilemma, and not merely as an issue of bureaucratic regulation (Jacobsen et al. 2012). Given that learning-by-doing, integration of different kinds of knowledge, and appreciating multiple perspectives are key features of adaptive co-management (Armitage et al. 2007), the Piriápolis case shows that participatory research can pave the way for adaptive co-management by injecting a dynamic learning component in early stages of the collaborative process. It can therefore be anticipated that the learning outcomes of the participatory research in Piriápolis will be useful for the future emergence of co-management in coastal Uruguay. For example, the skills that the DINARA manager learned through the problem-solving exercises during this participatory research can be applied to other situations (Berkes 2009c, Olsson et al. 2004). However, there might be obstacles to translating participants’ learning into new practice, such as found by Blackstock et al. (2007) in the evaluation of a regional sustainability project (Douglas Shire

Sustainable Futures) in Northeast Australia. It would be important to evaluate in the near future if the scientists who participated in the Piriápolis case incorporate the participatory research approach or some of its elements. Moreover, learning facilitated the improvement of relationships among participating stakeholders, another important element for co-management, and improved relationships fostered learning among participants. This linkage between social capital and (social) learning, which I have described as a feedback loop, is found in the literature on natural resources management (e.g. Falk & Kilpatrick 2000, Plummer & FitzGibbon 2007). Nevertheless, although it was suggested to occur in a participatory research context (Wiber et al. 2009), that feedback loop had not been addressed deliberately.

POPA started with one problem but in fact ended up working on another, both variations of the commons dilemma involving artisanal fishers' struggle for a share of resources (with the sea lions) and market. The second problem (markets and market competition from imported cheap fish) was the problem that was turned into a public issue using the Artisanal Fisheries Festival as a flashpoint, consistent with efforts elsewhere with community-supported fishery programs (Brinson et al. 2011). The organization of this Festival brought cohesion to the recently formed group (POPA), which acted as a bridging organization linking fishers with several organizations, while at the same time had an impact on the broader society. It could be speculated that the Festival influenced DINARA indirectly by showing that there was in fact great public interest in artisanal fisheries. The adaptability criterion (i.e. iterative cycles of planning, acting, observing and reflecting), which was absent in the literature on evaluation, has proved thus to be relevant. In other words, all the outcomes associated to the Festival would have not been achieved without openness for addressing additional topics different from the initial one (sea lions' impact).

Even though participatory research contributed to partially overcoming some of the barriers to co-management identified in previous chapters, such as with regards to conflict-ridden relationships between fishers and DINARA, stakeholders' lack of capacity, and low fisher organization or unity, there are several limitations of these contributions. Only some participating fishers improved their relationship with the DINARA manager throughout the process, and in fact, mistrust towards DINARA was still identified as a barrier to co-management. Similarly, only participating fishers are now better organized than before the participatory research experience, and fishers' lack of organization is a recurrent barrier to co-management. These mean that higher fisher participation is needed if participatory research is to contribute more greatly to creating conditions for co-management. A gap for further research is to investigate how non-participating fishers perceived the participatory research process in Piriápolis, and how they were affected by it, if they were. Moreover, the fact that there was only one DINARA manager in the participatory research process is another limitation. One cannot count on individual capacity building necessarily translating into institutional capacity building (Wiber et al. 2009).

Hence, fishers' lack of organization and DINARA's apparent lack of willingness are not the only shortcomings for artisanal fisheries co-management in Piriápolis. The inherent power imbalances in fisher-manager relations ("DINARA will manage things") can be addressed by participatory research but not necessarily solved by it. As the manager pointed out, a change of mindset within DINARA is needed to understand that fishers should be consulted, at the very least, before taking new measures. It is likely that participatory research would have contributed more importantly towards this direction if additional DINARA representatives had participated, or if fishers had accepted the manager's offers of organizing meetings with DINARA's Director in Piriápolis to address fishery problems. The latter is a further example of the intricate complexities affecting the contributions of participatory research to the emergence of co-management. It is possible that participating fishers did not take the opportunity because it would have meant certain mobilization and/or confrontation among fishers with opposing interests (e.g. regarding fixing a maximum number of nets). Also, it might be that participating fishers are expecting DINARA to organize the suggested meetings, in which they would participate along with other Piriápolis fishers.

#### **8.4.3. Towards the continuation of POPA and the replication of participatory research**

The continuation or permanence of some of the impacts that participatory research has had in creating conditions for co-management will depend on the continuity or sustainability of the multi-stakeholder group. I expect that individual capacity building will persist regardless of POPA's future, but this may not apply to the improvement of relationships. For example, if POPA does not continue as a group, the interaction between fishers and DINARA will not take place through the group but only through other means. If this interaction is not looked after or facilitated (as during the participatory research process) the relationship between fishers and DINARA might get worse. The fragility and dynamism of relationships was observed, for instance, when one participating fisher complained (after the Festival) about the manager's and DINARA's attitude with regard to fishing licenses. His complaint was based on the length of time DINARA takes to review the applications, after which the manager argued that fishers should organize and talk directly to DINARA's Director. In other words, as well as relationships improving, they can get worse; this is the dynamic nature of social capital, which changes over time (e.g. Uphoff & Wijayaratna 2000, Plummer & FitzGibbon 2006). Moreover, there should be a planned strategy for DINARA participation in POPA which goes beyond the manager's personal interest in the participatory research process. This will require a closer interaction between POPA's work and other DINARA divisions, including the Direction.

An opportunity for the latter as well as for POPA's sustainability emerged in October 2012, when following an offer from the biologists, the group decided to design a research project

to try fish traps as alternative gear, applying for DINARA-ANII funding. Undoubtedly, the group needs a common goal to keep functioning, and the study about sea lions' impact through the protocol produced collectively did not seem to be it, possibly because of the indirect connection between the study and the solutions to the problem. Two observations are worth highlighting. First, this is possibly the first time (or one of the first times) in Uruguay in which fishers work collaboratively with researchers (and other stakeholders) on defining the entire research proposal (e.g. objectives, methods, expected outcomes), of which they are team members. POPA biologists could have decided to apply for this funding with a conventional research proposal but they did not, suggesting somehow that they advocate the participatory research approach. Second, applying for DINARA-ANII funding shows that POPA has the capacity for funds searching, and the motivation to keep working as a group, suggesting its long-term viability and potential progress towards co-management in Piriápolis.

In addition to the existence of a common goal, each participant needs to have a personal interest or motivator for participating (e.g. learning, building relationships, research opportunities). The cost-effectiveness ratio will likely affect stakeholder participation over time, a further challenge. For example, in the case of fishers, due to unsuccessful and frustrating previous experiences of interaction with researchers and government agencies, perceived costs can be higher than perceived benefits (i.e. no positive outcomes are expected and thus, participating means wasting time). However, if they take the "risk" of participating in a new project, and personal or group benefits are envisaged in the short-term, they will probably decide to keep participating. This can have dual effects on non-participating fishers. On the one hand, they may decide to join the participatory research project after noticing their fellows' permanent participation. On the other hand, they might think that they are being represented by their fellows, trusting that they will do their best for the fishery, not perceiving therefore personal benefits (e.g. learning, network building) as motivators to participate.

Participatory research has proved to promote new forms of institutional arrangements which are initially established for the purpose of the research process but later acquire additional functions, such as promoting resources co-management (Neiland et al. 2005). For example, Local Resource Users Groups (LRUGs) were established by a project looking at the importance of self-recruiting fish species on livelihoods in Bangladesh, aimed at promoting knowledge-sharing between stakeholders based on floodplains where livelihoods and resources are often closely interlinked (Neiland et al. 2005). This makes me think about the potential of POPA as a new formed institution to serve co-management purposes in the future. For instance, how could POPA contribute to creating a Zonal Council like those being implemented in other coastal localities in Uruguay (Chapter 7)?

The continuation and replication of the participatory research approach could be promoted if each participant did the job of sharing with his/her organization or fellows the

experience in Piriápolis. The benefits or advantages that participants and stakeholder groups in general, perceive from participatory research will also affect a wider use of this approach. The question is, then, how could stakeholders be motivated not just to participate but to initiate participatory research projects? Participants' perceptions about the applicability of this approach for addressing environmental problems suggest that the substantive argument (in combination with the instrumental and normative arguments) could be used for encouraging the use of participatory research among local stakeholders, academics, government agencies and NGOs. Nonetheless, differences among stakeholder groups drawn from the Piriápolis case should be taken into consideration when doing that.

Scientists need to find scientific rigour within participatory research (including opportunities for publications) so that they do not underestimate this approach, a frequent challenge (Conway & Pomeroy 2006). Scientists should neither see participatory research as less reliable or valid than more conventional approaches (i.e. traditional expert research) nor feel that their reputations may suffer from becoming involved in such activities (Cambell & Salagrama 2001). As Shirk et al. (2012) argued, involving "non-expert" participants in the research process does not inherently result in data that are less scientifically interesting or useful. Moreover, the advantages of participatory research that scientists perceived (e.g. more comprehensive than conventional research and valid results according to all participants) should outweigh the longer time needed for participatory research as well as the additional disadvantages identified. Integrating the participatory research approach into the University curricula (such as the course "Science and Community Activities" at the Faculty of Sciences in 2011) will provide students with real-world experience (as suggested by Chopyak & Levesque 2002) and will likely contribute to increasing scientists' openness to other modes of doing science (e.g. respecting local knowledge instead of underestimating it because of its non-scientific nature; appreciating community contributions to research).

The Piriápolis case showed that after months of collaborative work between fishers and scientists, there were still barriers to integrating local and scientific knowledge. Even though this might have been a consequence of a weak effort of the facilitator team in this regard, it is more likely that the contrasting opinions of scientists and fishers (e.g. about sea lion feeding habits) will only be clarified when they get to the stages of collecting and analyzing data jointly, as well as drawing conclusions. It could be argued, then, that co-producing new knowledge through participatory research is an alternative approach to integrating opposing local and scientific knowledge. In fact, there are concerns that large differences in worldviews might make the knowledge systems of locals and scientists incompatible (Cambell & Salagrama 2001, Dale & Armitage 2011).

Participating fishers in Piriápolis identified only one disadvantage of participatory research, that is, that results might be detrimental to them. As Cambell & Salagrama (2001)

pointed out, the community may feel that the results from participatory research will be used for purposes which are to its disadvantage. In this regard, it can be suggested that it is crucial that potential negative impacts of the participatory research initiative to all stakeholder groups are minimized, while working towards achieving common goals. Even though fishers perceived several advantages and only one disadvantage of this approach, motivating fishers to become co-researchers, looking for solutions to local problems in order to improve their reality, has proved not to be easy. Science is meant to be done by experts; this is what common knowledge says. Participatory research not only needs to persuade scientists about the validity of considering multiple forms of knowledge and understanding when doing research, but also fishers, who might be hesitant or lacking confidence about their contributions for every research stage (Cornwall & Jewkes 1995, Conway & Pomeroy 2006). For example, when the sea lion study was resumed in March 2012, one fisher in Piriápolis stated that they would only assist the biologists who would do the research. As well, it is possible that fishers are not much interested in becoming co-researchers, meaning a further challenge for truly participatory research. Hartley & Robertson (2006) suggested that cooperative research funding programs, like the Northeast Consortium in New England, should offer the full spectrum of involvement options given the diverse interests of fishers in different types and degrees of participation.

Another important consideration for future participatory research is government participation, a challenge (Hartley & Robertson 2006). Even though participatory research originally tended to involve primary stakeholders and researchers, it is now known that engagement with stakeholders at all levels is essential, especially if policy-makers are to be influenced by participatory research (Neiland et al. 2005). Thus, participatory research is a reflection and a microcosm of the process of co-management in that regard; government participation is an essential part of it. Further research is needed to investigate how to facilitate government agencies to support and initiate multi-stakeholder participatory research. Government agencies might first need to learn that environmental conflicts are better managed through participatory processes. It is likely that the instrumental argument for participation will be the most tempting to them (i.e. fishers will comply with the created new rules). However, structural barriers, such as the one imposed by the Marine Mammals manager (DINARA) stating that solving conflicts was not part of his duties, will still be difficult to overcome. Moreover, at the political level, as in the case of university scientists, there might be resistance to longer time scales of participatory research – because of their relative short time frames which demand faster results than can be provided (Cambell & Salagrama 2001), although it should be noted that the benefits are expected to outweigh the costs.

#### **8.4.4. Conclusions**

Seventeen evaluation criteria of process and outcomes were applied to the multi-stakeholder participatory research in the Piriápolis artisanal fishery, most of which were achieved, partly because they acted as guidelines for the organization/facilitation team. By evaluating the participatory research process, several criteria that could facilitate the emergence of adaptive co-management were identified: problem or topic to be addressed of key interest to local and additional stakeholders; participation of all stakeholder groups in the selected problem/topic; participants' representativeness; involvement of all stakeholder groups in every research stage; independent facilitation; collective decision making through deliberation and consensus building; appropriate information management; adaptability through iterative cycles of planning, acting, observing and reflecting; and cost-effectiveness of the process. Moreover, the Piriápolis case study showed that participatory research had an impact on the seven faces by which co-management can be analyzed: (1) as power sharing, (2) as institution building, (3) as trust building, (4) as process, (5) as learning and knowledge co-production, (6) as problem solving, and (7) as governance. These faces are undoubtedly inter-related, and learning proved to be a cross-cutting component. Participatory research thus functions as a platform which enhances learning and knowledge co-production among stakeholders, paving the way for adaptive co-management by injecting a dynamic learning component in its early stages. Nonetheless, several barriers need to be overcome if the impacts of participatory research in creating conditions for co-management are to remain, and if this approach to research is to be used more widely. Low number of participating fishers and managers; inherent power imbalances in fisher-manager relationship; integration of local and scientific knowledge; less scientific rigour and longer time scales of participatory research compared to conventional research, are among these barriers.



## **CHAPTER 9: PROCESSES AFFECTING THE EMERGENCE OF FISHERIES CO-MANAGEMENT IN PARATY**

### **9.1. INTRODUCTION**

The objective of the last chapter of results is to analyze some of the processes that could affect the emergence of artisanal fisheries co-management in Paraty. The ultimate goal is to compare the research findings from Praia Grande/Ilha do Araújo to my case study in coastal Uruguay. This comparative analysis provides an interesting opportunity for learning across countries. Three main inter-related processes affecting co-management are analyzed in this chapter: the changes that have occurred in the social-ecological system (Section 9.2)<sup>106</sup>; the relationships among fishery stakeholders following a multilevel social capital approach (Section 9.3); and fishers' actual and desired participation in decision-making (Section 9.4). Lastly, the findings are discussed in light of the Brazilian context, as well as analyzing the similarities and differences with coastal Uruguay. The discussion is focused on barriers to and opportunities for the emergence of co-management. This is timely because artisanal fisheries co-management in Brazil, although more widespread than in Uruguay, still faces numerous barriers (Kalikoski et al. 2009, Seixas et al. 2009).

### **9.2. CHANGES IN THE FISHERY AS A SOCIAL-ECOLOGICAL SYSTEM**

This section examines the changes that have occurred in the fishery as an integrated social-ecological system, based on fishers' knowledge and perceptions<sup>107</sup>. In what follows, I first analyze fishers' way of life, after which I address the changes in fish resources, fishing practices, climate, and fishers' livelihoods. The last sub-section looks at the future by exploring fishers' wellbeing aspirations for themselves and for their children.

#### **9.2.1. Fishers' job and way of life**

In Praia Grande and Ilha do Araújo there are only a few young fishers under 30; most fishers are older than 40. The majority of fishers started fishing when they were 12 years old or younger; some started as young as 5-7 years old. When fishers were asked why they work in the fishery, four non-mutually exclusive reasons came up (Table 9.1): they have family members in the fishery; they like it; they make good money; and they do not have the training for other trades.

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<sup>106</sup> For analytical purposes, the changes that have occurred in the relationships among stakeholders are presented in Section 9.3.

<sup>107</sup> Part of this section has been published as: Trimble, M. & D. Johnson. 2013. Artisanal fishing as an undesirable way of life? The implications for governance of fishers' wellbeing aspirations in coastal Uruguay and southeastern Brazil. *Marine Policy* 37: 37–44.

Besides being the most frequently identified reason for starting to work in the fishery, the kinship basis is evident: all the fishers interviewed have had family members in the fishery, usually fathers and brothers, but some also had grandfathers and uncles. Even though only a few fishers mentioned the pleasurable aspects of fishing as one of the reasons for working in the fishery, when asked specifically if they liked fishing, all gave positive answers. Fishers like fishing because they find it relaxing and healthy; they value the independence of fishing; they love the sea; fishing is fun; they grew up in the fishery; and they like to catch fish to eat while making money at the same time. Even though this study did not explore in detail individual preferences, some fishers stated that they mostly liked a certain gear and/or disliked others (e.g. long-lines, gillnets, trawling).

**Table 9.1.** Why did individuals interviewed become fishers?

<b>Reasons for working in the fishery<sup>a</sup></b>	<b>No. Fishers (n=10)</b>
Family in the fishery	7
Like fishing	3 <sup>b</sup>
Make good money	2
Lack of alternative (or better) choices	2

<sup>a</sup> All responses could be grouped under the same four categories that had been identified in Piriápolis. A given fisher could mention more than one reason for working in the fishery.

Fishers older than 60 are generally retired but keep fishing because they love fishing, they want fish to eat, and/or they need additional sources of income (the retirement pension is one minimum salary, 622R\$ in April 2012). Women working in the fishery can also go into retirement (when they are older than 55) if they have contributed to the social fund collected by the *Colônia de Pescadores* (the municipal fisher association) for the National Institute of Social Services (INSS).

Making good money without having studied is seen as an advantage according to some fishers. A further advantage is that fishers get paid every Saturday in the local market (where most sell their catch), not just once a month. However, fishing has a negative side. For instance, selling the catch can be stressful because of low prices. Moreover, one fisher stated that fishing used to be a therapy but now he hesitates to go fishing due to the uncertainty in catches associated with resource decline. Income instability was mentioned as a further negative aspect. Some fishers argued that the fishery was much more profitable in the past: although fish prices were lower, catches were much higher. However, others felt that currently they still make good money.

Most women who process shrimp and crabs on land like their work: working at home enables them to cook, clean the house and look after the children at the same time. In Praia Grande, nevertheless, women used to work peeling shrimps as in Ilha do Araújo but almost all of them have moved to activities not related to the fishery such as handicraft production. They quit because they did not like peeling shrimps which damages their skin (sulfite is usually added to

shrimps and women do not use gloves) and it is boring. Another negative aspect of peeling shrimps is that it is not well paid.

### 9.2.2. Changes in fish resources, fishing practices and climate

According to fishers, resources have been declining over the past 20-30 years, being more notoriously so over the past 10-20 years. They stated that most species have declined severely. For example, the meaning of a “good catch” has changed as resources declined. One fisher explained that a good catch of shrimp would be 100 kg per fishing trip in the past, whereas now it is 20-30 kg. Moreover, some species have disappeared from the region.<sup>108</sup> Another resource change that fishers have noticed is with regards to size; the size of some species is smaller (sharks, whitemouth croaker, *robalo*, weakfish and shrimp). As one fisher stated, “In the past there were not many boats, so there was time for the fish to grow.” It is worth mentioning that *robalo* is one of the most important species in Paraty, mainly because of its high price.

Fishers explained that the main causes or drivers of resource decline are otter trawling, encircling gillnet for snook (*cercosoma*) and purse-seiners (*traineiras*). Even fishers who do trawling think that it is the main cause of resource decline, and they would like to stop using that gear. Only one fisher disagreed with the criticism that trawling has been received. He argued that trawling is good for shrimp because it mixes the water of the entire sea column, and thus, it prevents pollutants from sticking to the bottom, where shrimps larvae develop.

Additional drivers of resource decline mentioned by fishers are: high number of boats and fishers; pollution (including the marinas and the nuclear power plant, of which fishers are concerned because of radiation emission and increased sea temperature in the surrounding area); technology (e.g. depth-finder, motors, radios); pair-trawling (although it is not allowed any more in the bay); vessels from other Brazilian regions; and tourists going on fishing trips. Other fishers, either tourist boat workers or not, expressed no concern about this type of tourism, arguing that the amount that tourists catch is not high, that some of the species caught are not the same as fishers commercialize, and/or that it is for consumption (although it is known that some of these “tourists” also sell part of their catch). In addition to all the identified drivers of resource decline, a few fishers opined that they are also responsible for that.

With regards to fishing gear and practices, the most noticeable change is that canoes have been replaced by motorized boats over the past 20-30 years. For some fishers, this change was a consequence of resource decline: it was necessary to buy a boat to go fishing farther

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<sup>108</sup> During the interviews conducted in the first field season, about twenty species were mentioned to have disappeared (i.e. not any more seen or caught in the area). However, during the validation interviews conducted in the second field season, most fishers disagreed with that long list, giving details on when and where they had seen certain species. This methodological observation emphasizes the importance of validating data from individual interviews, or alternatively, it suggests that other procedures (e.g. group interviews, focus groups) would be more appropriate for studying fishers' local knowledge.

because there was little fish close to shore. However, others disagreed with this, and argued that 30 years ago resources were still abundant. Every fisher stated that nowadays they go fishing farther from the coast (e.g. 1-2 hours farther out). Otter trawls have been increasingly used over the past 25 years, partially replacing hook and line, and gillnets. According to fishers, fishing effort has increased to counter resource decline. For example, fishers now set up to 1,000-2,000 meters of gillnets (instead of 200 m), and still, the number of *robalos* caught is lower than in the past. Moreover, instead of fishing during part of the day, now there are times of the year in which gillnets stay set day after day (which is seen as counter-productive by some fishers).

Fishers have also perceived various environmental changes, including climate change, which in turn influence their job. The four seasons are not clearly defined anymore (e.g. summers last longer), and the weather is more unpredictable, making it difficult to know when a storm is coming. Moreover, the typical wind pattern has changed, affecting navigation and fishing. The east wind bringing warm water to the bay, especially during the summer (from 10am to 4pm every day), key for fishing *robalo*, has been rarely observed during the past 6-10 years. Partly related to the wind change, according to most fishers the sea temperature is now lower, which is also negatively perceived given that the fish species they catch prefer warm water.<sup>109</sup>

### 9.2.3. Changes in fishers' livelihoods

When the interviewees were younger, themselves and their parents would do both small-scale agriculture and fishing, usually the former in the morning (or while gillnets were in the water) and the latter in the afternoon. They would grow sugar cane, beans, corn, banana, manioc, coffee, potatoes, among others. Currently, only one family in Ilha do Araújo practices agriculture, whereas additional families have home gardens. When I asked fishers about the reasons for this transition, responses were diverse. In Ilha do Araújo, most fishers argued that agriculture was forbidden by IBAMA in order to protect the forest. They now have to buy all resources that they would cultivate in the past, and they come with agrochemicals, fishers explained. However, others stated that agriculture was not prohibited<sup>110</sup> but stopped because: (i) there was not enough time for the two activities (as fishing resources started to decline, more effort was needed on this activity); (ii) the income from the fishery was enough for buying food; and/or (iii) community members started to work as employees of rich people. For their part, fishers from Praia Grande explained that agriculture in their community decreased as IBAMA

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<sup>109</sup> This finding is striking because according to other researchers working in the same area, fishers have observed that the sea temperature is higher than in the past (C. Seixas, pers. comm., March 2013). Some fishers from PG/IA explained that the lower sea temperature is related to glacial melting in the South or *El Niño* events, although it is possible that these comments are influenced by television programs.

<sup>110</sup> In fact, the Chief Manager of the protected area APA Cairuçu stated that agriculture was not prohibited neither by IBAMA nor ICMbio in the area, while also referring to the Management Plan: [http://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/apa\\_cairucur.pdf](http://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/apa_cairucur.pdf) (Eduardo Godoy, pers. comm., March 2013).

created restrictive regulations; as people's lands began to be sold or invaded; and as construction increased.

As a consequence of the transition in fishers' livelihoods, their feeding habits have also changed. Rice and beans are much more common in their diet than in the past (when these used to be a weekend meal) because they can afford them. More strikingly, because of resource decline, they do not eat as much fish as they used to; they prefer to sell most of their catch in order to buy chicken, which is cheaper than high quality fish, and less frequently red meat. The norm of giving fish as food to friends, family and neighbours, is now less frequent. However, a few fishers still eat fish every day, and they stated that they would not change it for anything else. Several fishers were concerned about some species (small and big mullets, catfish) tasting like oil (asking for research about it), and about increased sea pollution in general: plastics, oil, boats' paint, engines' noise, nuclear power plant, sewage.

As resource decline became more prominent, most fishers began to look for additional or alternative sources of income in their communities, mainly as tourism operators or as housekeepers. Working as housekeepers became increasingly common as people from nearby cities ("outsiders") started to buy Caiçaras' land to build their houses (usually for holidays). Even though, this was mostly considered as a negative change, some community members emphasized the positive side of it: it is a source of income for numerous families. Currently, most fishers alternate fishing with tourism: they fish mainly in winter and carry out boat trips with tourists, usually to fish, in summer (and to a lesser degree in the rest of the year). The fishing tradition remains stronger in Ilha do Araújo than in Praia Grande.

Some fishers have moved completely into boat-tourism whereas others prefer alternative occupations, such as working in small restaurants and inns that they sometimes own, in construction, or as gardeners and housekeepers. It is worth noting that despite having quit the fishing sector, they still identify themselves as fishers.<sup>111</sup> Fishers who do not like doing boat trips explained that it is a job which requires patience to serve tourists, it might involve communication difficulties with tourists due to the need to speak other languages, and it has a fixed schedule. According to some fishers, a big advantage of doing boat trips for tourists, however, is that it is more profitable than fishing, aside from being enjoyable to take tourists to fish. In some cases, the money fishers make in tourism-related activities enables them to buy fishing gear. Despite all the different activities that fishers have done, fishing is usually the one they like the most. In fact, one fisher who used to alternate between fishing and tourism, in 2012 decided to stick to the fishery; even though it is less profitable, he loves being at sea and working independently.

Nevertheless, doing boat-tourism cannot be afforded by every fisher. The reasons why some fishers still work only in the fishery are not just based on the plenty of positive aspects of

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<sup>111</sup> This can be easily understood if we consider them professionals. For instance, in the same way as biologists who no longer do biology work are still biologists, fishers who no longer work in the fishery are still fishers, which is their profession.

fishing but also on their financial capital. At least two fishers explained that they do not work in tourism because their boats are small and they cannot afford a bigger boat. In fact, one of them argued that the combined licenses ("fishing & tourism") should be forbidden, and fishers would have to decide whether working in one or another, but not both. It is evident that tourism is a source of inequity in the two communities. In 2012 there were at least two new boats for fishing & tourism (compared to 2011), bigger than the rest of the boats and owned by fishers who already had one or two. This and other tourism-related activities are generating competition among families, as they explained. In fact, everyone in Praia Grande and Ilha do Araújo agreed that the community unity has decreased over time. Collective activities became less frequent; some festivities (such as *Folia de Reis*) do not take place any more, neither do the *mutirões* – collective construction of houses by community members.

Even though aquaculture has been promoted in the region by the Ministry of Fisheries and Aquaculture, in the studied communities this activity represents a source of livelihood for only two fisher families in Ilha do Araújo, who farm seaweed (*Kappaphycus alvarezii*). This aquaculture project was initiated by a university (*Universidade Federal Fluminense*), supported by the Ministry (MPA) and the National Research Council (CNPq).<sup>112</sup> Three other aquaculture projects existed in the past (for mussels, shellfish/oyster, and *robalos*) but they were not successful, for different reasons, including poaching and inadequate environmental conditions. When I asked fishers their perception about aquaculture, most of them mentioned that it could be a good alternative source of income, although they identified some barriers: government bureaucracy to start aquaculture projects; lack of fishers' unity; and consequent poaching.

#### **9.2.4. Looking towards the future**

When asked about their future, almost nobody mentioned a desire to change his or her job; fishers want to keep fishing (Table 9.2). People in Praia Grande and Ilha do Araújo do not want to move to a different community. Nonetheless, although most people seem satisfied living where they live and doing what they do, several of them feel discouraged when thinking about their community 20 years in the future: they pointed out that more and more "outsiders" will come and there will be few Caiçaras left; it will become an unbearably noisy and dirty place; fish resources will be depleted and almost no fisher will make a living from the fishery; and "there will be more tourists than fishers". Despite its economic benefits, therefore, local people are unenthusiastic about the transition from fishing to tourism. However, some community members are hopeful of getting increased tourism in Praia Grande and Ilha do Araújo, making tourists aware of respecting Caiçaras and nature.

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<sup>112</sup> [http://cardumebrasil.blogspot.com/2011\\_04\\_01\\_archive.html](http://cardumebrasil.blogspot.com/2011_04_01_archive.html)

When I asked fishers about their children’s future, they mentioned that they want them to study, particularly at the post-secondary level, so that they can have more options, or to work in the tourist sector, to make good money. When asked if they would like their children to work in the fishery, nobody replied affirmatively (Table 9.2), arguing that resources are declining and fishing is a hard job. Fishing, in other words, was seen as an undesirable occupation for fishers’ children. Fishers prefer their children to have a stable job on land and to limit themselves to sport fishing. Some fishers explained that in the past they would have liked their children to work in the fishery because resources were more abundant then.

**Table 9.2.** Fishers’ aspirations for themselves and their children

In the future	No. Fishers (n=10) <sup>113</sup>
Would like to keep working in the fishery	8
Would like their children to work in the fishery	0

Fishers’ aspirations for their children are being realized: most fishers’ sons have not become fishers but study or work as waiters, gardeners, and marine guides for "outsiders". Similarly, fishers’ daughters are not involved in shrimp processing but study or work as school teachers, accountants, cleaning ladies, handicraft makers. In fact, some fishers pointed out that their sons themselves do not want to become fishers. However, fishers’ unwillingness for their children becoming fishers should not be considered as a reason for not caring about the resources. As one fisher pointed out, “I don’t want to see my children living from the fishery but I want to see them eating fish”; he added that he is interested in helping improve fisheries management. Moreover, fishers are concerned about the future generations not getting to know the species that have disappeared.

### 9.3. MULTILEVEL SOCIAL CAPITAL: BONDING, BRIDGING AND LINKING RELATIONSHIPS

This section explores the relationships among fishery stakeholders through the lens of multilevel social capital, which includes trust, solidarity, and reciprocity norms embedded in social networks. First, the bonding and bridging form (i.e. horizontal connections) are presented, focused mainly on the relationships within and between Praia Grande and Ilha do Araújo. Second, linking social capital (i.e. vertical connections) between fishers from these communities and external stakeholders are analyzed.

<sup>113</sup> During informal conversations I asked five other fishers (different from the 10 interviewed) if they wanted their children to work in the fishery, and only one of them replied positively. One year later, during the validation interviews in 2012, this fisher stated that “Study is study. Fishing is a game [sometimes you catch, sometimes you don’t]. We fish because that comes from our parents. Now it’s getting bad [due to resource decline]. It will depend on his decision [referring to his one-month-old baby]. If he wants to fish, I’m not going to prohibit that. When he gets 3-4 years old, I will start teaching him [how to fish]. He will help me.” Thus, only one out of 15 fishers wants his children to work in the fishery.

### 9.3.1. Relationships among fishers: bonding and bridging social capital

Fishers from Praia Grande (PG) and Ilha do Araújo (IA) stated that they have a good relationship among them, either within their own community or with the neighbouring one (Table 9.3). They also feel medium trust towards each other (Table 9.4). For example, as one IA fisher pointed out, “Fishers are nice. Everybody understands everybody. On the island [IA], when the [shrimp] fishery closes, everybody stops fishing. Those who have more buying power are the ones who exploit the most [referring to the conflict with larger vessels].” He also stated that he feels total trust in fellow fishers given that they comply with the shrimp closed season, explaining that “what doesn’t work [well] are the authorities, they don’t enforce” (see Section 9.3.2).

According to fishers, there is no division between fishers from PG and IA. As fishers from both communities frequently mentioned, “we are the same thing”. Some fishers from IA, when explaining that they have a good relationship with PG fishers, referred to the low number of fishers in PG; there are only 3-4 fishers who make a living from the fishery, they said. Given that fishers have more fishers who are kin within their own community than in the neighbouring one, and that kinship may affect relationships, the finding of the similarity between bonding and bridging ties is surprising.

**Table 9.3.** Bonding and bridging relationships among fishers from Praia Grande and Ilha do Araújo

Relationship (*)	PG-PG	IA-IA	Bonding SC (PG-PG & IA-IA)	Bridging SC (PG-IA)
Bad	0	0	0	0
Regular	2/5	2/5	4/10	0
Good	2/5	2/5	4/10	9/10
Very good	1/5	1/5	2/10	1/10

(\*) Ten fishers (five from PG and five from IA) were asked a closed-ended question regarding their relationships with fishers from PG and IA. Prompts followed to understand better the responses.

**Table 9.4.** Bonding and bridging trust among fishers from Praia Grande and Ilha do Araújo

Trust	PG-PG	IA-IA	Trust in PG fishers (IA)	Trust in IA fishers (PG)	Bonding trust (PG-PG & IA-IA)	Bridging trust (PG-IA)
None	0	0	0	0	0	0
Low	1/5	1/5	2/5	1/5	2/10	3/10
Medium	2/5	3/5	0	2/5	5/10	2/10
High	2/5	1/5	3/5	2/5	3/10	5/10

(\*) Ten fishers (five from PG and five from IA) were asked a closed-ended question regarding their trust in fishers from PG and IA. Prompts followed to understand better the responses.

From Tables 9.3 and 9.4, it can be observed that there seems to be identical bonding social capital in the two communities, while bridging relationships are better and bridging trust is higher compared to the bonding connections. Nonetheless, during the follow up in 2012, most



fishers (8 out of 11) indicated no difference between the relationships within the community and with the neighbouring community.<sup>114</sup>

Bridging social capital also includes the relationships with fishers from other communities (besides PG and IA). Fishers from Praia Grande and Ilha do Araújo relate with fishers from additional Paraty communities, although usually these relationships are not close. Opportunities for interaction are diverse: at sea (when they fish in the same spots); at the dock in Praia Grande (when fishers from other communities come to land their catch); at the dock in Paraty; at the Colônia, or through it. Nearly half of the fishers stated that they feel trust in fishers from other communities, naming several of them (Trindade, Sono, Paraty city, Tarituba – all in Paraty Municipality). Exchanging information about fishing spots was a common example provided to illustrate this bridging trust. However, the fishers who did not trust fellows from other communities explained that they would need to know them better in order to trust them. The remaining part of this sub-section focuses on understanding in greater depth the relationships within and between the two studied communities.

### ***Solidarity and Reciprocity norms***

#### *Information management (knowledge exchange) among fishers*<sup>115</sup>

One of the examples that fishers gave to illustrate the good relationships they have was related to knowledge exchange about the fishery. Fishers talk to each other every day about the catch size and location of fishing spots, and they share this information at different places: at the dock; at the fish market; at the Colônia; or at sea - when boats approach one another, or by radio and cell phone (only recently). Although every fisher shares information about fishing spots with fellows, not everyone shares with everybody else. A third of the fishers stated that they give this information to half of the fishers from their community (Table 9.5). One of them added that he gives information to everyone who asks because he does not like deceiving others. When fishers were asked the same question but with regards to the neighbouring community, fishers explained (once again) that the relationship between PG and IA is the same as within their community. However, two fishers from PG were the exception. For example, one of them stated that he gives information to 20% fishers from IA (instead of 50% as in PG): "It's fewer than here. There [at IA]

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<sup>114</sup> Even though nowadays there is a good relationship between fishers from Praia Grande and Ilha do Araújo, this was not the case more than 25 years ago, when arguments between them were often. According to fishers, thanks to the work done at PG by a fisher from IA who was also a Catholic preacher, the relationships between people from PG and IA started to improve. Marriages between people from the two communities are the most common example given by fishers to explain this positive change in bridging relationships.

<sup>115</sup> This behaviour of exchanging information on fish resources is also relevant to the sub-section "Norms related to fishing resources use".

there are many liars. Even on the radio they overstate [the amount they caught].” This quote shows that bridging relationships are not always as good as bonding connections.

**Table 9.5.** Information exchange and nets lending among fishers (\*)

Category	How many fishers from your community do you give accurate information about fishing spots? (n=9)	How many fishers from your community would you lend nets to? (n=10)
None	0	2
Few	1	3
Half	3	1
All	2	4
(All who ask) (**)	(4)	-

(\*) This table shows the frequency of each of the closed-ended answers (none, few, half, all) to two interview questions asked to nine and ten fishers respectively (n).

(\*\*) Four fishers (instead of choosing one of the given options) replied that they give accurate information to all fishers who ask.

Some fishers (“few” according to some, “most” according to others) lie: they give misinformation when asked about catch size and/or fishing spots. According to one fisher, misinformation is one reason for not trusting all fishers. Misinformation is socially accepted (“lying is normal”) and fishers who lie are not punished by any means. However, reciprocity norms are in place: if you lie to a fisher, and he then finds out that you did, you will not receive accurate information from him again (“You give him a dose of his own medicine”). Fishers do not lie to friends: as one fisher explained, if you got a good catch, you wish they do too, because they are your friends. Sometimes fishers communicate on the radio using code words so as nobody else can understand them. Lies are usually discovered (“truth will come out”). For example, some fishers lie regarding the number of fish they caught: they say to other fishers that they only caught a few, but later on they are seen at the fish market with a higher quantity. Even though these events are funny for some, others get upset or angry when not accurately informed. Some fishers look at information management from a different perspective. According to them, it makes no sense to lie or to ask to others the fishing spot because of fish mobility; “I talk [I give information]. Nobody else will catch tomorrow what I caught today. Fish moves”.

Different strategies are followed by fishers who ask information from others in order to decide whether to go fishing or not and where. Some ask information to anyone who went fishing and caught something, whereas others only ask information to the few fishers whom they have a trust relationship or friendship. This shows the importance of maintaining strong bonding ties among fishers: it is a way to have access to accurate information about fishing spots. However, one fisher stated that he does not ask information to anybody because he is knowledgeable. Asking information to fishers from the neighbouring community occurs but apparently less frequently because they spend less time together.

In addition to the information fishers receive from others, when it comes to decide the spot they will go fishing, fishers take other variables into consideration: their last fishing spot, their knowledge about “good fishing spots” (knowledge which is usually transmitted over generations), instinct, luck, faith, fish sounds (in the case of the croaker). It is worth mentioning that fishers in PG/IA use landmarks to orientate/navigate, by doing triangulations. Except for a couple of exceptions, boats do not have GPS or depth-finders (to find fish schools).

When asked if they keep secrets about fishing spots or practices, only 4 out of 13 fishers replied affirmatively. Fishing *robalo* with live bait was an example of the latter. However, fishers explained that they share this information with a few other fishers. Thus, there is apparently no secret kept only within certain families. Interestingly, one fisher mentioned that he does not keep any secrets because it brings bad luck.<sup>116</sup>

### *Fish exchange among fishers*

Another example of the good relationships among fishers is the custom of giving fish as food to fishers who have not gone fishing, either due to sickness or age, or to fishers who did go fishing but did not catch anything. In addition to sharing among neighbours and friends, it is common that fishers share some of their catch with family members. One fisher from Ilha do Araújo explained that he knows which fish is “special” for each fisher, and therefore, he chooses what to offer to them according to their taste. It is worth mentioning that this exchange of fish not only occurs within each community but also between Praia Grande and Ilha do Araújo, for instance, when fishers from IA arrive at the dock in PG. Other community members also receive fish as gift, or ask for it. Sometimes one fisher gives fish to several people a day.

Nevertheless, not every fisher seems to offer/give fish; for example, one fisher said that fewer than 10% of them offer fish. Some fishers do not receive fish from others, and some fishers do not like to ask for fish but prefer to buy it at the local fish market. Fishers who do ask for fish consider that you have to do so because your fellows do not know that you are in need of it. However, what one is not supposed to do, by any means, is to ask a fisher who is departing to the sea, to bring you a particular fish (i.e. you cannot order fish, *encomendar*). When that happens, fishers do not go fishing until they forget about the order; otherwise, they will not be lucky.

As with information management, reciprocity also plays a role when giving fish to fellows. For example, one fisher explained that some fishers do not help others to pull up the boats, and

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<sup>116</sup> At least three other things are meant to bring bad luck according to fishers from PG/IA: (i) cheating when you are asked the spot where you went fishing: next time you go fishing, if you do not catch anything, it could have been because you lied; (ii) telling to somebody who has returned from sea with a good catch “oh! You’ve caught a lot today!”: this fisher will not be lucky next time he goes fishing; and (iii) asking for a fisher to bring you a specific fish.

thus, he does not give fish to them when he is asked. Pulling up the boats is a further example of solidarity among fishers' everyday lives, although a few of them do not get help easily. Fishers not only share fish for food but sometimes they also share fish and shrimp for bait.

#### *Giving assistance to others in need at sea*

A norm which is usually respected consists of giving assistance to people in need at sea (either in fishing boats or any kind). Even if fishers do not know each other, or if they have a bad personal relationship, they will help the one who is in need. Most fishers explained that this rule is a law by the Coast Guard, although they added that they assist others because it is part of how they lead their lives, helping one another, and expecting to be helped by others. "Today this happens with that fisher, but some other day it could happen to me", one fisher explained. This illustrates the importance of reciprocity in fishers' relationships.

Waving a white t-shirt or other white clothes is the signal used by fishers to show that they are in need of help. Since recently they can also use the cell-phone to ask for assistance. After one fisher assisted another at sea, he is not expected to receive a favour back but sometimes he receives fish, beer, or money for the oil. As in Uruguay, fishers' relationships do not improve after these events of helping one another. Sometimes it is not easy for a fisher to get assistance from others while in need of help in the sea. Even though assisting others in the sea is a Coast Guard rule, fishers do not report these events.

#### *Lending and borrowing fishing gear*

Lending and borrowing fishing gear seems to be intimately related to the trust relationships fishers have amongst themselves. For instance, as stated by an IA fisher, "Not all fishers lend [fishing gear]. There's trust only in a few. [You lend] when the person is acquainted, otherwise you distrust." Fishers explained that fishing gear is not often lent (gillnets, trawl nets, canoe, boat) because they are "work tools" carefully looked after by their owners. In cases of high levels of trust, between family members or friends, some fishers lend nets to another who needs to catch fish to eat. When asked how many fishers from their community they would lend nets to, 4 out of 10 replied that they would lend to all of them, or everyone who is in need (Table 9.5). One of them (from PG), however, during the validation interview in 2012, stated that "I wouldn't lend my net. Making it is very expensive. The guy won't be very careful [with it] given that it's not his own net. I've never lent."

Other fishers laughed when in 2012 I shared this finding of fishers willing to lend nets to anybody, arguing that it is not true (the hypothetical question, "would you lend", was not the best choice). I soon found out that lending fishing gear occurs only occasionally. When it occurs, the

one who goes fishing with the borrowed net usually gives fish to thank the owner. According to one fisher, nets or boats are “lent” but the owner receives 30% and 50% of the profit, respectively. Reciprocity norms do not seem to be present when it comes to lending fishing gear. For example, one PG fisher who replied that he would not lend gear to anybody then added that others would lend gear to him because they know how he looks after his nets.

Fishers mentioned several reasons to explain why they do not lend nets or long-lines: (a) they get damaged, it is arduous to repair them, and they are expensive (200-600R\$ per gillnet, 300R\$ per long-line). (b) Fishers might not give back the net (e.g. if a vessel dragged it away). Fishers who have had this negative experience once then decided not to lend nets any more; “I lent a cast net and it disappeared! It’s been two years since then. It serves as experience. ... Nets are not to be lent. My dad used to say that there are three things not to be lent: nets, work tools, and women!” (IA fisher).

When I asked fishers whether the decision of lending fishing gear was influenced by kinship, 5 out of 9 replied affirmatively, explaining that they lend to family members more often: “If it’s a cousin, or someone from the family, you trust more. And if the net gets damaged you’ll know how to find him! With a stranger it is more difficult.” Fishers who stated that kinship is not an important variable when making the decision, also referred to trust: “It’s the same. There are some people in the family who aren’t worth trusting, and others [not in the family] whom you can trust.”

### ***Norms related to fishing resources use***

Only a few fishers’ norms regarding the use of resources were identified. It is likely that there were several other norms in place at the time of this research but that did not come up during conversations with fishers.<sup>117</sup>

#### ***First comer’s rights***

This norm has been always present among fishers from PG and IA: the first boat or fisher arriving at a certain spot has the right to set his gear as he decides. In the past, individual fishers would not have customary sites respected by others. Fishers now have preferred fishing spots but first comer’s rights are respected. In other words, if a fisher arrives at his preferred site and there is another fisher working there already, he cannot complain. He should decide whether

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<sup>117</sup> According to Ostrom & Basurto (2011, p.322), “Norms are prescriptions about actions or outcomes that are not focused primarily on short-term material payoffs to self” whereas “rules are linguistic statements containing prescriptions similar to norms, but rules carry an additional, assigned sanction if forbidden actions are taken and observed by a monitor”. Given that in Praia Grande / Ilha do Araújo there are not evident assigned sanctions when norms are not respected, instead of naming this section “local rules” (as I had initially planned), I have named it “norms related to fishing resources use”.

to set his gear at a certain respectful distance or to go to a different fishing spot. However, if a fisher notices that another is getting a good catch, he can come to set his gillnets without giving the former the time to set his gear again in the same spot. It is interesting to note that some fishers disagree with the behaviour of setting gillnets successively in the same spot, arguing that this depletes the resources in that fishing spot.

#### *Distance between nets*

Fishers explained that a certain distance between nets from different boats has to be maintained if both of them are to catch fish. If nets are too close, no one might get anything. The distance to be respected seems to vary, both according to the fisher and according to the fishery. For instance, one fisher mentioned that the distance should be 500 meters, whereas another explained that it may vary from 300-400 meters to 50-60 meters. During the *robalo* season, the distance norm is not usually respected; for instance, during the *robalo* season in 2010, one fisher who was doing hook and line-fishing was not respected by another who came to the same spot and seined the *robalo*.

#### *Non-fishing days*

Catholic fishers do not go fishing on religious days: Good Friday (also Easter Saturday and Sunday for some), Feast of Corpus Christi (June), Christmas, and All Souls Day. Fishers explained that they learned from their parents or grand-parents not to go fishing in those days: "It's a tradition from our parents that we respect." Evangelical (Protestants, the other main religion in PG and IA) do not follow these norms.

#### ***Changes in the relationships among fishers over time***

Relationships among fishers have been changing over time, and fishers feel unenthusiastic about this, which they have associated with further changes in the community, in fishing gear or technology, and in resources abundance. To explain that arguments among fishers are recent, an elder stated that "In the past everyone would catch fish, so everyone was happy." Changes in fishing practices have created differences among fishers: even though there has never been a "timetable norm" for fishing, nowadays several fishers (especially the elders) feel dissatisfied with the others going fishing both during the day and at night, because this affects resource abundance. Some of the changes that have occurred in the relationships among fishers (which will be explained in what follows) include: lower respect, reduced information management about fishing spots, reduced fish exchange, and increased fish stealing.

### *Lower respect among fishers*

According to fishers, there used to be greater respect and unity among them. One fisher explained that after the construction of the highway BR-101 (locally known as Rio-Santos), in 1973, people in the community saw many new things which influenced relationships. Another fisher argued that nowadays there is lower respect among them because the eldest generation of fishers has already died; the eldest have more respect for others. Other fishers referred to the emergence of a selfish or competing behaviour among fishers. For instance, “In the past there was respect [among fishers]. Everybody used to work together. It didn’t exist that [feeling] of being willing to earn more than the other.”

### *Reduced information management about fishing spots*

Fishers explained that due to resource decline, they are now more careful when sharing information about fishing spots. They do not tell the spot’s location to everybody, and misinformation (or lying) is more frequent (although it has always occurred). For instance, one fisher explained that he usually leaves gillnets in the sea constantly from October to April. If he tells the truth of where his gillnets are, other fishers will set their gear over his, which is the reason why he prefers to lie. He explained that this is because there are fishers who only go fishing when they get to know that others got a good catch, especially during the *robalo* season.

### *Reduced fish exchange among fishers*

As fishers explained, in the past, as resources were abundant, it was frequent to give fish to friends, family and neighbours. Even though this still occurs today, it is not that frequent anymore. One fisher commented that “in the past fishers used to catch 100 kg of catfish or 100-150 kg of weakfish, and they would say ‘you could take as much fish as you want for you’.” Another fisher referred to the low market value of fish in the past to explain the frequent behavior of sharing fish.

### *Increased fish stealing*

Stealing high market value fish (*robalo*, weakfish, shark) from gillnets is more frequent than it was in the past. Fishers gave several reasons to explain this fact: resource decline; need of money for alcohol consumption by fishers or drugs consumption by non-fishers; or young people on the “wrong track” (i.e. the elders do not steal). Moreover, fishers explained that fish stealing has been facilitated by changes in fishing practices, such as leaving gillnets in the sea

for long periods (e.g. at night) and the use of lights in the nets. When lights started to be used on nets so as trawlers could detect them and avoid them, fishers had no need to stay at night in the boat close to the nets. However, according to fishers, lights have become signals for those looking for gillnets where they can steal fish.

There is no apparent sanction for fish stealing. Some fishers argued that they do not like to punish others, whereas others explained that it is difficult to find the person at the crime scene. The level of trust among fishers is in some cases influenced by this the stealing of fish and even sometimes gillnets. As one fisher from Praia Grande pointed out, “I know trustworthy people. I think that those are a minority. There used to be one, two fishers who stole because they were drug users; they stole to buy drugs. ... Out of ten fishers [from PG], I’ll trust three.” However, according to some fishers, fish stealing occurs mainly by fishers from other communities.

### ***Weak organization and collective action***

Fishers’ weak organization, or lack thereof, was a recurrent theme in conversations with fishers and other stakeholders. Even though there has been a community organization both in Praia Grande and Ilha do Araújo (“Associação de Moradores e Pescadores” – residents’ and fishers’ association), for six and eight years, respectively, the majority of fishers do not actively participate in it (e.g. they do not attend meetings). Furthermore, only a few community members participate in meetings or support the associations’ initiatives. Some fishers and other residents stated that they stopped attending the meetings because nothing improved in the community afterwards and they felt they were wasting their time. In 2011, the presidents of these associations (two fishers) were not legitimately perceived by part of the community. Indeed, the president of the association in Praia Grande had not been elected by the community but appointed by the previous president. This was one of the reasons that led a group in the community to organize the association’s elections in April 2012.

Even though fishers stated that they have a good relationship among themselves, most argued that this relationship needs improvement because they are not enough united or they are not united at all. Some quotes illustrate this better: “Fishers trust no other fisher! They are the most disunited thing I’ve seen on Earth.”; “Half [of the fishers] are united, half not. It’s a difficult class to understand, fishers’ class.” Fishers explained that they only unite in tragedies, and gave several examples of their lack of unity: (a) they do not have the strength to ask for government financial support; (b) fishers do not even get united to protest when there is a new law or regulation with which they disagree; (c) some go fishing during the closed season; (d) some fishers do not inform the rest when IBAMA is doing enforcement; (e) some want to get better catches than the rest; (f) fishers lie to each other; (g) few fishers attend meetings at the Colônia;



and (h) fishers sell their catch to fish buyers instead of associating to sell fish directly to consumers.

In fact, related to the last example of lack of unity, most fishers expressed that they wish there was a cooperative for direct marketing, avoiding fish buyers. Some fishers seem hopeful about creating a cooperative, whereas others are hopeless due to their disunity:

“There should be a [plot of] land where we could build a kind of fish market, to sell our product there and to CEASA [regional market in RJ State], fish markets in the city [Paraty]. That’s on paper but it’s never come out. There’s no unity. They try to unite ten boats, but nobody agrees because one wants to be better than the other. Fishers want to earn more than the rest. They think that they have to work on their own.”

Another fisher referred to the lack of trust to explain why there is no cooperative, whereas others considered that their relationship would improve with a cooperative: “It would improve if fishers reached an agreement and created a cooperative. Fishers are afraid that it won’t work out!”. Thirty to forty years ago (1970s-80s), one fisher from Praia Grande would bring his catch to sell it at a cooperative in Paraty. He explained that the cooperative was not successful because of financial irregularities. This fisher, who has been selling his catch to the same fish buyer in PG for 30 years, considers that it is better to sell this way because he does not waste time going to Paraty (which prevented him from going fishing every day). The President of the Colônia (when interviewed in 2010) stated that “Every cooperative which was created didn’t work out. Thus, fishers don’t believe much in cooperatives.” In April 2012, the president of the community association in Ilha do Araújo, mentioned that he was planning to organize a fishers’ meeting to discuss the possibility of getting a truck to sell their catch in the city, instead of the fish buyers. He added that fishers are not prepared to form a cooperative but he wanted to make the effort, although being aware that it would be difficult to get fishers together for that meeting.

Interestingly, fishers from PG and IA perceive that IA fishers are more united. Kinship was the reason that one fisher from IA used to explain this finding: “The Island is a single family, two big families actually”. Moreover, one fisher from PG, when explaining that IA community is more united, stated that they organize community festivals in which the community members participate with no profit reason in mind, whereas in PG the community does not participate in festivals. Besides fishers, other community members share this perception that the community of IA is more united (i.e. community members are closer to each other) than in PG. It is also likely that the isolated nature of IA has influenced these closer ties within the community.

### **9.3.2. Relationships between fishers and external stakeholders: linking social capital**

This section focuses on the relationship between fishers and external stakeholders, based on fishers’ perspective (as most of this chapter is). During the first month of fieldwork in

Praia Grande and Ilha do Araújo, through informal conversations with fishers, I got an initial understanding of fishery stakeholders in Paraty, based on which I prepared interview questions to enquire about fishers' relationships with fish buyers, the Colônia de Pescadores de Paraty, Prefeitura (Municipal Government), Capitania dos Portos (Coast Guard), IBAMA (Brazilian Institute of Environment and Renewable Natural Resources), and Ministry of Fisheries and Aquaculture (MPA). When selecting these stakeholders I also took into consideration that some were equivalent to fishery stakeholders in Piriápolis (Table 9.6), which would help the comparative analysis of my research. This is not meant to say that all fishery stakeholders were covered in my case study in Praia Grande / Ilha do Araújo. In fact, there are several other government agencies involved, such as ICMBio (in charge of protected area management) and FIPERJ (promoting fisheries and aquaculture sustainable development). However, when I asked fishers about them, almost all stated that they did not know them.

**Table 9.6.** External stakeholders included in the analysis of linking social capital in Paraty, with the correspondence in Piriápolis

<b>Stakeholder</b>	<b>Paraty (Brazil)</b>	<b>Piriápolis (Uruguay)</b>
Fish buyers	<i>Peixaria</i> (local fish market), <i>compradores</i> , <i>atravessadores</i> , <i>intermediários</i>	<i>Intermediarios</i> , <i>compradores</i>
Fishers' union	Colônia de Pescadores de Paraty (Municipal level)	SUNTMA (National level)
Municipal Government	Prefeitura de Paraty	Municipio de Piriápolis
Coast Guard	Capitania dos Portos (Marinha do Brasil)	Prefectura Nacional Naval (PNN)
Management Agency	MPA, IBAMA and FIPERJ	DINARA
Enforcement Agency	IBAMA	DINARA

Each of the following sub-sections will analyze the relationship between fishers and external stakeholders, starting by their role or mission, and followed by a description of the changes that fishers identified in these relationships. Table 9.7 summarizes fishers' responses to the closed-ended questions about these linking relationships, their level of trust in external stakeholders, and the perceived changes. In addition to the data coming from fishers' interviews, two of these sub-sections were enriched by interviews with the proper "external stakeholders", the main fish buyer in Praia Grande and the president of the Colônia.

Additional external stakeholders to those shown in Table 9.6 deserve at least a brief mention: NGOs and universities. First, only one NGO working with Ilha do Araújo was identified (none in Praia Grande). This was a tourism-oriented NGO (Projeto Bagagem) based in Paraty, which assisted the communities of Ilha do Araújo and Trindade to build a community-based tourism project (funded by TAM airlines).<sup>118</sup> Second, even though most fishers stated that they have no relationship with universities or researchers, many remembered having been interviewed

<sup>118</sup> <http://roteioparaty.wordpress.com/>

by various researchers, apparently from UNICAMP (possibly the same IDRC project my research was part of). Some fishers expressed to be tired or dissatisfied of collaborating with research projects which would have no impact in decision making or in their fishery. Also, curiosity and distrust seemed to be growing among some community members in Praia Grande and Ilha do Araújo because of a sudden researchers' interest in the area. Indeed, a few fishers showed no intention of getting to know my research findings. As one of them argued, "Lots of research was done and they got to nothing. [Name of a researcher of the IDRC project] worked in the fish market and in the island, but the *cerco de robalo* wasn't forbidden." This and other fishers' comments suggest that their expectations from the research differ from those of the researcher, especially if the degree of collaboration during the research is low. For instance, one fisher mistrusted the ultimate goal of the study conducted at the fish market: he thought that the findings of the study would serve to prohibit gillnetting *robalo* (one of his fishing practices).

**Table 9.7.** Relationships between fishers and external stakeholders (linking social capital) (\*)

	Peixaria	Colônia de Pescadores	Prefeitura (Local Gov't)	Capitania (Coast Guard)	IBAMA	MPA (Ministry)
<b>Relationship</b>						
Bad	0	0	0	1/9	1/9	1/8
No relationship	0	0	1/9	1/9	4/9	4/8
Regular	2/9	2/9	2/9	1/9	2/9	2/8
Good	7/9	7/9	6/9	6/9	2/9	1/8
Very good	0	0	0	0	0	0
<b>Trust</b>						
None	0	0	2/7	1/7	3/9	2/5
Low	0	0	0	0	2/9	1/5
Medium	4/8	5/8	4/7	3/7	4/9	2/5
High	4/8	3/8	1/7	3/7	0	0
<b>Changes in relationships (**)</b>						
Improved	2/10	7/10	6/9	6/9	2/7	2/6
Not changed	7/10	3/10	3/9	3/9	4/7	3/6
Worsened	1/10	0	0	0	1/7	1/6

(\*) Ten fishers (five from each community) were interviewed regarding their relationship with and trust in the external stakeholders included in the table. The number of respondents to each closed-ended question varied because of time constraints during the interview or fishers' apparent dislike for the questions.

(\*\*) The question of whether fishers' relationships with external stakeholders changed over the last years was made as part of the validation interviews conducted in the one-year follow-up (April 2012).

### ***Fishers' relationship with the local fish buyer or fish market (peixaria)***

The majority of fishers from PG/IA sell their entire catch to the local fish market (*peixaria*) in Praia Grande, owned by Sinésio, a fish buyer or middleman. The creation of the *peixaria* 30 years ago is seen by fishers as a positive change in the communities because previous to that they had to go to Paraty (even paddling) to sell their catch. Most fishers stated that they have a

good and trusting relationship (medium-high trust) with Sinésio, who was born in Praia Grande and was a fisher for 15 years. Fishers who sell their catch to Sinésio can get oil, ice, and sometimes bait, at cost price from him, which he would deduct from their payment. As one fisher explained, “Nowadays we deliver [the catch] there because of the facility to get oil. You cannot get oil [at the *peixaria*] to do tourism [boat trips], only for fishing. [Sinésio] sells ice to everyone. Long ago he wouldn’t sell ice; as fish was getting scarce, he started to charge for the ice.”

Moreover, fishers can ask Sinésio for small amounts of money if they need an advance. The frequency with which fishers ask for advances varies from every week to once or twice a year. One fisher pointed out that “You ask for 200-300 R\$ and every week he deducts 50. You decide how you want the deduction. Sometimes you don’t pay back till after a month. [Sinésio] understands fishers’ situation. That’s why we deliver [the catch] there. He helps us.” This quotation illustrates reciprocity as part of fishers-fish buyer relationship. Only one fisher stated that he never asks Sinésio for an advance, explaining that he knows that he cannot spend more than he earns. During an interview with Sinésio, he said that the relationship with fishers is good because they are trustworthy (reliable) and he has known them for a long time. He added that he does not give money in advance to every fisher; “If they don’t give preference to us, we cannot supply them. We don’t force them to sell [their catch] here. Sometimes they say that the price is better in another place and that’s ok.” When fishers need to buy fishing gear, they either ask Sinésio to get it for them or pay in installments at city stores. Except for one fisher, they do not ask friends or family to lend them money: “I don’t. I ask [for money] where I deliver [the catch]. That’s where I feel trust.”

In fact, some fishers stated that Sinésio is the best fish buyer Praia Grande ever had. An elder fisher commented that if Sinesio’s *peixaria* closed, he would sell his boat because he would not sell fish to a different fish buyer. This illustrates the intimate and faithful relationship some fishers have with Sinésio. There are fishers who also buy fish from the *peixaria*, either for home consumption or for their small restaurants. In these cases, those fishers having a stable relationship with Sinésio (i.e. selling the catch regularly to him) get better prices (fish cost price), a further advantage of selling at the *peixaria*. Nevertheless, some fishers identified disadvantages in the relationship with Sinésio. First, fish prices are not as good as in Paraty fish markets. Fishers complained that Sinésio pays little to them but then sells the fish at a much higher price. For instance, he would pay to fishers 0.50 R\$/kg of small mullet while selling it to consumers at 4 R\$. Second, some fishers feel dependent on Sinésio and wish they could sell their catch directly to consumers. Only the minority of fishers sell fish, shrimp and crabs to restaurants, inns or directly to tourists. A third disadvantage of selling fish to Sinésio is that fishers only get to know every Saturday how much money they will earn (that is the day in which they get paid). Apparently, Sinésio sets the price he pays to fishers according to the market price. When fishers were asked whether their relationship with Sinésio changed over the last years,

most of them explained that it has always been good or very good, whereas two stated that the relationship improved (e.g. prices are a little higher now). Only one fisher mentioned that the relationship is not as friendly as in the past, since Sinesio's son became the administrator of the *peixaria*.

A few fishers from PG/IA have a stable relationship with other fish buyers. Two fish buyers come sometimes to Praia Grande to buy the catch of 3-4 boats from Ilha do Araújo. As Sinésio explained, "Those [fishers] are their clients. One fish buyer does not get into other's clients". This shows a respectful relationship between fish buyers. In the past, more fish buyers would come to Praia Grande sporadically: fishers would have the chance to get better prices but they would get more benefits by having a stable relationship with the local fish buyer (Sinésio). Although less frequently, this still occurs during summertime, when additional fish buyers offer better shrimp prices. There is one fish buyer living close to Praia Grande who is known for buying undersized shrimp during the closed season (when saling shrimp is not allowed). According to fishers, in the past no fish buyer would buy small shrimp; now all sizes are sold, affecting shrimp overexploitation, they explained.

At least one fisher does not have a stable relationship with a certain fish buyer. Instead, he looks for the highest price every time he goes fishing in order to make the decision of where selling his catch. Sometimes, the fish buyer comes to Praia Grande to pick up the fish and other times the fisher takes it to Paraty, spending time and money (for oil). Two disadvantages of this strategy are that the fisher has to get oil and ice in the city, and also, that sometimes it takes a while before he gets paid by the fish buyer. This fisher explained that occasionally he gets oil from Sinésio, and in these situations he sells the catch to him, as this is the norm. Finally, a few fishers have a different selling strategy: they sell part of their catch to Sinésio, so as to be able to "profit" from the relationship (oil, ice, advances), and sell the rest to a fish buyer offering a better price.

### ***Fishers' relationship with the Colônia de Pescadores de Paraty***

As its President (2010-2014) stated during an interview, the Colônia in Paraty was created in the 1980s. He also explained that,

"The Colônia is a federal government body. It is a strong fishers' union. We are a service provider. Here we issue all the documentation that fishers need to have: fisher record [*registro de pescador, carteirinha*], fishing license. We have support from the government. That is why we need to be connected to the federal government."

In these words there seems to be confusion in whether the Colônia is part of the Brazilian government or if it just receives support from it. This confusion, which can be related to the Colônia's top-down and military origin (Breton et al. 1996), is also observed when talking to fishers. Some of them assured that the Colônia is a government body, whereas others argued

that it is not. As its president explained, the Colônia is the nexus between fishers and government agencies, such as the MPA and Prefeitura de Paraty when it comes to doing the paperwork for receiving the subsidies that the two give to fishers during the shrimp closed season. Moreover, the Colônia does the paperwork for fishers' retirement, in coordination with the INSS. To be affiliated to the Colônia fishers pay 15 R\$ every month (it used to be 10 R\$ in 2011). After retirement, fishers stop paying this amount but keep affiliated. In April 2012, the President of the Colônia stated that 1,500 fishers pay the membership fees out of the 3,000 fishers in Paraty (many of who are retired).

Another important role of the Colônia, as its president stated, is to represent fishers (small- and large-scale): "If there is a meeting [with any government agency], the Colônia has to be there representing the fishers, and defending them too." All fishers in Praia Grande and Ilha do Araújo agreed that the president of the Colônia represents them (not only the current president but the previous one): "Nowadays, without a fisher association [in Praia Grande], the representative is the president of the Colônia." Another fisher pointed out that "It's an obligation [of the president to represents them]. [President's name] is a native fisher, a fisher's son. ... Our legal representative is the president, but he has to come to the community" (adding that he has never come to Praia Grande).

Most fishers from Praia Grande and Ilha do Araújo stated that they have a good relationship with the Colônia and feel medium or high trust in it. However, several fishers expressed dissatisfaction with the services provided by the Colônia or its internal functioning (e.g. there is corruption). In addition, fishers complained that the Colônia has neither a doctor nor a dentist (services that Colônias were supposed to provide in the past, Breton et al. 1996), and that paperwork takes too long (e.g. for retirement or license renewal). However, a few fishers noted that the latter is because of other agencies' delay (e.g. INSS, MPA). Occasionally, the Colônia helps fishers get loans from PRONAF (National Program for the Strengthening of Family Agriculture - Bank of Brazil), although a few mentioned that small-scale fishers do not get them.

Very few fishers from the studied communities (and the entire municipality) attend the assemblies at the Colônia. Those fishers who do not participate, explained that the meetings lack order, respect and effectiveness to resolve the issues discussed. Interestingly, none of the six fishers who stated that they participate in the Colônia's meetings actually attended the assembly I was able to observe (in December 2010), which was the first one of the new directorate. During this assembly, the president and other members of the directorate showed concern about the low fisher participation, arguing that "fishers lack interest to improve things". Three fishers from Praia Grande and Ilha do Araújo are members of the Colônia's council (part of the directorate). However, from what I could observe in the field, these council members are not a nexus between the community fishers and the Colônia. In other words, there does not seem to be a fluent communication between the council members and the rest of the fishers (e.g. a few fishers did

not even know which fishers were members of the council). When I asked fishers how they got to know about these meetings or assemblies, they explained that there are usually posters (announcements) in the Colônia, and thus, they get informed when they go to pay the membership fees or to do some paperwork. One employee of the Colônia explained that they also communicate with fishers through the radio (VHF); but most fishers from PG/IA do not have one, or if they do, they do not use it. Therefore, communication between the Colônia and the fishers needs improvement.

The President of the Colônia as well as fishers from both communities identified two main achievements of this organization in 2012. First, canoe fishers (200 in Paraty municipality) became registered in the MPA and Coast Guard, and thus, they started receiving the subsidies during the shrimp closed season. Second, after being interviewed by the MPA to make sure they work in the shrimp fishery, an increased number of women have been receiving subsidies too. Nonetheless, most boat fishers had not received any payment by the end of April 2012, although the shrimp fishery closed in March 1<sup>st</sup>. As the President of the Colônia explained, this delay was because the MPA was requiring the original documents of every fisher in order to renew their fishing license (which the fishers then had to present at the Ministry of Labour). Another problem, according to him, is that the renewed licenses expire in less than a year.

Most fishers recognized that their relationship with the Colônia improved over the last few years. They, again, explained that the current president is a fisher or fisher's son, and that a Paraty Councilman who helps fishers (Luciano Vidal) is part of the Colônia. As one fisher stated,

“The relationship [with the Colônia] improved 1-2 years ago [2010-2011]. The president is a fisher; he does everything right. But fishers need a dentist and there's none, even though we pay [the membership fees] monthly. ... The previous president would not dialogue with fishers. The Colônia used to be the way he wanted. Now it is the way we want.”

Nonetheless, some fishers did not notice a change in their relationship with the Colônia over time. For instance, the President of the community association in Ilha do Araújo stated: “I think it's the same. The Colônia was made for that, it's the actual representative of fishers. Those who are unsatisfied do not understand that it was created for that.”

### ***Fishers' relationship with the Prefeitura de Paraty (Municipal Government)***

Most fishers stated that they have a good and trustful relationship with the Municipal Government, mainly because this organization provides a subsidy during the shrimp closed season. However, a few fishers do not trust it because the representatives invest money only in the communities where they got most votes, and they do not do what they promised during the electoral campaign (e.g. dock maintenance, sewage treatment). As one fisher pointed out,

“[From the Prefeitura] we only get that support [the subsidy] during the closed season but the community needs a sewage network. The current Mayor was elected about eight years

ago and he does nothing. He only comes to look for votes. The subsidy started thanks to a Councilman who was a fisher [L. Vidal], not the Mayor.”

When fishers complained about the little money the Prefeitura invests in their communities, they explained that the Municipal Government has been receiving increased funding from the Pre-Salt offshore oil exploitation and nuclear power plant. Also, corruption in the Prefeitura was frequently mentioned by fishers and other community members, as well as when referring to other government organizations.

Most fishers recognized that the relationship with the Prefeitura improved over the last three years: they started to receive the subsidy in 2008-2009, which increased in 2012 to 1,500 R\$ (for the three months of the shrimp closed season). However, some fishers complained about the Prefeitura’s failure to comply with its enforcement role in the Paraty bay, apparently in charge of the Municipal Secretariat of Fisheries and Agriculture. The President of the Colônia also complained about this Secretariat not doing enforcement during the shrimp closed season, as well as about its absence during meetings to discuss fishery issues. It is worth noting, however, that enforcing fisheries regulations is not among the mandates of the Municipal Secretariat of Fisheries and Agriculture (L.G. de Araújo, pers. comm., March 2013). IBAMA is the enforcement agency.

### ***Fishers’ relationship with the Capitania dos Portos (Coast Guard)***

The Capitania dos Portos (within the Marinha do Brasil - Brazilian Navy) is a military organization responsible for safe waterway traffic.<sup>119</sup> Most fishers reported a good relationship with the Coast Guard, with medium or high trust in it. In fact, the Coast Guard seems to be the government organization with which fishers have the most trustful relationship. One fisher recognized that this agency “is among the best government bodies in Brazil”, and another one stated that the Coast Guard “is the only state body in which fishers trust; they do a nice job.” The Coast Guard is in charge of fishers’ safety at sea and navigation permits, including the licenses for doing tourist boat trips. When talking about this agency, fishers would always refer to their educated employees, who are not aggressive towards them when enforcing regulations, unlike IBAMA’s employees who are.

However, those fishers who do not have in the boat all the required safety equipment did not recognize having a good relationship with the Coast Guard. They complained that the requirements are too many, that some equipment is expensive and not essential. Also, one fisher expressed that the Coast Guard demands more from fishers than from tourist boats. Nevertheless, most fishers recognized that the agency is quite flexible with them, giving them time to get all the equipment without fining them:

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<sup>119</sup> <https://www.cprj.mar.mil.br/missao.html>



“The Coast Guard tries to assist fishers. They are educated. They are there to enforce [regulations] but they don’t come with ignorance. If you don’t have a lifejacket, they’ll give you some time. Only if you are caught twice [without the lifejacket], you’ll have to pay a fine. The relationship with the Coast Guard is nice. If your documents expired 2-3 years ago, you just go there [to the office] and they’ll help you, they don’t fine you.”

Sometimes, to avoid paying the fine, fishers give fish and shrimp to the Coast Guard employees, although this behaviour is not widely accepted among fishers. Interestingly, some fishers noted that the relationship with the agency depends on the lieutenant in charge. One fisher who feels medium trust in this organization explained that he cannot feel high trust because positions at the Coast Guard are renewed frequently.

According to most fishers, the relationship with the Coast Guard has improved over the last few years: they are treated better than in the past; paperwork takes less time because documents are not sent to Rio de Janeiro anymore; canoe fishers are now registered in this organization, thanks to a Councilman (L. Vidal). In one fisher words, “[The Coast Guard] used to be worse, more severe. They were trained as military. Today they are partners. It’s a state body that enforces the law; they can’t be [our] friends.”

### ***Fishers’ relationship with IBAMA (Brazilian Institute of Environment and Renewable Natural Resources)***

IBAMA is the government agency which fishers mentioned most frequently. Its mission is to protect the environment and guarantee the sustainability of natural resources use, aiming at promoting environmental quality favourable for life.<sup>120</sup> IBAMA is partially in charge of fisheries management (mainly under the duties of the MPA) and also enforcement. About half of the interviewed fishers from PG/IA stated that they had no relationship with IBAMA, whereas this relationship was bad, regular, or good according to others. When the former explained the lack of relationship, which made them unhappy, they indeed had a bad relationship with IBAMA: “There’s none [i.e. no relationship]. When they come, it’s to punish. They arrive and threaten us. I think there’s no relationship because otherwise they would listen to us. They just listen to businessmen.” The first part of the quotation refers to the enforcement role of IBAMA.

Even though some fishers feel medium trust in IBAMA, others only feel low trust in this agency or none. The reasons are diverse: IBAMA does not listen to them (e.g. when they report that there are boats fishing shrimp during the closed season); IBAMA cares more about the big vessels rather than the small boats; and there is corruption within the agency. As one fisher stated, “I don’t trust [IBAMA]. ... [Name of an officer] does not communicate at all, and he can’t explain anything. The Coast Guard does talk with fishers and explains things. IBAMA does not.”

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<sup>120</sup> <http://www.ibama.gov.br/acesso-a-informacao/identidade-organizacional>

The origins of fishers' dissatisfaction with IBAMA can be summarized as follows: (1) fishers' disagreement with the date of the shrimp closed season (see Section 9.4.1); (2) IBAMA's unawareness of the local reality of the fishery; (3) aggressive behaviour towards fishers; (4) permission to use non-selective gear, such as trawling, purse-seiners, *cercos de robalo*; (5) poor enforcement of regulations; and (6) non-fishing zones inside protected areas (conservation units of integral protection, i.e. no-take), such as the ecological station (ESEC) Tamoios. Even though most fishers do not know that ICMBio is the current government agency in charge of protected areas management, IBAMA does still participate in enforcing regulations in the ESEC Tamoios.

With regards to the poor enforcement conducted by IBAMA, fishers commented that it is because of the low number of employees and boats. Indeed, this is one of the reasons why fishers do not report to IBAMA if another fisher is breaking the law (e.g. fishing during the closed season); "if you report, they won't come". However, fishers also decide not to report because they are afraid of reprisals, or because fishing is increasingly hard due to resource decline. Also, other fishers believe that it's part of IBAMA's job: "I don't like to be a stool pigeon [or squealer, *dedo-duro*]. Authorities are to do that." None of the interviewed fishers ever reported another fisher. Nevertheless, a few of them were reported once, apparently for mistaken reasons (e.g. they were accused of fishing in a protected area but they were not fishing there). This suggests that, although rarely, reporting takes place. This is an example of inter-related linking and bonding social capital. Moreover, one fisher explained that the complicated relationship with IBAMA (i.e. linking social capital) and the deficiencies of this agency, such as poor enforcement, discourage them when trying to organize as a group (i.e. bonding social capital).

According to most fishers, their relationship with IBAMA has not changed over the last few years (it is still not good) or got worse. Two fishers, however, recognized some improvement. For instance, one explained that his perception of IBAMA changed as he got to know IBAMA people in meetings, and that they now respect him; "They changed from being an oppressor organization to becoming a partner." He thinks that fishers' perceptions of IBAMA, and the trust in this agency, would change if they participated in meetings, and worked together with the government<sup>121</sup>. When fishers were asked with which government organization they would most prefer their relationship to improve, IBAMA was frequently mentioned. Indeed, fishers recognized that in order to improve this relationship, more dialogue and meetings were needed.

### ***Fishers' relationship with the MPA (Ministry of Fisheries and Aquaculture)***

The Ministry of Fisheries and Aquaculture (MPA) is responsible for implementing a national fishery and aquaculture policy, transforming this economic activity in a sustainable

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<sup>121</sup> It is worth noting, nevertheless, that this fisher was probably referring to ICMBio (instead of IBAMA) because that is the organization in charge of the protected area meetings he has been attending.

source of jobs, income, and wealth.<sup>122</sup> The relationship between fishers and the MPA seems to be more distant compared to that with IBAMA. Half of the fishers stated that they have no relationship with the MPA, arguing that they do not know who the Minister is, and/or that the Colônia is the organization which connects them to the Ministry. Other fishers, however, identified a regular or bad relationship with this government agency, while only one recognized having a good relationship. Fishers referred to the MPA mainly in relation to fishing licenses. At the time of this research, according to the president of the Colônia, the MPA was only issuing new licenses to catch fish (e.g. using gillnets, long-lines), not for shrimp trawling, which represented 300 out of the 900 fishing licenses in Paraty Municipality. Fishers have to renew their license(s) annually, and the Colônia assists them in that.

The level of trust that fishers feel in the MPA varied from none to medium. Several reasons make fishers not trust the MPA much. First, it is an unstable or fluctuating organization (compared to other ministries) because of the several reforms it has had (since the creation of the SEAP - Special Secretariat of Aquaculture and Fisheries in 2003), and there is corruption. Second, the Minister at the time (Marcelo Crivella) expressed publicly his complete lack of knowledge about fisheries, making fishers dissatisfied about it: "The Minister of Fisheries doesn't even know what a hook is! It should be someone knowing the fishery reality. He's there only to earn the Minister salary." A third reason for not trusting the MPA is its distance from fishing communities; several fishers claimed that the Minister or other MPA employees should come to PG/IA to talk with them. Moreover, fishers complained that renewing fishing licenses takes too long and the MPA does not explain why this is so .

Some fishers recognized that the relationship with MPA has not changed over the last few years, referring to the above reasons, while at the same time noting that they wish it could improve. At least one fisher stated that this relationship got worse, and argued that the MPA does not allow them to stay close to some islands (part of the ESEC Tamoios). However, this is just another example of fishers' confusion regarding government agencies: it is not the MPA which is in charge of protected areas but ICMBio. According to a couple of fishers, the relationship with MPA has improved a little over time thanks to L. Vidal, who was politically appointed by the Minister of Fisheries as the Rio de Janeiro Superintendent in September 2011, for a few months.

#### **9.4. FISHERS' ACTUAL AND DESIRED PARTICIPATION IN DECISION-MAKING**

In this section I first explore the current state of fishers' participation, including recent government initiatives for collaborative decision-making. I then analyze the fishers' desires and

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<sup>122</sup> <http://www.mpa.gov.br/index.php/ministeriomp/estrutura>

expectations regarding participation. The two final sub-sections focus on a phenomenon also observed in coastal Uruguay: low fisher participation in meetings with the government.<sup>123</sup>

#### **9.4.1. Fishers' perspectives regarding their participation in fisheries management**

Fishers from Praia Grande and Ilha do Araújo are not satisfied with the prevalent top-down management regime which does not take into consideration their knowledge about the fishery. Some fishers stated that there are no participation opportunities with the government and no dialogue. Other fishers explained that fisher participation is only through the Colônia; it is the Colônia which interacts with the government. However, a few fishers were aware of meetings which they should attend, while others mentioned they become aware after it already happened. Except for very few fishers who participate in meetings with the government, the rest of the fishers interviewed stated that the last of these meetings which they have attended was two to six years ago (2006-2010). A few fishers referred to the Colônia meetings in these responses, which might be a consequence of considering it as a government organization.

As an example of a meeting with the government, one fisher referred to one he attended in 2008-2009, in which he took undersized shrimp to show it to the government (SEAP), supporting his argument that the date of the shrimp closed season was not accurate (i.e. small shrimps are caught before the fishery closes). As this fisher added, "We were not heard. The date [of the closed season] remained as it was." Indeed, no fisher in PG/IA agreed with the period when the shrimp fishery closes; fishers stated that the closed season should be earlier in the year. A few fishers had the chance to tell this information to IBAMA during informative meetings in Paraty city, but according to fishers, they were ignored. As one fisher commented,

"They [IBAMA] do not listen to us. Fishers have already told them that they have to change the closed season because shrimps start to reproduce in December [not in March]. But IBAMA thinks that fishers are ignorant, with no theory... They have theory, because they've studied, but don't have practice; they know nothing about here."

Nevertheless, it is worth mentioning that the current date of the shrimp closed season was determined by IBAMA after having meetings with fishery stakeholders in several States of Brazil (Espírito Santo, Rio de Janeiro, São Paulo, Paraná and Santa Catarina) (Instrução Normativa N<sup>o</sup>189, 2008), although the participatory nature of these meetings and the representativeness of artisanal fishers' voice were criticized (Medeiros 2009).

In addition to the shrimp closed season, fishers frequently complained for not having been consulted when the no-take protected area ESEC Tamoios was delimited: "No fisher was even informed. It is said that they mapped the area through a satellite. It's something the

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<sup>123</sup> Most of this section has been included in the article: Trimble, M., Araujo, L.G. & C.S. Seixas. (*Under review*). One party does not tango! Fishers' non-participation as a barrier to co-management in Paraty (coastal Brazil). *Ocean and Coastal Management*.

government did.” This protected area was negatively perceived by every fisher. As expected in situations where measures are taken top-down, most fishers did not know why this protected area was implemented. Many fishers speculated that the protected area was implemented with conservation purposes.

When fishers were asked if there were meetings in which the ESEC Tamoios was discussed in any way, some responded that there have not been meetings, whereas others argued that there were meetings but they were not informed about them or they did not want to attend. Two fishers’ quotations illustrate the latter: “I don’t trust meetings. ... You arrive there and you don’t get to talk”; “I don’t go [to meetings]. They talk and talk, and nothing is resolved. I’ve been in many [meetings] already.” In April 2012, only one fisher was aware of the intentions at the ESEC Tamoios (publicly stated in March 2012) of starting a participatory process with fishers to review the current regulations in this protected area and potentially create new ones, as part of the Commitment Terms. This management tool institutionalized by federal legislation was adopted by ICMBio to manage conflicts regarding the access and use of natural resources by local/traditional communities. The fisher who was aware of this has been participating (as president of the community association of Ilha do Araújo) in the consultative council of the protected area since 2008. In fact, he was the only fisher who recognized that fisheries co-management was taking place in Paraty, giving the ESEC Tamoios as an example of collaborative decision-making between fishers and the government.<sup>124</sup>

### ***“Acordo de Pesca” (Fishing Agreement) for Ilha Grande Bay***

At the time of my first field season (2010-2011), a fishing agreement (type of co-management arrangement) was in the process of being institutionalized in Ilha Grande Bay by the Ministry of Fisheries and Aquaculture in collaboration with additional organizations. From 2009 to 2011, MPA, FIPERJ and UFRJ (Federal University of Rio de Janeiro) worked jointly on the development of the project to build the “fishing agreement project”. Other organizations became involved later on: the municipal governments, the Colônia de Pescadores and the Association of Fish Farmers of Paraty (AMAPAR). Neither the origin of the government interest to implement a fishing agreement in Ilha Grande Bay, nor its intentions, was clear.

The perceptions of members of different organizations about the fishing agreement varied greatly, which could be seen as a consequence of a project with unclear origins. At the municipal government, L. Vidal (Councilman) perceived the fishing agreement as an opportunity to achieve synergy among all stakeholders, while at the same time he stated that it could serve to determine the size of the boats allowed to fish in the bay. The president of the Fisheries Municipal Council (Paraty) perceived the project as an opportunity to legalize those fishers who

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<sup>124</sup> However, no decision has been made jointly in this protected area as of December 2012.

do not hold a license. More cautiously, an IBAMA official recognized the greater complexities of implementing a fishing agreement on the coast compared to the Amazon, where there is a tradition of this co-management arrangement. Lastly, the president of the Colônia stated that the fishing agreement would serve to eliminate the no-take zone of the ESEC Tamoios (“ESEC Tamoios is harming fishers too much, so this fishing agreement came to help fishers in that regard”).

For some organizations, such as UFRJ and MPA, the Colônia was perceived as the link with fishers, for example, to invite them to meetings or project activities. However, during my experience in the field I observed that this was not the case. No fisher from Praia Grande or Ilha do Araújo was informed about a training course of fisheries co-management (which took place in Angra dos Reis, November 2010), organized by UFRJ and connected to the project to build the fishing agreement project. Moreover, only 6 out of 16 fishers had heard that a fishing agreement was intended for Ilha Grande Bay. Two fishers (of the six), casually one from each community, participated in a meeting where the fishing agreement project was discussed. The rest of the fishers did not really know what this agreement was about. The fisher from IA showed to be distrustful about the project: “This is all politics. It’s always for the benefit of the larger-ones [industrial], never for the small-ones [artisanal]... If it was clarified, it would be fine. ... It’s not enough to do two meetings with the fishers.” On the other hand, the fisher from PG valued the fishing agreement because it would serve to determine that only fishers from Paraty Bay could fish here. Thus, fishers’ perceptions and expectations about the project were diverse. Fishers perceived the fishing agreement as an opportunity to propose the management measures they thought were needed. For example, one fisher commented that if the project forbid trawling and *cercos*, it would be good, because they have ruined the fishery. Also, another fisher stated that the project could serve to modify the date of the closed season.

In April 2012, during my second field season, the IA fisher who had stated that fishing agreement “is all politics” was very satisfied about the achievements of the project. He explained that the participatory initiative of ICMBio to discuss the ESEC Tamoios was part of this project, as it was the licensing of canoe fishers. In fact, both the president of the Colônia and the Councilman L. Vidal recognized that the first meeting to discuss the Commitment Terms at ESEC Tamoios was part of the fishing agreement.<sup>125</sup> Later on that day, Vidal explained that the fishing agreement project changed its title to what now is called “Public Policies Program for Co-management of Fishing and Aquaculture resources at Ilha Grande Bay”.<sup>126</sup>

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<sup>125</sup> However, there was no partnership between MPA and ICMBio, and there was even divergence between the two agencies regarding protected areas (L.G. de Araújo, pers. comm., March 2013).

<sup>126</sup> According to Pinto Joventino et al. (2013), government agencies were unhappy about the use of the term “fishing agreement” because of the many differences between the Amazon context (where fishing agreements originated) and Ilha Grande Bay, which could result in a very different process. With time, the name of the project was replaced by “Development of Management systems of fisheries and aquaculture at Ilha Grande Bay”.

#### 9.4.2. Fishers' willingness to participate in decision-making

Fishers in Praia Grande and Ilha do Araújo would like greater involvement in governance. When they were asked if the government should consider their opinions before taking fisheries measures, all replied affirmatively. While explaining their response, fishers referred to different kinds of knowledge and the need to combine them: "Fishers have more knowledge than them [the government]. They have the theory, fishers have the practice"; "[If they consulted us] they would understand what they do not know". During informal conversations, other fishers confirmed the need for a different kind of interaction between fishers and the government. For instance, one fisher stated that there should be a partnership (*parceria*) between government agencies and fishers, because "now it's IBAMA versus fishers".<sup>127</sup>

Fishers gave several examples of situations in which they should be consulted by the government, such as the determination of the date to close the shrimp fishery and the delimitation of areas to be protected, where government enforcement should be strong. When fishers were asked how they should be consulted, they responded that it could be during meetings in Paraty city or through collaborative research between fishers and the government about shrimp. A few fishers emphasized that the eldest fishers or those with more experience should participate in meetings with the government, along with members of the Colônia.

Women working in the fishery would like to be invited to meetings as well. When they were asked if the government should also consider their opinions, all replied affirmatively (7 out of 7). They argued that: "We also live from this [the fishery]"; "What we know, we've learned with them [fishermen]", "Why we can't participate? We see things that they [fishermen] do not". When asked the same question to fishermen, most of them (9 out of 10) replied that women working in the fishery should also be consulted by the government. Arguments given by men were diverse: women are equal to men because they also have the "fisher card" (*carteira de pescador*); women are part of the fishing family; women have learned from their fisher husband, father, and grandfather. Two other fishers made a link between women participation and the female president of the country. For instance, "Women do their part, they have their right. Women are taking an important role in the country, because we have a female president...". However, the one fisher who thinks that the government should not consult women's opinion argued that "they just peel shrimps... they have little knowledge".

Despite the great interest on participation that fishers (men and women) stated during interviews, the low number of fishers attending meetings, either with the government or in general (e.g. Colônia, community associations) was a recurrent theme. Thus, it is addressed next.

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<sup>127</sup> It is important to note that despite fishers continue talk about the government as IBAMA, most of the current interaction regarding ESEC Tamoios is between fishers and ICMBio, not IBAMA, although the latter does enforcement within the ESEC.

### **9.4.3. Reasons behind low fisher participation in meetings with the government**

While analyzing the reasons given by fishers to explain why they do not, or rarely do, participate in meetings with the government, three main themes or categories were identified: (1) Hierarchical governance, (2) Fishers-related barriers, and (3) Process deficiency. The first category, within which there were two subcategories (secondary categories), relates to prevalent top-down management. The second category, divided into three subcategories, included constraints that stemmed from fishers' traits, varying from their inner thoughts or feelings to their lack of organization as a group. The third category grouped all the reasons related to characteristics of meetings (i.e. processes deficiency), including three subcategories in a chronological order (previous and during the meeting, and its outcomes). In what follows, the subcategories within each of the three categories are described (see Table 9.8).

#### ***Hierarchical governance***

##### *Legislation*

One of the reasons identified by fishers for not participating in meetings is with regards to restrictive laws. These restrictive laws were made without taking into consideration fishers' voice (i.e. through hierarchical governance).

##### *Fishers-government relationship*

Another barrier which constrained fishers from participating was in regards to their relationship with government agencies. For example, in PG/IA, IBAMA has a reputation of not caring about fishers, or moreover, of protecting the environment in their detriment. As one fisher stated, "They are harming fishers... They don't do enforcement, so fishers don't attend. ... Fishers become discouraged. It's the same as the Municipal Government; [IBAMA] just listens to proposals, as politicians do."

#### ***Fishers-related barriers***

##### *Fishers' feelings/emotions or perceptions towards meetings*

Fishers usually commented that they do not like meetings in general. Another recurrent theme was that fishers are tired of meetings (i.e. meeting fatigue), especially so because these have not led to positive changes in the fishery (which is related to meetings' outcomes). Those few fishers who still participate in some meetings with the government argued that the main reason to explain fishers' low participation is their lack of interest and concern to become engaged in these processes (e.g. "Fishers are unconcerned; they don't care about tomorrow").



**Table 9.8.** Fishers' reasons for not participating in meetings with the government  
Reasons in bold font were those which fishers identified as the main reasons for not participating. The asterisk (\*) indicates the reasons that were initially observed by me and then validated by fishers (in the follow up).

Categories	Subcategories	Fishers' reasons for not participating
(1) Hierarchical governance	(i) Legislation	- <b>Restrictive laws</b>
	(ii) Fishers-government relationship	- IBAMA reputation <sup>1</sup> - <b>Government harms fishers</b>
(2) Fishers-related barriers	(i) Fishers' feelings/emotions or perceptions towards meetings	- Fishers dislike meetings - Meetings' fatigue - <b>Fishers' lack of interest</b> - <b>Fishers' lack of concern</b>
	(ii) Incompatibility between fishers' way of life and meetings	- Fishers are always fishing - There is no need for meetings - Fishers have other arranged commitments - Fishers are moving out from the fishery or complementing it with tourism-related activities (*)
	(iii) Representativeness	- <b>Lack of fisher association/organization</b> - Fishers are informed by those who attended the meeting - Young fishers should participate (according to retired ones) - A city councilman represents fishers - The Colônia's president represents fishers (*)
(3) Process deficiency	(i) Previous to meetings	- Inadequate notice - Inadequate date
	(ii) During meetings	- <b>Small-scale fishers are not listened</b> - <b>Only government opinion counts</b> - <b>There are arguments during meetings</b> - Fishers do not understand government language - People's talks overlap - Politicians participate in meetings and fishers distrust them
	(iii) Meetings' outcomes	- <b>Solutions are not found</b> - <b>Meetings are only informative or consultative; decisions are previously made</b> - There are few results from meetings - Nothing improves - <b>Government fails to keep promises</b> - <b>Requested enforcement is not achieved</b>

<sup>1</sup> It is worth noting that part of the bad reputation fishers attributed to IBAMA actually comes from duties corresponding to ICMBio, such as the management of the ESEC Tamoios.

### *Incompatibility between fishers' way of life and meetings*

Additional reasons that fishers mentioned for not participating in meetings were to be working at the time of the meeting (i.e. they are always fishing), which is related to the unpredictability of fishers' job, and having other commitments already arranged. Furthermore, some fishers argued that there is no need for meetings among themselves ("We talk to each other all day long; we don't need meetings"). This is related to the general fishers' dislike towards meetings, which might be preventing them from perceiving meetings with the government as worthwhile. Given that fishers from PG/IA are increasingly quitting the fishery and moving to work in tourism, with their children mostly studying or working on land rather than becoming fishers, this may be making fishers less motivated in engaging in participatory processes initiated by the government. This potential explanation for fisher low participation, originally posed by me, was confirmed by fishers, although it was not considered as one of the main reasons.

### *Representativeness*

As discussed earlier, there is one fisher in each community who usually attends the meetings organized by the government, but they neither define themselves as representatives nor are they seen as such by most fishers. According to a few fishers, if there was a fisher organization in the community, its president would be in permanent contact with the president of the Colônia in Paraty, and would encourage fishers to participate in meetings. In IA, the one fisher who participates in most meetings is the president of the community association, and for that reason, a few fishers think that he has the role of communicating to the rest what has been discussed in the meetings, which does not always happen. In fact, another reason why some fishers decided not to attend meetings is that they know that someone else will do it and they can ask him later. Moreover, a few elder and retired fishers claimed that it is not them who should participate but young fishers. Fishers' low participation was also associated to their feeling of being already represented by the city councilman L. Vidal. Given that fishers usually commented that they are represented by the president of the Colônia, it thought this could be a further reason for not participating (i.e. someone else is doing that for them). This was indeed confirmed by fishers; "[Participation] has to be by means of the Colônia. Fishers are not going to communicate with the government. They need to have a representative." However, some fishers argued that, besides representatives, more fishers should participate in government meetings.

### ***Process deficiency***

#### *Previous to meetings*

Fishers mentioned that a reason for not participating in meetings is not having been notified well in advance: "We get to know [of meetings] always late", the day before or when they

already happened. Moreover, the time of year can also influence fisher participation. For example, one fisher complained about meetings held in December because their work is very intense during that month.

#### *During meetings*

Fishers mentioned several aspects that they disliked about meetings with the government. First, their voices were not listened to, and only the government and scientific viewpoints were considered. Second, a few fishers mentioned that they did not feel like going to meetings because they did not understand what government people said. Furthermore, another aspect that fishers disliked was that everyone would talk at the same time, in a very disordered manner, being arguments also frequent. Finally, meetings with the government are usually associated with politicians, whose presence is not appreciated by fishers. Indeed, some fishers decided not to attend meetings because they did not want to have anything to do with politicians (e.g. known as corrupts).

#### *Meetings' outcomes*

One main reason why only few fishers participate in meetings with the government lies on their poor outcomes. Fishers frequently commented that nothing improves through meetings and that these just lead to few results. As one fisher pointed out, “[The government] does lots of meetings but no solution is found.” In fact, another fisher stated that he decided not to attend any more meetings because “You end up leaving [the meeting] unsatisfied.” Several other fishers claimed the same, and explained that this means a change compared to their communities in the past, when some fishers would decide not to go fishing so as to attend meetings. Moreover, according to fishers, decisions are made previously to the meeting (i.e. there is a foregone conclusion): “[The government] already has the study. They will just inform or consult [us]. I think they already have their own document, which they made.” Another major reason identified by fishers to explain their low participation was with regards to government fault to keep promises or address their concerns about poor enforcement. A fisher’s quote illustrates the former: “The main reason [why fishers don’t participate] is that [the government] promises to do things but then doesn’t. Thus, fishers think that they’re wasting their time.” Fishers have been expecting government improvements related to enforcement, and thus, the non-achievement of these have discouraged them from participating.

#### **9.4.4. Towards higher fisher participation in co-management**

Despite the numerous reasons which have been making fishers less motivated to attend meetings, when they were asked if they would personally have interest in participating in

meetings with IBAMA or MPA to discuss measures for fishery improvement, most said yes. At least one of them had participated in unsuccessful meetings, but even so, he was still interested. In order to address the question of how to achieve higher fisher participation, I asked fishers in which kind of meetings they would definitely participate. From their answers, four factors making them willing to participate arose: (1) The topic of the meeting has to be of their interest, such as: the shrimp closed season; the delimitation of areas in which they are allowed to fish (unlike no-take areas); and the renewal of fishing licenses. (2) Fishers have to be notified of the meeting well in advance either by a community representative or government people visiting the community. (3) Fishers have to be listened to during meetings (“If I were listened to more, I’d participate in every meeting”). (4) If a rule was discussed in the meeting (e.g. to protect nursing areas), government enforcement should follow it.

I also asked fishers what would be needed to achieve fisheries co-management (i.e. jointly decision-making between fishers and government agencies) in Paraty. Like in their previous answers, fishers argued that the government has to listen to them more, leaving partly aside the scientific studies. Indeed, one fisher claimed that they should assist the government in determining the reproductive stages of shrimp. Other fishers stated that to achieve co-management the Minister of Fisheries should come to the community, or there should be meetings with higher-ranking government representatives. Fishers’ lack of organization also came up in these responses. For example, one fisher stated that a cooperative would be needed to call the attention of the government and get support from them.

## **9.5. DISCUSSION**

The case study in Praia Grande and Ilha do Araújo showed that several factors that trigger co-management are in place: perceived resource crises, conflicts between fishers, and conflicts between fishers and management agencies (e.g. Sen & Nielsen 1996, Pomeroy & Berkes 1997). However, these can also be barriers to co-management, as it will be discussed below, along with the analysis of opportunities. Comparisons to the case study in coastal Uruguay are made throughout the section.

### **9.5.1. Through the transition of artisanal fisheries**

Fishers from Praia Grande and Ilha do Araújo stated that resources have been declining. A previous study in several fishing communities in Paraty Municipality also showed that fishers are concerned about resource decline, attributing this fact to similar causes as in PG/IA (bottom-trawling, *cercos de robalo*, purse-seiners) (Begossi et al. 2010). Bottom-trawling was also a main driver of resource decline according to Piriápolis fishers, with the difference that this gear is only

used by the industrial sector (farther out than 7 nm). Fishers explained that decreased catches triggered changes in fishing practices, such as increased fishing effort<sup>128</sup> and reduced information exchange about fishing spots. The latter is described by McGoodwin (1990) as an active strategy for limiting (others') fishing effort, also known as "de facto property right" (the right is on those in the know of fishing spots).

My research in PG/IA is one of the first studies in which information management among fishers is included in a social capital analysis. Ramirez-Sanchez & Pinkerton (2009) in Loreto (Mexico) found that high resource scarcity does not always decrease fishers' tendency to share information, and fishers' tendency to share information can be relatively low even in the absence of high resource scarcity. Comparing the changes in fishing practices in Paraty to those observed in Piriápolis, where fishing effort also increased, it is surprising that fishers in the former case have not started to use depth-finder, a technology highly valued in Piriápolis. However, it is probably that depth-finder is not much needed in a shallow bay with clear water (such as Paraty bay and surroundings).

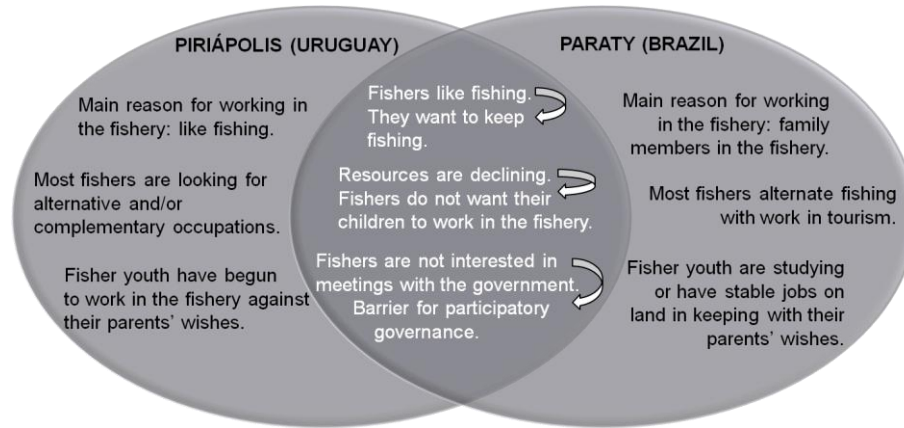
The implications of perceived resource decline to co-management are not straightforward. On the one hand, it has been identified as a triggering factor for co-management. On the other hand, it has been claimed that the difficulty for participatory management processes increases as resource scarcity increases, for instance because cooperation for collective goals becomes more difficult to maintain (Hanna 1995). A study of challenges and opportunities for fisheries co-management in Brazil found that resource over-exploitation is a hindering factor for the establishment of co-management arrangements (Kalikoski et al. 2009). It is possible that resource decline triggers co-management until a certain point, when resource restoration becomes unviable. In the Brazilian Amazon, such as in Silves, resource decline triggered fishers' organization and mobilization to improve management (Pinho et al. 2012). This is not the case in Praia Grande and Ilha do Araújo. However, catch decline might be acting as a triggering factor for co-management at government levels.

Findings from PG/IA, as well as those from Piriápolis, supported the large literature in developed and developing countries showing that fishing is a way of life rather than just a job (Pollnac et al. 2001, Pollnac & Poggie 2008). Artisanal fishers from the two case studies, regardless of differences in the reasons why they started fishing, identified pleasurable aspects of their occupation, similar to those found elsewhere. These findings provide, then, additional evidence against the assumption made by fishery researchers and policy makers that fishing is an employment of last resort (Pollnac et al. 2001, Béné 2003, Onyango 2011). In Paraty there is a strong fishing tradition grounded in kinship relationships whereas in Piriápolis fishers took up fishing because they liked it and made good money. In both instances the freedom of fishing and an inherent satisfaction in the occupation figured strongly in fishers' attachment to it. This has

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<sup>128</sup> Increased fishing effort could also be a driver for decreased catches.

also been reported in other Brazilian regions, such as coastal São Paulo (Diegues 1983). As Figure 9.1 shows, despite these positive reasons for working in the fishery, there are strong indications that the relationship of fishers to fishing is changing (Trimble & Johnson 2013).



**Figure 9.1. Similarities (in white type) and differences between artisanal fishers' perceptions of fishing in Piriápolis and Paraty**

While fishers from both areas wish to keep fishing in the future, they are moving into different occupations or supplementing their work in fishing with other employment. This trend is more evident in Paraty, where many fishers have become boat operators for tourists (quitting the fishery or supplementing it), than in Piriápolis, where fishers are in the process of looking for alternatives to fishing or considering it as a possibility. In contrast to what has happened in several countries where fishers were provided with alternative employment options as a response to overfishing with unsuccessful results (Pollnac et al. 2001, Pollnac & Poggie 2008), the trend observed in Paraty and, less sharply, in Piriápolis of fishers leaving the fishery seems to be self-initiated. This goes against the common assumption that artisanal fishers are resistant to leaving fishing because of their high attachment to their way of life even in scenarios of reduced catches and available alternative occupations (Pollnac et al. 2001). It can be hypothesized that the transition of leaving the fishery is more prominent in Paraty than in Piriápolis because fishers from the latter place first "opted" for migrating following resources and increasing the use of technology, two patterns unobserved in PG/IA.

In addition, artisanal fishers from both areas identified fishing as an undesirable occupation for their children. More than efforts to diversify their present day livelihoods, this lack of optimism for the succeeding generation's prospects in fishing marks the most serious flaw in the assumption of fishers' attachment to their occupation. Fishers are saying, in effect, that in the future fishing will no longer be a viable occupation (Trimble & Johnson 2013).

There are at least two implications of the current livelihoods transition in PG/IA for co-management. First, creating alternative and/or complementary sources of income was identified

as an opportunity towards fisheries co-management in Brazil (Kalikoski et al. 2009), although the transition from fishing to tourism could cause low fisher participation (e.g. Pinto da Silva 2004). Second, given that PG/IA communities, like others in Paraty municipality (Idrobo & Davidson-Hunt 2012) now mostly depend on tourism and fishing, the conception of fisheries co-management should be broadened to include tourism. The two activities should not be conceived independently; for example, some fishers in PG/IA recognized the need for regulations for the touristic activity. Considering other uses of the area (not just fishing) during a co-management process is consistent with conceiving the systems as complex commons (Seixas et al. 2009).

What should Uruguay learn from the Paraty fishery reality? Considering that Paraty might be in an advanced stage of transition (of leaving the fishery) than in Piriápolis, DINARA should realize of the importance of taking measures, in collaboration with fishery stakeholders, to improve resource status before it is too late. This would help prevent fishers from leaving the fishery as well as make them more willing to have their children in this profession. If a transition from fishing to tourism was purposively promoted in Piriápolis (and there are indications that this could occur), it should be borne in mind that it comes along with negative aspects: (i) not every fisher can afford a boat for doing trips with tourists, and (ii) it is a source of (further) social differentiation. In other words, doing boat tourism should not be seen as a secure source of income for every family in the communities, as the fishery used to be.

#### **9.5.2. Relationships among fishery stakeholders: barriers to co-management**

Bonding social capital, such as social cohesion at the community level and the capacity of fishers to collaborate, is a pre-requisite for co-management. Those two elements seem to be weak in Praia Grande and Ilha do Araújo, similar to other regions in Brazil, where the lack of social cohesion and organization of local communities were identified as hindering factors for the establishment of co-management arrangements (Kalikoski et al. 2009). The findings from PG/IA suggest that bonding social capital has been eroded over time. Lower respect among fishers, reduced information management about fishing spots, reduced fish exchange, and increased fish stealing are evidence of it. This trend has created a barrier to co-management.

One of the factors leading to these negative changes, as fishers explained, was resource decline. This finding of relationships among fishers being affected by changes in fishing resources represents another of the many interlinked connections between the social and the ecological components of the system. In fact, if resource decline actually led to worsened relationships among fishers, as results from Piriápolis also suggested, it would mean a barrier to co-management. However, relationships among fishers changed over time due to other reasons, such as the construction of the highway BR-101, and subsequent increased tourism in the region.

The level of community organization seems to differ throughout Brazil, with better organized communities in the North, such as the Amazon, than on the coast (Kalikoski et al. 2009, Lopes et al. 2011). In turn, this affects their preparedness for engaging in participatory management processes. At least two phenomena help explain this difference. First, most communities in the Amazon have not suffered the socio-economic and cultural impacts from growing tourism, and second, the Catholic Church promoted community organization and mobilizations in the Amazon (Kalikoski et al. 2009). In fact, the Catholic Church influenced co-management processes in the Amazon, such as in Mamirauá (Maccord et al. 2007), central Amazon (Pinho et al. 2012) and lower Amazon (Castro & McGrath 2003). This influence of the Catholic Church on community organization does not seem to have taken place in Praia Grande and Ilha do Araújo. On the contrary, the presence of two religious sects (Catholics and Evangelists) instead of one is inevitably a further source of social division within the communities. Fishing resources can also be affected by this division, as shown by the example of non-fishing days that are respected only by the Catholics.

Fishers' weak organization, unity and collective action are main implications of my findings in PG/IA for co-management. Despite the existence of solidarity and reciprocity norms, such as giving assistance to anybody in need at sea (similar to Piriápolis' findings), there seems to be low levels of collective action. In other words, social norms which are part of bonding social capital do not necessarily lead to fishers' collective action. Problems of collective action emerge from several sources, including inadequate information and conflicting interests, as well as the nature of the good itself (Poteete & Ostrom 2004, p.435). Fishers from PG/IA explained that they feel that they are competing for resources (i.e. everyone wants to catch more than the rest). This rivalry is similar to what was found in Piriápolis, and possibly echoes what happens in other countries. For example, Andersen (1972) reported that the Newfoundland trawler fisherman, as in most fisheries in the North Atlantic, regarded another fisher's gain as his loss, conceiving of fishing as a zero-sum game ("If we don't take it, somebody else will").

My research findings from PG/IA do not support McGoodwin's claim that small-scale fishers were becoming less isolated with advances in communication and transportation and that they were increasingly becoming politically active, unlike their mostly individualistic and apolitical predecessors (McGoodwin 1990). He argued against the common assumption that because of their rugged individualism, small-scale fishers are not particularly inclined toward cooperative action. An example against the assumptions of small-scale fishers being apolitical is the creation of fishing cooperatives for marketing purposes (found around the world). This political organization is far from being the case in Praia Grande and Ilha do Araújo. Comparing my two case studies (Brazil-Uruguay), at first sight it could seem that artisanal fishers are better organized in Paraty due to the presence of a community association of residents and fishers both in PG and IA. Indeed, before my first trip to Paraty I was hoping that the Brazilian case study



would help me learn about community-based resource management. Soon after I started fieldwork I realized this would not be the case. The minimum representation of fishers in the community associations was an indication of weak fisher organization. It is likely that bad experiences that fishers have had by participating in the associations' initiatives have discouraged them from further participation. It is unclear what could reverse this situation. The recent elections in Praia Grande community association open a possibility for achieving greater involvement of community members.

Something that should be considered as an opportunity rather than a barrier to co-management is the close bridging connections found between fishers from PG and IA (see Figure 9.2). Given the low number of fishers in Praia Grande, it is likely that they could form a stronger organization if it were to be formed in alliance with Ilha do Araújo. It is unknown, nevertheless, what the impact that the transition from fishing to tourism will have on fishers' relationships and social networks. Fishers could organize as boat operators (*barqueiros*), as in Trindade (another coastal community in Paraty), where there is a local association of fishers and boat operators, or they could end up more divided, having a fishers' association and a boat operators' association.

Even though I have discussed fishers' organization as part of bonding social capital, some results show that this is also influenced by linking connections, such as fishers' relationship with the Colônia. Fishers from Praia Grande and Ilha do Araújo feel that they are represented by the president of the Colônia. This could explain why they have not mobilized themselves to fight for their interests (e.g. improvement of fisheries management) as an alternative to Seixas' (2006) explanation that the latter is a consequence of fishers' lack of organizational skills. Interestingly, fishers' statements of being represented by the Colônia contradict other case studies in Brazil, which found that fishers' interests are very poorly represented by the Colônias (Diegues 1983, Kalikoski & Satterfield 2004, Pinto da Silva 2004, Medeiros 2009). This weak representation has been associated with the historical roots of these organizations (Breton et al. 1996, Kalikoski & Satterfield 2004). Breton et al. (1996, p.308), analyzing the case of the Colônias in Brazil as top-down producers' organizations, indicated that the government had three objectives when creating them: "(1) to develop a "reserve army" for the defense of national territory; (2) to serve as educational centers to improve the sense of citizenship among the fishers and to encourage them to participate more actively in national life; (3) to better regulate the conduct of fishing given the high level of disorganization among the coastal harvesters."

However, Colônias have rarely acted as fishers' associations and their role has been mainly assistance-based (*assistencialista*, Kalikoski et al. 2009). Colônias that were taken over by local elites are commonly found, and are presided over by politicians, military officers or fish buyers, instead of fishers (Diegues 1983, Breton et al. 1996, Kalikoski & Satterfield 2004, Pinto da Silva 2004, Seixas 2006). In Paraty, nonetheless, the current president of the Colônia is a

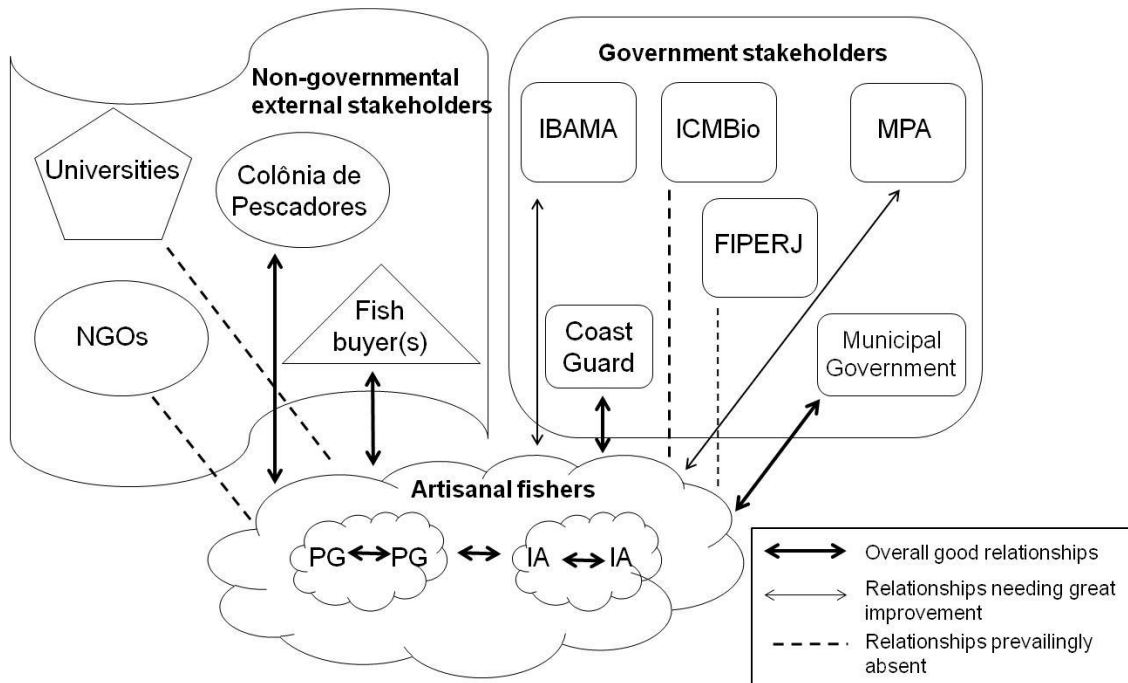
fisher or fisher's son (depending on the informant), which helps explain why fishers from PG/IA feel represented by him. It is not clear, however, to what degree fishers from these communities feel that their interests are being represented effectively by the Colônia.

In Uruguay, the National Union of Seamen (SUNTMA), despite including both the artisanal and large-scale sectors, is not equivalent to the Brazilian Colônias as I initially thought. First, SUNTMA is a national union instead of municipal. Second, it was not created in a top-down manner but from the bottom up. Third, SUNTMA does not act as an intermediary between artisanal fishers and DINARA when they have to renew fishing licenses or do any other paperwork. In Uruguay, where there are not such Colônias in charge of representing all fishing sectors, coastal artisanal fishers have also not organized successfully. Artisanal fishers have organized in inland Uruguay, though, where community boundaries are better defined than in coastal areas (with significant fishers' migration). In terms of the implications for fisher participation, it is worth remembering that DINARA does not recognize SUNTMA as the representative of artisanal fishers, and thus, keeps claiming that they need to form organizations.

In Praia Grande and Ilha do Araújo, as found in coastal Uruguay, the relationship between artisanal fishers and management/enforcement agencies needs to improve (see Figure 9.2), and trust has to be built. Similar findings come from other communities in Brazil, such as Arraial do Cabo (Rio de Janeiro), where fishers hold a negative view of IBAMA, which they see as a corrupted and inefficient agency, and which in turn leads to fishers' low trust in the government (Pinto da Silva 2004). Moreover, fishers' lack of trust in government organizations was identified as a barrier to co-management in Brazil (Seixas 2006, Kalikoski et al. 2009). The conflict-laden relationships between fishers and IBAMA go back to the creation of this agency in 1988 with a primary mandate for environmental conservation rather than fisheries, making fishers believe that the State had a strong indifference for fishing-related issues (Breton et al. 1996). IBAMA, like DINARA, is still a "bad word" in fishing communities. For example, when researchers visit PG/IA, fishers first show distrust towards them, thinking that they can be spies from IBAMA.

In Brazil, a further barrier to co-management, unlike Uruguay, is the number of government levels and organizations involved in fisheries management and enforcement, which have faced several restructuring processes. These mean a greater difficulty for achieving efficient inter-institutional linkages. Conflicting agendas between government agencies in Brazil are indeed common (Seixas 2006). As suggested by Pinto da Silva (2004), after the negative experiences that fishers have had with the State, care should be taken to renew relationships between the two. In this regard, the creation of the ICMBio should be seen as an opportunity. Most fishers do not know this agency, and thus, they do not have a negative image of it (not yet at least, because they think that IBAMA is responsible for the ESEC Tamoios). The participatory initiatives which are part of ICMBio's duties (e.g. consultative councils of protected areas, Commitment Terms) might have the potential to re-build or improve State-fisher relationships. In

fact, the president of the community association of Ilha do Araújo improved his relationship with IBAMA/ICMBio through participating of the consultative council of ESEC Tamoios.



**Figure 9.2. Bonding, bridging and linking relationships of Praia Grande (PG) and Ilha do Araújo (IA) fishers in Paraty, based on their perspective.** (Note: the absence of arrows or dotted lines indicates connections that were not studied because the case study focused on the local level). This figure can be compared to Figure 6.1 (multilevel social capital analysis in coastal Uruguay).

A further opportunity for co-management is the improvement of some relationships, as recognized by fishers from PG/IA. Management agencies should take advantage of this dynamic nature of social capital. For example, fishers stated that their relationship with the Coast Guard improved and they see it as a source of support (although, as in Uruguay, this relationship depends on the lieutenant in charge). Also, fishers have a closer relationship with the Coast Guard than with IBAMA, partly because of the proximity of the former's office (as in Piriápolis). Thus, IBAMA/ICMBio and DINARA could take this opportunity to get closer to fishers, for instance, through the Coast Guard's office, because fishers still feel distant from the management agencies. Supportive organizations, such as NGOs and academic institutions, have the potential of fostering the co-management process by facilitating dialogue between resource users and the government (Seixas et al. 2009). In fact, this was the main strategy found in Brazil for the implementation of participatory management arrangements: external organizations (including governmental and non-governmental) strengthening local institutions. The lack of supportive organizations in Praia Grande and Ilha do Araújo is, thus, a challenge for co-management.

Lastly, fishers' relationship with middlemen is among the factors of economic deficiency hampering the process towards co-management (Kalikoski et al. 2009). Fishers from PG/IA and Piriápolis suffer the stress of not knowing how much they will catch (i.e. increased uncertainty), and also, how much they will make because prices vary. One difference between the two sites, however, is that in PG/IA most fishers have a very good (and stable) relationship with a fish buyer they appreciate, whereas in Piriápolis most fishers have a stressful relationship with the fish buyers working in the area (i.e. only very few fishers were satisfied with a middleman). In PG/IA, although partly satisfied with their fish buyer, several fishers showed interest in forming a cooperative for the purpose of marketing (in contrast with Piriápolis, where "cooperative" is a bad word). This could be an opportunity to be taken by a supportive organization.

### **9.5.3. Fisheries co-management in Paraty: one or two to tango?**

My case study in Paraty showed that there seem to be several instances for fisher participation, such as consultative councils of protected areas, Commitment Terms, fishing agreement project – public policies program for co-management. These can be opportunities for achieving fisheries co-management. For example, management councils of protected areas have the potential of acting as platforms for collective learning and knowledge formation (Gerhardinger et al. 2009). Nevertheless, in the studied communities fishers' unawareness about participation instances prevails. Fishers from PG/IA were not aware of the fishing agreement initiative. Lopes et al. (2011) also pointed out that communities from Ilha Grande Bay were not fully aware of the meaning of a fishing agreement. Moreover, the authors stated that there was local suspicion of this co-management initiative, which may be a consequence of the historically over-restrictive conservation measures established by the government (Lopes et al. 2011). In the cases of the fishing agreement, Commitment Terms, as well as for the proposed fisheries legislation in Uruguay, fishers' lack of awareness of these initiatives (i.e. lack of participation and information) may result in legitimacy problems for the intended co-management.

Co-management is about at least two parties, government and resource users, thus the metaphor "two to tango" (Pomeroy & Berkes 1997). Even though there are government initiatives in the Paraty area willing to achieve some kind of fisher participation (maybe one involving just the Colônias' presidents as fishers' representatives), the other party in this tango dance, that is, the fishers, despite claiming through various arguments that they should be consulted by the government before making decisions regarding the fishery, provided numerous reasons for not participating in meetings with the government. As observed in the Piriápolis case, this means a barrier to the success of the government initiatives towards more participatory modes of artisanal fisheries governance. Indeed, community's low participation was identified as a hampering factor towards fisheries co-management in Brazil (Kalikoski et al. 2009).

In PG/IA some fishers' reasons for not participating were associated with their linking relationships with management agencies, which discourage fishers to get involved in participatory processes. Similar results were observed elsewhere in Brazil. For example, Medeiros (2009), in his research at Tijucas Bay (Santa Catarina State) explained low participation due to several reasons: fishers' mistrust in organizations, fishers' lack of interest in participating because the government should be the one promoting the changes in the fishery, and technical nature of the meetings (e.g. presentations of quantitative data). Other reasons that were mentioned by PG/IA fishers to explain their low participation were as well found in other communities in Brazil (e.g. see Kalikoski & Satterfield 2004). However, other factors affecting fishers' participation are likely context-specific. Understanding fishers' reasons for not participating provides with many clues of what would need to change for them to become willing (again) to participate. Government agencies will likely become more interested in these "clues" as they face more and more the low participation phenomenon.

There are lessons from the experience of POPA in Piriópolis that Paraty could learn. The participatory research process among fishery stakeholders contributed to transforming existing relationships (e.g. between fishers and the fisheries manager) and motivated engaged fishers to keep participating by achieving group outcomes in the short-term, such as the First Artisanal Fisheries Festival. Moreover, stakeholders' participation skills were developed, an example of capacity building for co-management. This is particularly relevant considering the scarce previous experience (of the government and the fishers) in collaborative decision-making, both in coastal Uruguay and Brazil. Thus, participatory research could be an approach to be followed by external agents willing to pave the way for adaptive co-management. More importantly, collaborative research with the government was proposed by some fishers from PG/IA (e.g. regarding the shrimp closed season), and others identified research gaps to be filled (e.g. fish pollution). Therefore, although there are risks of facing low fisher participation as in Piriópolis, local interest and the need for capacity for adaptive co-management represent opportunities for initiating a fruitful participatory research process.

#### **9.5.4. Conclusions**

The case study in Praia Grande and Ilha do Araújo enabled the identification of several barriers to and opportunities for the emergence of artisanal fisheries co-management. Among the barriers are factors or processes which add complexity to the intended government transition from hierarchical to participatory governance, such as: (i) livelihoods' changes (from fishing to tourism), (ii) low fisher organization and eroded bonding relationships, (iii) fisher representation through the Colônia de Pescadores, (iv) conflict-laden relationships between fishers and government agencies, (v) fishers' dependence relationship with fish buyers, (vi) lack of

supportive organizations, and (vii) fishers' unawareness of ongoing participatory processes and low fisher participation. Nevertheless, perceived resource decline and conflicts among stakeholders, which are in place, can be triggering factors for co-management. Additional opportunities or facilitating factors identified in my research could help overcome some the above challenges for co-management, such as strong bridging relationships between Praia Grande and Ilha do Araújo fishers; recent creation of a new government agency in charge of protected areas (ICMbio); improvement of some existing linking relationships; participatory initiatives (e.g. consultative council of ESEC Tamoios, Commitment Terms); and fishers' interest in co-management and participatory research.

## **CHAPTER 10: DISCUSSION AND CONCLUSIONS**

### **10.1. INTRODUCTION**

In the context of an intended government transition from top-down management to participatory governance of artisanal fisheries in coastal Uruguay and Paraty (Brazil), my doctoral research focused on investigating barriers to and opportunities for adaptive co-management, mainly in the former area but with comparisons to the latter.

Adaptive co-management, conceived as an emergent governance approach for complex social–ecological systems connecting the learning function of adaptive management (experimental and experiential) and the linking (vertically and horizontally) function of co-management, is a growing research field, with more than 100 published items according to a recent systematic review (Plummer et al. 2012). Fisheries, in particular, are one of the three most frequent types of resources in the adaptive co-management scholarship, along with forestry and water resources (Plummer et al. 2012).

In this final chapter of the thesis, I recapitulate the main research findings, and then discuss them under the umbrella of adaptive co-management, particularly from the angle of the barriers and opportunities identified in the two case studies. Finally, the larger significance of this research is discussed, highlighting theoretical, methodological, and policy contributions, as well as suggesting areas for further research.

### **10.2. MAIN RESEARCH FINDINGS**

Each of the four objectives of this research contributed to the understanding of aspects and processes that can affect adaptive co-management. Through Objective 1, the social-ecological changes of artisanal fisheries in Piriópolis and Paraty were investigated (Chapters 5 and 9). Objective 2 focused on a multilevel social capital analysis to explore the relationships within and among stakeholder groups, embedded in bonding, bridging and linking connections (Chapters 6 and 9). Objective 3 investigated stakeholders' perceptions about fisher participation in management, and government initiatives towards this direction, such as the proposed fisheries law in Uruguay (Chapters 7 and 9). Lastly, Objective 4 was about assessing an approach which can serve as a catalyst in the transition towards adaptive co-management, that is, participatory research involving multiple stakeholders (Chapter 8). In what follows, the main findings arising from each of the four objectives are summarized:

*(1) To explore the changes that have been occurring in the studied artisanal fisheries as integrated social-ecological systems based on the analysis of stakeholders' perceptions and fisheries policies.*

Artisanal fisheries in Piriápolis and Paraty have been under a social-ecological crisis: catches have been declining (the perceived causes differed between the two sites); fishing effort has increased; fishers' mobility along the Uruguayan coast has increased following more unpredictable resource movements; the need for additional or alternative sources of income has become more pronounced; and relationships among fishers have been eroded. Government (DINARA) interest in artisanal fisheries became formally recognized in Uruguay.

*(2) To investigate social capital at multiple levels by analyzing the relationships embedded in the bonding, bridging, and linking networks among fishery stakeholders.*

Although artisanal fishers of the two sites are not organized nor do they have formal representatives, they do have well-established bonding and bridging relationships with a number of norms of solidarity and reciprocity. In Piriápolis, nevertheless, fishers' migratory or non-migratory nature, fish marketing strategies, and linkages with local politicians, are among the factors creating conflicts among resource users. Most fishers have dependent relationships with fish buyers, who supply them with oil, ice, bait, and money advances, but these relationships are more stressful in Piriápolis than in Paraty. Fishers' relationships with fishery-oriented NGOs are absent in both sites, and fishers wanted to see more applied university research. Most fishers from Praia Grande and Ilha do Araújo feel that they are represented by the municipal Colônia, whereas the national union in Uruguay (SUNTMA) represents only poorly the artisanal sector. Bonding and linking relationships proved to be interconnected.

Fishers' relationships with management agencies are highly conflictual in both areas, whereas their connections with the Coast Guard were better. The municipal government plays a more important role in the Paraty fishery than in Piriápolis. Connections between DINARA's divisions, and among government agencies in Uruguay in general, lacked coordination.

*(3) To analyze stakeholders' perceptions about artisanal fisher participation in management, as well as government initiatives for fisher participation.*

Artisanal fishers from the two sites wanted to be involved in resource management. Non-fisher stakeholders in coastal Uruguay were also open to fisher participation and to the use of multiple sources of knowledge. Instances for fisher participation have been minimal (although apparently increasing) and with pitfalls. Fishers have not been much aware of these



opportunities, and when they have, a number of factors caused low fisher participation. The proposed fisheries law in Uruguay (before the Parliament since 2009) supports a consultative degree of fisher participation by the creation of national and zonal councils. The latter have been valued by fishers and other stakeholders, although the composition and anticipated degree of participation have been questioned. Many barriers to co-management were identified by fishery stakeholders in Uruguay, either related to fishers (e.g. lack of organizations, fishers' migration) or related to external stakeholders (e.g. DINARA's flaws, weak coordination among agencies).

*(4) To analyze a participatory research project among fishery stakeholders in Piriápolis, evaluating it as a participatory process and investigating its role in creating conditions that can facilitate the emergence of fisheries adaptive co-management.*

Evidence from the Piriápolis case showed that participatory research had an impact on the seven faces of co-management (Table 10.1): (1) as power sharing, (2) as institution building, (3) as trust building, (4) as process, (5) as learning and knowledge co-production, (6) as problem solving, and (7) as governance. Moreover, participatory research enhanced a feedback loop between social capital and social learning: learning facilitated the improvement of relationships among participating stakeholders, and improved relationships fostered learning among them.

The participatory research case fulfilled most of the 17 evaluation criteria developed in Chapter 8 (Tables 8.3 and 8.4). The following criteria used to evaluate the participatory research *process* could enhance the emergence of co-management: problem or topic to be addressed of key interest to local and additional stakeholders; participation of all stakeholder groups in the selected problem/topic; participants' representativeness; involvement of all stakeholder groups in every research stage; independent facilitation; collective decision making through deliberation and consensus building; appropriate information management; adaptability through iterative cycles of planning, acting, observing and reflecting; and cost-effectiveness of the process.

As can be observed from the summary of main findings, a number of similarities were found between the two case studies (coastal Uruguay and Paraty). This is not surprising if we consider that several results derived from Objectives 1-3 are consistent with the current situation or predominant features of artisanal/small-scale fisheries worldwide. These include resource decline, weak organizational capacities of fishers, dependent relationships with fish buyers, conflict-laden relationships with management agencies, willingness to become involved in resource management, unsatisfactory participatory initiatives led by the government, and creation of councils for stakeholder participation. Findings from Objective 4 are particularly insightful because the potentials of participatory research to adaptive co-management, although claimed in the scholarly literature, had not been empirically revealed.

**Table 10.1.** Contributions of the participatory research initiative in the Piriápolis' artisanal fishery to the seven faces of co-management (Berkes 2007b)

Faces of co-management	Contributions of participatory research
1. Co-management as power sharing	<ul style="list-style-type: none"> <li>- The opinion of all participants was considered throughout the process, and it was important for them to consider everyone's opinions and interests equally.</li> <li>- Participants of the four stakeholder groups considered that the study about sea lions' impact on the long-line fishery will serve for decision making.</li> </ul>
2. Co-management as institution building	<ul style="list-style-type: none"> <li>- Participants considered that participatory research enhanced fishers' organization, increased unity among them, and built fishers' capacity for co-management.</li> <li>- A multi-stakeholder body (POPA – Por la Pesca Artesanal en Piriápolis), with a common vision and goals, was created.</li> </ul>
3. Co-management as social capital building	<ul style="list-style-type: none"> <li>- Most relationships among participants improved, and trust among them increased.</li> <li>- Participants wish to maintain the relationships they have established.</li> <li>- Participants considered that participatory research contributed to co-management by bringing together fishers and DINARA.</li> </ul>
4. Co-management as process	<ul style="list-style-type: none"> <li>- Participants appreciated the group formation, and its increased cohesion and trust, despite not having completed the study on sea lions' impact.</li> <li>- Deliberation, enhanced by the facilitators, was also valued.</li> <li>- Participatory research was seen as part of the co-management process by the DINARA manager.</li> </ul>
5. Co-management as social learning and knowledge co-production	<ul style="list-style-type: none"> <li>- Stakeholders learned skills needed for participation.</li> <li>- Local and scientific knowledge were integrated to some degree, and new knowledge was co-produced.</li> <li>- One fisher considered that participatory research contributed to co-management because of mutual learning between fishers and DINARA.</li> </ul>
6. Co-management as problem solving	<ul style="list-style-type: none"> <li>- Two problem-solving exercises were conducted: (1) about sea lions' impact on the long-line fishery, which was not concluded, and (2) about market competition from imported <i>pangasius</i>, leading to a successful action (First Artisanal Fisheries Festival) which motivated the group to resume (1) and future problem-solving exercises.</li> </ul>
7. Co-management as governance	<ul style="list-style-type: none"> <li>- All stakeholders of the local problem identified by fishers (sea lions' impact) were invited to the participatory research initiative.</li> <li>- Stakeholder diversity was the most frequently mentioned element when participants defined "participatory research".</li> <li>- Two scientists learned the need to include all stakeholders in research.</li> <li>- One fisher and one scientist considered that participatory research contributed to co-management by promoting, through the Festival, increased attention to fishers by different segments of society.</li> </ul>

Furthermore, it is noticeable that most of the twelve components or variables of interest emerging within adaptive co-management (according to the systematic review by Plummer et al. 2012)<sup>129</sup> arose in the main findings of this research. First, *networks*, *organizational interactions*, and *trust* (three emerging components), were addressed in the multilevel social capital analysis (Objective 2). Second, the theme *shared power*, a foundational premise of adaptive co-management and a structural element (Plummer et al. 2012), was the focus of Objective 3, when stakeholders' standpoints about power sharing in artisanal fisheries management were analyzed. Third, enabling fisheries legislation in Uruguay, a sub-theme of *enabling conditions*, was also investigated. Lastly, four other components emerging within adaptive co-management were tackled in the participatory research case: *knowledge*, *learning*, *conflict*, and *bridging organizations*.

### 10.3. BARRIERS AND OPPORTUNITIES FOR ADAPTIVE CO-MANAGEMENT

This research found numerous barriers, but also several opportunities for the emergence of artisanal fisheries adaptive co-management in coastal Uruguay and Paraty. Identified barriers and opportunities can be grouped in four categories, which are a combination of categories proposed by commons and interactive governance scholars for addressing resource management (e.g. Ostrom 2007, Chuenpagdee & Jentoft 2009): Resource System, Resource Users, Governing System, and Governing Interactions (Table 10.2). Using these four categories is useful for visualizing the research findings but it should be noted that they are clearly interconnected. For example, "minimal consultation opportunities" (Governing System) is interconnected with conflict-laden relationships between fishers and management agencies (Governing Interactions).

In addition, some variables can be both barriers and opportunities. For instance, perceived resource crisis and conflicts among stakeholder groups, as found in the two case studies, are triggering factors for co-management (e.g. Pomeroy & Berkes 1997, Plummer & FitzGibbon 2004), but they are as well challenges for the process (e.g. Napier et al. 2005, Pomeroy 2007, Armitage et al. 2009), particularly so if the resource overexploitation is hard to reverse.

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<sup>129</sup> In alphabetical order, the twelve components are: bridging organizations; conflict; enabling conditions; incentives; knowledge; leadership; learning; networks; organizational interactions; shared power; shared responsibility; and, trust.

**Table 10.2.** Main barriers and opportunities for transitioning towards artisanal fisheries adaptive co-management in coastal Río de la Plata (UR) and Paraty (BR), based on the case studies in Piriápolis and Praia Grande/Ilha do Araújo

<b>BARRIERS OR CHALLENGES</b>	<b>OPPORTUNITIES</b>
<b>Resource System</b>	
<ul style="list-style-type: none"> <li>- (UR/BR) Fishing resources' mobility or migratory patterns even across the countries' borders</li> </ul>	<ul style="list-style-type: none"> <li>- (UR/BR) Resource crisis (decline in catches)</li> </ul>
<b>Resource Users</b>	
<ul style="list-style-type: none"> <li>- (UR) Artisanal fishers' mobility along the coast (i.e. fishers' seasonal migration)</li> <li>- (UR/BR) Weak organizational and marketing capacities of artisanal fishers</li> <li>- (UR/BR) Deteriorating relationships among artisanal fishers</li> <li>- (UR/BR) Artisanal fishers' growing need for alternative or additional occupations</li> <li>- (UR/BR) Conflicts among sport, artisanal and industrial fishers, who share some of their target species</li> </ul>	<ul style="list-style-type: none"> <li>- (BR) Clear group boundaries</li> <li>- (UR/BR) Good bonding and bridging relationships with trust, solidarity and reciprocity norms</li> <li>- (UR) Artisanal fishers' capacity to act collectively when facing crises</li> <li>- (UR/BR) Artisanal fishers' willingness to become meaningfully involved in resource co-management</li> <li>- (UR/BR) Artisanal fishers' interest in participatory research</li> </ul>
<b>Governing System</b>	
<ul style="list-style-type: none"> <li>- (UR) Fisheries management based on single-species approaches and maximum sustainable yield estimations</li> <li>- (UR/BR) Minimal and unsatisfactory fisher consultation opportunities (e.g. dismissing fishers' opinions)</li> <li>- (UR) DINARA's need for financial and human resources to implement co-management throughout the country</li> <li>- (UR) Fragmentation of interests, responsibilities, and information within DINARA</li> <li>- (UR) Weak coordination among government agencies</li> </ul>	<ul style="list-style-type: none"> <li>- (UR) DINARA's increased attention to artisanal fisheries</li> <li>- (UR) DINARA's interest in promoting artisanal fishers' organization (i.e. SUNTMA is not recognized as their representative)</li> <li>- (UR) DINARA's openness for fisher consultative participation and use of multiple sources of knowledge</li> <li>- (UR) Proposed fisheries law before the Parliament supporting the creation of consultative boards or councils</li> <li>- (UR) DINARA's awareness of several challenges for co-management</li> <li>- (BR) Growing initiatives for fisher participation in management (e.g. councils of protected areas)</li> <li>- (BR) Recent creation of ICMBio, in charge of protected area management</li> </ul>
<b>Governing Interactions</b>	
<ul style="list-style-type: none"> <li>- (UR/BR) Conflict-laden relationships between fishers and management agencies (DINARA, IBAMA/MPA)</li> <li>- (UR/BR) Low number of participating fishers when there are meeting opportunities with the government</li> <li>- (BR) Artisanal fishers' representation through the Colônia (municipal union)</li> <li>- (UR/BR) Artisanal fishers' dependence on fish buyers</li> <li>- (UR) Linking connections of local elites</li> <li>- (UR/BR) Capacity building needs of all stakeholders</li> <li>- (UR/BR) Scant NGOs or supportive organizations oriented to artisanal fisheries</li> </ul>	<ul style="list-style-type: none"> <li>- (UR) Agreement between artisanal fishers and DINARA regarding some management measures that should be taken</li> <li>- (UR) Potentials of participatory research involving fishery stakeholders towards the emergence of conditions for adaptive co-management (e.g. enhancing a feedback loop between social capital and social learning)</li> <li>- (BR) Improved relationships between artisanal fishers and the Coast Guard and Municipal government</li> </ul>

The research findings about barriers (Table 10.2) are consistent to some extent with the factors contributing to failure of adaptive co-management (Plummer et al. 2012). These factors included conflict of interests of those involved; power asymmetries; insufficient resources (financial, human, technical, etc.); absence of social networks; and lack of homogeneity among resource systems and users (Plummer et al. 2012). Nonetheless, one major barrier emerging from my research did not arise in that review and has received only little attention in the co-management literature, namely fishers' migration, which is thus discussed next.

### **10.3.1. Fishers' migration as a striking challenge**

Three main reasons support the provision of particular attention to fishers' migration. First, as suggested above, even though it is very well known that clearly defined boundaries of those authorized to use the resources is a condition for (adaptive) co-management (Napier et al. 2005, Pomeroy 2007, Armitage et al. 2009), the implications of the opposite situation, arising for instance when fishers are mobile, have been poorly discussed (see Nunan et al. 2012). Second, fishers' migration characterizes not only most of the Uruguayan coast but also small-scale fisheries of several other countries, although migratory patterns vary greatly. According to Njock & Westlund (2010), migration is one of the strategies used by fishing communities to secure their livelihoods. Given that many fish stocks migrate over large temporal and spatial scales, migration is an integral part of the fishing profession. Most African small-scale fisheries show fishers' migration, which can be considered as a built-in adaptation of fishing livelihoods to respond to environmental fluctuations and highly migratory resources (Crona & Rosendo 2011, p.386). Third, fishers' migration deserve special attention because it is forecast to increase as a consequence of increasing global environmental change and resources decline, among other factors (Crona & Rosendo 2011). Here I argue that in the same way as fishers' migration affects co-management processes, it can also be addressed through co-management arrangements.

By definition, migration ranges from circular, seasonal migration to more long-term settlement by migrants (Crona & Rosendo 2011). It can be international (cross-border migration), like in Africa, or internal (within a country), regular or not (Njock & Westlund 2010). Of the eight categories (not mutually exclusive) of migration described by Njock & Westlund (2010) for West and Central Africa, three characterizes artisanal fishers' migration in coastal Uruguay: (i) internal migration, which takes place between fishing settlements within the country in order to follow fish stocks or to take advantage of certain facilities or fish prices; (ii) short-term migration, lasting for a few weeks but less than a fishing season; and (iii) seasonal migration, in which fishers (occasionally with family members) stay in foreign fishing settlements for one or two seasons and then return home for a certain amount of time. Besides Uruguay and West and Central Africa (Njock & Westlund 2010), temporary migration to places where fishing resources are available has been reported in Chile (Aburto et al. 2009), Eastern Africa (Crona & Rosendo 2011, Nunan

et al. 2012), Indonesia (Bailey et al. 1987), India, Sri Lanka and Philippines (D. Johnson, pers. comm.), but it probably occurs in many other countries.

The phenomenon of fishers' migration has been regarded as complex as the fishing communities themselves (Njock & Westlund 2010), and fishers' migratory patterns proved to be dynamic. In coastal Río de la Plata, fishers' migratory routes are no longer predictable as in the early 2000s, mainly because of changes in the croaker's movements. In West Africa, fishers' seasonal migration has been transforming into long-term migration (Binet et al. 2012). A key aspect determining migration is fishers' access to fishing grounds in the area of destination, which is partly defined by legislation and management plans and partly by local institutions and relationships with host communities (Crona & Rosendo 2011). For instance, in Kenya, Tanzania and Mozambique, anyone holding a valid license can legally pursue fishing anywhere in the country that is open to fishing (Crona & Rosendo 2011). In coastal Uruguay, fishers' migration is favoured both by DINARA's allocation of fishing licenses to zones which comprise more than one jurisdictional department, and by fishers' prevalent values that "the sea has no owner" (although conflicts between migrants and host fishers occur).

It is unquestionable that fishers' migration has implications for co-management. Crona & Rosendo (2011) argued that migration can either motivate local co-management participation as a means of excluding outsiders, or it can undermine co-management efforts being developed because of increased heterogeneity of resource users, disrupting clearly defined boundaries. For their part, Njock & Westlund (2010) recognized the challenge of designing systems for redistribution of equitable and exclusionary access rights through co-management arrangements in places where fishers' mobility is common. Furthermore, Njock & Allison (2008) had to adapt the capacity building initiatives in their co-management project in West Africa according to the migration phenomenon.

A challenging and unresolved question is whether, and if so how, migrants should be included in decision making in the area where they live temporarily. Given that migrants may be competing for resources at the host communities, they sometimes suffer from discrimination, marginalization and exclusion from various aspects of community life, including political institutions and decision-making (Njock & Westlund 2010, Crona & Rosendo 2011, Nunan et al. 2012). Regarding the latter, seasonal migrants can be excluded because they are away when decisions are made or because of mistrust (e.g. given differences in language, ethnicity, nationality or religion, Njock & Westlund 2010). In coastal Uruguay, artisanal fishers often feel discriminated by non-fisher community members when they arrive at a new locality, and other times they are rejected by host fishers. More strikingly, migrant fishers are sometimes discriminated against by government agencies, particularly local governments, which see them as conflictive and problematic. In fact, there have been government initiatives to protect or support permanent fishers (i.e. non-migrants), for instance providing them with sheds for their

fishing gear or even houses, so that they dismantle their “hovels” on the beach. The ultimate government goal is to prevent the formation of irregular settlements by migrant fishers on the coast and the associated conflicts. There is divergence between the legislation which allows fishers’ mobility through fishing licenses granted by DINARA and the legislation which protects the coastal strip. It is evident that fishers’ migration complicates management and makes fisheries and coastal governance a wicked problem, which poses a constant challenge instead of being solved once and for all (Jentoft & Chuenpagdee 2009; Section 2.1.3). This should be seen as a governability issue. Considering that wicked problems require participatory approaches to governance, involving “those who know” and relying on the collective judgment of stakeholders in an interactive and deliberative process (Jentoft & Chuenpagdee 2009), tackling issues related to fishers’ migration requires the collaboration of the different stakeholders involved. Non-migratory fishing in coastal Uruguay might not succeed because of the increasingly unpredictable dynamics of fishing resources.

In this regard, fishers’ migration can and should be tackled through adaptive co-management. This issue indeed arose during a session of the zonal council in coastal Canelones, where participants of different stakeholder groups (fishers, DINARA, Municipal and Departmental governments) seemed to agree about the need to discuss measures for better managing fishers’ migration. It is worth noting that the fisher representatives in this council live in coastal Canelones but they migrate seasonally to other places depending on the croaker movements. It needs to be discussed, however, whether fishers migrating seasonally to coastal Canelones (e.g. from Piriápolis) should have a voice in this council, or whether fishers would only participate in the council located where they live most of the year.

There is only little information about similar cases in other countries. In Mozambique, the Strategic Plan for Co-Management of Artisanal Fisheries explicitly include “control of migration” in the recommendations of the powers to be given to co-management councils, and it also suggests that community fisheries councils may charge fees to migrant fishers for the use of local fishing grounds and use the revenue collected to fund their operation (Crona & Rosendo 2011, p.385). By contrast, in Congo, Gabon, Guinea and Mauritania, associations and consultative groups consisting of both local and foreign migrants were formed during a pilot co-management project (Njock & Westlund 2010). Nunan et al. (2012) analyzed fishers' mobility within Lake Victoria (Kenya, Tanzania and Uganda) and discussed the implications for co-management, including the facilitating or discouraging role of Beach Management Units (BMUs: community-based organizations formed to enable fishers to get involved in fisheries management). For instance, some of these BMUs required people to pay in order to move to their landing site. As the study concludes, migratory fishers deserve specific attention to enable their effective participation in co-management structures and processes, at different levels (Nunan et al. 2012). The next section

of this chapter looks at some lessons arising from my research regarding how the identified barriers to adaptive co-management (other than fishers' migration) can be overcome.

### **10.3.2. Overcoming barriers through participatory research and co-management**

Considering studies based on direct substantiated observations or experiences, the systematic review by Plummer et al. (2012) found eight factors contributing to success of adaptive co-management: (1) social networks; (2) learning; (3) participation of all relevant stakeholders in management; (4) generation, use, and sharing of information and knowledge; (5) development of necessary attitudes and skills; (6) government control over illegal resource use; (7) management flexibility, and (8) funding. We could thus believe that if these factors were facilitated, several barriers (or factors contributing to failure) could be overcome, and the likelihood of transitioning towards successful adaptive co-management would increase.

In this regard, the case study in Piriápolis provided empirical evidence that participatory research involving fishery stakeholders (artisanal fishers, fisheries agency, university researchers and NGOs) enhances the first five of the above eight factors contributing to adaptive co-management success (see Table 10.1). Considering that Uruguay is a small country in which relationships between government members and fishers can be more personal than in larger countries, trust building (part of social networks) becomes essential (as suggested by McConney et al. 2007 for Barbados and Grenada, where fishers had low levels of trust in the government).

Very importantly, a feedback loop between relationship improvement and participants' learning, in which one enhanced the other, was enhanced through participatory research. This is noteworthy, first, because social networks and learning were the two most frequently documented factors contributing to success in the adaptive co-management scholarship (Plummer et al. 2012). Second, this finding is valuable because the connections between social capital and social learning had not been analyzed in a participatory research context. The view of participatory research reinforcing this feedback loop relates to the concept of "communities of practice" developed by Wenger (1998), which emphasizes learning as participation. This participation is influenced by and may change the social structure. In this regard, Pahl-Wostl et al. (2007) made a link between communities of practice (CoPs) and social capital: "CoPs can be understood as social forms to manage and generate knowledge. Because the results of social learning processes are preserved in a CoP in its shared roles and practices, they constitute social capital that goes beyond individual knowledge and skills".

Nevertheless, participatory research is not without challenges. Actual and potential challenges arising from the Piriápolis case include: low number of participating fishers and managers; inherent power imbalances in fisher-manager relations; barriers to integrating local and scientific knowledge; obstacles to translating participants' learning into new practice; and,



from the scientists' viewpoint, less scientific rigour and longer time scales than conventional research. If these challenges are overcome, the contributions of participatory research to the adaptive co-management process will be more significant.

In addition to participatory research, co-management *per se* has the potential to overcome some of the identified barriers. As argued by Berkes et al. (2007), the very act of engagement in adaptive co-management has the potential to change the way in which management agencies have always conducted their business. In Uruguay, the creation of consultative councils at the national and zonal levels is supported by the proposed fisheries law. The importance of an enabling policy for (adaptive) co-management has been extensively claimed (Jentoft 1989, Olsson et al. 2004, Pomeroy 2007, Westlund et al. 2008, Armitage et al. 2009, Plummer et al. 2012). For instance, the Sustainable Fisheries Livelihoods Programme on co-management in West and Central Africa confirmed international findings that successful and effective co-management initiatives are based on four interrelated pillars: (1) an enabling policy and legal framework, and continued government support; (2) effective institutions and linkages; (3) real participation by resource users and other stakeholders, avoiding elite capture and exclusion of minority groups; and (4) incentives for individuals to participate (Westlund et al. 2008, p. 159).

In particular, the zonal councils that started to be implemented in coastal and inland Uruguay in 2012 have the potential to enhance several of the factors contributing to adaptive co-management success. For instance, the relevant stakeholders are part of these councils (artisanal fishers, DINARA, PNN, Departmental and Municipal governments), and they will potentially share information and knowledge, before submitting suggestions to DINARA's Direction. Furthermore, by personal exchanges and collective discussions in these multi-stakeholders boards, social networks can be strengthened and learning (including the development of necessary attitudes and skills) can take place. Lessons from the participatory research initiative in Piriápolis might be useful in this regard, where it was found that consideration of everyone's opinion equally, horizontal and respectful dialogue, and commitment towards a common goal were factors facilitating both relationship improvement and learning. In addition, the adaptive component of adaptive co-management could be enabled because the proposed fisheries law establishes that management rules for artisanal fisheries will be defined through the zonal councils. This might lead to management flexibility, another of the eight factors contributing to the success of adaptive co-management (Plummer et al. 2012). All these are examples of the potentials of participatory decision-making (if actual co-management develops) to overcome some of the barriers identified in this study.

Moreover, zonal councils could constitute arenas in which collaboratively problem-solving or conflict management takes place (Olsson et al. 2004, Plummer & FitzGibbon 2004, Pomeroy 2007). Given that conflict resolution was the most frequent outcome of adaptive co-

management (Plummer et al. 2012), it could be expected that conflicts among stakeholders will be alleviated with time, similar to what occurred throughout the participatory research experience. Nevertheless, temporary increase in explicit conflict is also an outcome of adaptive co-management, thus suggesting that outcomes are not always straightforward (Plummer et al. 2012).

Similarly, zonal councils for artisanal fisheries co-management in Uruguay might face additional challenges, besides financial and human resources for their implementation. Probably the major one is with regards to the devolution of power. DINARA's Direction, like central agencies in other countries with a top-down tradition, does not seem to be willing to give up much power, leading to a top-down co-management process with low degrees of fisher participation. Obstacles to devolving power can be illustrated by the interception of DINARA's Direction to two initiatives arising from the zonal council in coastal Canelones. One referred to a weekly radio podcast dedicated to artisanal fisheries and the DINARA-GEF-FAO project (through which the councils are being implemented). DINARA's Direction prevented the podcasts from continuing mainly because proper authorization had not been asked. Second, in another opportunity, the council members had decided to contact DINAMA and DNH to enquire about the procedures to dredging the mouth of a stream from which fishers depart, but DINARA decided that it was its Direction which had to do that, contacting only DNH.<sup>130</sup> Not surprisingly, council members have started to question whether the council has any power or if it is DINARA's Direction which makes all decisions.

Top-down decentralization processes and failure of devolution are likely to occur in contexts of long traditions of top-down rule (Berkes 2010b). Most decentralization experiments (including co-management) seem to have failed to meet objectives. For instance, instead of increased voice for local communities, empowerment and democratization, there has been elite capture of resources, and instead of poverty reduction through equitable access to resources, marginalization of the extreme poor and the disadvantaged groups occurred (Béné & Neiland 2004, Berkes 2010b). In particular, these non-positive outcomes of decentralization programs were reported and analyzed by Béné et al. (2009) in inland fisheries of five sub-Saharan African countries. The large number of factors working against the devolution of power and the development of partnerships include cultural differences, the historic role of government bureaucracies in management, low levels of political and financial support, and lack of traditions of cooperation (Berkes et al. 2007). As argued by Berkes (2010b), effective devolution requires a shift in focus from a static concept of management to a dynamic concept of governance shaped by interactions, feedback learning and adaptation over time.

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<sup>130</sup> The interaction between DINARA and DINAMA was not addressed in this research but it is known that these two agencies only rarely work collaboratively.

A further challenge that the implementation of zonal councils will potentially face in Uruguay regards the participation of the different stakeholders. For instance, the Coast Guard (PNN) has a rather bad reputation of not participating consistently in multi-stakeholder meetings. This has been actually the case in the zonal council in coastal Canelones, where PNN has been absent in most sessions, causing concern among other council members (fishers, DINARA, local governments). Moreover, even though the fisher representatives of the three pilot zonal councils have evaluated the councils positively, this study identified numerous reasons for fisher low participation (both in Piriápolis and Paraty) and thus, it should not be assumed that fishers of all localities will be interested in these boards or will be willing to elect representatives. For example, Beem (2007), in her comparative study examining the Chesapeake Bay blue crab fishery and the Maine lobster fishery, concluded that, although important, the attributes of user groups and resources as well as government support, are not sufficient in facilitating the development of co-management. Despite several similarities between her two cases, user groups' motivation to attend co-management options varied considerably (partly because of the affiliation of policy entrepreneurs). Beem (2007) thus emphasized the importance of recognizing that user groups may be resistant to investing time and energy leading to institutional changes. In addition, a potential challenge in Uruguay regards the legitimacy of elected fisher representatives, and the degree to which minorities are represented by them.

Having discussed several challenges and opportunities for the emergence of fisheries adaptive co-management in Uruguay, which can be considered lessons for the Paraty area, the next section explores the main contributions of this research, making recommendations for policy and identifying areas for further research.

## **10.4. CONTRIBUTIONS OF THE THESIS AND RECOMMENDATIONS**

### **10.4.1. Theoretical contributions**

This research provided several opportunities for theoretical contributions, most of which relate to factors leading to successful adaptive co-management, such as social capital and social learning, which were enhanced through participatory research. The relevance of studying social conditions for the transition towards co-management is not surprising given that it has been claimed that its success ultimately depends on the development of human relationships and institutional arrangements (Berkes et al. 2007). Before discussing these theoretical contributions, it is worth mentioning that this research represents one of the few studies in which the analysis of barriers to and opportunities for adaptive co-management is developed in a challenging context imposed by fishers' migration.

One field of theoretical contributions of the present research is social capital. Even though this is a field of growing literature, the study of the connection between social capital and (adaptive) co-management is relatively recent. The literature on social capital so far has had a prevailing focus on the community, especially the bonding component. Social capital involving other stakeholders such as the government (either looking at the link between the government and the communities, or among government agencies themselves) is poorly developed (e.g. agencies' social capital was indeed recognized as a gap by Plummer & FitzGibbon 2006). Given that multiple fishery stakeholders should participate in co-management (as governance), it is crucial to understand the relationships among them all (i.e. government stakeholders deserve as much attention as resource users). This, in turn, helps identify some of the changes that are needed for the emergence of co-management.

In this context, my research proposed a multilevel social capital approach, and thus contributed to the reconceptualization of the concept (Vermaak 2009). Considering that intra-external and external-external connections have been poorly addressed in the social capital scholarship, having investigated bridging relationships at the external level represents one of the contributions of the study in coastal Uruguay. In fact, this research identified barriers to adaptive co-management related to fishers and related to the government. The latter would not have been acknowledged if only resource users were the focus of this study. This multilevel conception of social capital is consistent with the core of adaptive co-management: "Adaptive comanagement thus forges links (both horizontal and vertical) for shared learning-by-doing between various actors, over a medium to long time horizon. It is multi-scale in spatial scope and concerned with enhancing and including the capacity of all actors with a stake for sustainably managing the resource at hand" (Plummer et al. 2012). Moreover, as suggested by Dahal & Adhikari (2008), the interconnections between different social capital components were analyzed in Uruguay, such as between bonding and linking relationships.

Not only does the proposed multilevel social capital analysis contribute to adaptive co-management but it can also contribute to governability assessment, and thus to interactive governance theory, by enhancing the understanding of the socio-economic system, the governing system, and the system of governing interactions. It proposes a way to study stakeholders' interactions within the three governance systems, enabling the uncovering of differing stakeholder views about their relationships, and thus, it helps find out limitations of the system in terms of the governability of the fishery. In other words, the social capital analysis helps understand the interactions between those who govern and those who are governed (i.e. system of governing interactions – corresponding to linking social capital), and also at the system-to-be-governed and the governing system. For instance, in the case of hierarchical governance (top-down management, still prevalent in artisanal fisheries in the two study areas)

community social capital would be included in the former, whereas government social capital would fit in the latter.

Another field to which this research has contributed theoretically is the transitioning towards adaptive co-management through participatory research. It has been argued that facilitating social interactions among stakeholders presents an important challenge, for instance because of the diverse interests and values of multiple stakeholders (Berkes et al. 2007). In this regard, participatory research among diverse stakeholders, working on addressing issues of interest to all and building common goals, proved to be an approach contributing in this direction. This is significant because participatory research had been said to improve co-management (Chuenpagdee et al. 2004, Wiber et al. 2009) but it had not been empirically assessed, as done in the Piriápolis case. Furthermore, the linkage between social capital and social learning, which I have described as a feedback loop, is found in the literature on natural resources management (e.g. Falk & Kilpatrick 2000, Plummer & FitzGibbon 2007), but it had not been empirically investigated in a participatory research context. In addition, factors facilitating relationship improvement and learning throughout participatory research were identified.

Lastly, this research contributed to the field of participatory research evaluation, proposing and applying to the Piriápolis case process and outcomes evaluation criteria. There is only scarce literature on how to develop, implement and evaluate participatory research (Blackstock et al. 2007, Shirk et al. 2012), particularly so for the empowering mode, which is not easy to achieve (Cornwall & Jewkes 1995, Arnold & Fernandez-Gimenez 2007). These contributions to knowledge (i.e. multilevel social capital analysis for adaptive co-management and interactive governance; participatory research for adaptive co-management; evaluation of participatory research) will potentially serve for other countries transitioning from top-down decision making to co-management of natural resources or environmental conflicts.

#### **10.4.2. Methodological contributions**

The two case studies of this research were developed in communities where fishers have been exposed to short-lived interventions of researchers, “extracting” information from them through interviews and questionnaires, or requiring assistance for sampling onboard their fishing boats. One lesson from this research is the importance of using alternative approaches, such as participant observation and informal conversations when fishers do not feel comfortable with interviews, and participatory research when the ultimate goal is to reverse the power imbalance between the researchers and the researched.

Moreover, participant observation proved to be particularly useful for studying social capital because certain features of relationships among stakeholders are evidently not told but need to be observed. The importance of a long time-frame for investigating relationships among

stakeholders resulted in a key aspect, which was expected given the dynamic nature of social relationships.

Additional methodological considerations are of importance for conducting a multilevel social capital analysis: (i) interviewing all the actors involved in a certain relationship (e.g. fishers *and* fish buyers; DINARA, PNN *and* DNH); (ii) interviewing other agency members in addition to the higher-ranking positions because the latter may find politically inappropriate to recognize weaknesses within or between agencies (e.g. DINARA's Director, Chief of PNN staff); (iii) looking at stakeholders' performance in addition to their statements in interviews about how good relationships are, because what they say may differ from what they do (e.g. DNH or PNN behaviour with fishing licenses); (iv) integrating structural and cognitive elements (e.g. fishers of the two sites are not formally organized – structural social capital, but they do share social norms that predispose them to cooperate – cognitive social capital); and (v) considering that social capital categories (bonding, bridging, linking) are useful for analysis but they should not be considered static. Not only the categories are interconnected but also specific actors may fit in more than one category (e.g. some fishers buy fish from others).

All these methodological considerations for conducting a multilevel social capital analysis are particularly valuable given the numerous observations regarding the difficulty to operationalize the concept (e.g. Woolcock & Narayan 2000, Plummer & FitzGibbon 2006). Most importantly, it should be borne in mind that social capital, understood as social resources and interactions among individuals, has both positive and negative sides. The Piriápolis case showed, for instance, how a local elite (“the untouchables”) used their close linking networks with local politicians to harm migrant fishers.

Interviewing non-fisher stakeholders was not only useful for the social capital analysis but also to the remaining objectives of this thesis. Exploring the opinions of non-fisher stakeholders about fisher participation and use of multiple sources of knowledge is as important as investigating fishers' opinions about it.

Finally, a methodological contribution from this research is the provision of criteria for developing a truly or empowering participatory research involving more than two groups of participants (local people and researchers – as in prevailing participatory research initiatives). Moreover, this research showed that it is possible to organize and facilitate a participatory research project in the context of a doctoral thesis. In this regard, it is worth pointing out that the student and/or researcher initiating the process should not quit as soon as her/his research questions have been answered (which would make the project more similar to a conventional study). Rather, if the student/researcher acting as a “facilitator” wants continuity in the positive outcomes that the process has reached at that point, he/she should do a gradual transition until the group can become self-organized, which logically takes time.

### 10.4.3. Policy contributions

First, considering that this research showed that artisanal fisheries in Piriápolis and Paraty are going through a social-ecological crisis, the government of the two countries should understand the urgency of seizing these windows of opportunity (in the sense of Olsson et al. 2006) before it is too late. Also, this research found that artisanal fishing in the two areas is a way of life for many fishers rather than just a job, and thus, policy makers should not assume that fishing is an employment of last resort (Trimble & Johnson 2013). This might be a particular challenge in the case of coastal Uruguay, where people usually say that artisanal fishing is not “traditional”, comparing it to countries such as Brazil, where artisanal fishing is traced back to indigenous peoples. Moreover, in Paraty, where fishing communities now mostly depend also on tourism, it is imperative to broaden the conception of fisheries co-management to include the latter activity. Likewise, it is recommended that the fisheries systems (in Brazil and Uruguay) are understood and managed considering the coupling between the small-scale and large-scale sectors, which share the use of some species. This is consistent with the claim that community-based and co-management approaches should give more attention to external drivers (Cox et al. 2010).

Second, the entire analysis of barriers to and opportunities for the emergence of artisanal fisheries adaptive co-management in coastal Uruguay and Paraty is a meaningful contribution to policy because the governments of the two regions intend to move in that direction. In the Uruguay case, this research has contributed to understanding some of the complexities of the migratory nature of the artisanal fishing activity, including its determinants, unpredictability and impacts on fishers’ livelihoods. As mentioned earlier, measures for “better managing” fishers’ migration should be discussed involving all the relevant stakeholders at an appropriate scale. In this regard, zonal or local councils in coastal Uruguay might not serve for this purpose unless they are articulated with similar boards covering broader coastal areas. Thus, one policy recommendation is that DINARA should adapt the scale of the consultative (ideally deliberative) councils to the scale of the problems or issues being addressed. The same recommendation applies to the Paraty case, where participatory processes involving artisanal fishers have been initiated.

Third, an evident contribution to policy is that building and strengthening capacities is needed at multiple levels (e.g. fishers, government, between agencies). Even though participatory research proved to be useful in that regard, additional capacity building initiatives for each stakeholder group are needed. Fishers of the two areas need to be better organized to fight for improving fishery issues. In fact, one of the main contributions of my research in Praia Grande and Ilha do Araújo, to the project *Community-based resource management and food security in coastal Brazil* (IDRC/SSHRC International Research Chairs Initiative), was the social capital analysis. Particularly, the weak organization of the Caiçaras in the two studied communities was

striking, contrasting with other Paraty communities, and it has direct implications for management. The finding showing that fishers in Praia Grande and Ilha do Araújo feel represented by the Colônia (Paraty) was also unexpected and this might be hampering fishers' self-organization. Nevertheless, this situation could likely change if the communities' livelihoods were threatened. Moreover, in the same way as fishers need to be better prepared for dialoguing and negotiating with the government, members of government agencies in the two study areas have to be better prepared for exchanging and deliberating with fishers. Government agencies need to have arenas for inter-institutional exchange and improvement of their coordination because these are aspects affecting local institutions and resource management. If the capacities of the different stakeholder groups were not built before co-management arises, however, they could be built with time throughout adaptive co-management processes.

Fourth, participatory research involving multiple fishery stakeholders is a promising approach for leading to improved management of local environmental conflicts, creating space for deliberation, promoting fishers' participation and building capacity at multiple levels. Therefore, DINARA in Uruguay and government agencies in Brazil should consider participatory research as an approach for "muddling through" (as suggested by Chuenpagdee et al. 2004) for addressing natural resource and environmental management issues: trust within and between stakeholder groups is built, social learning is facilitated and knowledge is co-produced. The factors favouring learning and improvement of relationships arising from the Piriápolis experience should be useful for this and other initiatives. Not only fisheries agencies but also universities should appreciate and promote participatory research for co-producing knowledge applied to problem solving. This is not meant to say that all research should be participatory, though. In fact, conventional and participatory research can be complementary. Nevertheless, when community empowerment and social learning (e.g. for better managing environmental conflicts) are among the research aims, the project should be participatory. In Uruguay, probably as worldwide, research projects in which local stakeholders (such as fishers) participate in all the stages, from defining the questions to disseminating the findings are still rare.

Lastly, the research findings regarding stakeholders' perceptions about fisher participation indicate that it is imperative that the meaning of *participation* is looked after, helping prevent the "tyranny of participation" (Cook & Kothari 2001), and the notion of participation from further becoming a catch-all concept (Cornwall & Jewkes 1995). If participation indeed becomes a synonym of consultation without influencing decision-making, low fisher participation, which was one of the barriers to co-management identified in the two case studies, will likely become more pronounced. Regarding the proposed fisheries law in Uruguay, given that its development is finished and several stakeholder groups (even those who were consulted) expressed objections, it could be recommended that the coming regulation is developed with actual stakeholder participation. For instance, the rules to be designed for the zonal councils' operation



should arise from discussions among the members of the existing councils and additional fishers of the communities involved.

#### **10.4.4. Opportunities for future research**

Several areas for further research were identified throughout my doctoral work. Most importantly, as the transition towards artisanal fisheries co-management progresses in Uruguay, the process and outcomes of zonal councils (Chapter 7) should be evaluated. The literature on evaluation of participatory processes (e.g. Rowe & Frewer 2000) and evaluation of adaptive co-management (e.g. Plummer & Armitage 2007) could inform this future research. Of particular interest will be to investigate the role of deliberation for decision making within the council, how and to what degree fishers' knowledge is considered, and the influence of the suggestions made by the zonal councils for DINARA. The same recommendations apply to the Commitment Terms in Brazil (Chapter 9) and additional participatory processes developed. Future research in these thematic areas could contribute to the two adaptive co-management gaps recognized by Plummer et al. (2012): (i) an evaluation framework is needed, in order to evaluate the process and the relationship between goals and outcomes; and (ii) most adaptive co-management experiences have been reported in North America and Europe, so more research is needed in other regions.

The evaluation of ongoing participatory processes in both study areas would also help to understand how to reverse the current trend of low fisher participation in meetings with the government. Moreover, in the Paraty case, special research attention should be directed to fishers' relationship with the Colônia, to achieve a better understanding of whether, how, and to what degree, fishers' interests are being represented by that organization. Studying bonding and bridging connections at the external level, as part of a multilevel social capital analysis, remains as a gap in both sites (the former was only poorly addressed in Uruguay).

Another major research gap regards artisanal fishers' seasonal migration along the coast of Uruguay following the fish. It would be important to know, for instance, which percentage of fishers are migratory, which routes they follow, whether they migrate or not with their family, how they alternate this seasonal activity with other jobs, among others. As argued by Njock & Westlund (2010), a better understanding of migration and its role in overall livelihood strategies will help inform policy makers to better incorporate migration into fisheries management. Similarly, before implementing spatially explicit administrative tools, fishers' migratory behaviour and their dynamic allocation of fishing effort needs to be known (Aburto et al. 2009).

Given that the multi-stakeholder participatory research approach is recent in Uruguay (and probably in Brazil also), further research should investigate the external legitimacy of the process and its outcomes (i.e. the perceptions of non-participating stakeholders: fishers,

members of DINARA, additional government agencies, University, NGOs). Moreover, it should be assessed whether the participants of the various stakeholder groups, scientists in particular, incorporated aspects of participatory research approach. In addition, the on-going learning processes embedded in the participatory research initiative should be continually monitored. Even though I did not analyze participants' learning through the angle of single-, double- and triple-loop learning (Armitage et al. 2008), it should be noted that most fit the first type, although a few cases of double-loop learning were observed (e.g. learning the value of stakeholders' inclusion in research and decision-making). Future research could focus on investigating how to promote the three types of learning, in association with the three orders of governance (Kooiman & Jentoft 2005), in a participatory research context. As well, analyzing the contributions of participatory research to changing stakeholders' images (representations of the how and why of governance, Jentoft et al. 2010) is another gap for further research.

To sum up, in addition to contributing to several policy and methodological recommendations, my doctoral work has opened up new research questions on adaptive co-management and related processes, in both coastal Uruguay and Paraty.

## **10.5. CONCLUDING REMARKS**

Artisanal fisheries in coastal Uruguay and Paraty (Brazil) are under transition. Not only catches have been declining and fishers are increasingly looking for, or moving to, alternative occupations (in Piriópolis and Paraty, respectively) but also resource management is being questioned. Government agencies in charge of fisheries management, partly under the influence of the FAO Code of Conduct for Responsible Fisheries, have shown willingness to devolve some power to user groups in order to increase rules' compliance, among other reasons. The paths taken in the two study areas in this direction differed and the stakeholders involved too. In Uruguay, in 2009, the National Directorate of Aquatic Resources submitted to the national Parliament a bill for a fisheries law which includes the creation of zonal councils for artisanal fisheries co-management. These councils started to be implemented in 2012 in pilot zones of the country although the law has not yet been passed. At the same time, in 2009 the Ministry of Fisheries and Aquaculture was discussing the institutionalization of a Fishing Agreement (a kind of co-management arrangement) for artisanal fisheries in Ilha Grande Bay, where Paraty is located. As of 2013, this co-management arrangement is no longer under consideration in the area, but a Public Policies Program for Fisheries and Aquaculture Co-management is being proposed.

Even though the fisheries law in Uruguay (as enabling policy) is part of a window of opportunity for improved management or adaptive co-management of artisanal fisheries, this

research showed that several are the challenges to be faced. Some of these obstacles were as well found in Paraty, such as weak organizational capacities of fishers and conflict-laden linking relationships with management agencies. Nonetheless, these and other barriers can be partially overcome through participatory research of the empowering type, involving fishery stakeholders (fishers, management agency, university, NGOs), leading to strengthened social networks, social learning and co-production of knowledge, among other positive impacts.

Assuming that actual co-management is consistent with democratic principles and leads to improved decision-making, collaboration among fishers, government agencies, researchers and additional stakeholders will be crucial for enhancing this transition, finally moving beyond the prevailing top-down management approach.

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## APPENDICES

### Appendix 1. Guide used during interviews (in Spanish) with fishers in Piriápolis (Uruguay)

#### 1. Descripción de su actividad en el sector

- 1.1. Dueño de barca: SÍ (Nº de barcas: ) NO  
 1.2. Libreta de: Patrón / Marinero / Grumete / No tiene  
 1.3. Actualmente trabaja (como):

Patrón	Marinero	Alistador	Comprador
Buzo mejillonero	Lavando barcas	Desenmallando	

1.4. ¿Cómo se te remunera tu actividad? (O cómo se reparten las ganancias en tu barca)

1.5. Nombre de las barcas donde trabaja, cuánto miden y cuánto cargan máximo:

1.6. En zafra: Nº máx. de redes / palangres que cala ¿Mallero o palangrero?

1.7. ¿A quién le vendes el pescado?	%
Comprador/Intermediario:	
Fábrica:	
Restoranes:	
Hoteles:	
Público: ¿puesto de venta o puerta por puerta?	
Exportación directa:	

- 1.7. Edad de inicio en la pesca: Año:  
 1.8. ¿Pescas aquí todo el año o emigras?  
 Puertos base donde pesca (ha pescado) y épocas:

1.9. ¿Has trabajado en los barcos de arrastre?: SÍ NO ¿Por qué?  
 Época y motivos por haber dejado:

- 1.10. Trabajas en la pesca porque... (se puede marcar más de una opción)  
 a) Tu familia se dedicaba a esto.  
 b) Te gusta.  
 c) Se gana bien.  
 d) No tienes otra opción de trabajo.

1.11. Familiares que trabajan/trabajaban en la pesca (incluye descendientes):

1.12. ¿Te gustaría seguir trabajando en la pesca en el futuro? SÍ NO  
 ¿Por qué?

1.13. ¿Te gusta/gustaría que tus hijos se dediquen a la pesca? SÍ NO  
 ¿Por qué?

1.14. Fuentes de ingreso de tu hogar y % de los ingresos totales de cada una:


## 2. Prácticas de pesca y cambios a lo largo de los últimos 10 años

2.1. A continuación leeré algunas afirmaciones y te preguntaré cuán de acuerdo estás tú personalmente con esas afirmaciones. (MOSTRAR TARJETA)

1: Muy en desacuerdo, 2: En desacuerdo, 3: Ni en acuerdo ni en desacuerdo,

4: De acuerdo, 5: Muy de acuerdo, 6: No sabe / No contesta

Todo el que quiera tiene derecho a pescar.	
Durante la zafra de la malla, la barca que sale primero al mar tiene derecho a calar donde quiera.	
Al palangre, la barca que sale primero al mar tiene derecho a calar donde quiera.	
En zafra, los pescadores deben ofrendarle el primer pescado del día a la virgen.	
Es importante que todos los pescadores devuelvan los peces chicos al agua.	
Los pescadores tienen el deber de conservar los recursos pesqueros para las generaciones futuras.	
La mayor movilidad de los pescadores entre puertos (migración) ha hecho que el pescado se quede menos en esta zona.	
<i>Actualmente...</i>	
Hay menos cantidad de pescado que hace 10 años.	
Las zafras son más cortas que hace 10 años.	
El tamaño de las especies capturadas es menor que hace 10 años.	
Es más frecuente encontrar peces con deformaciones que hace 10 años.	
El estado del tiempo es más impredecible que hace 10 años.	
El problema de los lobos marinos es peor que hace 10 años.	
Las prácticas de pesca han cambiado para evitar un poco a los lobos.	
El mar está más contaminado que hace 10 años.	
Hay menos códigos y principios en la pesca que hace 10 años.	
Hay más competencia entre los pescadores debido a la merma de la pesca.	

2.2. ¿Cuáles de éstos (MOSTRAR TARJETA) son causas de la merma de los recursos pesqueros? (Ordenar según importancia)

	Ranking
Barcos de arrastre	
Cambios del clima	
Mayor tecnología y herramientas de las barcas artesanales	
Lobos marinos	
Contaminación	
¿Otras causas?	

2.3. ¿De qué especies cada vez hay menos cantidad?

2.4. ¿Desde cuándo están disminuyendo?

2.5. ¿Hay especies que ya no se encuentran en esta zona? ¿Cuáles?

2.6. ¿Hay especies que se encuentran en mayor cantidad que antes? ¿Cuáles?

## 3. Relaciones/Interacciones entre todos los involucrados en la pesca artesanal

3.1. ¿Cómo es la relación entre los pescadores de...?

(los lugares a preguntar dependerán de su zona de pesca) (MOSTRAR TARJETA)

	Regular	RB	Buena	Muy buena	No hay relación	NS/NC
Puerto Piriápolis						
Pesquero Piriápolis						
Puerto-Pesquero						
Puerto Piriápolis y Playa Hermosa						

Pesquero Piriápolis y Playa Hermosa						
Puerto Piriápolis y Playa Verde						
Pesquero Piriápolis y Playa Verde						
Playa Hermosa						
Playa Hermosa y Playa Verde						
Playa Verde						

3.2. ¿Cuánta confianza/respeto/solidaridad sientes (tienes) hacia los pescadores de...?  
(1: Nada, 2: Poca/o, 3: Mediana/o, 4: Mucha, 5: NS/NC) (MOSTRAR TARJETA)

	Confianza	Respeto	Solidaridad
Puerto Piriápolis			
Pesquero Piriápolis			
Playa Hermosa			
Playa Verde			

3.3. ¿Has participado de alguna organización comunal o vecinal, asociación, cooperativa, sindicato? (Objetivo, antigüedad, etc.)

¿Por qué razones participas o no participas?

3.4. ¿Con pescadores de qué otras localidades te comunicas? (aparte de PP, PH, PV)

¿Por qué motivos?

3.5. ¿Cómo es tu relación con...?

(1: Regular, 2: RB, 3: Buena, 4: MB, 5: No hay relación, 6: NS/NC)

¿Qué grado de confianza/respeto sientes hacia.....? (en lo que refiere a la pesca)

(1: Nada, 2: Poca/o, 3: Mediana/o, 4: Mucha, 5: NS/NC)

	Relación	Confianza	Respeto
Dueño de la barca			
Comprador			
Pescadores deportivos de Piriápolis			
Barcos de arrastre costero			
Marineros de los barcos			
DINARA			
Prefectura de Piriápolis			
Hidrografía de Piriápolis			
Junta Local de Piriápolis			
Intendencia Municipal de Maldonado			
Aduana			
DINAMA			
SUNTMA			
Universidad			
ONGs (Nombre:			
FAO			

3.6. ¿Has participado de algún proyecto de la Universidad, o de ONGs, del Estado, o de la FAO?  
(Descripción) ¿Por qué no?



3.7. A continuación leeré algunas afirmaciones y te preguntaré cuán de acuerdo estás tú personalmente con esas afirmaciones. (MOSTRAR TARJETA)

1: Muy en desacuerdo, 2: En desacuerdo, 3: Ni en acuerdo ni en desacuerdo,

4: De acuerdo, 5: Muy de acuerdo, 6: No sabe / No contesta

El pescador artesanal debe buscar otras alternativas de trabajo cuando no hay pesca.	
Hay conflictos o enfrentamientos entre los pescadores que pescan todo el año y los que pescan solo en zafra.	
Hay conflictos o enfrentamientos entre los pescadores que son de Piriápolis y los que vinieron de otro lugar del país.	
Un pescador nunca debe dejar a otro tirado en el agua, aunque se lleven mal.	
Un pescador siempre debe avisar a los demás si Prefectura o Dinara está haciendo controles.	
Un pescador siempre debe ayudar a otro en caso de enfermedad, aunque se lleven mal.	
Un pescador siempre debe regalar pescado si alguien no tiene para comer.	
Se justifica que un pescador robe cuando no tiene para comer.	
El pescador artesanal es una persona individualista.	
Se justifica que un pescador le mienta al comprador sobre la cantidad que pescó.	
No es grave que un pescador le mienta a otro sobre la cantidad que pescó y dónde pescó.	
El consumo de drogas empeora las relaciones entre pescadores.	
El consumo de alcohol empeora las relaciones entre pescadores.	
Los pescadores jóvenes tienen menos respeto hacia los demás que los pescadores viejos.	
Se necesita más unión y compañerismo entre los pescadores.	
Sería bueno que los pescadores se reunieran regularmente para buscar soluciones a los problemas de la pesca.	
Hacer trámites en Prefectura es un problema.	
Hacer trámites en Dinara es un problema.	
Sería bueno que hubiera reuniones con Dinara más seguido.	
Los intermediarios son un mal necesario.	
Los intermediarios se ponen de acuerdo entre ellos para fijar el precio del pescado.	
Los pescadores deberían unirse para dejar de depender de los intermediarios.	
La intendencia municipal se preocupa más por el turismo que por la pesca artesanal.	
Al Estado le importa más la pesca industrial que la pesca artesanal.	
Hubo proyectos sobre la pesca en esta zona pero siempre quedaron en nada.	

#### 4. Posibles cambios o medidas a tomar en la gestión de la pesca

4.1. A continuación leeré algunas afirmaciones y te preguntaré cuán de acuerdo estás tú personalmente con esas afirmaciones. (MOSTRAR TARJETA)

1: Muy en desacuerdo, 2: En desacuerdo, 3: Ni en acuerdo ni en desacuerdo,

4: De acuerdo, 5: Muy de acuerdo, 6: No sabe / No contesta

Es necesario que haya menos corrupción en Dinara para mejorar la situación de la pesca.	
Es necesario que haya menos corrupción en Prefectura para mejorar la situación de la pesca.	
Se necesita mayor control de los barcos de arrastre.	
Habría que suspender los permisos de los barcos de arrastre cuando violan las reglamentaciones.	
Los barcos de arrastre deberían trabajar a más de 15 millas.	
Los barcos de arrastre deberían ser reconvertidos para usar artes de pesca que sean menos depredadoras.	
Los pescadores artesanales deberían ser autorizados para usar redes de arrastre.	
Los pescadores artesanales deberían ser autorizados para pescar más allá de las 7 millas.	
Los pescadores artesanales deberían ser autorizados para pescar todo el año en los 300 metros de la costa.	
Los pescadores artesanales deberían poder agrandar las barcas a más de 4 TRBs.	
Los pescadores artesanales deberían llenar los partes de pesca con información verdadera para que Dinara pueda evaluar el estado de los recursos.	
Todas las barcas con permiso de pesca deberían estar trabajando.	
La Dinara debería volver a otorgar permisos de pesca a todas las barcas artesanales que lo soliciten.	
Se debería establecer un número máximo de barcas por núcleo familiar.	
La Dinara debería retomar las matanzas de lobos marinos.	
El puerto de Piriápolis debería otorgar más boyas para barcas artesanales y menos para yates.	
Como parte de la regularización de la pesca, se necesita hacer una categorización de los pescadores artesanales según si dependen exclusivamente de la pesca o no.	
Durante la zafra solo deberían pescar aquellos pescadores que pescan todo el año.	
Solo los pescadores que nacieron en Piriápolis y alrededores deberían poder pescar en esta zona.	
El Estado debería apoyar al pescador artesanal para acceder a los implementos de seguridad exigidos por Prefectura.	
El Estado debería intervenir en la fijación del precio del pescado.	
La Dinara debería tener en cuenta el conocimiento de los pescadores sobre la pesca a la hora de tomar decisiones.	
El gobierno y los pescadores deberían buscar juntos soluciones frente a la merma de la pesca.	

4.2. ¿Qué otras medidas sugerirías para mejorar la pesca? ¿Qué harías para promover estas medidas?

4.3. ¿Participarías de una investigación junto con pescadores y técnicos para estudiar alguna de estas medidas? ¿Y para estudiar algún otro tema? ¿Sugerencias?

4.4. De las siguientes, ¿cuál(es) sería(n) la(s) forma(s) más adecuada(s) para interactuar los pescadores con la DINARA? (MOSTRAR TARJETA)

1. La DINARA les informa a los pescadores sobre las decisiones que ha tomado.
2. La DINARA consulta la opinión de los pescadores y toma todas las decisiones.
3. Los pescadores pueden hacer aportes a la DINARA para la gestión de los recursos.
4. Los pescadores asesoran o aconsejan a la DINARA sobre las decisiones a tomar y la DINARA es quien aprueba estas decisiones (luego de analizarlas).
5. Los pescadores y DINARA son tratados como “iguales” y toman las decisiones en conjunto.
6. Los pescadores toman las decisiones y le informan a la DINARA sobre las mismas.

## 5. Nueva ley de pesca

5.1. ¿Sabías que hay una nueva ley de pesca llamada “Ley de pesca responsable y fomento de la acuicultura” que está en el Parlamento por ser aprobada?

SÍ NO (Si no la conoce: ¿te gustaría recibir una copia? )

5.2. ¿Cómo supiste de ella?

5.3. ¿Sabes quiénes crearon la ley?

¿Participaste en alguna etapa del proceso de elaboración? SÍ NO

¿Conoces a algún pescador que haya participado? SÍ NO

5.4. ¿Qué te parece la nueva ley?

5.5. La nueva ley habla de la creación de **Consejos Zonales Pesqueros** para participar en el co-manejo de los recursos en cada zona pesquera. En esos Consejos participará un representante de Dinara, otro de Prefectura, otro de la Intendencia y dos representantes de los pescadores agrupados.

¿Qué opinión te merece? ¿Debería participar alguien más?

5.6. ¿Crees que sea posible que los pescadores se agrupen? ¿Cuáles serían los problemas?

## 6. Para terminar

6.1. ¿Te gustaría recibir los resultados de esta investigación? SÍ NO

6.2. ¿Tienes interés en participar de reuniones y talleres con otros pescadores?

SÍ NO

Datos personales:

Nombre:	Edad:
Localidad donde vive:	Localidad de donde proviene:
Teléfono:	Email:

Datos de la entrevista:

Fecha:	Lugar:
Hora:	Duración aprox.:

Comentarios sobre la entrevista:

## Appendix 2. Guide used during interviews (in Portuguese) with fishers in Paraty (Brazil)

### 1. Atividade na pesca

- 1.1. Desde quando você pesca?
- 1.2. Sempre pescou aqui (PG/IA)? Ou também pescou em outras localidades?
- 1.3. Com que frequência você pesca?
- 1.4. Você possui embarcação/ções? (canoa, barco)
- 1.5. Que tipo de redes ou apetrechos você usa?
- 1.6. Alguma vez trabalhou embarcado? Por que (deixou)?
- 1.7. Sua esposa/o lhe ajuda com alguma tarefa na pesca?
- 1.8. Qual é a importância da pesca como fonte de renda na sua casa?
- 1.9. Por que você trabalha na pesca?  
(Sua família pescava / Gosta de pescar / Se ganha bem / Não tem outra profissão)
- 1.10. Quais dos seus parentes trabalham na pesca (filhos incluídos)?
- 1.11. Você tem feito outras atividades além da pesca?  
(Turismo: ganham mais que antes com a pesca? Gostam?)
- 1.12. Qual dessas é a atividade que você mais gosta? Por que?

### 2. Relação entre pescadores

- 2.1. Você como acha que é a relação entre os pescadores da PG (ou IA)?  
(Ruim / Regular / Boa / Muito boa)
- 2.2. E a relação entre PG e IA?
- 2.3. Quão unidos você acha que são os pescadores da PG (ou IA)?  
(Nada / Pouco / Médio / Muito)
- 2.4. Quanta confiança você tem nos pescadores da PG (ou IA)?  
(Nada / Pouca / Média / Muita)
- 2.5. Quanta confiança você tem nos pescadores da IA (ou PG)?
- 2.6. Em quantos pescadores da PG (ou IA) você tem confiança?  
(Nenhum / Poucos / Metade / Muitos / Todos)  
Quantos desses são parentes?
- 2.7. Em quantos pescadores da IA (ou PG) você tem confiança? (parentes?)
- 2.8. Em quantos pescadores de outras localidades (quais?) você tem confiança?
- 2.9. Os pescadores daqui se ajudam? Em que situações? (Pedir exemplos)
- 2.10. A quantos pescadores da PG (ou IA) você emprestaria redes ou outros apetrechos se eles necessitassem? (Eles lhe emprestariam se você necessitasse?)
- 2.11. E a quantos pescadores da IA (ou PG) você emprestaria redes?
- 2.12. Alguma vez emprestou algo a um pescador e ele não lhe devolveu? (Emprestou mais alguma vez?)
- 2.13. Com que frequência você dá peixe para outros pescadores?
- 2.14. Com que frequência outros pescadores dão peixe para você? (comida ou isca?)
- 2.15. Com que frequência você conversa com outros pescadores sobre como está a pesca?
- 2.16. A quantos pescadores da PG (ou IA) você dá informação certa sobre o ponto onde pescou?
- 2.17. E a quantos pescadores da IA (ou PG)? (Outras localidades?)
- 2.18. Quantos pescadores da PG (ou IA) lhe dão informação certa sobre como foi a pesca?
- 2.19. E da IA (ou PG)? (Outras localidades?)
- 2.20. Você tem algum segredo sobre a pesca que não compartilha com o resto de pescadores?
- 2.21. Você alguma vez fez uma denúncia? Por que?
- 2.22. Você alguma vez foi denunciado por outro pescador? (de onde?)
- 2.23. Você acha que a relação entre os pescadores da PG (ou IA) teria que melhorar?
- 2.24. E a relação entre os pescadores da PG com IA?

### 3. Relação com outros atores

3.1. Como é sua relação com....? (Ruim / Regular / Boa / Muito boa / Não tem relação)

- a) IBAMA
- b) Ministério da Pesca
- c) Capitania
- d) Prefeitura
- e) Colônia de Pescadores
- f) Peixaria / Comprador
- g) Associação de Moradores

3.2. Quanta confiança você tem no/na...? (Nada / Pouca / Médio / Muita)

3.3. Você tem participado de reuniões com o IBAMA? Foram sobre o quê?

3.4. Como poderia melhorar a relação entre o IBAMA e os pescadores?

3.5. a) Você participa das reuniões da Colônia de Pescadores? Por quê?

b) Há alguma/s coisa/s que você acha que deveriam mudar na colônia?

3.6. a) Você participa das reuniões da Associação de Moradores? Por quê?

b) Há alguma/s coisa/s que você acha que deveriam mudar na Associação?

3.7. Você tem relação com alguma universidade/pesquisador? E com ONGs? (quanta confiança?)

3.8. Você acha que é o governo, os pescadores, ou os dois juntos quem têm que pensar como solucionar a escassez da pesca?

3.9. Você acha que o governo deveria consultar/considerar as opiniões dos pescadores sobre as medidas a tomar na pesca?

3.10. Você acha que o governo também deveria consultar as opiniões das mulheres que trabalham na pesca (limpando camarão, peixe, etc.)?

3.11. Você ouviu falar dos "Acordos de Pesca"?

O que sabe sobre eles? Como soube? Participou de reuniões?

Explicar os AP e pedir opinião.

3.12. Você acha que um pescador da sua comunidade deveria ir às reuniões dos AP como representante?

3.13. Que medidas você acha que se poderiam discutir nessas reuniões para tentar melhorar a pesca?

### 4. Bem-estar

4.1. O que é importante para viver bem ou para sua qualidade de vida nesta comunidade? (Você acha que isso é o que a maioria das pessoas daqui gostariam?)

4.2. Você gostaria de mudar de comunidade?

4.3. Você gostaria de mudar de trabalho/profissão? (turismo? pesca?)

4.4. Que tipo de trabalho você gostaria para seus filhos e filhas? (Gostaria que trabalhassem na pesca?)

4.5. Como você acha que estará a PG/IA daqui a 20 anos?

Nome:	Idade:
Localidade onde mora:	Localidade onde nasceu:
Telefone:	Email:
Data da entrevista:	Lugar:
Hora:	Duração aprox.:

Comentários sobre a entrevista:

Appendix 3. Pictures of the participatory research initiative in Piriápolis





Grupo POPA - Por la Pesca Artesanal  
los invita a la:

### Primera Feria de la Pesca Artesanal en Piriápolis

11 y 12 de febrero de 2012 - Hora 18

- Exposición de artes de pesca
- Degustaciones (pesca local)
- Muestra fotográfica
- Música en vivo
- Y mucho más!

Local de la Dirección Nacional de Hidrografía  
(frente al puerto)

Grupo POPA está integrado por:  
Pescadores artesanales



Por consultas: [porlapescaartesanal@gmail.com](mailto:porlapescaartesanal@gmail.com)



## Appendix 4. Guides (in Spanish) for planning and facilitating participatory research workshops

### (A) Guía para la realización de talleres (POPA - Por la Pesca Artesanal)

En este documento pretendemos hacer una lista de aquellos aspectos que nos parecen claves a la hora de planificar un taller de POPA, entre otras actividades del grupo. Esta guía la elaboramos reflexionando acerca de cómo llevamos a cabo los talleres en el 2011. Al igual que en la “Guía para moderación de talleres”, encontrarán sugerencias y recomendaciones, pero siempre habrá cosas para ir agregando!

A continuación presentamos una serie de tareas que creemos importantes, algunas a realizarse antes del taller, otras durante el mismo y otras después. Asimismo, algunas tareas pueden dividirse entre varias personas y/o ser rotativas para que nadie quede sobrecargado de trabajo y pueda disfrutar mejor la labor de todo el año.

POPA necesita de: un moderador/a, un apuntador/a, un coordinador/a de reuniones, un encargado/a del cronograma, algunos coordinadores/as de actividades (o subgrupos; por ejemplo: investigación participativa sobre lobos, actividades de comunicación, etc.). Al menos dos personas deberán, además, llevar las “cuentas”.

Un punto importante en los talleres es la puntualidad tanto para empezar como para terminar (como vimos en la “Guía para moderación de talleres”). Es una forma de respetar los tiempos de todos y tener una buena jornada de trabajo. Se recomienda tener a mano papelógrafos, marcadores, cinta adhesiva, té, café y algo rico para compartir.

Detalles de las tareas:

- Para la tarea del moderador/a se recomienda leer la “Guía para moderación de talleres”.
- El apuntador/a tiene la tarea de tomar notas durante el taller y luego hacer un resumen para que todos tengan una copia. Debería ser un reflejo de lo que sucedió en el taller, algo esencial para los que no pudieron asistir y también para contar con un registro del trabajo (hay cosas que con el tiempo se olvidan!). Es importante que se registren los temas discutidos, las decisiones tomadas, los compromisos asumidos por cada integrante del grupo y los asuntos que surgen y serán tratados en talleres venideros. (Nota: suele ser útil elaborar el resumen del taller siguiendo los “bloques” del cronograma).
- El coordinador/a de reuniones es el encargado de proponer el día y la hora asegurándose de conseguir un lugar para el taller. Debe asegurarse que se trate de un día en que la mayoría de los integrantes del grupo puedan asistir y que todos sean avisados con tiempo.
- Quien se comprometa con la tarea de ser encargado del cronograma u orden del día, debe estar atento a todos los temas que surgen entre un taller y otro, además de ver qué asuntos pendientes quedaron de un taller a otro. Se sugiere elaborar un “cronograma tentativo” y ponerlo a consideración del resto del grupo unos días antes del taller. Es importante pensar en qué tiempo se le dedicará a cada tema y armar “bloques de discusión” con cada uno de ellos. Ya tuvimos la experiencia de querer abordar muchos temas en una sola jornada y no tuvimos éxito. Es importante que el moderador haga respetar los tiempos de cada bloque. Es aconsejable que el cronograma esté a la vista de todos en un papelógrafo. También es recomendable que el cronograma incluya: unos primeros minutos para que el moderador repase las pautas para un buen trabajo, unos minutos en el medio para distender la mente (por ej. 10 min), y unos minutos al final para realizar una evaluación grupal del trabajo realizado en el taller (por ej. 15 min).
- Coordinador de actividades: los subgrupos pueden mantener la misma forma de trabajar del grupo, es decir, tener sus reuniones con apuntador, moderador, coordinador de reuniones. Lo ideal es que una vez conformado un subgrupo se identifiquen los temas a abordar, se definan las estrategias de trabajo y se planifiquen las acciones. Como en toda investigación y trabajo grupal, es muy importante que se vayan tomando registros



(notas, fotografías, audios – según el caso) de los pasos que se van dando, ya que son parte de los insumos que se necesitan para analizar los resultados alcanzados. Además, en los talleres de todo el grupo es importante que cada subgrupo relate sus avances. Con anticipación deberán comunicarle al encargado de armar el cronograma los asuntos que serán tratados en el taller.

- Papelógrafos: es útil tener siempre un papelógrafo en blanco a mano (ya hemos visto cómo podemos generar ideas colectivas a partir de una hoja en blanco!). Es muy favorable que estén a la vista el cronograma, las reglas para un buen diálogo y los requisitos para ser integrante de POPA. Las reglas para un buen diálogo sirven para recordar cuál es el ambiente de trabajo que queremos en los talleres, en especial si hay invitados o gente nueva que no conoce nuestro método de trabajo. Los requisitos para ser integrante del grupo, son útiles para la gente que nos visite y para tener presentes nuestra propia consigna como grupo.

Algunas de las cosas que muchos hemos destacado del trabajo del grupo durante el año 2011 es el buen ambiente que se genera en las reuniones, la capacidad de diálogo con mente abierta y el ver que podemos hacer grandes cosas juntos. Depende de todos poder alcanzar nuevos éxitos.

¡Grande POPA! ¡Por un buen 2012!

## **(B) Guía para la moderación de talleres (POPA – Por la Pesca Artesanal)**

Este documento pretende ser una guía para quien tenga la tarea de moderar (o facilitar) los talleres (tarea que puede ser rotativa). Es una compilación de algunas “pistas” que nos han ayudado a trabajar todos estos meses. Si bien son necesarias, no se agotan en este listado, así que cada uno puede ir agregando aquellas cosas que puedan ser útiles cuando tenga que moderar el taller.

Debemos recordar que los talleres de la *investigación participativa* que lleva a cabo POPA buscan ser foros de aprendizaje colectivo, donde se reúnen personas con diferentes visiones, conocimientos, información y experiencias, en este caso con el objetivo de abordar y/o resolver problemáticas locales de la pesca artesanal. El moderador tiene la tarea de ayudar para que el diálogo sea ordenado, respetuoso, ágil y participativo (o sea, que todos intervengan).

Al comenzar un taller, el moderador debe recordar las reglas para un buen diálogo:

- Mente abierta, es estar dispuestos a escuchar con respeto el punto de vista de otro integrante del grupo, a pesar de que nuestro enfoque o conocimiento sea contrario o diferente. Es importante entender lo que dice el otro y por qué lo dice, cuáles son sus argumentos y cómo obtiene ese conocimiento. Luego podremos decir nuestra opinión e incluso explicar por qué no concordamos con la otra persona.
- Todas las opiniones y conocimientos son bienvenidos.
- Escuchar atentamente lo que dice otro compañero. Si hablamos unos encima de otros no nos escuchamos!
- No interrumpir cuando otro habla; es muy útil tener papel y lápiz a mano para ir anotando las ideas que se nos vienen a la cabeza!.
- Levantar la mano cuando queremos hablar. De esta manera ayudamos a ordenar el diálogo, todos podemos participar y expresar nuestro punto de vista sin interrumpir a los demás.
- Todos pueden participar de la discusión de cada tema.
- Los comentarios deben ser breves, puntuales y sobre el tema que se está tratando. Se puede establecer que cada uno tenga 1 minuto para hablar, para que haya tiempo para que todos intervengan y para que se pueda seguir el cronograma (sobre todo si es apretado). De alguna forma (por ej., una señal de que vaya “redondeando”) el moderador le avisará si se pasaron de tiempo o se fueron de tema.

- Explicar el uso de términos de la “jerga científica” o de la “jerga pesquera”. Debemos asegurarnos que nuestro mensaje está siendo entendido por los integrantes del grupo. Por lo tanto, para que todos entendamos el lenguaje utilizado, es necesario explicar las palabras que no son comunes para todos (recordemos que tenemos diferentes formaciones).
- Tomarse un recreo cuando se necesite (por ej., para ir al baño, salir a fumar, tomar/comer algo).
- Se recomienda apagar o silenciar los celulares antes del comienzo de cada taller; no hablar por teléfono dentro del local (podemos hacerlo afuera todas las veces que sea necesario). Es parte del respeto que le debemos a los demás para no interrumpir su diálogo. Una llamada telefónica, distorsiona el taller e impide que los demás integrantes del grupo escuchen correctamente al que está hablando.

Durante el taller todos debemos mantenernos alertas para ayudar a que se cumplan estas reglas (si bien es tarea del moderador, todos podemos colaborar). Si surge algún inconveniente (porque alguien no las está cumpliendo adecuadamente), con respeto llamamos la atención y recordamos las reglas que sean necesarias para mantener el buen diálogo.

La puntualidad para empezar y terminar cada taller es algo que todos deseamos. Los talleres están divididos en “bloques” con el objetivo de intercambiar opiniones sobre un tema dado en un tiempo determinado. Es importante que los comentarios sean puntuales y sobre el tema en cuestión, por lo cual el moderador debe estar atento para que el grupo no se “vaya por las ramas”. Si surgen temas importantes pero no relacionados con lo que se está tratando se pueden dejar planteados para otro taller o si hay tiempo se pueden dejar para el final (se pueden escribir en un paleógrafo para recordarlos), a menos que se trate de algo urgente que lleve a que el grupo decida modificar el orden del día para tratarlo en el momento.

Algunas “pistas” útiles para que el moderador tenga en cuenta durante el taller:

- Tener una lista de “oradores”. A medida que los participantes levantan la mano porque quieren participar, el moderador va anotando su nombre en una lista. El participante espera su turno. Si una persona está interviniendo demasiado y otros aún no lo han hecho (o sea, esa persona está en la lista de oradores muchas veces seguidas y hay otros esperando turno), el moderador se la saltará hasta el final de la lista o le saltará el turno un par de veces (siempre se le va a permitir hablar a esa persona antes de cambiar de tema). El criterio para esto es que debemos equilibrar el diálogo de la mejor manera posible para que todos intervengan.
- Invitar a que todos participen e intercambien opiniones. Hay quienes pueden ser más tímidos, o simplemente pensar que no tienen nada importante para decir. Si vemos que alguien no participa, podemos buscar la forma de preguntarle si quiere hacer algún comentario.
- Si algo no está quedando claro, o se están utilizando palabras técnicas sin explicarlas, el moderador puede hacer pequeñas preguntas al grupo para asegurarse que todos están comprendiendo (por ejemplo, preguntar si se entiende, si alguien tiene alguna pregunta sobre ese tema en especial). Cuando pedimos una mejor explicación (una explicación diferente, utilizando otras palabras o con ejemplos) estamos ayudando a que todos comprendan.
- Es importante mantener un ambiente relajado de trabajo. Para ello es útil hablar pausado, con calma y sin gritar, pero con la suficiente claridad y volumen para que todos escuchen.
- En algunas situaciones puede que no se alcance el consenso, es decir que no nos pongamos de acuerdo con un punto de vista. En los casos en que haya que tomar decisiones, el moderador debe ayudar al grupo a “negociar” o a elaborar una nueva situación (propuesta) que permita tomar una decisión (quedando conformes).

- También pueden surgir temas controvertidos donde probablemente haya diferentes opiniones en el grupo. El moderador debe recordar las pautas para un buen diálogo si es necesario; por ejemplo, que todas las opiniones son bienvenidas, y que podemos pensar diferente pero debemos decirlo con respeto. En estos casos es conveniente ser muy estricto con el tiempo y con las veces de intervención, así logramos un mejor clima de trabajo. Cuando se cumpla el tiempo asignado (según el cronograma), buscar la forma de cerrar el tema, por el momento al menos; al tratarse de un tema controvertido, es posible que el grupo tenga que volver a tratarlo en otra ocasión. Quizá no se llegue a una posición unánime, pero cada uno habrá enriquecido la visión del tema tratado en base a las opiniones de los demás, lo cual seguramente nos deje reflexionando.
- El moderador debe evitar que ocurran conversaciones de “ida y vuelta” entre dos personas (a menos que sea realmente necesario). Las conversaciones de ida y vuelta impiden que los demás integrantes participen. Esperar nuestro turno para volver a hablar implica ser pacientes.
- Cuando estamos frente a situaciones donde hay que repartir tareas y vemos que no todos se “anotan” (o se ofrecen a encargarse de algo), estimularlos o invitarlos a que lo hagan. Debemos recordar que uno de los objetivos de las *investigaciones participativas* es que todos participemos de las etapas de toma de decisiones y acciones que se planifiquen para abordar un problema. No se trata de imponerle el trabajo a nadie sino de trabajar en equipo compartiendo nuestras visiones, conocimientos y acciones!
- Controlar el tiempo del cronograma del día. Esto implica intentar que cada bloque se realice en el tiempo que había sido asignado, aunque es probable que exista un pequeño desfase entre un bloque y otro. También implica asegurarnos que el corte (de 10-15min) no dure más de lo previsto. La puntualidad de todos es importante para poder cumplir con todo lo planificado para un taller dado. El hecho de que los tiempos de cada bloque se puedan cumplir también dependerá de cómo haya sido planificado el taller, para lo cual es bueno tener en mente el número de personas que seremos, la duración de las intervenciones (1min/persona) y el número de intervenciones que se crea que van a haber. Por ejemplo, una ronda de intervenciones (en donde cada uno opina en su turno), precisará menos tiempo que un tema que se trate de forma más “abierto” (no siguiendo la ronda). En esos casos es más difícil estimar cuánto tiempo sería necesario. Una lección aprendida es que no podemos tratar “demasiados” temas si queremos tener tiempo suficiente de intercambio.
- Cuando se produce un silencio, si bien cualquier miembro del grupo puede romperlo, el moderador puede hacer alguna pregunta abierta para retomar el diálogo, o incluso recordar la “consigna” de esa parte del taller (sobre qué estamos opinando o qué estamos resolviendo).

Para desarrollar su tarea de la mejor manera, el moderador limitará sus intervenciones (en número y duración). Se anotará en la lista de oradores cuando desee intervenir o lo hará cuando ya no quede nadie en la lista, pero como no puede descuidar su rol de moderador, intervendrá cuando lo considere muy necesario o antes de cerrar un tema, sin extenderse. Si los demás integrantes del grupo observan que el moderador está hablando demasiado, deben hacérselo notar, ya que es tarea de todos asegurarnos que se cumplan las reglas para un buen diálogo y para un buen trabajo!

**Appendix 5. Protocol generated collectively by the participatory research group (POPA) to study the sea lion impact on long-lines**

FECHA:	
Puerto de salida:	
Nombre de la embarcación:	
Nombres de la tripulación:	
Nombre del observador acompañante:	
Hora de salida puerto:	
Hora de entrada al puerto:	

**ARTES DE PESCA:**

Número de PALANGRES:	
Largo del palangre:	
Número de anzuelos por palangre:	
Tipo de anzuelos (marca, duros/blandos):	
Tipo de carnada:	
Especie objetivo:	
Forma de calado (en vagas? dirección?)	
Hora de calado:	
Hora de virado:	
Horas de reposo:	
Distancia de la costa:	
Profundidad:	

Número de REDES:	
Tamaño de las redes (cm)	
Especie objetivo:	
Forma de calado (en vagas y dirección)	
Hora de calado:	
Hora de virado:	
Profundidad:	
Posición por GPS	
Presencia de lobos	Si No
Daños de lobos	Si No
Numero	Sexo
	Estadío

**GASTOS**

Carnada:	\$
Alistada de palangres:	\$
Combustible: (Litros usados: Precio/litro: )	\$

**VENTAS**

Kg POR ESPECIE		Precio VENTA/ kg
Brótola		
Congrio		
Corvina		
Pescadilla de calada		
Pescadilla de red		
Pargo		

**CAPTURA**

	Vaga 1	Vaga 2	Vaga 3
Posición geográfica	Lat: / / Long: / /	Lat: / /      Long: / /	Lat: / / Long: / /
Hora de calado			
Hora de virado			
N° palangres (todos de 100 anzuelos?)			
Especies capturadas			
Brótola			
Congrio			
Corvina			
Pescadilla de calada			
Pescadilla de Red			
Palometa			
Pargo			

**DAÑOS:**

	Vaga 1	Vaga 2	Vaga 3
Lobos comiendo peces (número de peces y de qué especie):			
Brótola			
Congrio			
Corvina			
Pescadilla de calada			
Pescadilla de red			
Palometa			
Pargo			

<b>Peces mordidos/dañados en la captura (número y especie):</b>			
Brótola			
Congrio			
Corvina			
Pescadilla de calada			
Pescadilla de red			
Palometa			
Pargo			
<b>Peces flotando (número y especie) - no comidos por los lobos:</b>			
Brótola			
Congrio			
Corvina			
Pescadilla de calada			
Pescadilla de red			
Palometa			
Pargo			

**LOBOS:**

Siguieron a la barca desde el puerto?: Si No

	Vaga 1	Vaga 2	Vaga 3
Hora de inicio (obs. de lobos)			
Número de lobos:			
Especie			
Categoría de edad (juvenil/adulto):			
Sexo:			
Presencia de gaviotas:			

Interacción lobos y gaviotas:			
Hora fin (obs.de lobos):			

**DATOS A TOMAR EN TIERRA: DAÑOS**

Nº de brazoladas perdidas (enteras)			
Nº de anzuelos perdidos			

**OTRAS EMBARCACIONES:**

Nº barcas que salieron a pescar ese día (misma hora)	
Nº barcas que estaban simultáneamente en la misma "zona de pesca" <b>anotar los nombres de las barcas</b>	
Artes de pesca utilizadas (en cada barca)	
Captura total (de cada barca)	
¿Qué barca tuvo interacción con lobos? (nº de lobos?)	

**OBSERVACIONES:**

**Appendix 6. Brochures (triptychs) produced by POPA and distributed to every visitor of the First Artisanal Fisheries Festival in Piriápolis (February 2012)**

**Delicia de tierra y mar**  
*Brochette de pescadilla con manzanas Granny Smith con un manto de salsa de cítricos y hierbas aromáticas*

**Ingredientes** (6 brochettes)  
200g. pescadilla (35g. por brochette), 2 manzanas verdes (GrannySmith) en cubos (3 o 4 cubos por brochette), 20g. manteca, pizca de pimienta.  
La salsa: mezclar 2 Cdas. de mayonesa con 1 o 2 Cdas. de jugo de naranja, tomillo, perejil y ciboulette picados chiquitos.

**Elaboración**  
Calentar una plancha a fuego medio, untar con la manteca, sellar de los dos lados el pescado, retirar, sellar luego la manzana, retirar y dejar enfriar un poco. Armar las brochettes. Espolvorear con pimienta solo el pescado. Por último rociarlas con la salsa o las hierbas.

(Fuente: Grupo Innovadores de Tierra y Mar)

POPA – Por la Pesca Artesanal es un grupo interdisciplinario integrado por pescadores artesanales, Facultad de Ciencias (UDELAR), Facultad de Ciencias Humanas (UCU), el Proyecto Pinnipedos-Cetáceos Uruguay, EcoPolis, SOS Rescate de Fauna Marina y Pablo Puig (DINARA-MGAP). El grupo fue conformado en 2011 para abordar problemáticas socio-ambientales de la pesca artesanal en Piriápolis a través de una investigación participativa

**Cebiche de corvina**

**Ingredientes** (5 porciones)  
1kg. de corvina fresca y sin espinas, 1Cda. de cilantro fresco, 1 cebolla morada, 1 taza de jugo de lima, 1Cda. de sal, ají picante a gusto, tomate en cubos sin semillas, 2 pelones.

**Elaboración**  
Cortar la corvina en trozos de 1cm por 4 cm. aproximadamente y condimentar con sal, picar el cilantro bien chico, despepitar y eliminar nervaduras del ají (en las semilla y nervaduras es donde conserva lo más picante del ají), cortar la cebolla en pluma (corte en finas tiras), exprimir una taza de jugo de lima, marinar todos estos ingredientes en el jugo de lima y conservar en heladera por 5 minutos antes de consumir, acompañar con tomate fresco y gajos de pelones.  
Es muy importante consumir el cebiche entre 5 o 10 minutos después de elaborarlo.

(Fuente: Pablo Montes de Oca)



Apoya DINARA

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**Pesca Artesanal: TRABAJO DE MUCHOS**

## PESCA ARTESANAL EN URUGUAY


*El mar: nuestra huerta*



**¿Sabía usted que aproximadamente 6000 personas trabajan directamente en pesquerías artesanales de Uruguay?**

**La pesca artesanal en Piriápolis**


- Se define como una actividad comercial a pequeña escala con un importante componente de esfuerzo manual en su operativa.
- Presenta gran relevancia socio-económica. En varias localidades costeras, además de Piriápolis, la pesca artesanal constituye una de las principales fuentes de ingreso durante gran parte del año.



*Las artes de pesca principalmente utilizadas en esta pesquería son las palangres y las redes de enmalle.*


Las artes de pesca utilizadas por la pesca artesanal en Uruguay son selectivas, ya que no capturan peces por debajo de ciertas tallas (como individuos juveniles).

**Para muchos pescadores artesanales, la pesca es más que un trabajo, es una forma de vida. Si pudieran cambiar la pesca artesanal por un trabajo en donde ganaran más, muchos no la cambiarían. Ese gusto y pasión por la pesca tiene que ver, entre otras, con el mar en sí mismo, la naturaleza, la libertad y las relaciones entre quienes integran la barcada.**



**Principales especies que se capturan en Piriápolis:** brótola, corvina, pescadilla. Además, según la época se captura: palometa, anchoa, cazón, lisa, pejerrey, congrio, entre otras

A diferencia de los productos importados, como es el caso del pangasius (panga), el salmón y la tilapia, el pescado proveniente de las pesquerías artesanales es un **producto nacional**, generador de muchas fuentes de trabajo y es **fresco, natural y nutritivo**.



**¿Como reconocer el pescado fresco?**

Si está entero:

- los ojos deben estar brillantes
- y las agallas rojas.

El pescado fresco jamás es opaco, ni arenoso al tacto, y no debe tener feo olor.



**Especies más comúnmente capturadas por los pescadores artesanales en Piriápolis**



**Brótola**  
**Corvina**  
**Pescadilla**  
**Palometa**  
**Anchoa**  
**Lisa**  
**Congrí**  
**Pejerrey**

**Pescado a la manteca rubia (corvina, pescadilla u otro pescado de costa)**

**Ingredientes** (5 porciones)  
4 bifes grandes de pescado del día,  
50 g. de manteca, harina,  
3 Cdas. de alcaparras y pimienta.

**Elaboración**  
Se enharina el pescado y se coloca en la plancha caliente con aceite de oliva. Cocción a gusto.  
En una olla se pone a derretir la manteca a baja temperatura (sin quemarla) con las alcaparras y un poco de pimienta.  
Al salir el bife de la plancha, saltear el pescado con esta preparación.

Manteca rubia es una derivación de la tradicional receta "pescado a la manteca negra". La diferencia es que solamente se derrite la manteca y no se quema como en la última. De esta forma, el plato es más sano y más liviano, acompañando la frescura del pescado.

(Fuente: Juan Carlos Nuñez)



Apoya DINARA



[porlapescaartesanal@gmail.com](mailto:porlapescaartesanal@gmail.com)

**PESCADO ARTESANAL:  
FRESCO Y NACIONAL**

*El mar: nuestra huerta*



**El pescado proveniente de las pesquerías artesanales no solo genera mano de obra nacional, sino que también es fresco, natural, y posee importantes propiedades nutritivas.**

**Usted sabe que es sano comer pescado fresco capturado artesanalmente. ¿Pero sabe realmente por qué? Porque el pescado capturado artesanalmente es pesca del día.**

*Las propiedades nutritivas del pescado tienen efectos beneficiosos para la salud.*

**¿Qué beneficios brinda el pescado en la alimentación?**

- Posee pocas calorías.
- Aporta proteínas en 15-20%, de alto valor biológico porque contienen todos los aminoácidos esenciales que el organismo necesita.
- Aporta ácidos grasos omega-3, previniendo enfermedades cardíacas y cerebrovasculares.
- Aporta vitaminas B1, B2, B3 y B12, A, D y en menor proporción la E.



**El pescado en un alimento indispensable en la dieta, en todas las edades y en las distintas etapas fisiológicas.**

**Su ingesta, dentro de una alimentación sana y equilibrada, constituye un modo de prevenir la aparición de algunas enfermedades.**



*En una dieta saludable, el pescado debe alternarse con otros alimentos proteicos de origen animal o vegetal.*

POPA – Por la Pesca Artesanal agradece a las Doctoras Karin Achaval y Zulema Coppes, y a la Nutricionista Fabiana González, por la información brindada.

**¿Qué enfermedades podemos ayudar a prevenir mediante una dieta rica en pescado?**

- Por ser más tiernos y fáciles de digerir, son alimentos recomendados en caso de padecer gastritis, úlcera péptica, dispepsia o reflujo gastroesofágico.
- Durante el embarazo, ayudan a consolidar la formación del tejido nervioso y visual del bebé.
- En la niñez, contribuyen a evitar alteraciones en la retina, dislexia, cambios bruscos de comportamiento, hiperactividad y disminución de la capacidad cognitiva.
- Previenen el Alzheimer, diabetes, asma y la senilidad precoz
- Evitan inflamaciones, sequedad y fisuras en la piel.
- Estimula al sistema inmune; combaten la osteoporosis.
- Protegen y colaboran favorablemente en el tratamiento de enfermedades como esclerosis múltiple y artritis reumatoide, entre otros aportes a la salud.

Appendix 7. Press release regarding the First Artisanal Fisheries Festival in Piriápolis, on the front page of the national newspaper *La Diaria*

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# la diaria

**DINAMIZARLA.** MUJICA PROPONE QUE LA DINAMA PASE A SER DEPENDIENTE DE PRESIDENCIA PARA "JERARQUIZAR" SU FUNCIÓN.  
POLÍTICA página 3

**TRANQUI.** CON CALLECITAS PINTORESCAS Y PLAYAS DE AGUA DE RÍO, LAS CAÑAS RECIBE VISITANTES DE TODO EL PAÍS Y DE ARGENTINA.  
SOCIEDAD páginas 6-7

**PALA PRONTA.** ANCAP ESPERA PERMISO PARA INICIAR PERFORACIONES EN SALTO EN BUSCA DE HIDROCARBUROS.  
ECONOMÍA página 8

**RAPIDSHARE Y FURIOSOS.** TRÁFICO DE INTERNET EN URUGUAY BAJÓ APENAS 3% DESDE CIERRE DE MEGAUPLOAD SEGÚN DATOS DE ANTEL.  
POLÍTICA página 4

**MODIFICADO.** SE APROBÓ CONSTRUCCIÓN DEL PUENTE SOBRE LAGUNA GARZÓN, CON LA CONDICIÓN DE CUIDAR VELOCIDAD Y AMBIENTE.  
SOCIEDAD página 7

**LA PEDRERA EN MONTEVIDEO.** LOS CORTOS GANADORES DEL FESTIVAL ROCHESENSE, INCLUYENDO DOS ASPIRANTES AL PREMIO OSCAR.  
CULTURA página 13



*Pescadores artesanales de Piriápolis remolcan su bote luego del arribo al muelle. ★ FOTO: NICOLÁS CKLATA*

## Artes

FERIA DE PESCA ARTESANAL EN PIRIÁPOLIS REUNIÓ DISCIPLINAS MUY DIVERSAS PARA VALORIZAR LA ACTIVIDAD Y SUS PRODUCTOS

# Saberes y sabores

Feria de Pesca Artesanal en Piriápolis para revalorizar el producto y la actividad

Una exposición fotográfica, la demostración del uso de las artes de pesca, una exposición de obras de arte de pintores que crearon un cuadro en conjunto allí mismo, un taller sobre las propiedades nutritivas del pescado, cuatro chefs cocinando con productos de pesca artesanal –que fueron degustados por el público– y espectáculos musicales. Todo eso incluyó la feria de pesca artesanal realizada en la tarde y noche de sábado y domingo en Piriápolis, a la que asistieron cerca de 3.000 personas. Si bien la evaluación formal no se ha hecho, saltaba a la vista que se alcanzó el principal fin: que el público se interiorizara de las vivencias cotidianas de los pescadores artesanales y tuviera más elementos para revalorizar el producto que obtienen, rico y nuestro.

LA ACTIVIDAD fue organizada por el grupo Por la Pesca Artesanal (Popa), formado en mayo de 2011 e integrado por pescadores artesanales de Piriápolis, investigadores de la Facultad de Ciencias de la Universidad de la República, por la Facultad de Ciencias Humanas de la Universidad Católica, la Unidad de Pesca Artesanal de la Dirección Nacional de Recursos Acuáticos (Dinara) y tres organizaciones sociales, Proyecto Pinnípedos-Cetáceos Uruguay, Ecópolis y SOS Rescate de Fauna Marina.

Tanto pescadores como biólogos resaltaron, en diálogo con *la diaria*, las virtudes de amalgamar en un mismo grupo a investigadores y pescadores por el aprendizaje mutuo que obtienen ambas partes, que en pocas oportunidades trabajan codo a codo, investigando y tomando decisiones en forma colectiva.

Micaela Trimble, bióloga integrante de Popa y estudiante de doctorado en la Universidad de Manitoba en Canadá, contó que el grupo se conformó “cuando iniciamos una investigación participativa para tratar problemáticas de la pesca artesanal en Piriápolis”. Por su parte, el pescador Johnny Bouyssounade celebró integrar un equipo que es realmente “participativo y popular”: “Acá se encuentra la Dinara [Dirección Nacional de Recursos Acuáticos], pescadores, científicos, biólogos, ONG que trabajan, de repente, en ideas desencontradas con las de los pescadores; pero tenemos un fin en común, el medio ambiente”. Agregó: “Yo he dejado de salir al agua para trabajar en este equipo porque me parece que esto es importante no tanto para mí sino para el futuro de mi familia, mis dos hijos que viven de la pesca artesanal y mis dos nietas que dependen de la pesca artesanal. Si no cuidamos el recurso y el medio ambiente, ¿de qué vamos a vivir?”.

## Anzuelos

Sobre las 16.30 del domingo en las instalaciones de la Dirección Nacional de Hidrografía, frente al Puerto de Piriápolis, ya comenzaba a dibujarse lo que sería la segunda jornada. Dentro del local el grupo de investigadores afinaba los detalles de una encuesta que haría entre el público; podía recorrerse la muestra fotográfica *Un día en la vida del pescador artesanal*, con imágenes tomadas por integrantes del colectivo Popa; además de las diferentes instan-

cias del proceso, se registraban las jurisdicciones de Piriápolis-Playa Verde, Playa Hermosa, Puerto de Piriápolis y Pesquero Stella Maris– y se incluía información sobre la pesca artesanal y sus productos. Colgados estaban también los cuadros de tres artistas plásticos uruguayos, María Antonia Beloso, Adolfo Fito Sayago y Quique Souza, con motivos relacionados con la pesca artesanal y sobre un caballete un lienzo en blanco. Fuera del recinto se iban montando las mesas y los espacios donde se demostraría la utilización de las artes de pesca usadas: redes y palangres (línea con cientos de anzuelos). Debajo de cuatro carpas del Ejército se volvían a colocar las cocinas y hornos que habían estado activos la noche anterior, y más lejos se hacían las pruebas de sonido. De a poco fueron llegando los pescadores, que armaron también cada una de sus partes.

Al mediodía había salido una barca de pescadores que aparcaría sobre el atardecer en el Pesquero Stella Maris. La zona queda a pocas cuadras del puerto y allí viven pescadores artesanales y hay puestos de venta de ellos y de intermediarios.

Pasó poco tiempo desde que se divisó la embarcación, a pocos metros de la costa, hasta que llegaron a la orilla, y menos tiempo todavía en que un montón de pescadores saliera de sus casas para sacar la barca del agua. Cerca de diez hombres cincharon con la embarcación y no les fue sencillo porque, además del peso de la barca y el desnivel de la rampa, las olas llevaban la embarcación hacia el mar. El domingo no había viento, lluvia ni frío, pero no costaba imaginar cuánto más difícil sería esa tarea cotidiana combinada con esas variables. De hecho, hacía una semana que no salían a pescar debido al mal tiempo.

Nito era el tripulante de esa embarcación. Descansó unos segundos antes de continuar fileteando algunas de las corvinas que traían, que eran esperadas por cocineros de la feria. Mientras preparaba las postas, contó que habían pescado cerca de tres cajas de corvina (cada una lleva cerca de 23 kilos), lo que para ellos era “muy poco”. La ganancia que obtendrían dependería de la forma en que las comercializaran: si las vendían a un intermediario, descontando los costos de nafta de la embarcación, los tres tripulantes obtendrían cerca de 600 pesos por el jornal, pero si lo hacían directamente, podían sacar 600 cada uno.



Pescadores artesanales de Piriápolis, fileteando parte de la pesca de la jornada. • FOTO: NICOLÁS CELAYA

Al volver a la feria los tempranos bosquejos habían cobrado vida y todo estaba en acción. Los pintores matizaban con colores del atardecer el cielo en el lienzo que había sido blanco, y que ahora tenía por centro la barca que estaba en exposición en el predio de la feria; cientos de veraneantes recorrían pausadamente la muestra fotográfica; y afuera pescadores y alistadores –quienes preparan los anzuelos de los palangres– mostraban su tarea. Los cocineros también habían entrado en acción y cada uno preparaba su menú: guisado de brótola, pescadilla sobre caramelo de limón, cebiche de corvina o de brótola y corvina a la manteca rubia. Los cientos eran cocineros reconocidos y habían concurrido voluntariamente, complacidos con poder promover el consumo de productos de la pesca artesanal.

Uno de ellos, Mario del Bó, chef y docente del Instituto Universitario Gastronómico de Punta del Este, opinó: “En Uruguay tenemos buenos pescados pero, como siempre, como son nuestros los tratamos más o menos”. “Pero son muy buenos pescados”, remarcó, a la vez que indicó que “es mucho más fácil y más importante consumir el pescado fresco que cuando está en una góndola congelado”.

También participó el chef internacional Francisco del Piero, argentino radicado en México que tiene un espacio en el canal *Gourmet*. Él preparaba el guisado de brótola y tenía un gran marco de público que le sacaba fotos y le hacía preguntas sobre sus trucos a las que contestaba complacido. Del Piero aludió a una cuestión que preocupa a muchos productores: la competencia del pescado congelado, particularmente el pangasius, que se comercializa en supermercados. Comentó que ese pescado “es asiático y de pésima calidad” porque son criados en estanques y “estamos comiendo eso en vez de comer el pescado nuestro;

esto [en relación a la feria] es para que abramos un poquito la mente y comamos nuestros pescados, que contiene una cantidad alta de colesterol bueno”.

## Investigación colectiva

De las problemáticas que enfrentan los pescadores artesanales, el grupo prefirió hacer referencia a una: la interacción de su actividad con los lobos marinos (*Otaria flavescens*), que a simple vista son similares a los lobos marinos (*Arctocephalus australis*), pero es otra especie y compite por el producto, destrozando redes y palangres. Trimble contó que encontraron “un vacío de información en la interacción al palangre” porque las últimas investigaciones han abordado el impacto con las redes, mientras que el palangre es el arte de pesca más usado en la zona y su destrucción implica mayores costos, por el alistamiento de anzuelos y la carnada. Buena parte de 2011 se destinó a diseñar entre todos una planilla que se llenará este año en distintas oportunidades en que se salga al mar.

El problema no es de sencilla resolución. La matanza de lobos y lobos no está permitida, pero además éstos cumplen una función en el ecosistema y su presencia es importante para mantener el equilibrio; además, la población de lobos ya está en descenso.

Los pescadores afirman que hay mucho menos pescado que

antes y atribuyen esto a la competencia de barcos de arrastre industrial y al cambio climático. Los lobos marinos del entorno de Piriápolis “están cebados”, decían los pescadores, porque van y comen el pescado servido en las redes y palangres en lugar de ir a buscarlos, como hacen otros; según ellos “se pasan las mañanas”. Respecto a los lobos marinos hay visiones contrapuestas en el grupo: algunos pescadores están a favor de la explotación de los lobos marinos, y a la interna tienen que conciliar posiciones con quienes los defienden; pero todos dicen que esto se puede hacer, “porque el fin es llegar a algo en común”.

La segunda línea de trabajo de Popa fue iniciada a mitad de 2011, a partir de la preocupación de los pescadores por la competencia de pescados importados, como el pangasius. El equipo optó por promover en la feria el “consumo informado”, intentando que el público revalorizara los productos nacionales provenientes de la pesca artesanal. Paralelamente, a largo plazo, se apunta a que los pescadores comercialicen sus productos directamente, lo que trae beneficios para el consumidor, porque le llega fresco, y para el pescador, que obtiene mayores beneficios por su trabajo. ■

Amanda Muñoz

en [ladia.com](http://ladia.com)

## PLAN CEIBAL

### LIGA DE VERANO

Luego de que en 2011 unos 180.000 usuarios descargaran el juego Los Cazaprobemas del Plan Ceibal, dará comienzo la Liga de Verano 2012, con propuestas de matemáticas para niños de 6 a 12 años. Desde mañana los niños en

edad escolar podrán descargar el videojuego e inscribirse completando los datos solicitados al inicio. Cada semana habrá diez ganadores. La descarga estará disponible en: [www.cazaprobemas.com](http://www.cazaprobemas.com). Por más información escribir a [comunicacion@plan.ceibal.edu.uy](mailto:comunicacion@plan.ceibal.edu.uy). ■

## **Appendix 8. Interview guide (translated from Spanish) of the final interviews with POPA members in Piriápolis**

### **Participatory research section**

1. Considering that POPA was formed in a participatory research context:

(A) Did you know about participatory research before being invited to this experience in Piriápolis?

(B) How would you explain what participatory research is?

2. (A) Which participatory research elements do you see as different in relation to conventional research conducted only by scientists?

2. (B) Comparing conventional research to participatory research conducted among fishers, scientists, government and non-government stakeholders: What are the advantages and disadvantages of each?

3. Do you think it is appropriate to promote participatory research to address problems originating from the interaction between environment and society? Why?

4. (A) What were your initial objectives or motivations in this participatory research process (thinking back to May 2011)?

4. (B) What did motivate you to continue this participatory research?

4. (C) What do you think were the objectives or motivations of other participants?

4. (D) Did you believe (at the beginning) that the individual objectives of each participant could be integrated into the group interests? In what way do you see your objectives integrated? And those of other participants?

5. (A) Did your previous experiences with fishers, DINARA, scientists, Ecópolis and SOS influence, in any way, your motivation at the beginning of this participatory research? How?

5. (B) Did the fact that a DINARA employee was present in this participatory research influenced in any way your participation in the group? How?

5. (C) Do you think that other persons or organizations, government or non-government, should have been present in this participatory research? Who/Which and Why?

6. (A) Do you think that the participatory research initiative conducted by POPA has been successful? Why?

6. (B) Do you think that in this participatory research the group and individual objectives were achieved? Which ones?

6. (C) What do you think were the strengths and weaknesses of the participatory research process?

7. (A) Do you think that the opinion of every member of the group, including yours, was considered (or listened to) throughout this participatory research process? Which situations would you give as examples?

7. (B) Do you remember any situation in which your opinion, or that of other group member, was not considered (or listened to)?

7. (C) Do you consider that the opinion of any group member had more weight than the opinions of the rest when decisions were made throughout the participatory research process?

7. (D) Do you think it is important that everyone's opinions and interests are considered equally in the group? Why?

8. (A) Has your opinion about the need to combine or integrate different knowledge, experiences and views changed by participating in the participatory research process?

8. (B) Do you think that there were situations throughout the participatory research in which scientific knowledge and fishers' knowledge were integrated? Which situations?
8. (C) Do you think that there were situations of disagreement between both types of knowledge? Which and Why?
8. (D) Do you think that new approaches, strategies and/or knowledge have been generated by the group? Which and How?
9. (A) Whom do you expect this participatory research to impact? Which impacts in particular? (Ask about impacts on fishers, DINARA, municipal government, other NGOs, other scientists, University)
10. Having participated in this participatory research initiative, what are your reflections on the possibility of improving the artisanal fishery in Piriápolis?
11. Considering that co-management is a type of decision-making in which fishers participate jointly with DINARA in developing measures for a better use of fishing resources:  
 (A) Do you think this participatory research initiative has contributed to the emergence of co-management? In which way?  
 (B) What do you think is lacking to achieve fisheries co-management in Piriápolis (between fishers and DINARA)?
12. Besides the topics we have addressed throughout this participatory research, which other topics or problems would you suggest using this approach?
13. (These questions were asked for Patricia's undergraduate thesis)  
 Considering that health is defined as a state of physical, mental, and social wellbeing, not only the lack of illness:  
 (A) Do you think that addressing problems between the society and the environment can include aspects of human health? Which examples would you give?  
 (B) (If the answer was affirmative) Do you consider interesting the possibility of addressing that problem by means of participatory research? Why?  
 (C) What do you think about addressing human health problems related to fishers' job by means of participatory research?  
 (D) Which types of human health problems related to fishers' job could be addressed?

### **Relationships section**

14. Reflecting on how your relationships with other group members have been evolving throughout the participatory research process: With whom have your relationships improved / worsened / or not changed?  
 (In every case, ask how the relationship was at the beginning of participatory research or before it.)
15. Throughout this participatory research: In whom has your trust increased / declined / not changed?
16. By participating in this participatory research process: Has the respect you felt towards group members changed? Towards whom? In which way?
17. (A) Which factors, situations or characteristics of the participatory research process have facilitated the changes in relationships that you mentioned?  
 17. (B) And which things do you think have hindered the improvement of some relationships?
18. In which way has the change in your relationships with or trust in people of the group influenced your opinion about the institution they belong to (DINARA, Ecópolis, SOS, University)? Why?

19. Do you have interest in maintaining the relationships you have formed with other members of the group? Which and why?

20. Do you think that the participatory research initiative conducted by POPA contributed in any way to increase unity among fishers? Why?

### **Learning section**

21. Do you think that you have learned during this participatory research process? Could you give us examples of the learning you have had?

22. Did you gain personal skills during this participatory research process? Which skills?

23. In this series of questions we will ask you to reflect on the personal changes you have noticed during the participatory research process, and we will give you four options (Nothing, Little, Moderate, Much) referring to the degree you consider appropriate in each case:

- a) To what degree have you noticed improvements in your communication skills during the participatory research process?
- b) To what degree have you noticed improvements in your skills in dialoguing with specific objectives?
- c) To what degree have you noticed improvements in your skills in relating to people who are in different professions and/or organizations?
- d) To what degree have you learned to be more tolerant of the different views of other participants about a given theme?
- e) To what degree have you noticed improvements in your ability to reflect on your own opinions and conceptions after knowing (or listening to) others' views?
- f) To what degree have you noticed improvements in your skills in exchanging opinions until reaching a consensus in the group?
- g) To what degree have you learned that the common good of the group takes priority over personal interests?
- h) To what degree has participating in this participatory research initiative helped you be more self-confident?

24. Have you obtained specific information during this participatory research process? What information?

25. In this series of questions we will ask you to reflect about the degree to which your knowledge about certain aspects increased throughout the participatory research process, and we will give you four options (Nothing, Little, Moderate, Much):

- a) To what degree has participating in this participatory research process increased your knowledge about the problems in Piriápolis' artisanal fishery?
- b) To what degree has your knowledge about sea lions increased?
- c) To what degree has your knowledge about *pangasius* increased?
- d) To what degree has your knowledge about the nutritional properties of fish increased?
- e) To what degree has your knowledge about the job done by fishers in Piriápolis, including their fishing practices increased?
- f) To what degree has your knowledge about the work done by scientists increased?
- g) To what degree has your knowledge about the work done at DINARA's Artisanal Fisheries Unit increased?
- h) To what degree has your knowledge about administrative procedures or paperwork increased?

- i) To what degree has your knowledge about technical language or scientific jargon increased?
  - j) To what degree has your knowledge about the language or terms used in the artisanal fishery increased?
26. (A) Has your perception about the problem of the interaction between the artisanal fishery and sea lions changed during this participatory research initiative? How/Why?
26. (B) Has your perception about the possible solutions to that problem changed throughout this participatory research initiative? How/Why?
27. (A) Has your perception about the problem of the low competitiveness of artisanal fishery products before *pangasius* imports changed during this participatory research? How/Why?
27. (B) Has your perception about the possible solutions to that problem changed throughout this participatory research? How/Why?
28. (A) Reflecting on everything that has included group work: What situations, activities or characteristics of this participatory research initiative do you think have facilitated your learning throughout the process?
28. (B) And which things do you think have hindered a greater learning? Why?
29. (A) Do you consider that the improvement in relationships, that occurred as the work progressed, has facilitated learning in the group? Why?
29. (B) Do you consider that learning among group members has facilitated a greater improvement in relationships? Why?
30. (A) Do you consider that the learning you have had throughout the participatory research process has been useful? Why?
30. (B) Do you think that your daily work will be enriched by the learning you have had during this participatory research process? How?
30. (C) Will the learning you have had throughout this participatory research process be communicated or transferred to the institution or group where you belong? Why are you interested in doing that?