Fishing is more than just a livelihood: Wellbeing and small-scale bag net fisheries governance in Gujarat, India

By

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Abstract

The purpose of the thesis was to understand the socio-cultural dimensions of the small-scale bag net fishery practised in coastal Gir Somnath, India. Using an ethnographic methodology, I applied a three-dimensional social wellbeing approach to address the three research objectives: first to explore the supply chain, second to understand local governance and third to explore the values, beliefs and perceptions of local fishers. The research reveals that fishers relate, interact and negotiate with multiple parties to use a variety of resources that contribute towards their material wellbeing. The local fishery is governed by a mixed-regime where relationships make an important contribution. The worldview and beliefs of fishers are largely shaped by local fishery; however recent trends in the fishery, such as access to markets, have influenced the attitudes and perception of the fishers in this region.

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ACRONYMS

RWA – Relational Wellbeing Assessment

MPEDA – The Marine Products Exports Development Authority

GLOSSARY OF TERMS

Patel	President of Boat Owner's association and leader of Samaj
Samaj	Caste based society or council
Tandel	Boat owner
Khalasi	Crew member
Wam	Local unit of measurement (=1 metre)
Dalits	Lower caste people in India mostly considered as untouchables
Koota	Waste fish (Juvenile shrimp (paste shrimp), fish and prawn)

Fish and Shrimp		
Local Name	**English Name**	**Scientific name**
Pamphlet	Pomfret	Pampus argenteus/Formio niger
Jhinga	Shrimp & Prawn	Solenocera crassicornis/ Parapenaeopsis stylifera/Penaeus monodon
Jaulo	Paste shrimp	Acetes indicus
Vaga	Silver Ribbon fish	Lepturacanthus savala
Pata	Small head hair tail	Eupleurogrammus muticus
Vangda	Mackerel	Megalaspis cordyla
Gedra	Little tuna	Euthynnus affinis
Titan	Lobster	Panulirus polyphagus/ Penulirus homarus/Penulirus ornatus
Magra	Shark	Carchahinus limbatus
Dhoma	Croaker	Otolithes biaruritus
Ghol	Jew fish	Protonibea diacanthus

Tabla	Ray fish	Mobula diablus / Dasyatis zugei
Vam	Eel	Congresox talabonoides/ Muraenesox cinereus
Khaga/ Khagi	Giant Cat fish	Arius thalassinus
Palvo	Chinese herring	Tenualosa toli
Mendli	Golden anchovy	Colia dussumieri
Diy	Silver bar	Chirocentrus dorab
Narsingha	Squid	Loligo duvaucelli
Sag	Talang queen fish	Scomberoides commesonnianus
Jiv	Long tongue Sole fish	Cynoglossus lingua
Boomla	Bombay duck	Harpodon nchereus

Chapter I: Introduction

Figure 1.1: A fishing boat approaching the harbour of Saiyad Rajpara

1.1 Introduction

This chapter elaborates the following topics: the study context; the research purpose and objectives; the research methods; area profiles and an overview of small-scale fisheries; theoretical background; significance of the study; and the outline of the chapters of the thesis.

1.2 Context

Small-scale fisheries are not adequately explored or acknowledged despite their socio-cultural and economic contribution. This research aimed to explore the socio-cultural contributions of small-scale fisheries in coastal Gir Somnath, the Arabian coast of Gujarat in India. Using the guidelines of the Working Group III (Johnson, 2013) of the 'Too Big to Ignore' project (Chuenpagdee, 2011), the research explored the small-scale bag net fish chain in the west coast of Gujarat, the local governance systems, and how fishers' perception on the bag net fishery in the region. This research was guided by a three dimensional social wellbeing approach.

Small-scale fisheries contribute significantly to local economy and culture, and are important for the survival of many coastal fishing communities. More than 90% of all fishers across the globe rely on small-scale fisheries for their livelihoods (Chuenpagdee, 2011) though it generates comparatively less income than large-scale fisheries (World Fish Centre, 2008). These fisheries are not merely an economic activity but a way of life for many coastal communities (Ommer, 1999). Fishing plays a vital role in shaping fishers' lives which is also embedded in social structures and is clearly reflected in fishing cultures (Thompson *et al.,* 1983). Small-scale fisheries are considered to be locally embedded and ecologically sustainable (Johnson & Bavinck, 2010, p.15). McGoodwin (1995) Small-scale fishers are labelled as ecosystem people with innate knowledge of marine ecosystems for their limited mobility into larger areas and reliance on single or a few marine ecosystems (McGoodwin, 1990, 1995).

Social relations play an important role in fishers' lives that contribute to their occupation. Social relationships and bonds among fishers help them to carry on their daily fishing related activities (Pretty & Ward, 2001). Fishing economy primarily depends upon a range of elements including networking, access to markets, market related information, flows of fish, capital, and labour (Johnson & Sathyapalan, 2006). The market structure for small-scale fisheries is different from industrial fisheries specially meant for the world commodity market (McGoodwin, 1990). This market specific orientation, however, has shifted in recent years with the increasing integration of small-scale fishers into global markets. Nevertheless, social capital continues to play an important role in promoting trust and co-operation among small-scale fishers (Grafton, 2005). Men and women have shaped their lives differently within fishing and around

different kinds of fishing activities (Thompson, 1983). This research explored the fish supply chain in coastal Gir Somnath of Gujarat, which was the first research objective.

Governance has emerged as one of the many challenges countries face in managing fisheries. Governance not only considers economic and ecological aspects but also the socio-cultural domain of fishing in a specific context or place. Small-scale fisheries, which are important for the survival of coastal communities' identity, culture and way of life, need to be addressed through holistic approaches that integrate management, combining ecological, economic and socio-cultural domains (Urquhart & Acott, 2013). The second research objective was therefore to explore the local governance system and various management practices.

Fishers' socio-cultural lives are largely shaped by the traditional occupation. Fishers' pride is instilled through fishing. According to the maritime anthropologist McGoodwin (2001), fishing provides an occupational identity to fishers and fishers show devotion towards the fishing way of life. McGoodwin appreciates the heroic aura of marine fishers who take high degree of risk and face many occupational challenges to harvest some of the large and valuable marine species; he further identifies some of the attributes such as degree of independence, self-reliance, and autonomy in addition to risk and challenges as the cultural characteristics of the fishing occupation. The third research objective was therefore an attempt to explore how people perceived small-scale fisheries in the west coast of Gujarat.

1.3 Purpose and Objectives

The broad purpose of this research was to understand the socio-cultural dimensions of the small-scale bag net fishery practised in coastal Gir Somnath of Gujarat from a social wellbeing prospective.

The specific objectives were:

1. To understand how the small-scale bag net fishery functions in the dry-fish zone of coastal Gir Somnath.

   This objective intended to study the distinctive bag net fishing practices in the dry-fish zone of Gir Somnath related to the suitable socio-ecological condition and history. In detail, the objective explored the different phases of fishery from pre-harvest to post-harvest for both fresh-fish and dry-fish economy in that region. The objective also made an attempt to find the linkages, for example, the different parties involved in the entire fish supply chain and their relationship and interactions; their contribution to the fishing economy in coastal Gir Somnath. This objective also identified the potential challenges and issues that the bag net fishers faced in their daily lives.

2. To examine the local governance and management system(s).

   The second objective endeavoured to identify the local institutional arrangements and management practices related to fishing. The objective further identified the degree to which socio-cultural contributions were recognised and incorporated into governance arrangements. Information on how the local arrangements enabled (or disabled) the small-scale bag net fishers in accessing the marine as well as market resources was documented. The study on governance included the

response of the local institutions in addressing different kind of threats or issues faced by the bag netters in that region.

3. To explore fisher perceptions of the value of the bag net fishery in coastal Gir Somnath.

   Based on prior knowledge of the unusual social and ecological characteristics of the focus fishery, the third objective of the research intended to identify the bag net fishery's distinctive social and cultural attributes. This section of the research was subjective, based entirely on fisher perceptions of satisfaction with their lives and livelihoods. Information on how fishers incorporated the socio-cultural values of fishing in their personal lives and, especially, the degree to which the distinctive dry-fish economy influences participants' self-perceptions was documented.

1.4 Methods

The major part of the research was to gain in-depth understanding of fishing communities' way of living using perspectives of from anthropology, governance theory, and international development studies. The research was predominately qualitative for its explorative and interpretive characteristics. A social constructivist paradigm was therefore used to understand the complex socio-cultural aspects of the small-scale bag net fishery in the west coast of Gujarat. The research followed a social wellbeing approach to achieve the three main objectives: a material dimension to explore the contribution of bag net fishery to the wellbeing of fishers; a relational dimension to examine the way fishers act through relationship with others to achieve wellbeing; and a subjective dimension to explore how fishers value the small-scale bag net fishery in this region. The research

employed an ethnographic strategy of inquiry to provide rich, holistic insights into fishers' world views and their socio-cultural practices.

1.5 Context: Gujarat marine fisheries

Marine fishing is an important livelihood option for many people in Gujarat - it supports around 100,000 people in Gir Somnath District alone (Johnson and Sathyapalan, 2006). The fishery contributes to food security, employment generation, poverty reduction and foreign exchange earnings. Gujarat has a long coastline of 1600 km, which is 20% of India's total coastline. It has 33% of the country's continental shelf (Johnson, 2001). This extensive and rich coastline, suitable ecological conditions and good infrastructure have contributed to Gujarat's high marine fish production (Handbook on Fisheries Statistics, 2012). A study by the Gujarat Industrial Development Research (GIDR) in 2003 states that Gujarat has 662 ice industries, 225 cold storages, 55 freezing plants, 28 boat building yards, 8 net making plants, 3 fishmeal plants and 119 service stations which together all contribute to the marine fish industry in Gujarat (Khakkhar, 2004).

Gujarat's highly diverse marine species contribute a lot to the economy within which there are many commercially important species. The major fish captured by the fishery are Bombay duck, elasmobranch, sciaenid, shrimp, seer fish, tuna, pomfret, catfish, ribbonfish and lobster (Balan *et al.,* 1987; Central Marine Fisheries Research Institute, ND, Veraval, 1973). According to the Agriculture and Cooperation Department (2014), Government of Gujarat, the total marine fish production during 2012–13 was worth INR394488.65 lakh ($661,117,248.36)[1]. Gujarat contributes approximately 28% of

[1] Converted through xe.com and the exchange rate was based on the 14th June, 2014.

the national marine fish export in quantity and 15% in term of value (Agri-business and Food Processing sector profile, 2013).

In addition, there are 121 marine fish landing centres spread over 247 marine fishing villages along coastal Gujarat (Department of Animal Husbandry, Dairying and Fisheries, 2014). Veraval, Porbandar, Mangrol and Jafarabad are the major fishing harbours in Gujarat out of which Veraval and Mangrol are within Gir Somnath district. Fishers in Gujarat use different kinds of crafts for fishing. For example non-motorised traditional crafts, motorised (out-board motor: OBM) boats, in-board motor (IBM) boats and small trawlers. Small-scale fishers mostly use traditional boats with out-board motors for fishing (Khakkhar, 2004), however the traditional boats have largely been replaced by fibreglass crafts (Johnson & Sathyapalan, 2006).

Table 1: Profile of Gujarat Fisheries (Source: Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India, 2012 - 2013)

Description	**Statistics (2012 – 13)**
Length of Coastline of Gujarat	1,600 km
Fishing population in Gujarat	3,36,181
Number of traditional non-motorised crafts	1,884
Motorised traditional crafts	8,238
Total number of mechanised crafts	18,278
Total Marine fish production (in 1000 tonnes)	692.50

1.6 Overview: Gir Somnath marine fisheries

Gir Somnath is one of the few western districts and it is in the southern part of the Saurashtra region of Gujarat. Gir Somnath is a new district, which was created in late 2013. Veraval is the district headquarters and an important port and fishing hub.

Figure 1.2: State of Gujarat in India, district of Junagadh (highlighted within Gujarat). (Credit: Derek Johnson)

There are five administrative divisions in the newly formed Gir Somnath district known as 'Talukas'. Like many other coastal regions, agriculture is one of the main occupations of the majority of people in Junagadh and Gir Somnath region. In addition, the coastline of 156 km and rich fish resources contribute to the regional economy. There is little information on Gir Somnath district. Hence, this research used information largely from

Junagadh (Figure 1.2) because earlier Gir Somnath was part of Junagadh district and accounted for most of the latter's coastline.

The Gulf of Kachchh and the Gulf of Khambhat have been instrumental in shaping the region's marine fisheries. The Gulf of Kachchh is blessed with ecologically rich biodiversity, harbouring the largest mangroves in Western India, which acts as a natural shelter and breeding ground for many marine species (Johnson, 2001). On the other hand, the Gulf of Khambhat is crucial for carrying significant volumes of freshwater from various rivers with nutrient discharge. In addition, the currents from the Gulf of Khambhat and the extensive continental shelf and relatively shallow waters have contributed to marine fisheries in that region (Johnson & Sathyapalan, 2006). The bag net fishery depends on strong water current to function which comes from the Gulf of Khambhat, on the eastern part of Gir Somnath coast (Johnson & Sathyapalan, 2006, p. 12). Additionally, the east-west ecological division due to the two gulfs also contributes to the different kind of species. For example the eastern high turbidity region of Gir Somnath is famous for mostly non-peneid prawns, peneid prawns, predators such as Bombay duck, ribbonfish, and jew fish. On the other hand, the less turbid western zone with trawler fishing is famous for a range of pelagic species such as tunas, pomfret, sharks in addition to Bombay duck and ribbonfish (Johnson & Sathyapalan, 2006).

The fishery has tremendously contributed to different coastal communities in Gir Somnath, which has also different influence on their social lives. The main fishing communities in the coastal Gir Somnath region are the Kharvas, the Ghediya Kolis, and the Machhiyaras (Johnson, 2001). The fisheries contribute to local economy and the dominant fishing communities play an important role in coastal affairs. Hence people

may value fishing differently than elsewhere in the State (Johnson & Sathyapalan, 2006). Gujarat, however, is a predominately a vegetarian State (though many coastal communities, who have access to resources, eat fish and meat), and fishing communities are therefore marginalised and viewed as a low caste people within the State. Ghediya Kolis are considered lower caste and belong to some other less developed caste category (OBCs as official term used for lower castes in India) in the caste classification system.

The fishery of Gir Somnath is broadly divided into dry-fish and fresh-fish zones. The zones have distinct fishing practices, market systems, and processing characteristics. The fishing economy of Gir Somnath is basically segregated into three different categories: frozen fish trade in international markets, domestic fresh fish, and dry-fish trade across the state and the country (Johnson & Sathyapalan, 2006). The eastern zone of Gir Somnath especially the Saiyad Rajpara and Navabandar stretch of Una taluka (the sub-division or block of a district) has thrived as part of Gujarat's dry-fish zone. The dry-fish zone is known for dried Bombay duck with recent addition of dried waste fish (for fish meal) and extends up to Jafrabad in neighbouring Amreli district. In the dry-fish zone of coastal Gir Somnath, Rajpara, Simar, and Navabandar are the landing centres where processing of dry-fish is completed and is transported to other parts of the state and country by road (Johnson & Sathyapalan, 2006). As Gujarat is largely a vegetarian State, fisheries have long had an export component. Johnson and Sathyapalan's research (2006) states that bag net (or dol net as mentioned by the authors) fishing in the dry-fish zone is relatively new as compared to other kinds of fishing in the eastern zone of the district .

Coastal fishing in the Saurashtra region can be further distinguished in terms of different fishing practices such as beach-based or boat-based fishing. Depending on the ecological niche, fishers adopt different fishing practices.

Fishers in the dry-fish zone of Gir Somnath largely practice bag net or dol net fishing (Zacharia & Najmudeen, 2012). "The dol net is a large thick polyethylene fibre bag net about 25 metres long that is held in place by two long metal pipes that are sunk part way into the ocean bottom and thus serve as anchors for the net" (Johnson & Sathyapalan, 2006, p. 34). The bag net fishing is done in the high current zone where fish swim or get into the fixed net and cannot escape due to high water current. The mouth of a bag net is open with large mesh size and gradually the mesh size shrinks towards the tail, which is folded over and tied against itself. Unlike trawl nets and gill nets, bag nets are a fixed gear. Bag-netters' main targets are Bombay duck, prawns, ribbon fish, and large fin fish (Bapat & Alawani, 1973).

1.7 Theoretical Background

Each small-scale fishery has a precise socio-cultural and economic arrangement related to that particular place (Johnson, 2006). Fishers from different places therefore not only have distinct rituals but they also value the profession differently (Pollnac & Poggie, 2008). Fisheries are complex and multifaceted because of the involvement of a range of actors performing different tasks, each with different objectives and values, and preferences and capacities (Coulthard *et al.,* 2011). A multi-dimensional framework (Coulthard, 2012) is therefore required to capture the complex and diverse views, aspirations and capabilities of fishing communities (Coulthard *et al.,* 2011). The Working

Group III of TBTI adapts a social wellbeing approach to advocate for both the tangible and intangible aspects of small-scale fisheries.

The social wellbeing approach is a multidimensional framework that entails more than fishers' income. It also includes satisfaction with and flourishing in, a way of life that is appreciated and believed valuable (Coulthard, 2012). Wellbeing, according to White (2009) is a subjective evaluation of having a good life in terms of material welfare but also the capability to live a good and meaningful life and experience happiness. The concept of wellbeing is not based on the model of any particular society nor does it focus on any specific socio-cultural setting or geographical location; rather it frames different attributes such as set of needs, freedoms and quality of life that altogether contribute to wellbeing (Coulthard *et al.,* 2011). A social wellbeing approach is ideally a comprehensive framework and all the different dimensions are closely interlinked with each other (Britton & Coulthard, 2013). Many scholars have adopted the three dimensional social wellbeing approach (Figure 1.3) that entails subjective, objective or material and relational dimensions (Britton & Coulthard, 2013; Weeratunge *et al.,* 2013; Coulthard, 2012; Coulthard *et al*., 2011; Camfield, 2006). The material and relational aspects of wellbeing comes mostly from actual observed conditions and may not be entirely related to individual's perception (Smith & Clay, 2010).

The first research objective, related to material wellbeing, intended to explore the fish supply chain, such as pre-harvest preparation to post-harvest selling and trading of fish in addition to the distinctive fishing practices. The material dimension explored how the bag net fishery has contributed to the wellbeing of the local people in terms of food security, income and standard of living (Britton & Coulthard, 2013; Coulthard, 2012).

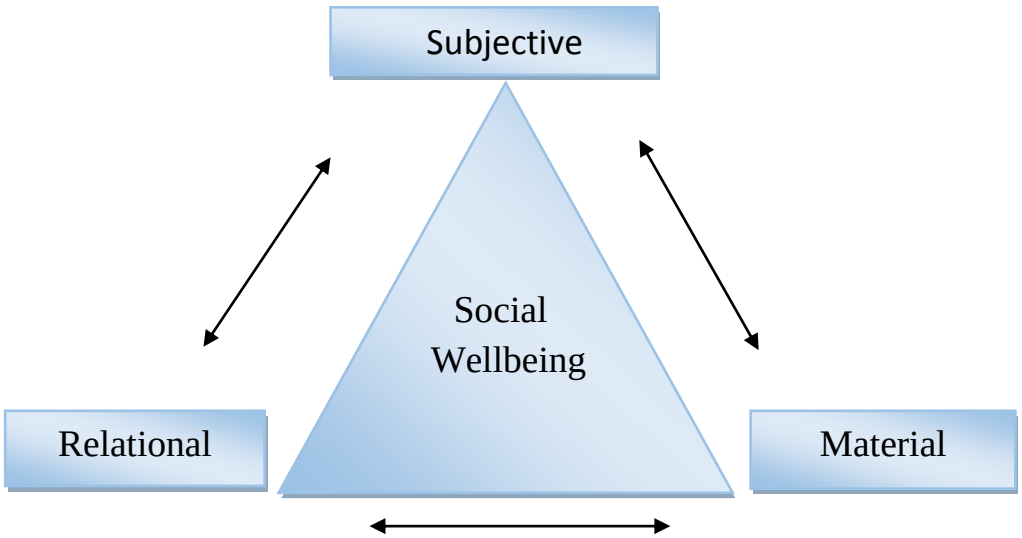

Figure 1.3: Social Wellbeing Approach (Source: White, 2009)

Consistent with the first objective, I argued that the economic transition in the bag net fishery from a subsistence-based to a market oriented has had negative ecological consequences. Though the first objective largely captured the material aspect of wellbeing, however, it was not restricted to that. Fishers also interact and negotiate with many people such as traders, buyers, and grocery-shop owners to earn their livelihood which is a part of relational wellbeing.

Individuals in the wellbeing framework are connected to the wider social context through the relational dimension, which explicitly studies how relationships or networking with others shapes an individual's wellbeing within a community (Britton & Coulthard, 2013; White 2009). Many fishers who are involved in small-scale fisheries have their own sets of norms and rules that enable them to solve disputes and the problem of overfishing at local level (Basurto & Ostrom, 2009). Furthermore, commons resource users are mostly competent in self-organisation and regulation (Berkes, 2009). The second objective of the research therefore endeavoured to explore if there were any local

norms and regulations developed and practised by the bag net fishers in the dry-fish zone of Gir Somnath. I argued that without a representative from the fishing community within the mixed-regime governance, fishers have adapted and developed their own mechanisms to deal with their day-to-day issues.

Subjective wellbeing focuses mainly on individual values or perceptions (Coulthard, 2012). Many maritime anthropologists have argued that fishing needs to be understood beyond the lens of the conventional economic aspect and rather it should be considered as a 'way of life' for many fishing communities (Britton & Coulthard, 2013; Coulthard, 2012; Smith & Clay, 2010; Pollnac & Poggie, 2008). Smith and Clay (2010) further explain that subjective wellbeing is an independent form of assessment that focuses on how fishers perceive or value themselves as fishers and fishing as a occupation. The third research objective aimed to explore how people perceived fishing as their way of life. Consistent with this objective, I argued that relatively recent changes in fishing practices have affected the local fishers' socio-economic life, which in turn has influenced their perceptions. For example, with increasing work load and declining fish catches, fishers are not very satisfied with the occupation.

1.8 Significance of the Study

Small-scale fisheries may have socio-cultural significance in coastal Gujarat but existing traditional and cultural practices are under-documented. First, besides contributing to the literature on small-scale fisheries, this empirical research indicated ways in which fishing is significant in the coastal regions of Gujarat. Second, the research helped in understanding the dry-fish market and might open the door for further collaborations. The potential socio-economic opportunity of small-scale fisheries,

especially the bag net fishery, in the dry-fish zone has not been captured properly and that is why it has been side-lined by policy makers. This research was to seek the attention of decision-makers by publishing evidence underpinning the importance of small-scale fisheries in the coastal region. Additionally, the research aimed to establish linkages with different government and non-government organisations during various phases to encourage brainstorming of different issues related to small-scale fishers. Fishery policy is largely wedded to the commercial fisheries in Gujarat; this research made an attempt to raise awareness, highlight the importance of the bag net fishery and its contributions.

1.9 Structure and Organisation

This section outlines the structure of the thesis. The next chapter reviews the literature on small-scale fisheries studied elsewhere. Chapter three explains the research methods that were used for conducting the qualitative research. Chapter four describes the data and discusses the findings on the fish supply chain. The findings of second objective on local governance is described in chapter five. Chapter six analyses the findings on the local fishers' perceptions. Finally, the chapter seven summaries and concludes the thesis.

Chapter II: Literature review

2.1 Introduction

The aim of this chapter was to recapitulate the relevant findings from the literature pertinent to this research. The first part reviews literature on the fish supply chain related to the first research objective. The second part discusses literature on local governance and various management practices. The final segment of the chapter draws on literature to explain the perceptions of fishers, which was the third objective.

2.2 Small-scale fisheries

Small-scale fishery is a complex term and has been perceived differently in different regions in the world. Small-scale fisheries are also known as artisanal, traditional, native, subsistence, or inshore fisheries (Johnson, 2006; Berkes, 2003). There is no universal definition for small-scale fisheries because of their diversity and complexity (Alfaro-Shigueto *et al.,* 2010; Chuenpagdee *et al.,* 2006). However, many scholars have defined small-scale fisheries on the basis of their scale of operation, level of technology, employment generation, and degree of capital intensity and investment (Carvalho *et al*., 2011). Alfaro-Shigueto et al (2010) define small scale fisheries according to vessel size that is up to a length of 15 metres and is operated manually within a maximum range of 5 nautical miles of the coast though it is important to mention that the fishing vessels in Gujarat, which are mostly less than 15 meters, go beyond 5 nautical miles. These fisheries are predominately labour intensive and fishers use less capital intensive gears to harvest a comparatively smaller catch than industrial fisheries (Ziegler, 2012; Hauck, 2008; Sowman, 2006).

Small-scale fisheries in many countries are largely defined by a combination of factors such as local biological, social, economic, as well as political factors (Carvalho *et al.,* 2011). Johnson's extensive research (2006) further subdivides small-scale fisheries into subsistence and domestic commodity production. There is a clear demarcation between these two types on the basis of different criteria such as social-institutional organisation, knowledge and technology, and space and time (Johnson, 2006; Johnson *et al.,* 2005). According to Johnson (2006), small-scale fisheries are not necessarily used for subsistence purposes only, but the domestic commodity production has larger outreach in terms of spatial, operational and market as compared to the subsistence category.

Small-scale fisheries are often considered as "the occupation of last resort" for many fishers (Allison & Ellis, 2001, p. 377), though Béné (2003) disagrees with the generalisation. According to Hauck (2008), more than 90% of total fishers are small-scale fishers who mostly reside in developing countries. Small-scale fisheries are important for their contributions not only to food security but also as a source of animal protein for more than a billion people (Alfaro-Shigueto *et al.,* 2010; Hauck, 2008) in addition to employment generation and poverty alleviation (Sowman, 2006; Berkes, 2003). Besides economic contributions, small-scale fisheries are important for their contribution to social justice and ecological sustainability (Reed *et al.,* 2013; Johnson, 2006). Moreover, small-scale fisheries manifest great cultural diversity in contrast to industrial fisheries (McGoodwin, 1990).

2.3 Bag net fishery

The dry-fish zone of Gir Somnath is known for its bag net fishery. The term 'small-scale' is not a legal category in India; therefore the research draws literature from

FAO to justify that bag net fishing is small-scale. However, the India legal fishing category bag net fishing boats range from non-mechanised to mechanised[2]. As per the FAO report (2002), in Cambodia the bag net fishery is considered as medium-scale fishing; it is part of traditional small-scale fishery in Malaysia; bag net fishing is part of municipal or small-scale fisheries in the Philippines, and it is part of the artisanal fishery in Thailand. Due to the influence of globalisation, the concept of small-scale is changing and expanding (Johnson *et al.*, 2005). In addition, Johnson's broader definition of small-scale fisheries (2006) provides enough space for bag net fishing to fit into those criteria.

Bag net fishing is in a continuous state of innovation because of sharp competition among fishers to maximise their catches (Johnson & Sathyapalan, 2006). A study by Balan et al (1987) reveal that during the early 1980s, the contribution of the bag net fishery in Gujarat to the total mechanised landing was 18%; however, in subsequent years the contribution increased. According to Johnson & Sathyapalan (2006), the bag net fishery has changed drastically since the late 1990s by adopting more advanced technologies such as motorisation and synthetic twine. In addition, fishers started using metal pipes to anchor the nets during that period, which increased the efficiency of bag net and cut costs. The introduction of bigger boats helped the bag net fishers expand their area further into the sea and allowed them to spend more time at sea in order to maintain

[2] The definition of artisanal and mechanised boats, in an Indian context, is complex, ambiguous and there is a high degree of variation. According to Pillai et al., 2000 from the Central Marine Fisheries Research Institute of India, bag net fishing is an artisanal fishing practised in the coast of Gujarat. However, on the basis of the distance the bag netters cover, number of days they spend at sea per trip and the type of technology they use, bag net fishing could be categorised as small or medium scale and semi-mechanised fishing. I have categorised these bag net fisheries as a type of small-scale fishery based on these criteria.

their catches. Fishers adopt advanced technology to increase the fish catch for a better life, however, advanced technology alone does not necessarily ensure a good harvest.

Social capital plays an important role in marine fishing due to its uncertainty and risky occupational attributes. Social capital in this context is used as the traits of social institutions such as networks, norms and social trust, seeking mutual benefits through coordination and cooperation (Bodin & Crona, 2008; Grafton, 2005; Putnam, 1994). Bodin and Crona (2008) further explain that fishers in Kenya keep strong ties with others to exchange information or knowledge of natural resources and to discuss important matters related to their occupation. In addition, fishers also maintain good rapport with buyers, middlemen and traders for marketing which is an important aspect of relational wellbeing.

2.3.1 Fish supply chain

The fishery involves a range of activities, such as the preparation of gears and boats and subsequent activities like harvesting fish at sea along with processing, selling and trading of fish. Once fish is harvested, marketing of those harvests play an important role. While often used interchangeably, there lies a clear demarcation line between market chain analysis and value chain analysis. I used a value chain analysis to understand the entire process in the dry-fish zone of Gir Somnath. Value chain analysis is an extension of traditional supply chain analysis (Gilbert, 2006), which is also a process that transforms raw products to saleable items for consumers (Will, 2008). Value chain analysis can be defined as follows:

> Value chain analysis focuses on the interactions and relations between the different parties, firms and organisations influencing the market operation, part of

the value chain. The analysis sheds light on how products are traded between different parties. Simultaneously, the analysis describes the process of creating value, which looks beyond production and includes the value added activities that contribute to income (SEEP Network, 2006).

Value chain intervention included interventions that impact the vertical linkage among different parties within the chain or horizontal cooperation among different parties (Will, 2008). A report on Gujarat fisheries by Shiyani (2003) exemplifies the vertical linkage for marine fish supply chain. Figure 2.1 explains that fishers interact with a range of people to sell their harvest. Acheson's research (1981) shows how fishers bond with middlemen to avoid market uncertainty and to obtain capital. Middlemen have a good deal of specialized knowledge to negotiate fluctuating market situations and hence fishers collaborate with them to sell their harvest.

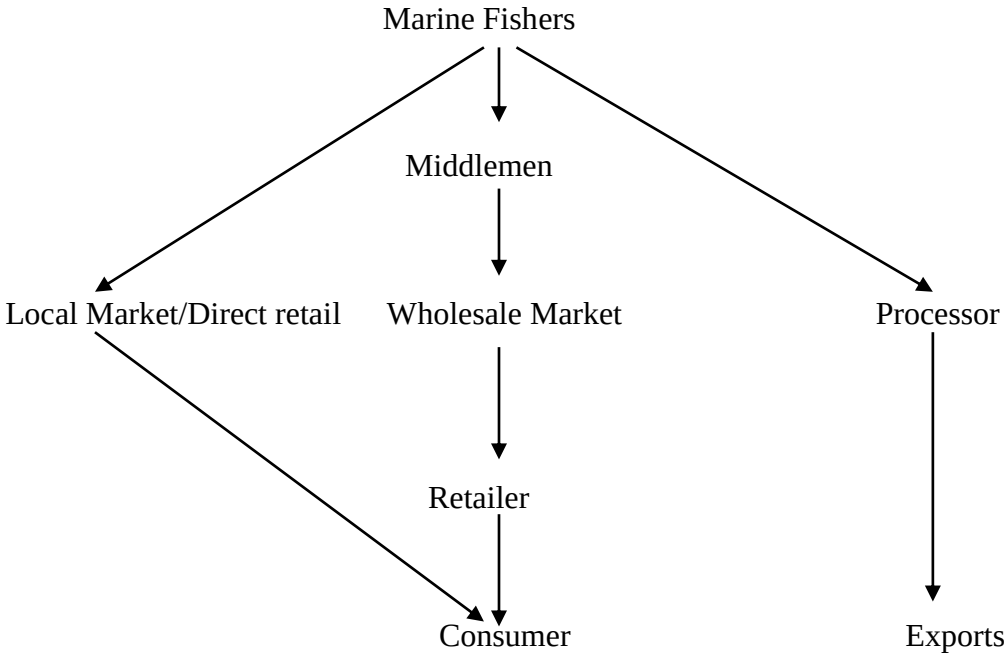

Figure 2.1: Vertical Linkage for fish supply chain in Gujarat (Source: Shiyani, 2003)

Dried fish is disproportionately important for many poorer consumers. The value chain and process for dry-fish is not necessarily similar to the fresh-fish value chain. Markets are segmented for dry-fish based on consumer and demand. The non-perishable dried fish is consumed throughout year and therefore has less pressure of time and sale.

I also used a value chain analysis to explore the dry-fish chain starting from the pre-harvest to post-harvest activities. In addition, there are some cross-cutting themes which this research specifically intended to address, for example the gender division of labour, occupational health, livelihoods and insecurity of different parties involved in the dry-fish chain, credit and administration. The scope of value chain is quite broad and altogether it requires separate research. Therefore, this research was limited to the area where fishers had direct involvement and interaction with different parties.

2.4 Governance

Most marine resources are considered as freely open to all citizens by many national governments, ignoring de facto fishing territories of many maritime communities (Berkes, 2006). In the open access scenario, each fisherman considers his own marginal costs and revenues and overlooks the fact that by increasing fish catch, it may have adverse effects on other fishers as well as the health of future fish stocks (Ostrom, 2002). Therefore, the management of the commons is a major concern not only for the economic benefits but also important for the ecological and socio-cultural regions. Common-pool resources are either natural or manmade systems used by multiple individuals and have finite quantities of resources where one person's use reduces the quantity of resources available to others (Basurto & Ostrom, 2009; Berkes, 2006; Basurto, 2005; Ostrom, 2002).

The global fisheries crisis has led to major structural changes in the marine fishing industry across the globe. Governance has emerged as one of the many challenges countries face in managing fisheries. Traditionally, governance has been related to the government and its activities but interactive governance theory and other approaches to governance to fisheries argue the governance includes other actors as well as government (Jentoft & Chuenpagdee 2009). Different countries adopt different sets of rules, processes and behaviors that may influence the way in which powers are exercised (Gray & Hatchard 2003). In order to achieve economic efficiency, ecological stewardship and safety at sea, Iceland introduced the individual transfer quota system (ITQs), a neoliberal solution to controlling fisheries resources. The findings of Palsson (2006) further illustrate how this high modern regime benefits mostly capital and boat owners and scientific experts; marginalizing the small fishers, crews and local knowledge. McGoodwin (1990) criticized both maximum sustainable yields and maximum economic yields for completely ignoring the social component of governance, which also resulted in ecological degradation as, for example, in Peru where the anchovy fishery crashed. In the drive to recover fish stocks across the globe, policy and governance have most commonly emphasized economic and ecological components, while the socio-cultural domain is either completely ignored or has taken a backseat (Urquhart & Acott 2013, Reed *et al.,* 2013). Modernist governance often fails to consider nature and society together (Palsson 2006) by undermining the local place and its importance, which is complex and diverse (Jentoft and Chuenpagdee 2009).

Governance is perceived differently by different scholars. Johnson (2006) describes governance as a process rather than an end product, which should reinforce the

ties among different stakeholders and foster dialogue, debate and collaboration among stakeholders through interaction. While McGoodwin's criticism (1990) of the capitalist way of governing resources underpins the exclusion of social and cultural considerations, the interactive governance theory brings together the governing system and the system to be governed to a common platform where they interact to manage fisheries (Johnson, 2010; Jentoft, 2007) while considering all the societal and cultural values of place (Jentoft & Chuenpagdee, 2009). A self-governed common-pool system is where major resource users are involved in making and adapting rules within collective –choice areas regarding the inclusions and exclusions of existing or new resource users, appropriate regulatory strategies, monitoring mechanisms, obligations of users, and conflict resolution (Ostrom, 2002, p. 1). While citing an example from the Coromandel Coast of India, Bavinck (1996) finds that cultural norms, ecological interdependency and social justice are the key pillars of many traditional fishing regulations and practices. A similar study by Basurto (2005) on the Seri community of Mexico, which is not regulated by the federal government, reveals that strong bonding and cooperation within the community has successfully managed their small-scale fishery in that region . The community has a traditional government which not only regulates the access to marine resources but also their strong monitoring mechanism and sustainable harvesting strategies have helped the local fishers to earn their livelihood for generations. In many cases, lives of fishers in traditional fishing communities are administered by a set of socio-cultural norms and local beliefs which sometimes hinder their own growth and influence their social and economic lives (Immanuel *et al.*, 2008).

2.5 Fishers' perceptions

"Small-scale fisheries constitute a way of life for millions of people worldwide" (Carvalho *et al*., 2011, p. 360). In West Africa, without any alternative livelihood options, almost half of the coastal communities rely on small-scale fisheries for their food and livelihood (Belhabib, Sumalia and Pauly, 2015). Weeratunge et al. (2013) looked at fisheries beyond the conventional economic lens and described them as a social identity which shapes the socio-cultural lives of many fishers. Simultaneously, fisheries have undergone drastic changes in recent times which have also influenced fishers' satisfaction and attitudes towards the traditional occupation. For example, there are different factors such as management or fish catch that shape fishers' satisfaction and attitudes towards their traditional occupation (Pollnac, Bavinck and Monnereau, 2012).

Many coastal communities have a strong fishing heritage, which passes from generation to generation, where fishing becomes a way of life for them (Urquhart & Acott, 2013; Thompson, 1983).The specific ways in which fishers practice fishing activities and live their lives or behave in certain ways varies from one context to another as a reflection of part of their culture (Inglis, 2005). Brookfield et al (2005) describe fishing as glue that holds communities together and shapes their way of living and therefore communities rely on fishing for economic, social and cultural survival.

Place represents not only the location (geographical characteristics of a setting), or locale (activities and experiences), but also the sense of place (the meanings and emotions people associate with settings) (Amundsen, 2013; Sampson & Goodrich, 2009; Davenport & Anderson, 2005). Fishing provides complex meanings and identities to the inhabitants of coastal fishing communities.

Gender Dimension

Men and women from fishing communities shape their lives around different fishing activities which later on becomes their identity (Thompson, 1983). Work at sea is mostly reserved for men (fishing) and men enjoy their time at sea; while women work ashore in preparing for fishing and in disposing the catch (McGoodwin, 1990; Thompson, 1983). Fishermen marry fisherwomen to sell their fish. In the poorer households of Comoros, the supplementary food and income from women helps the family to alleviate stress (Hauzer *et al*, 2013, p. 34). Women are an important part of the fishing occupation, paid or unpaid, contributing significantly to their families and communities (Zhao *et al.,* 2013) while also contributing significantly to the maintenance of culture of their communities.

Women's presence in fisheries, on the other hand, is perceived differently in different cultures and their roles are much restricted. Fishermen in many places including Britain are superstitious about women going for fishing at sea. Men in some cultures consider women's presence at the work place as pollution (Thompson, 1983). In the Pacific Islands, deep-sea fishing of pelagic fish such as shark, tuna and bonito tends to be the men's domain, whereas women with children collect shellfish and other organisms from the shallow waters close to the island (Matthews, 1993). The ability to fish is often synonymous with manhood in those societies, on the other hand, men who do not fish are like women (Matthews, 1993, p. 38). A study by Hanson (1982) in the Pacific Islands shows that throughout the Pacific, the masculine association of fishing as an occupation restricts women from deep-sea fishing. The restriction is even stricter for pregnant and menstruating women than the women without these conditions, who are not expected to

participate in any of the rituals and are kind of locked in their houses when their husbands are out at sea (Matthews, 1993). In Samoa a woman's touch on any fishing equipment can destroy harvesting potential, and a woman's presence in a canoe or boat is considered a bad omen for fishing. The findings of Matthew's research also reveal that the bodily fluid of menstruating women is considered highly polluted and contaminating. Findings from Chapman (1987) show that the restricted movement of women influences the kind of seafood they collect in the Pacific region. Interestingly, the rituals and taboos are not only restricted to just women, men at sea also strictly follow some of the taboos while fishing.

Depending on the risk, men would follow certain rituals and the longer and greater the risk, the more strictly the rituals would be practised. Poggie et al (1976) shed light on some of the main taboos followed by men in New England including: the hatch cover is not supposed to be upside down, no whistling on board, never utter the word 'pig', never turn once back on the sun and a black bag should not be carried on board.

The uncertain and risky nature of fishing has some influence on fishers' beliefs and their worldviews. The occupation has turned some fishers towards religion; on the other hand the demands of the occupation allows them to escape from the restriction of their religious congregations (Thompson, 1983). Income irregularity, uncertainty and fluctuating economy together influence a fisher towards religious beliefs and church; however, this relationship between religious institutions and fishers is purely individual and complex. Thus, fishers' culture, beliefs and tradition are shaped by the occupation and also largely due to the nature of work they do.

Despite the risk involved, fishing contributes positively to many coastal communities. Fishing communities though isolated from other communities, have strong cohesion between them (Thompson, 1983). Fishing provides a great freedom and satisfaction to fishers, which is the main reason why fishers are so attached to the occupation (Trimble & Johnson, 2013; Pollnac & Poggie, 2006; McGoodwin, 1990).

Fishing is viewed predominantly as a man's domain in many developing countries though women play a major role in pre and post-harvest activities. Fisherwomen occupy a sub category position. In Ghana, men go fishing and women are the fish sellers (Acheson 1981), and that's how they make the arrangements to keep the profit within the household. Acheson (1981) finds in many cases, men prefer women kinsfolk to sell their fish because women are trustworthy. Women in India are engaged in a variety of tasks such as the drying and salting of fish in peak fishing seasons, which are not well acknowledged, even though these activities raise income to keep households functioning on a daily basis (Immanuel *et al.,* 2008; Rubinoff, 1999; Ram, 1991).

In the central peninsular region of Gujarat known as Saurashtra, fishing is an important occupation, although one that employs mainly low caste individuals. Fishing is considered as a low status job in many societies and fishing communities often struggle due to poor infrastructure and poor living conditions (Sowman, 2006). Regardless of low status, fishing on the Saurashtra coast provides plenty of opportunities to local people. The influence of globalisation and the relatively modest local market due to largely vegetarian society have shaped the export oriented fish market. This research attempted to understand the subjective wellbeing of local fishers shaped by the distinctive history and practices of fishing in that region's subjective wellbeing.

Chapter III: Research Methods


Figure 3.1: Field Ethnography on a fishing trip in the Arabian Sea (Top left); participant observation where fishers explaining fishing practices to the researcher (top right).

3.1 Introduction

This research used methods appropriate to exploring the socio-cultural dimensions of the Gir Somnath District small-scale bag net fishery. The chapter elucidates the philosophical worldview, research design, strategy, data collection methods, sampling techniques, and how the data was analysed to accomplish each research objective.

3.2 Philosophical worldviews

This research was guided by a constructivist worldview due to the exploratory nature of the research (Creswell, 2013, 2009). I intended to understand the bag net fishers' world and their occupational lives and the constructivist worldview contributed usefully to understanding the social and cultural dimensions with subjective meanings.

3.3 Study area

The four-month research was conducted in the dry-fish zone of Gir Somnath, mainly in Saiyad Rajpara with occasional visits to other areas. The dry-fish zone in Gir-

Somanth stretches from Navabandar to Saiyad Rajapara (Johnson & Sathyapalan, 2006) (Figure 3.2).

Figure 3.2: Gir Somnath district map showing the coastal areas including Navabandar and Rajpara (Source: Revenue Department, Government of Gujarat, 2015)

3.4 Research design

A qualitative research method was used to address the research purpose and objectives. Qualitative research is about "understanding the meaning people have constructed, that is how people make sense of their world and the experience they have in the world" (Merriam, 2009, p.13). Since there are multiple perspectives involved and reality is socially constructed, knowledge generated from the research is mostly co-constructed by the researcher and the participants (Petty *et al.*, 2012a). The research design provided an opportunity to engage with participants in a natural setting in their day-to-day events (Creswell, 2013; Hanson *et al.*, 2011). Qualitative research is considered relativist because it does not intend to provide ultimate truths, instead knowledge generated from the research is mostly value laden and reflects a plethora of

viewpoints (Petty *et al.*, 2012a). One of the great advantages of a qualitative design is its flexibility (Creswell, 2013; Brown, 2010). The research process in qualitative research is largely 'emergent' not predetermined as in quantitative research (Creswell, 2013). Despite great advantages, qualitative research is often criticised for the issue of generalisability due to relatively small sample size. This research, however, did not intend to generalise the outcomes because of the limited geographical focus.

3.5 Research strategy

An ethnographic strategy of inquiry was used to provide rich, holistic insights into fishers' worldviews and their socio-cultural practices. Ethnography is defined as "the study of the rich, complex matrix of social life and culture" (Simmons-Mackie & Damico, 1999, p. 681). Ethnography, originating from anthropology, is a complete cluster of methods for data generation, analysis, interpretation and documenting a particular group of people from a common cultural unit (Reeves *et al.*, 2013; Davies & Henze, 1998), which is done in a natural setting for a prolonged period (Creswell, 2009).

Ethnography was useful as a strategy of enquiry in understanding of the social interactions, behaviours and perceptions of local fishers. The aim of ethnography was to "delineate the shared beliefs and practices, folk knowledge and behaviours of a group of people" (LeCompte & Goetz, 1982, p. 55). The outcome of ethnographic research often provides new insights into and sensitivity to important social issues (Simmons-Mackie &Damico, 1999), yet there are some key issues such as credibility and dependability.

3.6 Sampling techniques

Purposive sampling was widely used for this qualitative research. Unlike a rigid sampling technique in quantitative research (Coyne, 1997), sampling in qualitative

research is directed by the precise research objectives and efforts made to capture the target sample in the natural setting from an idiographic viewpoint (Nastasi & Schensul, 2005, p. 182). Flexibility in qualitative research allows choosing a sample of participants (Hanson *et al.,* 2011), who can understand the needs and contribute to the research (Creswell, 2013; Coyne, 1997). Purposive sampling was more deliberate than a regular demographic stratification, though age, gender and any other variables (Marshall, 1996b).

Purposive sampling can be further categorised as snowball sampling or theoretical sampling (Hanson *et al.,* 2011). In the absence of any proper sampling frame, snowball sampling was useful as the participants referred others they knew. The theoretical sampling allowed to choose participants from particular groups with certain characteristics (Hanson *et al.,* 2011). This research used both sampling techniques to conduct interviews.

3.7 Sample size and composition

In qualitative research, an appropriate sample size is one that amply answers the research objectives (Marshall, 1996b, p. 523). Since qualitative research focuses on in-depth exploration of a subject, researchers purposefully choose relatively small sample size (Coyne, 1997). Respondents embody and share meaningful and detailed experience rather than being systematic and statistically representative. The respondents are ‘cases’ in this context and not just individuals with certain required attributes (Crouch &Mckenzie, 2006). A variety of respondents were considered for the research. Table 2 details the number and criteria used for selecting the respondents. The most common criterion for all the respondents, regardless of any criteria weas their willingness to participate, and their time and availability. A total of 69 respondents were interviewed,

however, there were many informal conversations during the participant observation that added extra value to the research.

Table 2: Respondent details and selection criteria

Respondents	Selection criteria
38 Fishers	Main respondents, selected on the basis of their Age and experience Theoretical & snowball sampling was used
3 Dry-fish traders 2 Fresh fish traders 3 Middlemen	Key informants selected on the basis of Snowball sampling was used
4 sales women 1 women wage earner	Key informants, selected on the basis of Snowball sampling was used
3 boat owners 3 local leaders 2 old women and 3 old men	Key informants, selected through theoretical sampling
4 government employees	Key Informants, selected through snowball sampling
3 businessmen	Key Informant, selected through theoretical sampling
Total 69	**38** main respondents and **31** key informants

3.8 Data sources

Primary data were the main source of information. There was limited literature available, which studied the socio-cultural aspects of the bag net fishery in Gir Somnath. This research used some information from the Department of Fisheries and other line authorities from local institutions or administration to supplement the answers to the research questions.

3.9 Data generation methods

Multiple methods of data collection was used to generate data. Qualitative research largely uses open-ended techniques such as observation, interviewing and recording (Nastasi & Schensul, 2005, p. 182). I used various tools from the 3D

Wellbeing tool kit as part of a broader ethnographic data gathering strategy. An approval from the Joint Faculty Research Ethics Board of the University of Manitoba was obtained prior to the commencement of field work.

3.9.1 3D Wellbeing Approach

A social wellbeing approach was used in which I used the three dimensions in relation to the three research objectives. A material wellbeing perspective was used to research the fish supply chain in Saiyad Rajpara in which I explored how fishers used different resources to harvest fish that contributed to their wellbeing. I used the relational dimension of the social wellbeing approach to examine the local governance and management practices in which I studied how fishers related and networked with others to meet their occupational needs and to address their day-to-day issues. The third objective was about exploring the subjective wellbeing of fishers that included fishers' perception on bag net fishing and the dry-fish economy, and their satisfaction from the occupation shaped by different factors such as the local governance and management system. The three different objectives in this research corresponded respectively with the three dimensional social wellbeing approach that was not strictly restricted to a particular category. Each objective was interrelated with other aspects of wellbeing. Participant observation was one of the major tools used to generate data for all the research objectives, however, there were some specific tools used to meet the objective specific needs.

The objective specific data collection tools were independent measures, which contributed to primary data. A semi-structured interview tool was used that drew on the resources and needs questionnaire to address the fish supply chain (see next section).

The second objective was to explore the local governance and management practices through interviews with members from different institutions as well as from the community based on the relational wellbeing assessment questionnaire. I used semi-structured interviews to explore fishers' perceptions.

Participant observation

Participant observation as a method is considered as the foundation of field work in cultural anthropology (Russell Bernard, 2006, p. 342). Detailed recording of the behaviour of participants, their interpersonal interactions, daily activities, occasions, and any kind of contextual features within the natural setting are all part of participant observation while making them comfortable at the same time (Russell Bernard, 2006). The role of researchers is crucial (Atkinson & Hammersley, 1995, p. 248) and varies from non-participant to full participant in the target setting (Hanson *et al.*, 2011, p. 379; Nastasi & Schensul, 2005, p. 184). Field notes and diaries were important instruments in participant observation and were central to my own data gathering.

Semi-structured interviews

Semi-structured interviews with objective specific questions were useful, particularly for collecting information on respondents' opinions, attitudes, values, and how fishers contextualised different things. The flexibility within semi-structured interviews allowed to adjust questions and change directions as an interview progresses (Dunn, 2005). I used a voice recorder to record the interviews during the field work. The questions used for semi-structured interview schedules are detailed in Appendix C.

Key informant Interviews

Key informant interviews are an important technique to gather information on a range of topics, such as kinship, society, culture, economic system, political structure, and local beliefs and practices (Tremblay, 1957). Key informants are able to provide detailed information and deeper insight because of their personal skills, or positions within a society (Marshall, 1996a). Key informants are also known as 'natural observers' (Tremblay, 1957, p.693). Tremblay (1957) has highlighted some characteristics of an ideal key informant such as: role within community, knowledge, willingness, communicability and impartiality. Key informant interviews have the advantages of obtaining quality data within a short period of time; however, are criticised for not representing any society and for close relationship between researchers and informants (Marshall, 1996a). Appendix E details the category of respondents interviewed and it lists out some of the important questions used for key informant interviews.

The resources and needs questionnaire (RANQ)

The aim of this tool was to ascertain the resources fishers had to achieve their material wellbeing. In detail, this tool helped in exploring the ways in which fishers' demands and needs were being achieved with the resources they had. A template questionnaire on material wellbeing is reproduced in Appendix C.

Relational wellbeing assessment (RWA)

The purpose of the relational wellbeing assessment (RWA) tool was to assess relationships that were important to fishers in achieving their wellbeing. For example, fishers maintain relationships with fellow fishers and crew members, traders, middlemen, petty consumers and people from the local administration or institutions to achieve their

wellbeing. This tool particularly attempted to understand how relationships influenced fishing behaviour and how satisfied fishers were from those relationships. A template questionnaire is reproduced in Appendix C.

3.10 Field data collection process

Primary data was collected approximately for four months from September to December 2014 on the southeast coast of Gir Somnath. Key resource persons from that area were contacted prior to the field visit to ease entry into the field. Detailed information on their fishing seasons and time was obtained prior to the field visit. I hired a research assistant to assist in understanding some regional dialects. Participants were selected on the basis of their social position, experience, gender, knowledge and involvement in the local fishery, and above all willingness to participate. Table 3 details the tools and instruments used to generate primary data. Participant observation and semi-structured interviews were the dominant tools to collect data on fishers' views, however, key informant interviews were used as a secondary tool to explore the history on socio-cultural life. Appendix D lists the detailed scheduled of interviews.

Table 3: Data collection methods (√ = dominant tool and ● = secondary tool)

	Data Collection Methods		
	Participant Observation	**Semi-structured Interviews**	**Key informant interviews**
Objective One :			
Fish supply chain	√	√	√
Objective two :			
Governance	●	√	√
Objective three:			
Value, Beliefs and Perception	√	√	●

3.11 Data analysis

Data generated through participant observations and semi-structured interviews were transcribed and translated. There were three different aspects of data analysis: the first aspect is description, then analysis and finally interpretation (Reeves *et al.*, 2013). Field notes often help in filling gaps and finding links. Unlike quantitative analysis, qualitative research involves many emergent concepts and ideas (Nastasi & Schensul, 2005). The data analysis was largely inductive and interpretive (Forman *et al.*, 2008). Several quotes from the respondents related to the context were used in analysing the data with codes; for example SR01 represents the respondent 01 whereas field notes were used with particular dates.

Qualitative data analysis entails multiple stages. For example the analysis begins from examining primary data to coding, thematic sorting, and finally identification of relationships among various themes (Forman *et al.*, 2008, p.767). The use of licensed Nvivo 10 Computer Assisted Qualitative Analysis Software (CAQDAS) was helpful where all the interview transcripts were imported. Nvivo 10 basically contributed in organising data under different pre-conceptualised themes and many new themes emerged during the analysis process.

3.12 Credibility and dependability

Qualitative researchers adopt certain strategies to establish credibility (= validity in quantitative research) and dependability (= reliability in quantitative research). Multiple source of data generation, also known as triangulation, is one of the main strategies that contribute to credibility (Petty *et al.*, 2012b; Hanson *et al.*, 2011). In addition, systematic documentation and recording of data, prolonged engagement,

persistent observation and skilful interview techniques altogether contributed to the credibility of the qualitative research. Similarly, rigorous procedures such as systematic sampling, data generation and analysis and crosschecking the data with the community through regular interaction contributed to the dependability of this research (Petty *et al.*, 2012b; Hanson *et al.*, 2011).

3.13 Verification & dissemination of findings

The findings of the research were disseminated to the community before the final departure in which approximately 25 respondents participated. During the final group meeting with the Koli community, the major findings were shared with the respondents and confirmed by the members which was a part of the triangulation process.

3.14 Limitations

This research was primarily focused on the socio-cultural dimensions of the bag net fishery from a fishers' perspective and therefore the main respondents were predominately fishermen. Despite the fact that women are important for the local fishery and are part of the supply chain, it was difficult to interview women because of their busy work schedule, unavailability and unwillingness to participate (in some cases). The other major limitations of this research were limited available data on fish catches and on market prices at final point of sale. As local fishers supply all of their catches to fish traders and do not keep a record of their catch, it was difficult to collect any statistical data on fish catch. Similarly, a substantial portion of local fish get exported and even the local fish traders did not have any information on the final market price.

3.15 Summary

The chapter explains the qualitative research methods that were adopted to conduct the qualitative research. An ethnographic strategy of inquiry was followed to conduct the qualitative research. A set of data gathering instruments from the social wellbeing toolkit helped in structuring the research inquiry. A purposive sampling technique was adopted and primary data was collected through participant observation, semi-structured interviews, and key informant interviews. Nvivo 10 software was used to analyse the qualitative data.

Chapter IV: The Fish Supply Chain

“The good thing about dol net is we can harvest anything and everything, which helps us in keep going and recovering our investment cost even if we do not make a huge profit (SR37)”

Table 4: Photographs of Fish supply chain

Pre-harvest preparations: Workers and crew members loading ice (top left) and setting up Styrofoam for multipurpose use (top right).
Harvesting: Crew members emptying the fish catch from a bag net after harvesting (bottom left).
Post-harvest: A fisher counting money after trading his lobsters (bottom right).

4.1 Introduction

The aim of this chapter is to analyse the data and share the major findings pertinent to the fish supply chain by describing the history of the changes to bag net fishing practices in the dry-fish zone of coastal Gir Somnath from the introduction to the present. A social wellbeing perspective, especially the material dimension of wellbeing, was used to explore how the small-scale bag net fishery functions and has contributed to the material wellbeing of the local fishing community, which addresses the first research objective. Consistent with this objective, I argue that an economic transition in the bag net fishery has had ecological consequences that are increasingly threatening the livelihoods of many people in this region.

4.2 Profile of the place

Saiyad Rajpara is a fishing village on the east coast of the Gir Somnath district in the State of Gujarat. The village has one of the three harbours, based in the dry-fish zone of coastal Gir Somnath (SR53). The population of the village is over six thousand (Field Notes 2014/11/15). All the inhabitants of the village either directly or indirectly rely on the fishery for their livelihood (Field Notes 2014/09/10) with limited alternatives. The shortage of enough arable land and the saline environment do not encourage many people to adopt farming as a livelihood option. Fishing has made an immense contribution to the local economy due to the advantage of a suitable geographic location at the Arabian sea coast. The caste demography of the village is predominately Koli (SR56; Field Notes 2014/09/09), which is one of the most deprived castes in India (Field Notes 2014/09/10). The Kolis from this village are also known as Gedhiya Kolis, who are from the Gedh

areas (coastal areas), eat non vegetarian food (SR56) and mostly involved in fishing or related activites (SR56), which has become their identity.

Fishing and associated activities are widely practised and have shaped the local socio-economic lives of people in coastal Gir Somnath. The majority of Kolis directly or indirectly are associated with the local fishery. There are approximately 10 to 15 Muslim households who are generally involved in the dry-fish trade and some are involved in snack and cold beverage business which they mostly supply to the fishers. Caste based occupation in livelihoods is prevalant in India. For example, there are three households from the Rabari (herder) caste who raise cattle and supply milk to the local fishers. There are around 30 households from the Dalit caste (untouchables) who mostly work as wage earners in the dry-fish trade. There are three households who are barbers. Most of the business or traders are from outside who are either Kolis or Muslims and are from the nearby areas. The fishing village is the centre of commerce and trade for many people because of the establised fishing economy. The average income and expenditure is relatively high in this harbour village compared to other nearby villages (Field Notes 2014/10/16).

4.3 History and Transition in Fishing

Saiyad Rajpara's history is characterised by the dominance of different communities. The name of the approximately 200 year old village (SR54 SR56 SR66) became famous as 'Saiyad Rajpara' at the time when the Saiyad Muslims ruled the local area (SR54 SR66) during the British rule. Prior to the Saiyads, some Parsi people, involved in liquor trade, briefly dominated the village (SR65). Once the Saiyads left during partition in 1947, Kolis were left in Saiyad Rajpara (SR65). Kolis were mostly

wage earners and would work in agriculture or were engaged in manual work such as grass cutting or stone breaking work (SR54 SR56 SR65 SR66). Food security was an issue and the local Kolis would struggle to get two square meals per day after a whole day's work (Field Notes 2014/12/23).

Figure 4.1: Location of Saiyad Rajpara on the east coast of Gir Somnath

The socio-economic life in Saiyad Rajpara witnessed a major change after the arrival of the Machhis from South Gujarat. The Machhi people from Valsad come to the

west coast of Gujarat around 60 to 70 years ago (SR54 SR56 SR65 SR66). The Machhis started using the local harbour because they found the natural harbour useable for fishing (SR54 SR66). Gradually, the Kolis started working as wage earners for the Machhis, doing mainly loading and unloading work at the harbour (SR54). The Kolis do not belong to one of the traditional fishing castes in Gujarat unlike the Machhis or the native Kharvas of Saurashtra (SR54). Over the years, the local Kolis acquired the skills of fishing from the Machhis, which indicates the caste socio-economic mobility. Fishing at the harbour by the Machhis ceased over time because the younger generation of Machhis were not interested in pursuing their traditional occupation (SR54; Field Notes 2014/12/16).

The influence of the Machhis' specific way of harvesting and managing the fishery has been pivotal in the development and success of the fishing economy in coastal Gir Somnath. Without modern instruments such as GPS or wireless, the Machhis used traditional knowledge for fishing at sea (Field Notes 2014/23/12). The Machhis used bag nets for fishing Bombay duck and prawns though a variety of fish such as eel, jew fish and cat fish were amply available (SR54).

Subsequently, the local Kolis adopted marine fishing as their main livelihood option which became the traditional occupation for them, passing from generation to generation (SR54 SR56). The Koli fishers followed a similar fishing procedure, which they had learnt from the Macchis. Gradually, many Kolis from the nearby villages migrated to Saiyad Rajpara for a better livelihood opportunity (SR54). Previously, fishers had non-motorised wooden boats, which cost more than a fibre boat (SR05) and they had to sail their boats at sea (SR04 SR05 SR12 SR29 SR31 SR55 SR56 SR66). Many boats

were smaller in size than the present time (SR06 SR09). Bag nets were the main means of fishing, which was mainly made of cotton (SR05 SR11 SR30 SR54) and was up to 30 *wam* (1 *wam* = approximately 1 metre) (SR06 SR11 SR35 SR36 SR54). Bag nets made of cotton would not last that long and would need frequent maintenance (SR17). Koli women from the fishing community would collect bark from mango or prickly acacia trees to boil those in water to colour fishing nets (SR20 SR62 SR66). The coloured nets, once soaked in the water, would release a smell that would attract many fish towards the nets and fish would get caught (SR66). Crew members would mostly do manual work such as carrying the water-soaked nets to the ground for drying, collecting stones and loading those on fishing boats (SR08). Fishers would keep extra pairs of nets at the harbour for replacement as cotton nets would get heavy and difficult to use after getting soaked (SR30). Three to four crew members would carry a single net to the drying ground with no transport rickshaws available at that time (SR33 SR54). Previously, the mesh size of fishing nets used to be bigger than the present time (SR18 SR62), which would take less time to knit (SR62). A maximum of four to five crew would be employed per boat. As a fixed net fishery, fishers in earlier times would carry stones to make piles inside the water without metal pipes (SR31 SR54 SR56). Interestingly, small-size fish would hide inside the stone pillars and bigger fish would come to eat those smaller fish and would get caught (SR66). Fishers would use comparatively small ropes in the past (SR54) and those ropes were made of from natural resources such as date palm plants (SR62). In the absence of any mechanical net-puller, crew would manually pull nets from the water. Earlier, there was no wireless radio to communicate with other boats (SR05

SR07). Previously, there was no life-saving equipment such as life jackets or tubes and fishers, who mostly knew swimming, would use Styrofoam in case of emergency (SR16).

The fishing time and seasons were different in the past and were highly dependent on the weather. Previously, fishers would mostly use a compass or follow the stars in the sky to find directions in the sea without a GPS (SR04 SR05 SR06 SR07 SR12 SR13 SR14 SR19 SR23 SR29). Fishers would travel for a maximum an hour or two at sea for fishing (SR30 SR33 SR36 SR38 SR55), which would be around 10 to 12 km (SR06 SR08 SR12 SR14 SR23); they would rarely stay beyond a day and half at sea (SR23 SR33 SR54). The movement of fishing boats would rely on the direction of wind (SR06 SR08 SR12 SR14 SR31 SR33). A two day trip would be sufficient to harvest plenty of fish and make money. The fishing season would start after Navratri (a festival towards the end of September), which was a common practice. The late fishing would allow sufficient time for fish to breed and grow into full size. Fishers would always halt for a couple of days between two fishing trips in the past (SR52).

It can be argued that life was not so demanding in the past for the Koli fishers. Fishers would mainly fish golden anchovy and Bombay duck because of the market demand (SR18 SR52 SR54). Despite the availability of a variety of fish such as pomfret, jew fish, cat fish, eel and prawns in the sea (SR66), there was limited demand for these fresh fish (SR54). Prices were really low and fishers would pay C$13 for a barrel of diesel (200 litre), which cost C$240 at present (November, 2014) (SR52). There were approximately 100 boats at the harbour (SR52). There would be sufficient diesel available for everyone without any issue (SR54). Fishers would get enough rest in the

past before their next voyage (SR66). Life was good and peaceful in earlier times regardless of less money, claimed by an old and experienced fisher (SR66).

4.4 The modern fishery

The traditional bag net fishery after modernisation has thrived as main source of income in this region. There are around 400 boats currently operating at the local harbour out of which 302 are either 32 feet or more and the remaining are smaller than 32 feet (SR58). The number of fishing boats and people employed in fishing has increased over the years because of good income and employment opportunities (Field notes 2014/12/10). With limited alternatives and lack of suitable farming condition, fishing has become a lucrative source of income for many Kolis with limited literacy and skills (Field Notes 2014/12/09). Figure 4.2 details the percentage of respondents who have any alternate source of income other than fishing. Sixty-six percent (*n=38*) of respondents stated that they did not have any additional income source than fishing.

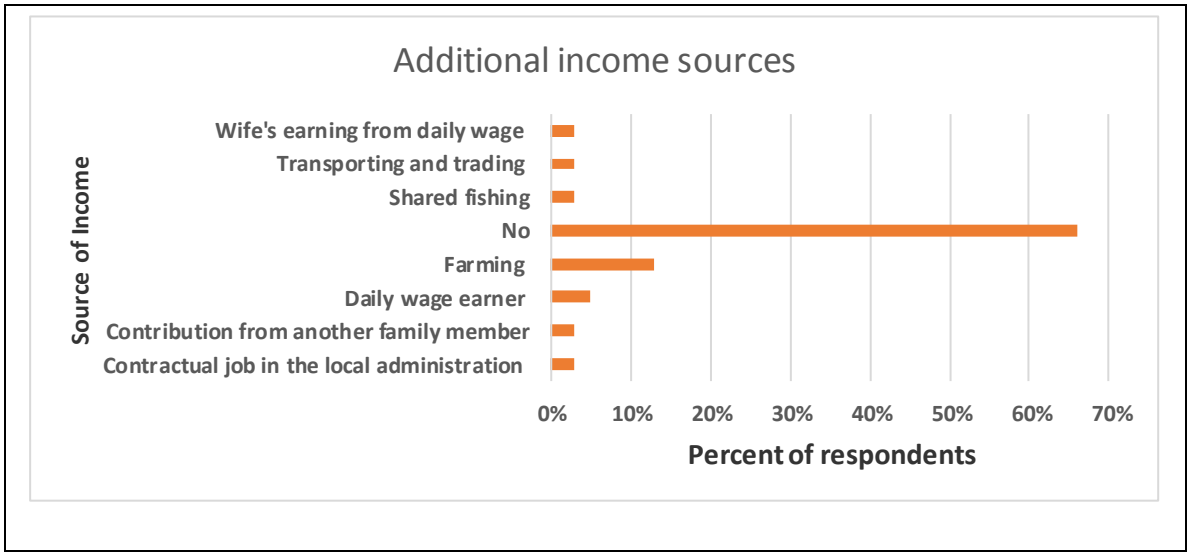

Figure 4.2: Alternative livelihood options (*n=38*)

Figure 4.3 illustrates the education profile of the respondents. Without much education or alternative sources of income, most Kolis get involved in fishing as it does not require

professional skills; most of them have already been exposed to fishing since their childhood and they obtain their skills through practise. Fifty-eight percent (*n=38*) of total fishers interviewed had basic literacy skills with limited ability to read and write. A significant percent of fishers (37%) did not have basic literacy skills while 5% respondents had college degrees. The bag net fishery, in coastal Gir Somnath, entails a lot of interactions, relations and negotiation among multiple parties at various stages. Fishers network and collaborate with multiple parties to utilise the marine resource in order to achieve material wellbeing (Wills, 2008). Though fishing is a lucrative source of income for many locals, however it is not free from challenges. The next section tries to understand the different phases of fishery and how the entire fishery functions.

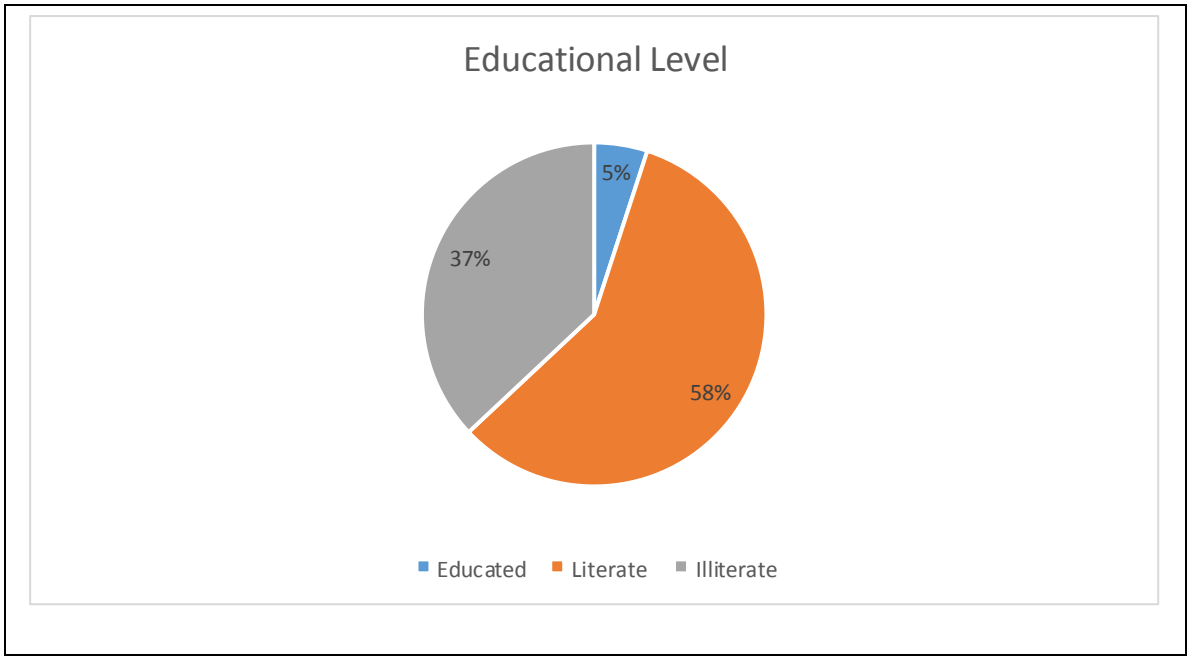

Figure 4.3: Educational profile of Respondents (*n=38*) in which educated refers to some college education, literate means the limited ability to read and write and illiterate means no ability to read and write at all.

4.4.1 The pre-harvest phase

The pre-harvest stage of fishery is the phase in which fishers prepare before their voyage. Boat owners (also fishermen) first organise finance before hiring crew and collecting fishing equipment and necessary resources. Arranging finance is a major challenge for many fishers in Saiyad Rajpara. Without cooperatives or government financial institutions (stated by all 38 respondents), fishers use multiple sources such as fresh-fish traders (transport companies), dry-fish traders, middlemen, sales women and family and friends to arrange finance. Fishers spend a minimum of C$200 (SR25 SR37) and up to C$1500 per trip (SR30) depending on boat size and length of the trip. Boat owners get up to C$14000 (SR08) credit for a year from fresh-fish traders depending up on the size of the boat and past credit record (SR14). In return, boat owners must provide all of their harvest to the particular fresh-fish traders with a lower landed price at the harbour (SR08). For example, fishers from outside the credit system sell cat fish for C$1.06 per kilogram against the fishers, part of the credit system, sell the same quantity of cat fish for C$0.98. Table 5 details the market price of different fish species at the local and regional level in comparison to the export price quoted by the Marine Products Exports Development Authority (MPEDA) in June 2014. The data shows that there was a wide variation in price for lobster in comparison to other fish species in 2014.

Dry-fish traders also provide credit up to C$6000 with the similar condition as fresh-fish traders (SR07). Fishers mainly spend money on buying harvesting materials such as nets, ice, diesel and groceries, repairing and mending work, and paying salaries to the crew (SR07).

Table 5: Market Price of different fish in different places

Price/ Kilogram / Fish variety	Price in Saiyad Rajpara (in C$), part of credit system	Price in Saiyad Rajpara (in C$), without part of credit system	Veraval / Mumbai (in C$)	MPEDA Export Price in June, 2014 (in C$)
Ribbon Fish	2.30	2.50	3.00	2.48 – 3.92
Squid	1.10	1.20	1.40	2.20 – 4.10
Lobster	20 - 30	20 - 30	30 – 40	48 – 62

Human resources are one of the most important assets in the bag net fishery in Saiyad Rajpara. Prior to fishing, boat owners have to secure crew members for a fishing year, which is for eight months. The fishing year starts after the monsoon season and continues until next summer with a month break during the marriage season (Field Notes 2014/12/05). All crew members in Saiyad Rajpara work as contractual employees for a fishing calendar year (Figure 4.4). Figure 4.4 also elaborates the hierarchy of salary structure among crew members. For example a captain gets salary from as low as C$3000 (SR03) in small boats and up to C$5000 in bigger boats (SR13). Depending on experience, a crew member can make from C$2000 up to C$2600 in eight months. Crew members, however, do not get paid all the amount up front (SR10) but boat owners pay them in several instalments (SR03). A boat owner stated:

> *Earlier there were only few boats and there were more people available for work; therefore we had the bargaining power. Currently the situation has just reversed. There are too many boats and the demand for crew members has gone up and so as the salary structure. Besides, we have to accept all the terms and conditions when we hire the crew. As the crew members carry our valuable property at sea and our earning or profit depends on their effort, we have to accept all of their demand* (*Field Notes 2014/12/05).*

In addition to the salaried crew working on different boats, two fishers (*n=38*) go for share-fishing during monsoon. Fishers in small groups, which consists three to four crew members, go for shared fishing (SR02). The entire harvest gets distributed among all the members in which the boat owner takes four shares. Beside his own share, the boat owner gets extra shares for his boat, net and pipes respectively (SR02 SR21). The other members get one share each.

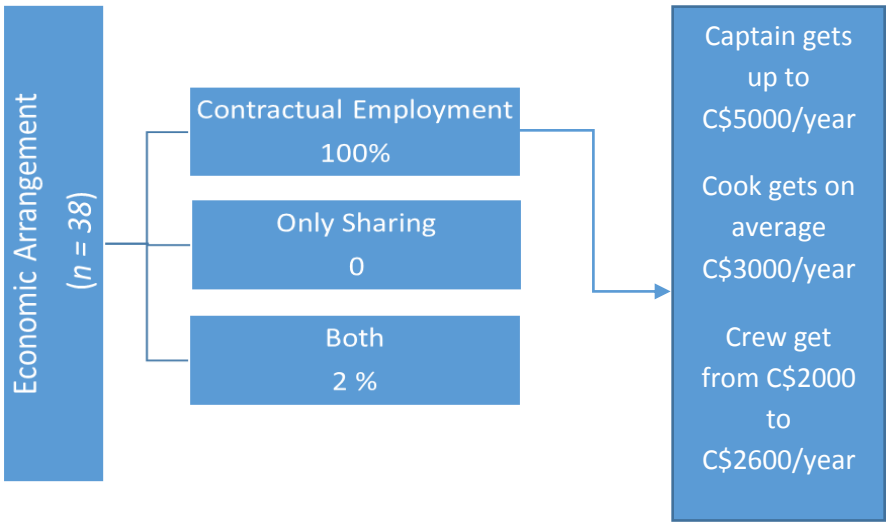

Figure 4.4 Economic arrangement among fishers (*n = 38*)

The caste composition of crew in Saiyad Rajpara is almost entirely Koli, with the exception of two to three Muslims. The small Dalit presence in the village is not evident at the harbour (SR05). In bag net fishing, from four to nine crew members work per boat, depending on the size of a boat, which is comparatively less than trawl or seine netters. Once, finance is sorted out and crew members are hired and contacted, fishers gear up for fishing by arranging necessary supplies.

Technology is central to the bag net fishery. Fishers carry different fishing equipment in addition to the supplies such as food and items necessary for survival. Table

6 details the material fishers in Saiyad Rajpara arrange during the pre-harvest phase before the voyage. The local fishers have a mixture of fibre and wooden boats. The fibre boats are mostly smaller than the wooden boats and cost less but the maintenance cost is higher than wooden boats. Wooden boats last longer than fibre boats. Fishers mainly buy used boats from Veraval and other areas which are cheaper than new ones. Wooden boats are for longer fishing trips and fishers need to carry all the necessary materials including supplies (Table 6). Fibre boats are comparatively for short trips and some fishers do not carry ice for short trips. In comparison to some other gear users, large boats in bag net fishing can carry up to five bag nets and up to 10 hook and line gear packages in which there are up to 500 hooks (SR16 SR24). Fishing nets are the second most expensive equipment needed after boats, which are still cheaper than trawl nets or seine nets (SR26). Many fishers buy used nets from other areas to save on cost (SR37). Crew members fix ongoing wear and tear of nets if they have some free time otherwise boat owners hire wage labourers to mend fishing nets (SR33). Bag nets are the main gear widely used in the dry-fish zone and therefore most crew members are familiar with the mending work required for them (SR27). Net pullers, GPS and wireless are the other expensive items which are necessary in bag net fishing and were introduced roughly around seven to eight years ago (SR14 SR29 SR30). Table 6 illustrates that all the respondents have access to the necessary technology. Bag netters do not use expensive fish finders like other mobile fishing practices (Field Notes 2014/09/10). Net pullers have made the harvesting process easier as fishers do not have to pull in the net manually. GPS units help in finding direction and wireless radios are the most important tools for communication with others (SR29). Appallingly, 50% of respondents did not have any

safety equipment such as life-saving jackets or tubes *(n = 38)* and they were regularly fishing at sea. Out of the remaining 50% with safety equipment, further 47% had both life jackets and tubes and the remaining fishers had either those life jackets or tubes. While responding to my concern on safety issue, one crew member responded:

> *We do not have life-saving jackets neither do we have tubes. Two of us do not know how to swim. Learning swimming wouldn't help us to swim in the sea to the shore. We have surrendered our lives to the almighty (SR30).*

Table 6: Materials required for fishing

Category of Material	**List of materials**	**Tally (*n=38*)**
Basic Harvesting technology	Boat, multiple fishing nets (bag net), hook and line, anchor, gaffe, ropes, Net-puller torchlight (flashlight)	100%
Electronics	GPS, wireless radio and/ or cell phone.	100%
Other necessary materials	Styrofoam, diesel, ice, empty plastic drums, insulated storage box(es), bulbs	100%
Additional supplies	Drinking water for drinking and cooking, grocery items, vegetables, milk, tender coconuts, Pots and pans, Kerosene, Firewood	100%
Documents	Identity card	100%
Safety equipment	Life-saving jackets and/or tubes	50%
Non-fishing materials	Mattress, pillow, shawls, music player	Depends on individuals

The fact that only 50% (*n = 38*) of respondents have life insurance further illustrates the high level of risk taken by the bag net fishers in this harbour village. During the four month of my stay, I personally witnessed two different accidents in which boats capsized at sea. Almost all the fishers see Styrofoam blocks as the main safety equipment to

survive and therefore every single boat carries Styrofoam while going for fishing. Besides this fishing equipment, fishers do have some of their own personal requirements such as sleeping mattresses, pillows and they carry some snacks for consumption. In addition, to stay awake many fishers carry tobacco (SR26; Field Notes 2014/ 09/10).

Once boat owners arrange all the necessary fishing gear and supplies, family members and or some wage earners are hired to carry them and load the boats. Crew members also contribute their labour in loading the necessary fishing gears and supplies. Once the necessary materials are loaded and all crew members are on board, a boat is ready to leave for the voyage provided the water level at the harbour is good enough for a boat to get out of the harbour.

4.4.2 The Harvest phase

Season and time have a great influence on fishing in Saiyad Rajpara. Officially, the fishing season starts after the 15th of August, the date when the ban period ends (Figure 4.5). Figure 4.5 details the fishing season with the category of fish, bag netters fish in Saiyad Rajpara. Figure 4.5 illustrates the category of fish bag netters harvest in the beginning and towards the end of the fishing season (Field Notes 2014/09/26). Fishers get the largest fresh fish harvest in the beginning of the 1st season because, the fishing season starts immediately after the monsoon which is the breeding season for many fish (SR29 SR30). As stated by a fisher:

> *Bhadrav season (1st harvesting season) is the best time for harvesting which lasts for two to two and half months until Diwali. Once the season gets over, we harvest koota (waste fish) that mostly comprises shrimps, prawns and juvenile fish. Winter is the worst time as sometimes we do not get any harvest. After winter, we get some fresh fish and koota as well (SR03).*

The 1st fresh fish season lasts only for two months until the beginning of winter and fishers use the time to make maximum profit out of it (SR43 SR44). Once the fresh-fish catch declines, fishers harvest small and juvenile fish and shrimp, mentioned in table 7, mainly for drying purpose and to recover the investment cost (SR03 SR30). Fishing is widely stopped from the end of January to the end of February to celebrate the marriage season (SR21 SR28). After the marriage season, once the winter is over, fishers get some

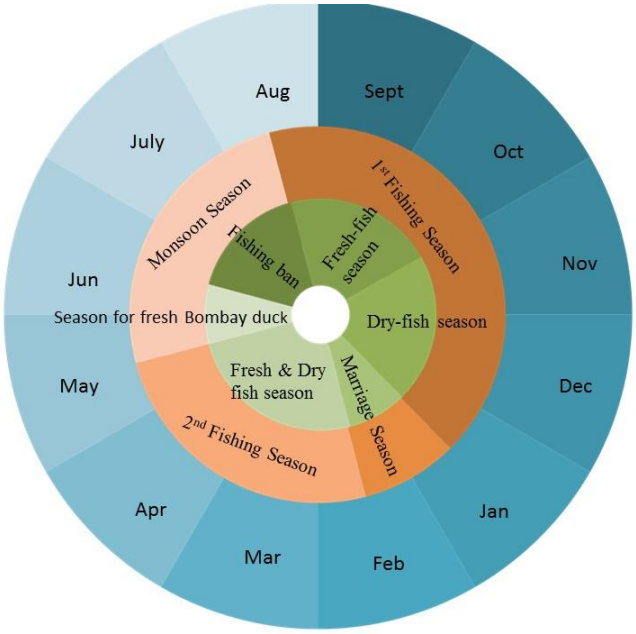

Figure 4.5: Fishing Calendar

fresh fish in the second fishing season, however, unlike the 1st fishing season (SR14 SR23 SR28 SR33). There is no fixed time for arrival and departure of boats at the harbour. Depending on tides, fishers decide to go and depending on the fish catch, boats come back to the harbour (SR04). Medium-size boats with 15 HP to 20 HP engine size spend up to four days, while bigger boats with engine capacity of 25 HP or more, which travels up to eight hours, tend to stay a week or may be longer (Figure 4.6) (SR01 SR09).

Table 7: Variety of fish harvested in Saiyad Rajpara in different seasons

Category	Type	Season
Fresh Fish	Ribbon fish, cat fish, sole, croaker, prawn, kiddi prawn, carangids, Chinese herring, big eye ilisha, lobster, pomfret, eel, cobia, mackerel, ray and silver bar.	The fast two months in the beginning of the 1st season and last two months towards the end of the 2nd season.
Dry fish	Paste shrimp, Bombay duck, small ribbon fish, juvenile shrimp and prawn, and golden anchovy.	Mostly available throughout the year except the winter

Some small boats travel one to two hours in the morning and come back to the harbour in the afternoon once the fishing is over (Field Notes 2014/09/10). The frequency for trips is greater during the peak fishing season when fishers get good catches and often come back to the harbour to unload; while fishers have less frequency in movements during off seasons and fishers tend to have longer trips exploring fish (SR06 SR07).

Figure 4.6: Medium-size fibre boat (20 HP engine) & big wooden boat (25 HP engine)

The bag net fishery has distinctive harvesting procedures. For example, the harvesting of fish largely depends on the water current and not entirely on time. Captains contact fellow fishers to query about specific fishing locations for a good catch because a

boat may have multiple fishing locations (SR09). Bag net fishing is a fixed net fishery, unlike mobile trawl or seine nets, where multiple metal pipes are fixed to the sea bottom. The funnel shape net allows fish to enter with the water currents but there is no escape as the tail of the net has thinner mesh size and closed (SR10). The construction of bag nets contribute to fishing of both small and large fish (SR05 SR17). The captain is the sole decision making authority, with crew members being under the captain's command (SR09 SR18). Mutual coordination among the crew members is very important in bag net fishing. The captain of a boat operates the GPS to locate their own fishing spot. Once a boat arrives at the exact location, crew members put anchors in the water and the captain powers off engine to save some diesel which is not possible with mobile gears (SR11 SR18 SR29 SR33 SR37). Crew use a gaffe to drag the floating Styrofoam which marks their territory. The Styrofoam that floats on the water surface is connected with the fixed metal pipes and once crew get the Styrofoam, they get a hold on to the attached ropes and tie with two ends of a fishing net. Each pipe is attached with two ropes and hence there are four ropes attached to two pipes through the floating Styrofoam. Once the net is tied with the ropes, connected with the stationary pipes, crew members release the net inside the water. The entire process takes about 30 minutes, however, large vessels may take an hour or more as they carry up to five fishing nets. Bag nets occupy less space in a boat in comparison to trawl net or seine net (SR16 SR23 SR24 SR35 SR36). There are multiple pipes in each fishing locations where fishers use several nets on either sides of their boats. Once a bag net is released inside the water, fishers get two to three hours rest during which they may get some sleep or they may use hook and line to harvest large fish especially cat fish and jew fish (SR11 SR24 SR25 SR29). Crew members get ready to

haul the net in after it has been in the water for two to three hours. They have to pull the net from the water before the water current changes its direction, which happens at an interval of every five to six hours. It is the responsibility of the captain to instruct the crew to act accordingly otherwise there may be a damage to the nets resulting in financial repercussions for the captain (SR09 SR18; Field Notes 2014/11/02). The captain must start the engine to use the net puller to haul the fishing net from the water. Crew members coordinate well to pull the heavy and water soaked net which is strenuous and requires muscle power. The entire process takes about an hour to hour and half (depending on the number of nets) to pull all the nets. Once the net is pulled completely out of water, all the crew sit together and start sorting out fish with the help of hand rakes. There must be insulated boxes with ice (for mostly longer trips) where the crew members keep all the large fish such as pomfret, prawns (tiger), cat fish and other fresh harvest. The juvenile fish and shrimps which are considered as waste fish are kept within the hold of a boat. Fishers recovers their investment cost from waste fish in case they lack large fish. During the entire process, the wireless radio must run continuously. In response to my query on the wireless radio, the captain informed me that wireless radio would be the key instrument to communicate with other boats in emergency (Field Notes 2014/11/02).

Bag netters in coastal Gir Somnath face many challenges while fishing at sea and deal those challenges wisely. For example, during my four month stay in this harbour village, there was a cyclone warning in the Arabian Sea in October, 2014. Fifty seven boats were still fishing at sea during that period (Field Notes 2014/10/31). Table 8 elaborates the kind of challenges fishers face while harvesting in the sea and how they tackle those challenges. From the responses of the local fishers, the challenges can be

categorised into three different kinds: technical, weather related or health related. In case of technical issues such as engine problems, fishers contact fellow group members or relatives through the wireless radio. Group members come for help and, depending on the arrangement, the group members often get the diesel cost paid (SR05 SR13 SR14 SR21 SR31). Fishers make arrangements with fellow fishers, who harvest close to each other, so that in case of emergency they can help each other (SR04 SR07 SR20 SR37). Sometimes a boat approaches another boat and signals for help by lowering or swinging its flag (SR08 SR21 SR35). The captain of a boat is the most responsible person and has to be alert and act wisely to avoid any accident. Sometimes big steamers or cargo ships use the same route to cross and a captain has to watch out for these giant ships to avoid any crash (SR09). Bad weather can be another big risk for marine fishers. Surprisingly, only 33% respondents (*n=33*) answered positively about returning to the harbour in case of bad weather. The remaining fishers said they would stay at sea until the weather gets better. A fisher stated:

Table 8: Major challenges faced and measures taken by fishers

Category	Challenges	Measures taken
Technical issues	• Engine stops working, • Net or a rope gets entangled in the propeller blade under water	• Contact others through wireless for help • A crew member can jump in the water and can remove or cut the rope or net from the propeller blade
Weather related challenges	Tropical storms or torrential rainfall	Return to the harbour/ stay still until the weather calms down
Health issues	Accidents Sea sickness	An injured/sick crew member get sent in another harbour bound boat

In case of bad weather we just cannot come back to the harbour as our Tandel (boat owner) will never allow us to do so without any catch unless the weather gets really extreme. We just collect our fishing gear and rest on the boat until the weather gets calm. Sometimes, I get scared to see the huge waves dashing our boat. We do not have life-saving jackets nor do I have any insurance. I have surrendered my life to the almighty (SR29).

Fishers generally do not come back to the harbour in case any minor health or any family issues on shore. That's why relatives, friends or neighbours are important who help in emergencies.

Bag netters in coastal Gir Somnath are worried about declining fish catches. Bhathal's research (2014) shows that the marine fishery in Gujarat has been continuously declining since 2000. Figure 4.7 details the various environmental and socio-economic reasons of declining fish catches mentioned by the local fishers in Saiyad Rajpara.

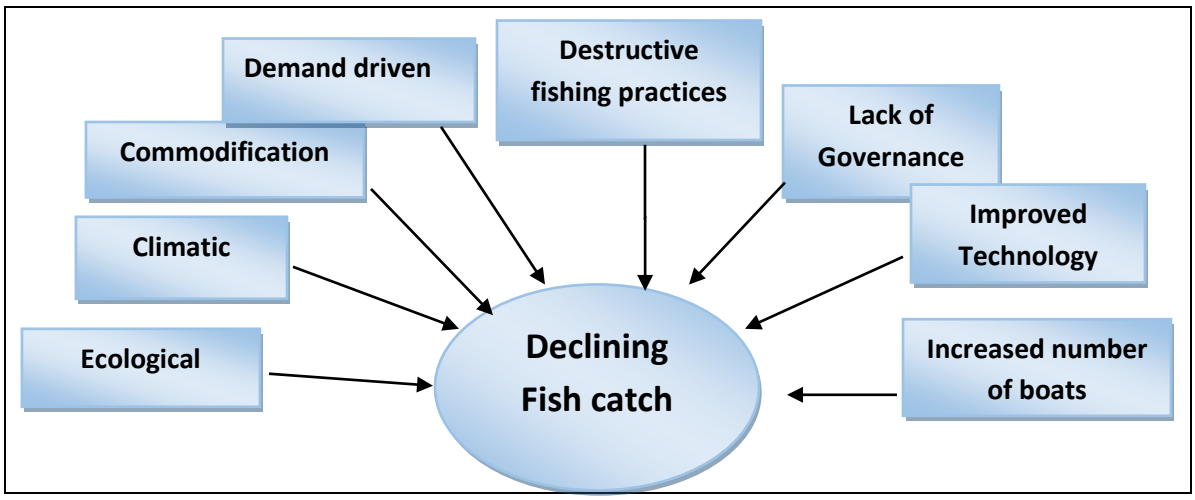

Figure 4.7: Reasons for declining fish catches in Saiyad Rajpara.

Declining fish catches has two main environmental reasons. The ecological side of the decline in catches is due to size selective fishing (mostly by trawl and seine netters), which has resulted in less fish left for breeding (SR25). Climate variability has also adversely affected the fish reproduction and renewal of the marine resource. First, a

comparatively shorter monsoon has severely impacted on fish breeding and behaviour of fish as well as the growth of fish (SR16 SR33). Fishers, on the other hand, immediately start harvesting after the short monsoon, not allowing fish to breed properly and grow into a large size (SR11 SR55). Secondly, the frequency of tides has diminished over the years, which has affected the availability of fish (SR18 SR22).

Besides the two environmental reasons, there are also socio-economic reasons which have affected the fish catch in the dry-fish zone of coastal Gir Somnath. The increased commodification has been a major factor. Earlier fishers would get lower prices for their harvest and therefore, there was no aggressive fishing in this village (SR62). Fishers would harvest just enough to earn their livelihood and they were satisfied in that (SR56). The arrival of the transport companies has created a market demand for large size fish in this village and fishers have become more involved in fresh-fish harvesting (SR66). Mainly, fresh-fish harvesting, encouraged by the companies and harvesting of waste fish have replaced the traditional fishing of Bombay duck (SR33) though there are several other reasons such as decline in fish catches and inaccessibly of the local fishers to adjacent shallow areas of the Arabian Sea due to territorial restrictions by the *samaj* organisation in Jafrabad. Fishers have continuously been modifying their gears to maintain or increase their catch. The narrowing of mesh size in fishing nets to catch waste fish and fishing during the monsoon are the two main unsustainable fishing practices widely happening at present (SR26 SR56 SR66). The lack of effective governance to control these practices is a major reason for the decline in fish catch (SR55 SR57). Improved technology such as motorised boats and high frequency wireless radios have made it easier for fishers to travel further out at sea. The wireless radios have also

enabled the local fishers to communicate with others and exploring fishing locations for good catch that has led to further decline in fish catches (SR12 SR66). The drastic increase in number of boats at the local harbour (SR10 SR12 SR20 SR22 SR28 SR29 SR33 SR38), increase in the arrival of outside purse seine netters (SR17 SR27 SR32), and increased trawling (SR35 SR57) have resulted in overfishing.

4.4.3 The Post-harvest Phase

The post-harvest phase is the stage where fishers sell and trade their catch. Social networking and relationships have a positive influence on market dynamics as found by Sekhar (2006) where fishers negotiate and network with fish traders to sell their catch. The process of sale and trade depends primarily on the fish variety and fish size. The entire sale and trade can be classified into two broad categories; the fresh-fish trade and the dry-fish trade. This section does not include consumption. Fishers generally get up to two kilograms of fish from respective boat owners for consumption once they are back from fishing.

Fresh fish Trade

The sale and trade of fresh fish entails multiple factors and phases. Besides the fish variety and fish size, the sale and trade of fish catch also depends on the quantity of fish as well. The harbour area gets busy as soon as boats are back. The catch from small boats gets dumped onto the harbour ground itself and women start sorting immediately. Once sorted out, the retail sales women buy all the fresh fish for the local market or neighbouring markets. Ninety-two percent ($n = 38$) of fishers mentioned that the catch from the large boats mostly goes to the transport companies who are also the major fresh-fish traders. As per the statement of a respondent:

> *Once we are back in the harbour, we unload all our harvest. We supply all our fresh fish to one of the companies from whom we have taken advance. My boat has a contract with Somnath as I have taken credit worth C$4000 from the company. I am not allowed to sell my harvest to others (SR12).*

Sometimes, the boat owners sell some of their harvest to the middlemen or retail saleswomen under the table to get some ready cash as the companies do not provide ready cash (SR17 SR26 SR31 SR37). In addition, not all companies collect shrimp or prawns and therefore boat owners sell those species to middlemen. The interaction between fishers and middlemen is very limited as mostly the fresh harvest goes to the transport companies who are the main exporters for the processing units. In Saiyad Rajpara, middlemen sell their catch either to the customers or to the transport companies. Small boat owners and occasionally other boat owners negotiate with retail sellers for their harvest to fulfill the local market demand. Figure 4.8 details the supply chain for fresh-fish trade and the different people associated with it. It is a breach of trust to sell fish to middlemen or retail saleswomen if a boat is on contract; if that particular company finds out, it may not give credit for the next year (SR31). Once a boat owner receives credit, he is in contract and has to supply all his catch to the company until he clears off the debt. The contract rolls over to the next year in case the boat owner fails to clear off all his credit (SR45). In details, fishers, who get advance credit from the traders, have to sell their catch for a lower landed price (Johnson, 2010). Transport companies hire women labourers for eight months to sort and clean fish before exporting outside. Once a company has good stock of fish, those get transported to Veraval processing units (SR45 SR46). After the catch is with the processing units in Veraval, there is a standard procedure that has to be followed. For example, the employees weigh the product prior to

putting it in ice; after the fish are iced, employees grade the product and weigh it again before freezing and packing it. Finally, the product gets ready for shipping within India or to some other countries through Pipavav port. Most of the exports go to China, Sri Lanka and Bangladesh as the regulation for EU countries are very strict (Field Notes 2014/12/26). Most of the fresh fish is exported out of Saiyad Rajpara, so local retail

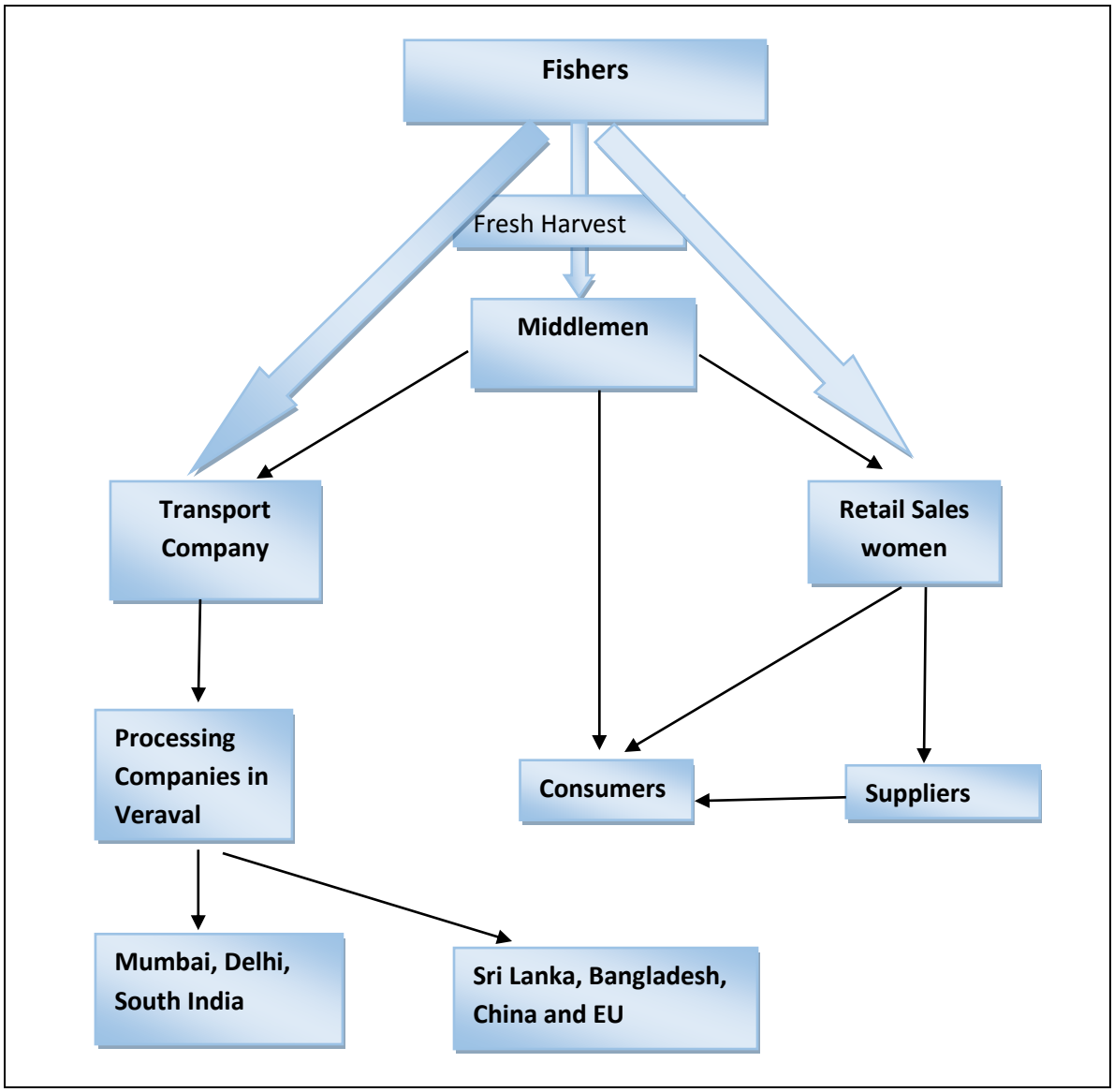

Figure 4.8: The supply chain for fresh fish trade

sales-women have to buy fish from other nearby harbours such as Diu to meet the local demand (SR47 SR49). Sometimes, the saleswomen go to nearby places to sell their harvest for a better price if they have enough catch (SR47 SR49).

Dry-fish trade

The dry-fish trade in Saiyad Rajpara has been the major contributor to the local economy in recent years. Declining large fish catches and comparatively a short fresh-fish season have compelled many fishers to harvest juvenile shrimp (mostly paste shrimp), prawn and fish otherwise known as '*Koota*' (waste fish). Waste fish is actually not trash and have monetary value. It is mainly used for fish meal or for poultry feed.

The dry-fish trade can further be subdivided into two categories; one for human consumption and another for fish meal (Figure 4.9). The dry-fish season starts later than the fresh-fish season that starts immediately after the monsoon (SR39). The dry-fish traders also provide credit to fishers for an eight-month contract (SR39 SR40 SR41). The dry-fish process for consumption is slightly different than waste fish.

The dry-fish trade has to pass through several phases before arriving at the final destination. Primary dry-fish traders collect all waste fish from the fishers with whom they may or may not have a contract. Boat owners coordinate all the processing work themselves for dry-fish meant for consumption instead of giving out to primary traders. After the collection from the harbour, primary dry-fish traders dump all the waste fish on the drying ground without any delay and the family members and or wage earners start spreading it on the ground with the help of rakes. There is no particular processing time for dry fish that includes both for consumption and waste fish. Women start processing as soon as a boat arrives at the harbour irrespective of day or night (Field Notes 2014/09/28

2014/11/16). While waste fish get spread on the ground for sun drying (Figure 6.2), fish such as Bombay duck and Ribbon fish for consumption are hung on the ropes for sun drying after cleaning (Table 10). The fish take two to three days to dry depending on sun and humidity. To avoid infestations of worms, traders mix pesticides into waste fish. Women working on dry ground flip the waste fish three to four times a day. While working on dry grounds, women sort prawns from the waste fish and keep them separate

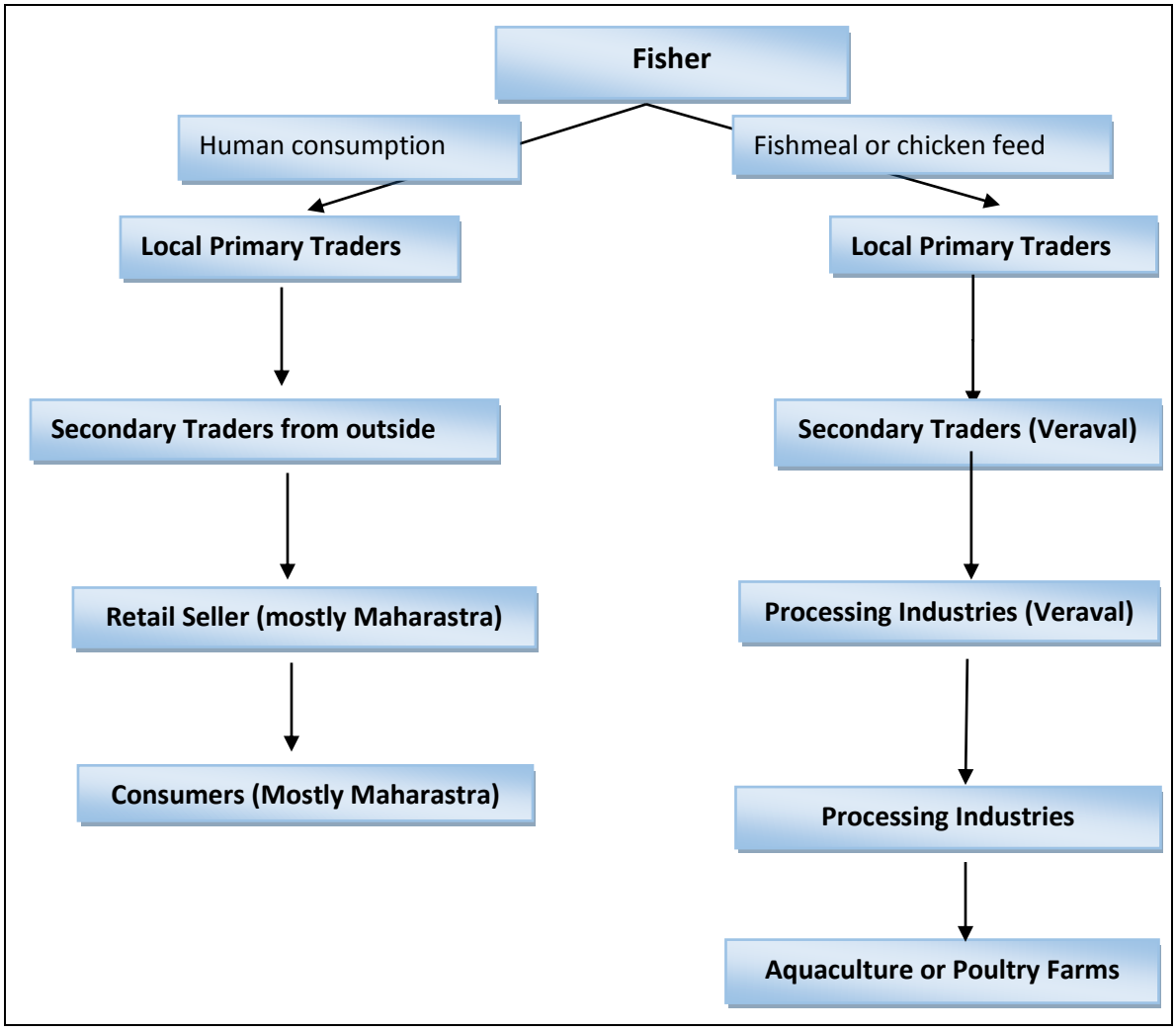

Figure 4.9: The Dry-fish trade

for human consumption (Field Notes 2014/11/16). Women pile all dried waste fish in one place. Primary traders then contact the secondary traders from outside Saiyad Rajpara to

collect the dried waste fish once they negotiate the price (SR40). Dalit wage earners pack dried waste fish in sacks (SR39 SR41) and then load it into trucks. Similarly, once Bombay duck and Ribbon fish are dried, they are put into sacks and handed over to the local primary traders. Primary traders hire dalit women labourers to sort the dried Bombay duck and ribbon fish into different sizes (Field Notes 2014/11/05). Fishers get one price for their dried Bombay duck or ribbon fish irrespective of size. On the other hand, primary traders make some extra money for the large size Bombay duck from the secondary traders who are from outside the village (SR40). The processed and dried Bombay duck and ribbon fish mostly get exported to the neighbouring state of Maharastra (SR40) while dried prawns are either consumed or sold locally; whereas dried waste fish mostly go to Veraval to the fish processing units and then to some other parts of the country (SR41).

Regardless of the contribution the dry-fish trade make, only 8% (*n = 37*) of total fishers are interested in dry-fish trade (though many fishers actually involved in dry-fish trade but not all of them actually like it). Five percent (*n=37*) of fishers have neutral view for either fishery. A fisher stated that:

> *I think both dry-fish and fresh-fish trades are good. I personally prefer dry-fish trade over the other because harvesting of dry-fish is less time consuming and we can come back to the harbour frequently. Fresh fish harvesting takes long time to travel, searching for fish, harvesting and sorting. Secondly, the fishing season for fresh fish is really short as compared to dry fish which is mostly available throughout the year. Harvesting of waste fish needs less investment such as less diesel and no ice. That's why I prefer dry-fish trade over fresh fish (SR30).*

Unlike Bangladesh where the dry-fish season varies from place to place, multiple fish species are used for drying depending on the market demand and value of the species, which entails a variety of processing activities (Kleih *et al*., 2003). Coastal Gir Somnath

has a homogeneous dry-fish season where the consumable dry-fish is mainly restricted to Bombay duck and ribbon fish and small quantity of prawns.

Bag net fishing has made a fundamental contribution to the material wellbeing of the local Kolis in coastal Gir Somnath. The fishery provides access to the marine resources and is the major source of income for the local community who spend their income mostly on groceries and other household assets such as furniture, paying for children's education, and buying jewellery, and mending nets and fixing engines if required (SR19 SR25 SR37). Seventy-four percent (*n=38*) of fishers interviewed do not have any additional source of income other than fishing. Fishing is instrumental in shaping the social life of the local people that provides them food, employment, assets, shelter, all part of their material wellbeing. Fishers get satisfaction from this traditional fishing which contributes to their subjective wellbeing. The bag net fishery contributes not only to the fishers and people who are part of the fish supply chain, but also to many other people, who earn their livelihoods because of the local fishery. For example, in summer, soft-drink sellers make a profit from selling their products at the harbour. In addition, coconut sellers, tea stalls and grocery stores are a few other beneficiaries. Some local entrepreneurs also deal with ice and motor parts which generates a good income for them (Field Notes 2014/09/16).

Despite its economic contribution, bag net fishing in coastal Gir Somnath is highly risky and full of uncertainties. The family members and fishers themselves feel insecure about their life while fishing at sea (Field Notes 2014/11/26 2014/12/04). Forty-three percent (*n=37*) of all fishers stated that they managed to meet the breakeven point even if they are not making a profit. Fishing is a risky occupation and full of uncertainty

and therefore not everyone makes money out of it. Bad weather could be a big threat for both fresh-fish (SR47) and dry-fish traders (SR39 SR41). For example, hot and humid weather frequently spoils the fresh catch and fishers do not get the full price because of the degraded fish quality (SR42 SR44). In some cases, fishers fail to repay all of their loans and traders lose money (SR42 SR44 SR45 SR46). The entire fish trade in this region takes place on the basis of trust without any legal document signed and hence the risk is always there (SR41). Two local boat owners recently went bankrupt and are currently working as wage earners (SR42 SR46). Regardless of many challenges, the bag net fishery has been by far the major contributor to the local economy.

Gender Dimension

Fishing is a working class occupational culture, which is gendered (Reed *et al.*, 2013). Fishing in coastal Gir Somnath is definitely a man's domain with the majority of women in a subsidiary position. Women are never considered as a burden because of their multiple roles and contributions to the fishery (Luomala, 1980); for example carrying firewood, ice and other materials to the harbour during the pre-harvest phase, carrying fish catch to the transport companies, loading waste fish in transport rickshaws, sorting, cleaning fish at the harbour, and drying and packing dry-fish in the post-harvest phase. Women are also hired by boat owners and fish traders for a fishing season which provides them decent income. Unlike many other areas where men harvest and women sell (Weeratunge *et al*., 2013; Acheson, 1981), fishermen, while not fishing at sea, are involved in mending nets or some other sorts of work such as repairing engines or cleaning boats. The type of task performed by men and women shows the gender division of labour at the harbour. The technical work related to boat and gear is largely

masculinised and is performed by men whereas processing, drying and selling are mainly carried out by women. Bennett (2005) suggests that there is a symbiotic relationship between men and women in the fishing sector and neither could manage without the other. Women's earnings contribute significantly to the material wellbeing of households, which is particularly true where men spend a substantial amount of their income on alcohol and gambling (SR29). Unlike many areas where women's work is not properly recognised and is completely undervalued (Hapke, 2012; Immanuel *et al*., 2008), fishers in coastal Gir Somnath acknowledge women's contributions.

Despite demanding and hard work, the bag net fishery contributes to women's wellbeing. The demand for limited species for dry fish do not require a variety of processing activities unlike Bangladesh where the scale of operation is more diverse and labour intensive. Mostly Dalit women are involved in the final processing work of dry fish before it gets exported, however, they earn a regular wage unlike exploited women workers in Bangladesh (Kleih *et al*., 2003). Besides monetary value (unless they are the family members), women labourers sometimes get free fish for consumption from their employers, which contributes to their material wellbeing. The financial freedom and nutritious food also contribute to their subjective wellbeing by giving them satisfaction. Women's work relationships with boat owners or fish traders reflect the relational dimension of wellbeing in a broader context. Women, however, have to pay a price to achieve their wellbeing. For example, working in the sun without shade in hot and humid weather with no sanitation and drinking water facilities is exhausting (Immanuel *et al.,* 2008). The working condition for women varies from place to place. In some cases, the dry-fish grounds and the places where women sort, tie and pack are without basic

facilities such as hygiene and drinking water like other areas mentioned by some researchers (Kleih *et al.*, 2003). Women, hired by the transport companies, have better work conditions with sanitary and drinking water facilities and women work in the shades which is an improvement over the conditions of women who work outside.

4.5 Summary

The introduction of bag net fishery in coastal Gir Somnath has transformed the livelihoods of the local Kolis from basic subsistence-based to an ability to earn a comparatively good income. The fishery has certainly contributed to food security and to the material wellbeing of local Kolis. Access to advanced resources and new markets have created employment opportunities for both men and women.

The access to new markets, which is largely profit-driven, has mainly influenced the traditional fishing of Bombay duck to meet the market demand. With fresh fish largely replacing Bombay duck, fishers have adopted unsustainable fishing practices, such as the further shrinking of mesh size and fishing of juvenile and brooder fish, to meet the market demand, which is largely controlled by the fish traders. The local fishers have become dependent on the credit system and are involved in intensive fishing. On the one hand, the profit-driven fishing practices have created employment opportunities for many people and further have contributed to their material wellbeing, on the other hand, this commodification of fishery has resulted in overfishing and declining fish catches. Climate variability is also another reason, which has affected the fish behaviour and harvesting practices resulted in declining fish catches; together all the reasons have increasingly threatened the livelihoods of many people in Saiyad Rajpara.

Chapter V: Local Governance

"In order to pursue fishing in this village, we need to have a good relationship with an influential person to help us in emergency. Secondly, we have to maintain a good relationship with the fish traders to get some advance credit. We also maintain a cordial relationship with crew members to have a good harvest (SR26)."

5.1 Introduction

The second objective of my research aimed to explore the local governance in the dry-fish zone of coastal Gir Somnath that involved various governing processes such as formal regulations, informal management practices and cultural norms. A social wellbeing approach, focussing primarily on the relational dimension, was used to research how fishers' relationships with multiple parties contribute to the management of the local fishery. The local fishery is governed with a mixed-regime system, where multiple parties contribute to the functioning of the bag net fishery in Saiyad Rajpara. I argue that without any representative of the local fishers within the mixed-regime governance system, fishers have adapted and developed local mechanisms to address everyday issues, however, these are inadequate to deal with bigger governance problems.

5.2 Past Management practices

Management practices in Saiyad Rajpara have changed since the introduction of bag net fishing approximately seventy years ago. The local harbour was managed by a local representative known as *patel* (President) (stated by 50% (*n = 37*) of the fishers interviewed) until 2011-2012. There was an institution called '*samaj*' (caste society for the Koli community) (SR11 SR56), which also contributed to the management of the local fisheries. There was no formal government structure such as the Fisheries

Department to navigate the state legislative law; however, there was still some presence of government structures at the state level with inadequate implementing capacity at the local level. The entire village including the harbour would be managed by the informal institution i.e. the *samaj* and the *patel* (SR66).

Generally, the harbour was governed by a set of local customary norms. The fishery was regulated by those local norms (SR15 SR65), which were not a written document but were based on morally binding principles (Jentoft, 2004) such as a fishing ban during the new moon or any cultural celebrations. Fishing and the movements of boats would need prior permission from the *patel* at the harbour (SR33 SR65). In case of breach of any customary norm, there was a possibility of being socially outcast and hence fishers would not take the risk (SR65). Fishing was prohibited on new moon days (SR15 SR66). If anyone breached the rule of no fishing on a new moon day, he was forced to discard all of his catch as part of his punishment. Local fishers strictly followed the customary management practices (SR15). Previously, fishers would spend limited time at sea and would get enough rest between two fishing trips (SR26).

The role and responsibilities of the *patel* at the harbour were important to implement the customary norms and practices. Everyone would listen to and respect the *patel* (SR17 SR65 SR66). The *patel* was responsible for resolving disputes among fishers (SR12 SR14 SR18 SR20 SR22 SR24 SR30 SR36 SR66). For example, if a boat caused damage to another, if a crew member felt exploited by a boat owner, or if a crew member refused to work after committing to a particular boat, the *patel* intervened to resolve these conflicts (SR06 SR10 SR27 SR29 SR33 SR35 SR36). In addition, the *patel* was the first person to be contacted by fishers in case of accident or emergency at sea and was

responsible for organising assistance to the stricken boat (SR18 SR22 SR27 SR30 SR35). If there was a death of a crewmember while fishing, the *patel* would make financial arrangements for the deceased's family through the *samaj* (SR07 SR12 SR14 SR18 SR27 SR28 SR31). The *patel* would contact other *patels* from nearby harbours in case gear was lost (SR21). He was also instrumental in negotiating the market price of the fish catch for the local fishers (SR10 SR18 SR20). If the *patel* asked for a group meeting, all the boats were required to return to the harbour prior to the gathering (SR16 SR18 SR24 SR25 SR30). The *patel*'s role was not limited to just conflict resolution or providing assistance to the fishers; the *patel* was also responsible for infrastructure and overall development at the harbour (SR11). As stated by a respondent:

> *When there was a patel at the harbour, the situation was good; we did not have to struggle again and again for something. We would just request once in case we had any problem, and he would try to resolve our issues. I think it would be nice to have a patel for a better management at the harbour (SR37).*

5.3 Governance System

Governance is "the outcome of a social process" (Jentoft & Chuenpagdee, 2009, p. 554). Therefore, a deep understanding of local place and its social context is important to comprehend the complexity. To address the second research objective, I explored the kind of governance system that functions in Saiyad Rajpara, for example informal, formal or multi-level governance.

5.3.1 Informal governance

The homogenous social context in Saiyad Rajpara has a major influence on the informal institutional governance, which is distinct from the other neighbouring harbours. Saiyad Rajpara is predominately a homogenous Koli fishing society with a small

presence of other people from non-traditional fishing communities. Despite a homogenous social context, the harbour lacks an informal institutional governance system to execute the customary rules (SR03 SR06 SR18). Unlike other harbours in the dry-fish zone of coastal Gir Somnath, where the fishery is managed by single non-state caste based institutions (*samaj)* and *patels* (President) in leadership positions to govern and manage the harbours; the actions of fishers of the particular caste is regulated by their own *samaj* (Johnson & Sathyapalan, 2006), Saiyad Rajpara does not have a *samaj* to manage the local fishery. For the low caste fishers such as Kolis, together local *samajs*, *patels* and Boat Owners' Associations play a crucial role in decision making, conflict resolution and smooth functioning of the harbour (Johnson & Sathyapalan, 2006), which explains the presence of multiple parties with better coordination among them. Despite the presence of a Boat Owners' Association in Saiyad Rajpara, the harbour struggles with management work due to lack of the members' desire to together contribute to the development of the harbour unlike in many other areas where fishers are actively involved (Jentoft, 2004). Unlike other harbours with heterogeneous fishing communities in the dry-fish zone of coastal Gir Somnath, where fishers learn from each other; Koli fishers in Saiyad Rajpara said that they have jealousy of each other, occupational rivalry, and they lack unity. The last *patel* at the harbour resigned from his position two to three years ago. The relatively wealthy fishers within the Koli fishing community often considered themselves exceptional as compared to others and were not interested in following orders of the *patel*. There was an issue of social status and ego among the fishers. The *patel* resigned from his position and the *samaj* lost its existence because many young and wealthy fishers did not necessarily respect the *patel* and refused to

comply with the local management system (SR13 SR17 SR26 SR56). The homogeneous social context has limited contribution to the informal institutional governance.

5.3.2 Formal governance

Marine fishing, which is part of a complex socio-ecological system, often entails governance at different hierarchical level such as national, provincial and local levels. Multilevel-governance is expected to contribute to better management of fisheries through linking scientific knowledge with traditional management practices and through sharing of knowledge and outcomes (Armitage, 2008).Table 9 details the governance structure that functions at various level in coastal Gir Somnath and the level of contribution. International maritime law is not relevant for the local fishers in this region. As local fishers in Saiyad Rajpara do not go that far out at sea (beyond 200 nautical

Table 9: Degrees of governance at different levels

Level of Governance	Relevance
International	Not applicable
National	Applicable (not effectively)
State level	Applicable (Principal regulatory agency)
Regional level	Strongly applicable (Regional administrative agency)
Sub-regional level	Strongly applicable (local signatory authority)
Local level	Strongly applicable (informal governance)

miles). Some fishers go into the contiguous zone of India (up to 24 nautical miles), which is the jurisdiction of the central Government (at national level) of India. According to the 1981 Maritime Zones of India Act, the Central Government has the sovereign right to exercise its power for the security purposes in India's territorial water which extends up

to 200 nautical miles from the coast. The State of Gujarat reinforces the 2003 Gujarat Fisheries Act in the territorial water of the state, which extends up to 12 nautical miles and is important for the local fishers in this region. The main legislative agency for coastal Gir Somnath is the regional office of the Fisheries Department, which collaborates with the Coastguard and the Marine Police for the enforcement of the Fisheries Act. In case of any violation of the 2003 State Fisheries Act, the marine police are responsible for maintaining the law and order in this region. The Fisheries Department's office at sub-regional level has limited signatory power over several branch offices where basically they allocate the duties among different staff at the branch offices, coordinate with the branch offices for collecting information and signs document for the offices. The limited information on multi-level governance was based on the responses of the low ranked employees at the branch office and from some other reliable sources. Saiyad Rajpara fishers have limited knowledge on the State Fisheries Act and the different levels of governance jurisdictions, which illustrates the weak relationship between the local fishers and the Fisheries Department.

The Fisheries Department's branch office has inadequate power to exercise the Gujarat Fisheries Act and with insufficient resources, it is limited to a basic administrative role. An effective institution must have a specialised body or authority to enforce the institutional rules (Bavinck, 2001, p. 34), which the local harbour lacks (SR16 SR21). The branch office does not have a regular position of a Fishery Officer (Government appointed) to effectively enforce the Fisheries Act. Licensing and recording of boat movements are the two most common activities that the Fisheries Department does on a regular basis and the low ranked employees such as guards perform the task

(SR60). Fishers get ID cards mainly through the branch office in Saiyad Rajpara (SR01 SR09 SR13). Of fishers interviewed, 32% (*n=37*) said that it was important to submit all the necessary documents to the Fisheries Department but in my observation most fishers submit document to avail government subsidies. Each boat owner must enter the detailed information about his fishing trip such as registration number, number of crew employed and supplies his boat carries for a trip and duration of the voyage in the department's register for official requirement (SR11). Boat owners get subsidies on diesel whereas small boat owners receive subsidies on kerosene (SR07 SR08). Depending on the capacity of an engine, a large boat can get subsidised diesel of up to 24000 litres per year and up to 1400 litres of diesel per trip. However, during the fishing ban period (from 10th of June until the 15th of August) or any emergency ban such as cyclone warning, the department does not issue subsidy coupons. Sometimes, the department provides life jackets and other fishing equipment depending on the available schemes (SR58) and conducts awareness programmes for the local fishers (SR60). In case of the death of a fisherman while harvesting at sea during the regular period, the family members can receive compensation of C$2000 for their loss (SR10 SR58). Thus, the role of the Fisheries Department is limited to some basic administrative work with limited contribution to the management of the local resources.

5.3.3 Mixed-regime governance

The local harbour is mixed-regime in character (Galappaththi and Berkes, 2014; Berkes and Fast, 2005). The harbour consists of partial control by the Fisheries Department, partial control by the local market, some customary norms, and informal management practices without any *patel.* In sum, Saiyad Rajpara has de facto open

access without effective regulatory mechanisms. The Fisheries Department limits outsiders through licensing the local fishers and through the registration of their fishing boats in addition to its effort to control the number of boats by limiting the boat size less than 32 feet (since 2004 no license has been issued to 32 feet or over size boats). With limited welfare schemes and no financial cooperatives at the harbour, the fish traders supply financial credits to the boat owners, which also help them in sustaining the fishery in their slack periods. However, the boat owners are expected to sell all of their harvest to the respective fish traders in exchange for credit (Johnson, 2010), which explains the fish traders' control over the fish catch.

Besides the limited contribution of the Fisheries Department and partial contribution of the fish traders, the local harbour has some general management practices, which the local fishers at the harbour follows. Without any *patel* or *samaj*, anyone with sound financial background can fish in the territorial water (SR04 SR10 SR29 SR38) provided fishers should have some connections through either family, friends (SR22 SR30), or with any influential person from the village (SR19 SR27). The situation is different for Navabandar and Jafrabad, where the *patels* prevent outsiders from using the harbours or their territorial waters (SR29 SR57). In order to access the local marine resources, fishers mainly find an unoccupied space at sea to set their location in their GPS, fix their pipes, and leave the Styrofoam floats as a symbol of their "possession" (SR01 SR02 SR03 SR07). Once a space is occupied at sea, others cannot operate boats at the same space without prior permission from the concerned person from Saiyad Rajpara (SR01). This is a general understanding and standard norm among the local fishers in Saiyad Rajpara where fishers respect each other's space at the harbour and at sea. Fishers

allocate spaces among themselves within the 50 km radius from the harbour (SR07). Basically the lands at the harbour belong to the inhabitants of this village and therefore, fishers pay rent to the concerned landowners to moor their boats at the harbour during off seasons. On the other hand, anyone can use an empty space to moor his boat in the water at the harbour with or without prior permission from the place owner which is a common understanding among the local fishers (SR17 SR18 SR26 SR33). Sometimes if fishers decide to stop fishing for different reasons, such as due to old age or health issues, they may consult with elders or other family members prior passing their boats, gears and other fishing equipment to a younger family member (SR31 SR37).

In addition to the regulatory management practices, the local customs and traditions play a crucial role in the management of fisheries at the harbour. Even without a *patel* or *samaj* to manage or regulate, all the boats come back to the harbour during major cultural celebrations. Fishers stop fishing during the one-month winter break to celebrate the marriage season, which is a customary norm. Largely populated with Koli fishers, a man from the local community in Saiyad Rajpara is allowed to get married only during the marriage season (in winter) (Field Notes 2014/12/05). According to a respondent:

> *Since generations, we Koli fishers have been celebrating the season of marriage. We consider this particular season very auspicious after the marriage of our God and Goddess. This month is particularly useful for us as farmers reap their harvest and fishers have already spent a few months in fishing and need a break. Besides, in winter the fish catch goes down. In addition, when there was no motorised boats and fishers would sail their boats at sea, during this particular time of the year, the weather in the sea would get stormy and fishers would struggle a lot. Therefore, for all these reasons, it was decided to stop fishing for a month so that fishers could finish their social responsibilities prior to their next voyage (SR66).*

Similarly, during monsoon, fishing is largely stopped. Though, the official ban period starts from the 10th of June until the 15th of August, most fishers in Saiyad Rajpara stop fishing from the 15th of May due to the stormy weather at sea. Besides the one month marriage season and monsoon break, the local fishers celebrate all the possible major festivals during which all the boats must return to the harbour (Field Notes 2014/10/13).

5.4 Current issues in governance

On the one hand, where the mixed-regime governance has some contribution to the daily functioning of the harbour, on the other hand, it has limited capacity to address the governance related challenges that fishers face from outsiders while fishing at sea, exploitation and the broader overfishing problem. Interaction and collaboration are the key ingredients, which contribute towards a better management of natural resources (Jentoft and Chuenpagdee, 2009; Kooiman and Bavinck, 2005); with inadequate resources in the Fisheries Department and no contribution from the fish traders, 51% (*n = 37*) claimed that they felt helpless with the current management system without any local representative to complain to. Despite the presence of multiple parties in the system, there is a lack of integration and coordination among the parties to address different issues faced by the local fishers. The limited interaction between the dormant boat owners' association and the Fisheries Department does not address the issues in the management of local resources. Therefore, the de facto mixed-regime governance at the harbour is by default not by design. The various parties involved have limited interaction and coordination. Exacerbating this situation is the lack of a leader from the fishing community to address various issues faced by the local fishers.

Fishers in Saiyad Rajpara face many governance challenges. One of the major issues that the local fishers face is from the credit system. On the one hand, the credit system has helped many fishers in sustaining the local fishery, on the other hand, the rent maximisation factor has soured the relationship between these two parties (Johnson, 2010). Fishers sell all of their catch to the companies at a lower landed price in exchange for advance credit. Fishers feel resentful as they cannot raise their voice against the exploitation due to the fear of losing advance credit for the next year (SR18). Feeling trapped with a financial burden, fishers aggressively exploit the natural resources, which has influenced their relationship with the environment and has resulted in decline in fish catches (Johnson and Sathypalan, 2006). The rent maximisation relationship has reduced the profit margin of fishers, affecting their material wellbeing and their job satisfaction (subjective wellbeing).

Another major issue that fishers in Saiyad Rajpara face is from the intrusion of outsiders. Figure 5.1 details the four major governance issues that the local fishers face from the outsiders. All the four governance issues, mentioned in the figure 5.1, are interrelated through the intrusion of outsiders. According to a respondent;

> *Many outside fishers trespass in our territory. For our fishers the area stretches from Navabandar up to Jafrabad and similarly Navabandar and Jafrabad have their own territory. We have coordination with the fishers from these two harbours as we all use bag net. We do not go beyond our territory. However, fishers from other neighbouring areas, mainly the trawl netters, often trespass into our area. They fish up to five months and take our catches. Sometimes if our fishing gears and equipment come on their way, they may damage those (SR06).*

Inter-territorial space conflict is a major issue for the local fishers. According to 18% (*n = 37*) of fishers interviewed, outside fishers from other states such as Maharastra especially Mumbai, Goa and all the way from South India, come up to Gujarat territorial

waters for fishing and harvest all the large fish. Thirty five percent (*n = 37*) complained that those outside fishers would use different gears and comparatively advanced technology such as fish finders to catch large fish than the local fixed netters who would struggle to get good catch. Of fishers interviewed, 65% (*n=37*) complained about the

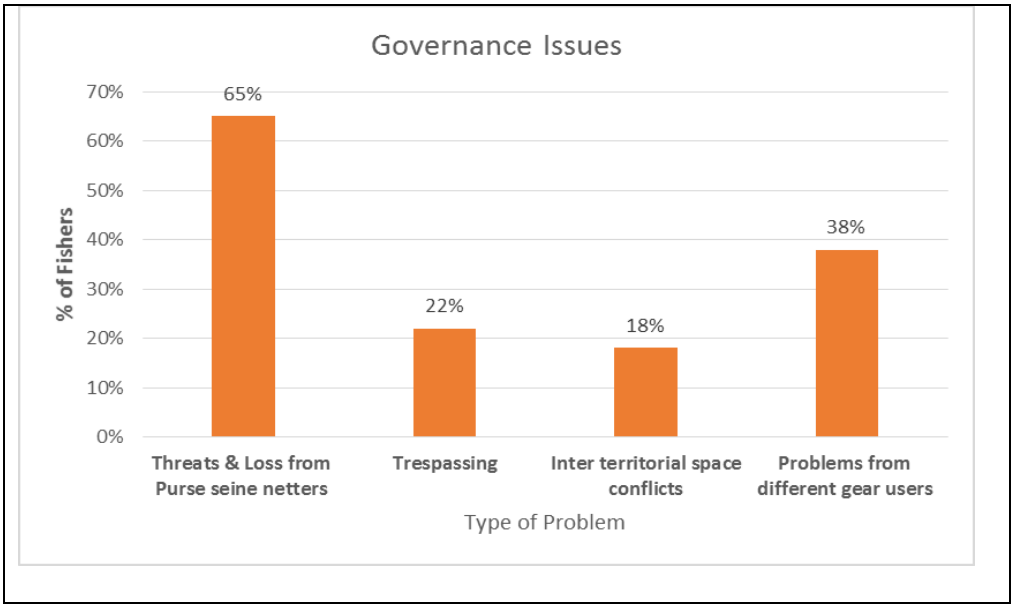

Figure 5.1: Governance issues faced by local fishers (*n = 37*)

out-state seine netters. Seine netters from the neighbouring State of Maharastra are locally perceived as 'sinners' for crossing the boundary of the Gujarat territorial waters and 'stealing' all the large fish from the local territory (Johnson & Sathyapalan, 2006). Whenever the local fishers use high frequency radio to share information on fish availability, the seine netters can listen to them and locate the place through GPS to fish in the same region (SR21). The seine netters have large vessels and several small boats within the large vessel, and multiple gears with more manpower to fish (SR12 SR14 SR21). The seine netters basically make a circle and fish in a group; they do not bother about the local bag netters fishing in that area (SR09 SR12 SR15 SR55); the bag netters are often forced to vacate the area for them because they feel intimidated after surrounded

by the seine netters (SR21). Twenty-four percent (*n = 37*) of fishers claimed that they were scared of the seine netters due to their large capacity and manpower. A respondent stated:

> *We are only a few crew members with maximum seven to eight persons on our small boats. Seine netters have around 20 crew members on their huge boats. We do not have courage to argue with them. In case, they get angry, they may beat us… (SR11*).

Sometimes, the purse seine netters damage the gears and nets of the local fishers (SR01 SR10 SR20 SR27 SR37 SR38) and do not compensate the local fishers for their loss particularly if the damage happens at night when it is hard find the perpetrator (SR15 SR20). Seventy-six percent (*n = 30*) of fishers mentioned that there was no monitoring mechanism at sea to check trespassing or to stop the intrusion of outsiders; the remaining 23% (*n=30*) had occasionally seen coastguards monitoring at sea. The crew claimed that the issues with purse seine netters need to be dealt with carefully by the boat owners as the boat owners get affected mostly by the low fish catch (SR09 SR11 SR38). The crew further stated that boat owners have more time and resources to deal with this issue in comparison to the crew, who are mostly out at sea. The local fishers claimed that the intrusion of outsiders into their territorial waters has threatened the livelihoods of many traditional bag netters in this region. (SR14). This is, however, debatable as to who crosses which boundary, as most of the seine netters go for deep sea fishing at relatively great distance from Saiyad Rajpara.

An ineffective governance system may have serious socio-economic and ecological repercussions. With ineffective institutional governance, the local fishery is heading towards the 'tragedy of commons'. Despite a centralised hierarchical structure,

Saiyad Rajpara lacks a strong enforcement of the 2003 Gujarat Fisheries Act, which has affected the local fishery. The two key characteristics of common pool resources such as excludability, where it is difficult to control the amount of potential users, and subtractability, where one is capable enough to reduce the welfare of another user (Berkes, 2006, p.3) fits in this particular context. Unlike Kharwas, Kolis have adopted this fishing occupation because of limited alternative livelihood options (SR56) which has resulted in the increase in the boats and fishermen. Without effective regulatory mechanism at the harbour, the number of boats in Saiyad Rajpara has increased from 100 in previous years to 400 in recent times (SR28 SR30 SR52), which shows a weak excludability. According to the Fisheries Act, the Fisheries Department has a right to regulate further licensing of fishing boats, which has never been enforced. The local harbour is struggling with overcrowding of fishing boats (Johnson & Sathyapalan, 2006) and overfishing is certainly a major issue in Saiyad Rajpara with skyrocketed boat numbers (SR12 SR30 SR52). All the harbours in the dry-fish zone are at overcapacity regardless of the limited formal and informal exclusion controlling mechanisms (SR61). Limited control over excludability has resulted in de facto open access marine resources. Incidentally, this harbour village is known for the dry-fish trade in coastal Gir Somnath, especially the dried waste-fish that is comprised of juvenile shrimp and fish. During the peak season, traders frequently transport bulk under-sized fish, evidently breaching the Gujarat Fisheries Act, which prohibits catching, purchasing and transporting of juvenile fish. That indicates subtractability, which is not uncommon in this region. The mixed-regime governance system has limited control over the excludability and subtractability factors, pushing the situation further towards the tragedy of commons.

5.5 Local mechanisms to deal with issues

To deal with the decline in fish catches, Hardin recommended a strong top down governance or privatisation to avoid the tragedy of commons while he completely ignored the existence of community-based management (Ostrom, 2002; Ostrom et al., 1999). However, many resource users in different areas have successfully managed their resources through various self-governance and regulatory mechanisms without depending on the government intervention or privatisation (Berkes, 2006, p.3). The fishers in Saiyad Rajpara, like many other traditional communities, are flexible in nature and are well adapted to the changing technical and socio-ecological circumstances (Bavinck, 1996). As seine netters harvest most of the large fish, the local fishers have adopted unsustainable fishing practices by narrowing the mesh size and harvesting the juvenile and brooder fish to compensate for their loss to large-sized fish, which reflects how the rent maximisation relationship has strongly influenced fishers' relationship with the environment. As some fishers claimed, many fishers with small boats fish even during the breeding season and ban period. Disregarding the cyclonic warning and fishing ban in the end of October 2014, 57 fishers went out at sea for fishing (SR57; Field Notes 2014/10/31).

Dissatisfied with the current mixed-regime system, fishers have adapted and developed their own mechanisms to deal with regular issues at the local harbour (Figure 5.2). Of the fishers interviewed, 38% (*n=37*) indicated that they were part of some groups in which group members would help each other during emergency. In emergencies, while fishers are out at sea, the social cohesion within the community works as social security

for many fishers to resolve different issues (Stone, 2000). Fishers form groups on the basis of different criteria to meet their needs. According to a fisher:

> *Generally a group has several members with the same wireless number. For example, while fishing at sea, several boats from a particular location have a common area code. Fishers, with common area codes, form groups so that in case of emergency group members can easily contact and reach each other … (SR31).*

The second largest category was the self-managed fishers (35%). Fishers from this category were directly not part of any group; however, they still rely on their friends and family members for help in case required (SR14 SR18). Around 27% (*n = 37*) of fishers mentioned that they would rely on some influential or key persons at the harbour for help.

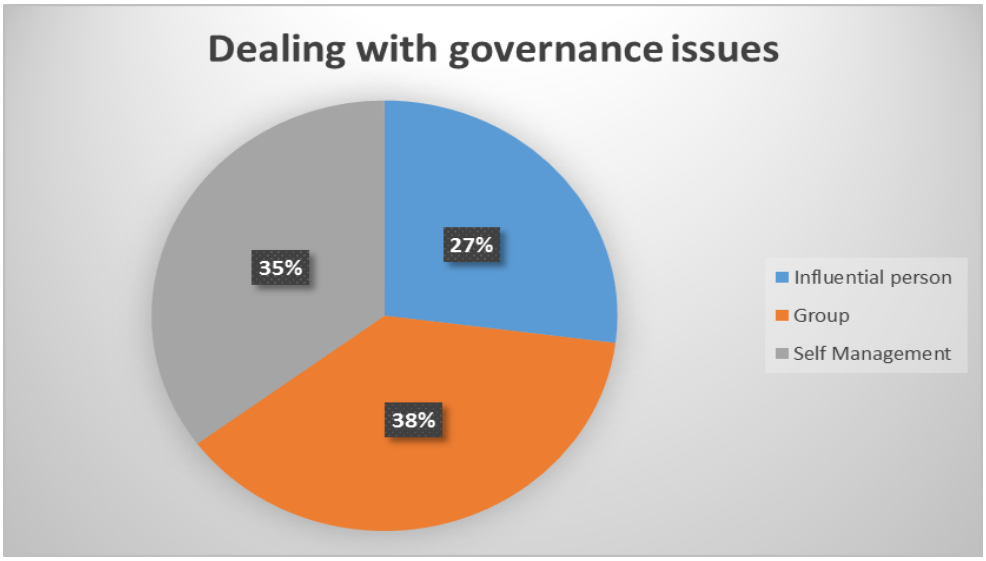

Figure 5.2: Current management mechanism at the local harbour (*n = 37*)

According to one of the respondents:

> *Currently, one of the respectable persons at the harbour who looks into different issues. A crew member goes to him in case he needs help. Though the person is not a patel, but he is a gentleman and helps fisher in many ways and sometimes he supplies ice and spare parts on credit in case someone does not have money to pay up front (SR05).*

Social relations have been well recognised in fishery related ethnographic research, which showcases how the diversity of relationships such as support, reciprocity, exploitation and dependency influence the wellbeing of fishers (Coulthard 2012).

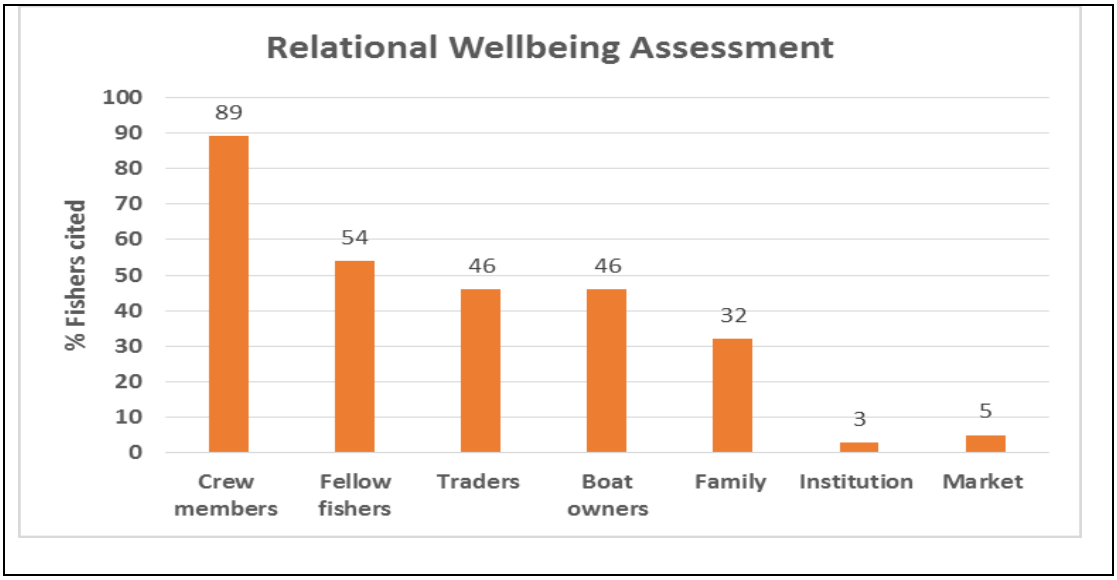

Figure 5.3: Important relationships cited by local fishers (*n = 37*)

As the bag net fishery is more than just harvesting, fishers interact and relate with multiple parties to accomplish their task. The relational dimension of the social wellbeing approach connects individuals to the society at a wider context; it also reflects how relationships shape the wellbeing of fishers and their relation with natural resources (Britton & Coulthard 2013). Figure 5.3 illustrates a simplified portrait of relationships based on the relationship wellbeing assessment framework that is important to the local fishers. According to the framework, 89% (*n = 37*) of fishers gave importance to their relationships with crewmembers. Crewmembers are in charge of boats and fishing gears. Therefore, it is important to maintain a cordial relationship with the crewmembers (SR06 SR07). The increased number of boats in recent years has created a huge demand for crew members at the local harbour. Fishers provide many incentives, such as good salary,

to get experienced and well-behaved crew members (SR18). Fifty-seven percent fishers cited the relationship with group members was very important. Fishers share their harvest with fellow fishers, relatives and friends, which contributes to social cohesion (Field Notes 2014/12/08). Among the fishers interviewed, 46% (*n = 37*) of fishers mentioned that their relationship with boat owners was very important. Crew members, who are the main harvesters, rely on boat owners for financial resources and a good relationship ensures timely salary and more money in case of emergency (SR15 SR29). Similarly, 46% (*n = 37*) of fishers mentioned that the relationship with fish traders was important to them. Fishers need advance credit to invest in diesel, payment for the crew, and for repairing and mending work. Good relationships with traders ensures a decent advance credit (SR18 SR21). Fishers relate with the Fisheries Department to get their identity cards which enables them fishing at sea, whereas boat owners share a cordial relationship with the department to get subsidy coupons and to avail the benefits from some government schemes. The boat owners and the fish traders in Saiyad Rajpara share a reciprocal relationship with each other.

Fishers relate and negotiate with multiple parties, which enables them in achieving their material wellbeing, however, the relationships are complex and vary from person to person. Informal groups have contributed to dealing with regular fishing issues, however, these groups are insufficient to address the broader collective issues such as exploitation by fish traders, encounters with seine netters, or overfishing.

5.6 Summary

To summarise, the local harbour in Saiyad Rajpara functions with a mixed-regime system where multiple parties such as the Fisheries Department, the market demand, the

informal management practices, cultural norms and a de facto open access system are involved. With no representative from the fishing community and with limited interaction among the multiple parties involved, the mixed governance regime has not succeeded in addressing major governance issues faced by the local fishers. Dissatisfied with a mixed-regime governance at the local harbour, fishers in Saiyad Rajpara have adapted and developed their own mechanisms to deal with various governance related issues, which has consequences on their wellbeing. For example, without any control over fish market, the rent maximisation relationship with the fish traders has affected the material wellbeing because of the lower landed price. Profit-driven fishing practices have also affected the relationship between fishers and the environment and resulted in decline in fish catches. Furthermore, with ineffective regulatory mechanism, the local harbour is like a conditional de facto open access. Though, there is a restriction for the outsiders to use the local harbour, however, the drastic increase in boat numbers in reflect an de factor open access within the harbour. Fishers have adopted several unsustainable fishing practices such as further narrowing of mesh size and fishing of juvenile and brooder fish to cope with the pressure from the fish traders. Fishers have crossed the territorial water and have gone far out at sea where they frequently have negative encounters with seine netters. The local fishers have established several informal groups to deal with regular issues, however, these relationships are inadequate to deal with broader collective action issues such as exploitation by fish traders, encounters with seine netters, and decline in fish catches.

Chapter VI: Fishers' Perceptions

"*Fishing is my family occupation. My father had a boat but he never forced me to pursue the occupation. I decided to continue our family tradition because I like being in the sea and I absolutely enjoy it (SR38)!"*

6.1 Introduction

This chapter provides a brief narrative of the transition of fishers' socio-cultural life from the introduction of bag net fishing some seventy years ago, elucidating how this has shaped the worldview of the local community. A social wellbeing approach, focussing particularly on subjective wellbeing, was used to address the third research objective on fishers' perceptions in coastal Gir Somnath. I argue that recent changes in fishing practices have affected the socio-economic life of the local fishers in Saiyad Rajpara, which in turn has influenced their perceptions.

6.2 History of socio-cultural life of Koli fishing community

The socio-economic life of Kolis was different when fishing was not a major livelihood option in Saiyad Rajpara. The Kolis in this coastal village struggled for basic things such as food and a decent life (SR62 SR65). The local diet in this region was different. For example people would eat more dairy products such as milk, yogurt, butter milk and cheese (SR56 SR65 SR66). Farmers would grow vegetables for the local people as there was a demand for vegetables (SR56). Farmers had the highest social status within the Koli community, regardless of their economic conditions (SR66). The Kolis were not interested in education and getting employed under someone; working under someone was considered as a low status job (SR66). Education was not considered as

important for women (SR62). Women were mostly employed in agriculture and would help family members and had less freedom. There was limited interaction between men and women with no mobile phones. With limited exposure to the outside world, many young women, in their late teenage years, did not have adequate knowledge on family life; for example how to manage a family after marriage. Therefore, the average marriageable age for women was between 20 to 25 years; parents would find suitable candidates for their daughters when they considered their daughters ready for marriage. Parents would prefer to marry off their daughters to men with good moral values such as keeping promises and not being addicted to alcohol and respecting elders. Economic condition was not necessarily the main priority. The life of Kolis was very much limited to that particular region with limited exposure and travel to the outside as transportation links were poor (SR62).

The lifestyle of Kolis changed after the arrival of Machhis in the Saurashtra region. Food security and livelihoods were no longer major issues. Gradually, from a small proportion, fish became a major part of the diet for Kolis. Similarly, gender roles changed as many men and women became employed in the bag net fishery. Men from the Koli community were employed in fishing at sea while women were employed in a variety of onshore jobs. The Machhis from South Gujarat would spend the fishing season in coastal Gir Somnath before going back home with all the harvested fish (in dried form), which created employment opportunity for the local women in this region. Until then, the harbour was of no use in Saiyad Rajpara. With no fresh-fish traders or transport companies, only processed and dried fish were in demand. As the fishery gradually expanded, local women were in much demand for the processing and drying work. The

processing and drying of large quantity of Bombay duck were labour intensive. Women had limited time for their own needs such as to maintain hygiene because of the demanding fish processing job in addition to their domestic responsibilities (SR62). Without any modern technology, such as kitchen appliances women would perform most of their task manually. As women lived mostly in extended families, they had to take care of the entire family while deferring to elders (SR62). Fishermen would not rush to their next voyage after coming back from fishing, which would give some free time to both men and women (SR62 SR66). Despite the fishing job which kept them away from their families, fishers had ample time to rest and socialise with others (SR66). Not many fishers in this coastal village were intensely addicted to alcohol to release their work-related stress (SR65). Fishers were more respectful to each other in the past (SR65). Some retired fishers claimed that life was peaceful and people were happy in their occupational and personal lives (SR62 SR65 SR66).

6.3 Current socio-cultural life of Kolis

The arrival of Machhis transformed the social identity of the Koli fishers in coastal Gir Somnath. Like Newfoundland, whose identity was shaped by its cod fishing after the arrival of European migratory fishing fleets (Ommer 1999), this coastal village of Gir Somnath became popular for Bombay duck after the arrival of the Machhis in the Saurashtra region. A suitable biophysical environment, an important aspect of fishing (Stedman, 2003), attracted the Machhis all the way from south Gujarat. A fully functional fishing harbour at present (SR54) and the presence of material elements, such as fishing boats and gears, have provided a meaning and new identity to the place (Urquhart & Acott, 2013). The coastal village has become the economic hub in that region where

fishers earn a decent income that contributes to their material wellbeing. The harbour has become a functional intermediary (Biersack, 2006) for the local fishers where they frequently interact with the environment and relate and negotiate with multiple parties including fellow fishers, traders and wage earners to achieve their wellbeing (Figure 6.1).

Figure 6.1: Multiple interaction at the local harbour

Figure 6.2: Dry-fish plot adjacent to a house

Rich fishing heritage shapes the identity of a place. Fishers construct a place to accommodate their fishing requirements, which becomes part of the identity of that place (Ommer, 1999). For example, the local fishers in this coastal village have constructed large concrete houses close to the harbour with paintings of their Goddesses on the walls and many houses are attached to a large fish drying ground suitable for drying purpose (Figure 6.2) (Field Notes 2014/09/28). The distinct characteristics, such as the presence of boats and gears, and fishers, spread out fish drying grounds, in addition to the smell of waste fish and sound from the frequent movement of transport rickshaws have constructed a different identity, which is associated with fishing (Urquhart & Acott, 2013). Places become the identity for those communities that encompass fishers' experience, tradition and culture (Ammundsen, 2013).

Despite being a commonly used term, place has distinct meanings for different people (Thompson, 1983). The local harbour is the main place for businesses; fish traders negotiate price and procure fish catch; for boat owners, it is a platform for networking with fish traders for credit, bonding with fellow boat owners and making contact with crew for fishing; crew members make contact with boat owners for employment and also engage in repairing and mending work in their free time, and pre-harvest preparation before heading out to the Arabian sea; women earn their livelihoods from sorting, processing and drying work; for children it is one of their favorite places as they enjoy their hook and line fishing; and for some petty vendors and businessmen, it is the main business centre where they sell snacks, tobacco, tea, cold beverages and toiletries. Fishers are so attached to the local harbour (McGoodwin, 1990) that they like to hang out or play cards with fellow mates in their free times, which contributes to their happiness (subjective wellbeing) (Field Notes 2014/09/10).

The lifestyle of Kolis including food habits and social life in the dry-fish zone of coastal Gir Somnath has changed over the years. Despite no more Machhis coming for fishing, the Kolis in Saiyad Rajpara have completely adopted the fishing way of living. During the four-month field work period in this village, I noticed that fish have largely substituted for vegetable dishes and have become the major diet within a Koli household (Figure 6.3). Figure 6.3 shows a variety of fish items, such as roasted Bombay duck, prawn curry, traditional millet chapattis and some vegetable curry, served in a Koli family. With vegetables replaced by fish as a major diet, farmers also lost their high social status within the Koli community. Currently, a financially wealthy person has higher social status in the Koli society (SR10).

Figure 6.3: Fish as a major dietary item for the Kolis
Photo Credit: Derek Johnson

The access to new markets has largely influenced traditional fishing practices in Saiyad Rajpara. For example, the harvesting of Bombay duck have been largely replaced by other species such as cat fish, sole, ribbon fish, croaker, mackerel, tuna, shark, ray, and lobster. The market demand for fresh fish in coastal Gir Somnath has certainly generated more employment, but also has reduced the post-harvest workload of fishers. Fishers deliver their fresh catch to these companies without processing. Therefore, 76% (*n=37*) of fishers showed their interest in fresh-fish harvesting, which generates more profit and has comparatively less work load. Traditionally, fishers would harvest Bombay duck mainly for the dry-fish trade that needed more effort for processing and drying (SR03 SR13). Currently, only 19% (*n=37*) of fishers showed their interest in the harvesting of Bombay duck. Fishers' rent maximisation relationship with fish traders has compelled many fishers (who are part of the advance credit system) to involve themselves in intensive fishing and exploiting the environment, which has resulted in decline in fish catches (Bhathal, 2014).

The decline in fish catches and access to dry-fish market have led to unsustainable fishing practices which also have socio-economic and environmental consequences. Fishers catch juvenile fish and shrimp (mainly paste shrimp) for the dry-fish trade which is largely used for fish meal or feed for poultry farms (mentioned as waste fish). With a short fresh-fish harvesting season, the fishing of waste fish is perceived as a 'survival

strategy' among local fishers to recover the investment cost through the unsustainable fishing of juvenile fish and shrimp (SR05).

6.4 Influence of changing fishing practices

The market oriented fishing practices in coastal Gir Somnath has influenced gender roles and contributed to the wellbeing of women. With traditional dry-fish trade of Bombay duck and ribbon fish largely replaced by the waste-fish trade, the role of women has changed and more work has available for them. Previously, women from fishers' families would do everything, from sorting to processing and drying. Currently, once women (either from fishers' families or wage earners) load waste-fish on the transport rickshaws (bottom right table 10), the work of those women is over. The dry-fish traders employ women either from their own families or wage earners for processing and sun-drying. Women, currently engaged in the dry-fish trade of Bombay duck, ribbon fish and prawns comparatively have a higher workload than the women in waste-fish trade. The different phases of processing of Bombay duck and ribbon fish, such as sorting, sun drying, tying of dried fish into bundles and packing those into sacks, needs a lot more effort and time (above two pictures in table 10). The processing and drying of Bombay duck and ribbon fish is mainly performed by the women from the fishers' families (SR62, Field Notes 2014/10/16).Women are in demand for relatively easy processing jobs like drying of waste fish. Similarly, the presence of transport companies at the local harbour has not only created more employment opportunities for women in the fresh-fish trade but also has provided better working condition. According to an old women:

> *Life has become so easy for women at present. Many women are working at harbour or in fish drying plots and financially independent that also contributes to their freedom and movement. They use mobile phones to communicate with*

others. Decline in demand for the dried Bombay duck has lessened the work burden and women have more free time. Bombay duck would require much more effort and was time consuming for processing and drying than the waste fish, which is currently used for fish meal… (SR62).

Table 10 shows women's involvement in different jobs part of the fish supply chain. Many women are employed in transport companies with better working conditions (bottom left in Table 10).

Table 10: Recent changes in women's work profile




However, women employed outside of companies, still have a hard time with irregular work schedule regardless of day or night. Unlike many other areas, where women earn from onshore fishing to contribute to their family income (Hauzer *et al*., 2013), women in Saiyad Rajpara, employed in non-fishing work, such as processing work and drying jobs, still contribute to their family income. Hence, the change in fishing practices has certainly contributed to the material wellbeing of women by creating job opportunities for

them and with better work condition, the subjective wellbeing of women is also influenced.

Besides financial contribution, the recent changes in the bag net fishery has also influenced the social life of women in Saiyad Rajpara. Despite their financial liberty, many women do not have freedom to choose their life partners. In fact, the average marriageable age for women has decreased to sixteen in some context (SR50 SR62 SR65). The newly acquired freedom and use of technology are to be blamed, as there is a fair chance for teenage girls to elope with men. There already have been a few incidents in this village where young women eloped with young men and got married without their parents' consents. Feeling insecure, parents want their daughters to marry when young to pre-empt the possibility of social embarrassment from an unwanted love marriage (SR62 SR65). Parents are protective about their daughters much more than with sons.

The change in fishing practices has also influenced the social life of fishers in Saiyad Rajpara. To meet the occupational demand of women and to share the workload in the fishery, fishermen prefer to marry women from the fishing families (Hauzer, 2013). Despite good socio-economic conditions, parents from non-fishing communities hesitate to marry off their daughters to the fishermen from Saiyad Rajpara due to the work load of women (SR54), which reflects how outsiders have given importance to the subjective values over material values.

The access to new markets has significantly contributed to the material wellbeing of the fishers in coastal Gir Somnath. The presence of multiple transport companies and access to the dry-fish trade has created a market demand for both fresh and waste fish, which has resulted drastic increase in the number of boats. There is also strong demand

for crew members, which has raised the pay scale of crew members in order to attract experienced crew. According to a fisher:

> *I am completely happy with my profession. This profession has helped me in making extra money. I believe that when you have enough money to manage everything, you will be happy. It is so hard to earn money from any other occupation especially from farming…(SR23).*

Currently, there are many more concrete houses in this village than the past. With people living mostly in mud houses in the past, women would plaster the mud walls at frequent intervals, which was an extra burden (SR62). People had hardly any modern household assets, such as television, but now every other house has modern household assets (SR66). Access to market and cash inflow have also helped many fishers to access better quality education for their children (Field Notes 2014/10/13). Fishermen's hard work has paid off and improved their lives materially.

On the one hand, the recent changes in fishing practices have contributed to the material wellbeing of the fishers in coastal Gir Somnath, on the other hand, the change in occupational behaviour with frequent and longer exposure at sea has also influenced the relational wellbeing of fishers. The exceptionally risky occupational environment and mutual dependency on workmates have increased the solidarity among the local fishers. Fishers, may be working in different boats, however, bond well during the non-fishing periods (Ommer, 1999; McGoodwin, 1990; Thompson, 1983). Table 11 details the outcome of the quality of life survey which was an effort to measure the subjective wellbeing of fishers. The things important to fishers in this coastal village are largely shaped by fishing. Fishers in Saiyad Rajpara rely mostly on their family and relatives in emergencies and, therefore, the relationship with them are most important for the local

fishers. The second most important thing for fishers is livelihood and fishers need financial assistance to invest. The outcome of the quality of life survey reflects how the relational wellbeing of fishers is influenced by the strong desire to achieve the material wellbeing in Saiyad Rajpara.

Table 11: Quality of life survey (*n=37*)

Domains of Subjective wellbeing	
What do you need to have a good life?	**% of fishers cited**
Family (parents, wife, children & relatives)	68%
Financial assistance	59%
Good/bigger house	59%
Job satisfaction	54%
Bike	38%
Gourmet food	35%
Nice cloth	35%
Traveling	19%
Friends/ fellow fishers	14%
Boat	14%
Happiness/Peace	11%
Agriculture land	11%
Good health	8%
Rest/Leisure time	8%
Alcohol	8%
Safety	5%
Mobile	5%
Clean environment	5%
Good future for children	5%

Fishers' worldviews and local beliefs highly rely on the already risky marine environment and the amount of time fishers spend harvesting at sea. With no life-saving devices on many boats (discussed in chapter 4), fishers in coastal Gir Somnath follow local beliefs as a precaution to avoid any bad fortune. Unlike many places, where researchers have found the presence of women is considered as a bad omen in fishing (Mathew, 1993; Thompson, 1983), fishers in coastal Gir Somnath do not necessarily

consider women as bad omens. The active involvement of women in festivals and the importance given to them reflects the position of women in the fishing community. The unmarried young girls (the girls yet to start their menstrual cycle) actively take part in the most important ritual of fishers, which is the worshipping of sea and boats, prior to the beginning of the fishing season. The presence of young girls is considered auspicious and those girls step on the fishing boats and touch the gears prior to fishing (SR12). Young fishers take the blessing of their mothers before going out at sea (SR62). The participation of women in various cultural activities and fishing ritual reaffirms the stronger position of women. On the other hand, in a patriarchal Koli society, where gender roles are clearly defined, women do not go fishing because there is no requirement for women to do so. Traditional bag net fishing requires a lot masculine physical work and is therefore mainly reserved for men. Besides, in male dominated crews on boats, it is difficult for women to maintain privacy for the disposal of bodily waste (SR10). Fishers in this coastal village, however, have their distinct beliefs on bad omens. Leather footwear and alcohol on fishing boats are perceived as bad omens in this region (SR05 SR08 SR10). For example, fishers generally do not carry footwear as there is no requirement for the same at sea (SR13 SR20 SR22); alcohol, on the other hand, is prohibited in fishing boats because it is also a major safety issue (SR07 SR15 SR21 SR33). Boats are considered auspicious places because they contribute to fishers' livelihood where fishers acknowledge the presence of their Goddess on their boats. The celebration of different festivals is important in the Koli fishing culture because of the risky occupation. According to a fisherman:

> *We have our own Goddess on our boats. We offer a coconut each time we go for fishing. Coconuts are considered as an auspicious fruit and therefore, we believe that by offering coconut and praying to Goddess, we will not face any problem while fishing at sea. We worship sea and boats once in a year during monsoon and prior to the beginning of the harvesting season. We invite a local priest to perform the rituals where everyone takes part. Women come to prepare the offerings and sing songs. Women in their menstrual cycle, however, are not allowed to take part in the ceremony and touch anything as we believe that menstruating women may bring bad luck (SR15).*

Thus, the local beliefs and worldview, which are part of the subjective wellbeing, are shaped and influenced by the risky occupation. Moreover, intensive fishing has also affected the health of the fishers. Eight percent (*n=37*) fishers stated that alcohol was one of the important needs for them to release their frustration and tiredness to enjoy their life (Table 11). Addiction to tobacco is common and widely accepted while consumption of alcohol is a major issue in this village.

6.5 Changing perceptions

The perception of fishers towards fishing has been shaped by their changing economic environment and with changes in the way that they work. With no one to control the growing market oriented fishing practices at the harbour, fishers are compelled to spend more time at sea. Only 27% (*n=37*) of fishers are actually happy with the current mixed-regime governance system. A fisherman stated:

> *I feel frustrated being an educated fisher. Even if I want to protest against the exploitation, I do not get support from my fellow mates. Besides, I will suffer to get advance credit from any of these companies if I raise my voice against the exploitation. Therefore, I wish for a patel to fight against the companies' exploitation in favour of us… (SR18).*

Despite decent earnings from fishing, only 46% (*n = 37*) of fishers were really satisfied with their fishing life (Figure 6.4). Interestingly, when asked why they were in this occupation, 59% (*n=37*) of fishers responded that they could easily follow their

family tradition to earn their livelihood. Of total fishers interviewed, 14% (*n=37*) mentioned that the lack of alternative livelihood options forced them to join this occupation; while 11% (*n=37*) of fishers were genuinely interested in fishing.

Figure 6.4: Fishers' perception on fishing as livelihood occupation (*n=37*)

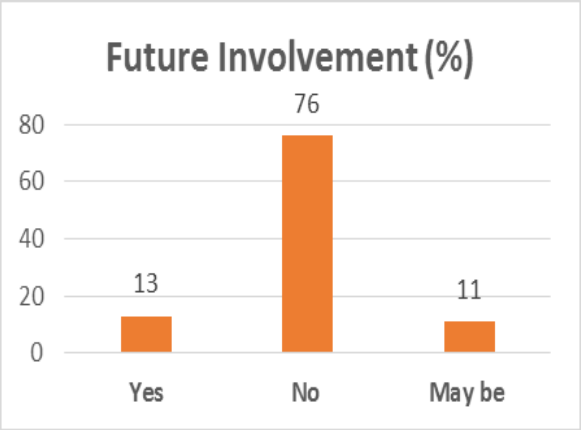

Figure 6.5: Percentage of fishers want their children to pursue fishing *(n = 37)*

Of total fishers, 19% (*n=37*) are strongly dissatisfied and are frustrated with the current institutional arrangement and hope for a better system. Fishers' material and subjective wellbeing are largely affected by the rent maximisation relationship with the fish traders.

With their dissatisfaction with the current fishing situation in Saiyad Rajpara, fishers' perception of education and employment has changed over the years. Fishers want a different and better future for their children. Once, education was not given importance and employment was considered as low status jobs within the Koli community, however, 59% (*n = 37*) of fishers currently wanted their children to get educated and acquire a non-fishing job (Figure 6.5). Surprisingly, only 13% (*n = 37*) of fishers responded positively about their children pursuing the traditional fishing. Fishing despite being a lucrative occupation, 76% (*n = 37*) of fishers did not want their children to pursue their family occupation.

6.6 Summary

Bag net fishing has strongly shaped the socio-cultural life including the identity of the Koli community in Saiyad Rajpara. Over the years, fishers have had better access to resources and new markets. The access to new markets and recent changes in traditional fishing practices has contributed to the material wellbeing of men and women. The increased market demand for fresh and dried waste fish over traditional Bombay duck and ribbon fish have not only created more job opportunities for women but also have provided a better work conditions for them and has contributed to their wellbeing.

Fishers' rent maximisation focused relationships with fish traders have affected traditional fishing practices leading to a reduction in the quality of men's working condition. With inefficient mixed-regime governance system, fishers feel exploited with no *patel* or *samaj* to whom they can complain. Besides contributing to material wellbeing, the relatively recent changes in fishing practices to meet the market demand, have compelled fishers to engage in intensive fishing. The increasingly souring relationship with fish traders and declining fish catches have forced the local fishers to adopt unsustainable fishing practices which has had further ecological consequences. Change in work practices, particularly the increased length of time spent on fishing have affected their social lives. More and more fishers are addicted to alcohol to release their work-related stress and frustration. The intensive fishing in an already risky environment has also profoundly shaped the worldview of fishers. Currently dissatisfied by their work life, a majority of fishers in Saiayd Rajpara seek a better future for their children outside fishing.

Chapter VII Conclusions and Recommendations

7.1 Introduction

Fishing is much more than just a livelihood option for the Koli fishers in coastal Gir Somnath. A three dimensional social wellbeing approach was used to explore the socio-cultural dimensions of small-scale bag net fishery where I explored the fish supply chain, the local governance, and how fishers' perceptions were shaped by the fishery.

The research was conducted under the guidelines of the "Too Big to Ignore (TBTI): Global Partnership for Small-scale Fisheries Research" project. The main purpose of the TBTI project was to establish a global network to develop research and governance capacity to address different challenges faced by small-scale fishers globally. This research focused the main theme of working group III on the diverse values of small-scale fisheries.

7.2 Research Overview

The broad purpose of my thesis was to understand the socio-cultural dimensions of the small-scale bag net fishery practised in coastal Gir Somnath within the state of Gujarat in India. I made three arguments in consistent with three research objectives. In the first research objective where I explored how the bag net fishery functioned, I argued how the economic transition in the bag net fishery has had ecological consequences that are increasingly threatening the livelihoods of many people in this region. While examining the local governance system for the second objective, I argued that without any fishers' representative within the mixed-regime governance, fishers have adapted and developed local mechanisms to manage day-to-day issues but these mechanisms have

been inadequate to deal with the problems that they face. In line with the third objective, which explored the perceptions of the local fishers, I argued that relatively recent changes in fishing practices have affected the socio-economic life of local fishers, which in turn has influenced their perceptions.

In order to achieve the broad purpose and three objectives, I conducted ethnographic research on the small-scale bag net fishery. I followed a social constructivist paradigm grounded in a prior, extensive review of secondary literature. My main methods were participant observation and semi-structured and key informant interviews. My four-months of field work generated rich ethnographic observations and data from respondents that contributed to understanding the complexity of the small-scale bag net fishery of Saiyad Rajpara and the various socio-cultural aspects and issues within the fishing community.

7.3 Overview of Conclusions

The bag net fishery of coastal Gir Somnath contributes much more than just to the livelihoods of the local fishing communities. Despite contributing to the material wellbeing of the fishers in coastal Gir Somnath, the commodification of fish has influenced the traditional harvesting process. The profit-driven approach has resulted in intensive fishing which has had ecological consequences that are threatening to the livelihoods of many people in this region. The local harbour functions with a mixed-regime of governance where multiple parties are involved. Without strong integration and coordination among the actors that system has limited capacity to address major issues faced by the local fishers. As fishers are highly dissatisfied with the current governance system, they have adopted unsustainable fishing practices to increase their catches and

have strengthened their social relationships with others to deal with regular issues. Relatively recent changes in the local fishery and practices have influenced the occupational behaviour that has resulted in job dissatisfaction and fishers wish for a future for their children outside fishing.

7.3.1The fish supply chain

The traditional bag net fishery has transformed the livelihoods of local Kolis from basic subsistence to an ability to earn a comparatively good income. Before the introduction to bag net fishing, the local Kolis were engaged in wage work and would struggle to get two meals per day. The arrival of Machhis in the Saurashtra region provided an employment opportunity to the Kolis through which they acquired the bag net fishing skills. Besides contributing to their food security, bag net fishing has also increased the standard of living of the local Kolis. Command over a variety of assets and access to natural resources has contributed to building up the capacity of fishers to lead a good quality of life (Coulthard, 2012; Sen, 1999). Over the years, the bag net fishery has changed from just subsistence based to more market oriented. The access to new markets after the arrival of fish traders changed the traditional fishing practices. Mainly the market demand for fresh fish and access to dry-fish market (for waste fish) have replaced the traditional harvesting of Bombay duck. The access to new markets has also created more employment opportunities for both men and women. With the availability of financial credit from fish traders, and the increasingly lucrative nature of fishing, the number of boats in this region has drastically increased. While the access to dry-fish trade (for waste fish) has influenced the gender roles where the role of women has been

redistributed and spread out creating more space and demand for women for various onshore jobs.

Despite the contribution to the material wellbeing of the local fishers in coastal Gir Somnath, the change in fishing practices has jeopardised the sustainability of the marine resource in the Arabian Sea coast of Gujarat (Johnson & Sathyapalan, 2006). Coastal Gir Somnath is struggling with overcapacity (Johnson & Sathyapalan, 2006), which has resulted in overfishing. The decline in overall fish catches (Bhathal, 2014) and the relatively short fresh-fish harvesting season has compelled the bag net fishers to adopt unsustainable fishing practices, such as the further shrinking of mesh size and the harvesting of juvenile and egg-bearing fish. These practices have exacerbated the ecological threat to the local marine resources as well as increasingly threatened the livelihoods of many people.

7.3.2 Local Governance

The coastal harbour in Saiyad Rajpara functions with a mixed-regime that includes the limited role of the Fisheries Department, partial control by local market actors, a certain degree of customary norms, traditional informal management practices but the lack of single local *patel* and *samaj* authority. This situation has resulted in de facto open access for members of the fishing community.

With inability to integrate the multiple parties involved in governance, the mixed-regime system has not succeeded in dealing with the concurrent issues in the local fishery. There was a lack of leadership in the governance because the fish traders were interested in making profits and the Fisheries Department has limited administrative role. The arrival of fish traders has opened the door to financial credit for the local fishers in

the absence of any welfare scheme of the state, on the other hand, fishers are expected to sell all catches to the respective fish traders at a lower landed price. The rent maximisation relationship with the fish traders has compelled many fishers to change the traditional fishing practices (Johnson, 2010). Without effective regulatory mechanism to control the number of boats at the local harbour, fishing has become highly competitive. Trapped in a credit system with debt and competition from fellow fishers have forced the local fishers to go for intensive fishing, which has also affected their relationship with the environment. The local fishers are currently struggling with overfishing and decline in fish catches. With decline in fresh fish and pressure from the fish traders, the local fishers have adopted unsustainable fishing practices such as fishing of brooder and juvenile fish and shrimp. To meet the market demand, fishers have crossed the traditional territory where they frequently have negative encounters with seine netters. Fishers do establish informal groups to deal with regular issues but these relationships are inadequate to deal with broader collective action issues such as exploitation by fish traders, encounters with seine netters, and the overarching problem of too much fishing effort.

7.3.3 Fishers' Perceptions

Relatively recent changes in the bag net fishery have influenced the socio-economic life of the local community in coastal Gir Somnath. Access to fresh fish markets and dry-fish markets (for waste fish) have differently affected the occupational behaviour of both men and women. The arrival of transport companies/fresh fish traders has mainly affected the traditional fishing of Bombay duck, which has been largely replaced by a variety of fresh fish though there are several other reasons such as decline in fish catch and limited access to the shallow areas of the Arabian Sea. The increasing

market demand for fresh fish has created more employment opportunities for the local community, which has significantly contributed to their material wellbeing. Women are mostly hired by the fish traders with better work conditions in certain contexts for sorting and cleaning jobs. Work opportunities for women have diversified with the expansion of the dried waste-fish trade.

On the other hand, the increased market demand for fresh fish, rent maximisation relationships with fish traders and declining fish catches have reduced the quality of men's working conditions. Increased physical and economic risk on land and at sea have increased fishers' stress and dissatisfaction with their situation. Resentful fishers do not see a future in fishing anymore and seek a future for their children outside fishing.

7.4 Discussion

The bag net fishery is more than just a livelihood option in coastal Gir Somnath. It entails socio-cultural, economic and ecological dimensions. For example, fishers take a month off from fishing to celebrate the marriage season, which has become an essential part of their life. The economic transition of bag net fishing from subsistence-based to market-oriented has not only contributed to material wellbeing by creating employment opportunities for the coastal communities but also has shaped their socio-cultural life. However, the recent changes in the fishery such as the mutual rent maximisation focussed relationship between fishers and fish traders without any effective institutional governance have had ecological consequences (figure 7.1). The lack of integration and coordination among different institutions at different levels have affected the management of resources. Without a leader from the community to coordinate within the mixed-regime governance, fishers struggle to address major governance issues such as

encounters with seine netters at sea despite their limited ability to address their day-to-day issues. These problems such as profit-driven fishing practices and exploitation by fish traders have further affected the socio-economic life as well as the perceptions of the local fishers in this region.

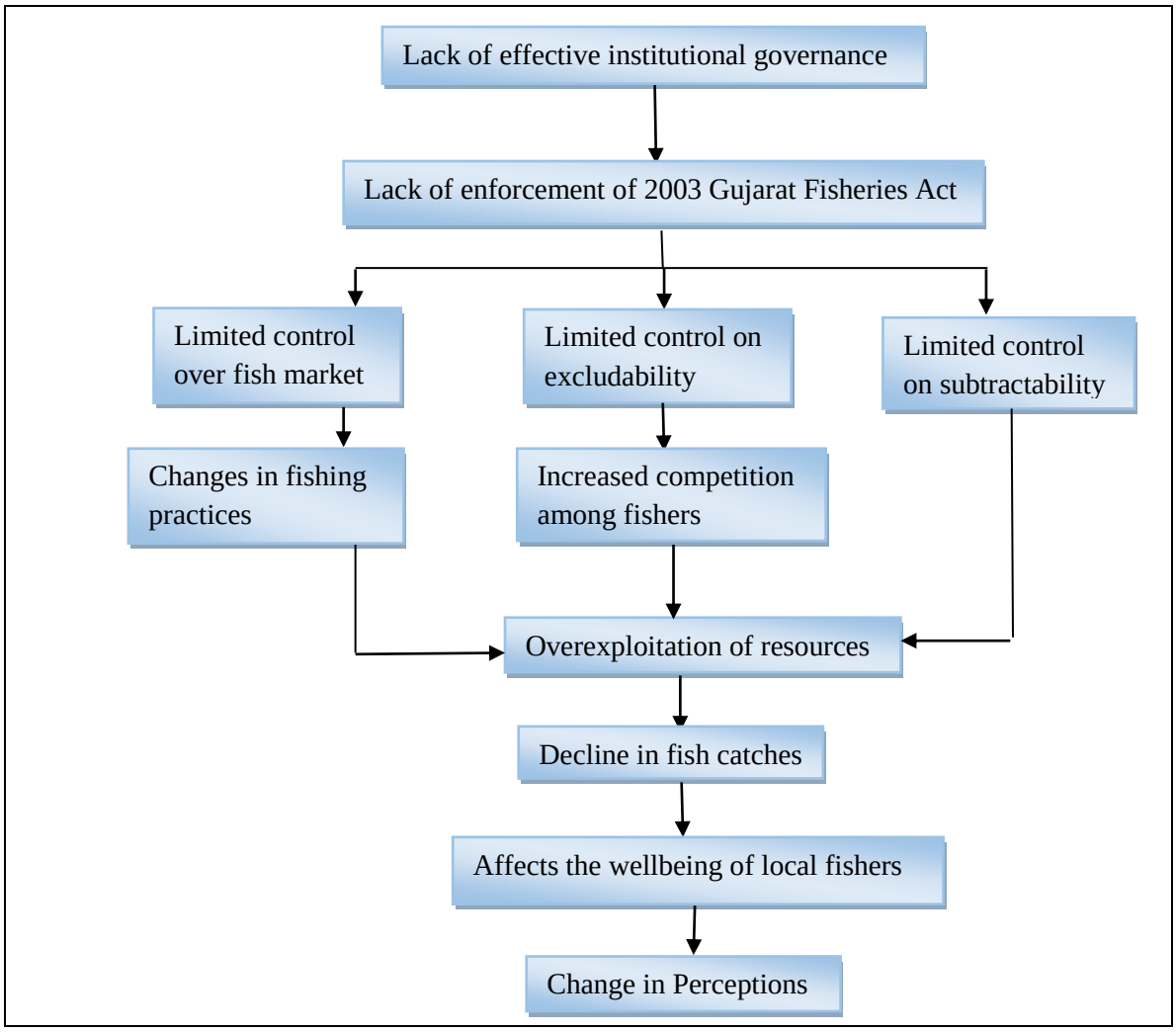

Figure 7.1: The central argument of the research

7.5 Recommendations

The objective of this research is consistent with the objective of Working Group III: Broadening the scope of the TBTI project to explore the diverse values of the small-scale fisheries. The findings of this research reflect how the commodity values of fishery

have overshadowed and in some context undermined socio-cultural and governance values. Relatively recent access to new markets has created employment opportunities for men and women in this region but the lack of efficient institutional governance, to coordinate and restrain effort, the profit-driven intensive fishing has had serious ecological consequences. Therefore, while seeking to address the overarching objective of the TBTI project to elevate the profile of small-scale fisheries, this research shows such efforts have to also simultaneously recognise the major governance challenges they face. Small-scale fisheries and the people they directly and indirectly support, are in the end fundamentally dependent on sustainable engagement with their marine ecosystem.

Despite the limitations of the available statistical data on fish catches, many fishers confirmed that they have been experiencing a decline in fish catches. Therefore, this research recommends improved ecological monitoring of fish catches for better management of resources. In addition, in order to make the fishery more sustainable, the governance capacity and interactions of state and non-state institutions need to be strengthened in relation to a more effectively implemented Gujarat Fisheries Act.

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Appendix A: Ethics Approval Certificate

UNIVERSITY OF MANITOBA | Research Ethics and Compliance
Office of the Vice-President (Research and International)

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Fax +204-269-7173

APPROVAL CERTIFICATE

August 12, 2014

TO: **Rajib Biswal** (Advisors T. Henley/D. Johnson)
Principal Investigator

FROM: **Susan Frohlick, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2014:118**
"the socio-cultural dimensions of small-scale bag net fisheries in coastal Gir-Somnath, India"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement (2). **This approval is valid for one year only**.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- **If you have funds pending human ethics approval, please mail/e-mail/fax (261-0325) a copy of this Approval (identifying the related UM Project Number) to the Research Grants Officer in ORS in order to initiate fund setup. (How to find your UM Project Number: http://umanitoba.ca/research/ors/mrt-faq.html#pr0)**

- **if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

The Research Quality Management Office may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/orec/ethics/human_ethics_REB_forms_guidelines.html) **in order to be in compliance with Tri-Council Guidelines.**

umanitoba.ca/research

Appendix B: Consent Form

UNIVERSITY OF MANITOBA

Natural Resources Institute

70 Dysart Rd,
Winnipeg, Manitoba
Canada R3T 2N2

General Office [redacted]
Fax: [redacted]
http://www.umanitoba.ca/academic/institutes/natural_resources

Research Project Title: The socio-cultural dimensions of small-scale bag net fisheries in coastal Gir-Somnath, India.

Researcher: Rajib Lochan Biswal

Proposed script for verbal recruitment of research participants in the semi-structured interviews that will be spoken in Gujarati.

I am a postgraduate student at the University of Manitoba in Canada and currently in the process of conducting my Master's thesis research. Small-scale fisheries are not fully explored or recognised despite their socio-cultural and economic significance for many coastal fishing communities. The aim of the research is to understand the socio-cultural dimensions of the small-scale bag net fishery practised in coastal Gir-Somnath of Gujarat, shaped by distinctive economic and political features. Using the guidelines of the Working Group III of the 'Too Big to Ignore' project , the research will explore the small-scale bag net fish chain in coastal Gujarat, the local governance systems and how people perceive the bag net fishery in that region. Small-scale fisheries may have socio-cultural significance in coastal Gujarat but existing traditional and cultural practices seem to be underdocumented. Besides contributing to the literature on small-scale fisheries, this empirical research will tease out the significance of the profession in the coastal regions of Gir-Somnath. This research is being funded by the 'Too Big to Ignore' project, Canada. The research project has been approved by the Joint-Faculty Research Ethics Board at the University of Manitoba (Canada).

This consent letter, a copy of which will be left with you for your records and reference, is part of the process of informed consent. This letter should give you the preliminary information of what this research is about and what your participation will involve. If you

would like to know further details about this research or your participation, or some other information not included here, please feel free to ask for clarification. Please take time to read this carefully and to understand this information.

In the course of the research you will be asked a series of questions that will contribute me understand the existing situation of the small-scale bag net fishery in this area. Specific aspects such as the fish supply chain, local management practices and governance, and fisher perceptions on the bag net fishery and local governance and their satisfaction would be covered during the process. You will be requested participate in an interview session that will last for an hour. If more time is required, a subsequent meeting can be arranged at your convenience. These interviews may be conducted at a place convenient to you and according to your suitable time. After the interview, if need arises, you may be contacted for further clarifications.

The interview will be recorded on a digital recorder and will be documented in a notebook provided that you do not have any objections. The information provided by you will be used to complete my Master's thesis, and will potentially be published in an academic journal. You need to inform me if you are not comfortable with some information for public use and needs to be confidential. This information will not be recorded. You may also choose not to answer questions you are not comfortable with. All data gathered during the research will remain under the strict supervision of the researcher and stored in encrypted form in a secure location: the researcher's field notes and logs will be kept under lock, while audio recordings and transcripts of the interviews will be encrypted and stored in the personal computer of the researcher. Your name and contact information will be kept in secure location and will be destroyed upon completion of the study and after any academic publication (potentially in two to three years). You will not be identified by name in any such publications.

There will be a group meeting organized towards the end of the research where I will verify all the information collected during the research process. You will have an option to disagree to any such information, in which case, the information would be suitably modified with your inputs.

You are free to decline to participate in this research and withdraw from the study at any time, and/or choose not to answer any questions you may not be comfortable with. If you do decline to participate in the study or answer any questions, you will not face any negative consequences. If I have not explained the study clearly, please feel free to ask for clarifications or additional information at any time throughout your participation.

Thank you for your time.

My email is: [redacted]

If you have any complaints or further questions about the nature of this research, your concerns may be directed to

The Human Ethics Secretariat at the University of Manitoba [redacted]

or to my advisor:
Prof Thomas Henley
Phone: [redacted]
E mail: [redacted]

Please be advised that the staff at these offices speak only English.

Please be advised that the staff at the University of Manitoba has a right to look at my research records to see that the research is being done in a safe and proper way.

Do you understand and agree to the terms described here?

_____ I want to be referred by name and do not want to be anonymous

_____ Verbal consent for the participation in the research has been granted

_____ Consent for audio recording has been granted

Date: _____

Informant's signature (optional): _____

Appendix C: Semi-structured interview questions

The resources and needs questionnaire for material wellbeing

Pre-harvest period

1. How do you prepare yourself before you go for fishing? (What kind of resources do you use to earn your livelihood? (Ex house, fishing net, gear, boat, access to natural resources etc)
2. Do only Ghediya Kolis work on the boats? If not then who else work? If yes then why is it so?
3. What kind of gear do you use for fishing and how does it contribute?
4. How the gears have changed over time and why?
5. What are the modern devices do you use and since when did you start using modern devices?
6. Where do you get fishing nets and how do you maintain/repair it?
7. Do you have your own fishing boat? If yes then what kind of boat do you have?
8. How much do you invest per trip when you go for fishing? (For example buying diesels or any other stuff if you have any).
9. Do you recover all the investment you make for each trip? If yes then, how much profit do you make? If no then, what do you do to recover your investment?
10. What kind of resources do you have (other than fishing equipments)?
    a. Do you have a fishing license or Identity card?
    b. Are you associated with any group or cooperative? If yes what kind of group or institution you are associated with and how does it contribute?
    c. Do you have any kind of insurance? For example health insurance or boat or gear insurance.
    d. Do you have any access to credit? Where do you get loan or credit if you need?

e. Do you network with others before you go to the sea? If yes whom do you collaborate?

Harvesting

1. What is the best time or season for fishing?
2. How many months/ seasons you go for fishing? Please give detail information on the months you go.
3. How many hours/ days you spend in the sea for each trip?
4. What time of day you go for fishing and when do you come back?
5. What kind of problems do you face in the sea while fishing?
6. How do you tackle with those problems? Is there any institutional arrangements part of the local management system to tackle a problem?
7. Do you have any modern device which can help you in fishing such as tracking fish, or GPS to know direction or a radio to know the weather forcast or VHF or wireless to communicate?
8. How much fish you can catch in general in one trip (on average and how much it cost)?
9. How do you store fish for long period if you stay longer in the sea?
10. What kind of fish or any other aquatic species you generally catch and why?
11. How the harvest has changed over a period of time in terms of variety and size? For example what kind of fish would you have in earlier times and what kind of fish you are getting at present and what kind of changes do you see in terms of size?

Post- harvesting/ supply chain

1. Do you fish alone or in a group with other crew members? If in a group, then what is the economic relationship/ arrangement between the boat owner and crew members?
2. What do you do with your harvest? Do you consume more or sell more?
3. If you consume fish, how do you allocate the quantity within your family? Do men and women get same quantity and same type of fish to eat?

4. How do you sell your harvest? Do you sell as fresh fish or do you sell dry-fish?
5. How do you segregate the fish catch? For example which fish to sell as fresh fish and which fish to sell as dry-fish?
6. How different the market structure for fresh fish is from dry-fish?
7. Do you directly sell to the local consumers or you have any contact with petty traders or middlemen?
8. How do you obtain market related information for example consumer demand or market price?
9. How much you generally earn in one trip?
10. Do you think your earning from fishing is enough to maintain your family's living expenditure? If not what other alternative do you have?
11. How do you divide your share if you are involved in group fishing?
12. What kind of challenges you face for selling your harvest and how do you tackle those?
13. How does fishing contribute to the material wellbeing of your life? For example how do you utilise the earnings from fishing?

Questions for Relational wellbeing

Governance

1. How the local fishery in this region is managed?
2. What are the different institutions you are associated with regarding fishery management?
3. How has the institutional arrangement changed over time?
4. Are you part of any Samaj or any boat owner association or any state level association such as Gujarat Fishermen's society?
5. What kind of facilities fishers get from the institution (regarding management such as conflict resolution)?
6. Are there any rules or norms to regulate fishery? If yes, then what kind of rules or norms is there? Is it from the central government or state government or self imposed by the local institution(s)?

7. How the management related decisions are made? Do the members have any stake in decision making process?
8. Is there any monitoring mechanism to regulate trespassing? If yes what kind of penalty or fine is there for trespassing or breaking rules if there is any?
9. Do you often have inter-territorial space conflict issue? For example fishers from other state/region come to Gujarat coast for fishing which causes problem for you?
10. How do you manage conflicts (internal or external)?
11. What formalities or criteria one has to meet to get access to the local fishing area?
12. How fishing spaces are allocated among the members?
13. How the fishing spaces are transferred from generations to generations or from one member to another within a family?

Relational Wellbeing Assessment

Relationship (Ranked in order of influence)	(%) Fishers who cite this relationship as being important	Satisfaction with Relationship scale 1 to 5	(%) Fishers who fish to change this relationship
Dry-fish marketing			
Fresh fish marketing			
Government administration			
Local institutions			
Bank			
Crew members			
Family			
Other fishers			
Customers			
Fish traders			

A. ***Name three relationships that you believe are <u>most influential on fishing behaviour</u> and rank those in order of importance.***

   (Explain: Which relationship is so important for a fisher to do a good fishing or continuing fishing in future?)

B. ***How satisfied are you currently from these relationships (in %)?***

C. ***Which of these relationships do you want to change and why?***

Questions for Subjective wellbeing

Perceptions, Values and Beliefs

1. How long have you been involved in bag net fishing?
2. Why are you in fishing? It is because of your family tradition or any other reason that you would like to share. According to you, what is the most interesting part in fishing?
3. How do you feel about your life as a fisher? Would it be different if you were a farmer?
4. Are you satisfied with your profession? Give reasons for your response.
5. Do you see a bright future in fishing? Give reasons for your response.
6. Do you want your children to continue the same profession? Please give reason for yes or no.
7. What status you have in the society as a fisher? As compared to others (farmers or any other people such as daily wage earners), what do you think of your position within society?
8. What do you think of dry-fish economy? Do you feel any difference between dry-fish and fresh fish economy?
9. How satisfied you are with the local management system? Give reasons.
   a. Mutual understanding among group members.
   b. Fishery department
   c. Any other institutions such as cooperative societies or bank
10. How do you feel about fellow fishers from your community?

11. How do you spend your free time and with whom do you generally spend your free time?
12. What are the main festivals do you celebrate and with whom would you like to celebrate?
13. What is the status of women within your society?
14. How important women are to fishery?
15. How do women contribute to your profession? (depending on the response, explore).
16. Do you have any general beliefs? If yes what kind of belief you have?
17. Do you have any religious beliefs? If yes, what kind of religious beliefs do you have?

Quality of Life Survey

Domain	**% of fishers**	**Satisfaction scale (1 to 5)**	**Area of improvement (in points)**
Family			
Safety in the sea			
Work			
Security			
Financial security			
Leisure time			
Social status			

A. Name five most important things that they need to live a decent life.

B. How satisfied fishers are with those stuff at present (scale in %)?

C. Which of these stuff they want to change to lead a better life. Why these are important and what change they want to make

Appendix D: Interview Schedule

	Field Work Season in Gir Somnath, 2014 (in months)			
Category of Respondents	**September**	**October**	**November**	**December**
Fishers	SR01 – SR08	SR09 – SR37	SR38	-
Dry-fish traders	SR39	SR40 – SR41	-	-
Fresh-fish traders /Transport companies	SR45	SR46	-	-
Middlemen	SR42 – SR43	-	SR44	-
Saleswomen	-	SR47 –SR50	-	-
Wage earner in Transport company	-	SR51	-	
Ex-fishermen/boat owners	-	-		SR52 – SR54
Local leaders	SR55	SR56	SR57	-
Employees of Fisheries Department	-	SR58 – SR59	SR60 – SR61	-
Old Women	SR62	SR63		
Old men	SR64	SR65 – SR66	-	-
Local Businessmen	-	SR67 – SR68	-	SR 69

Appendix E: Key-informant Interview Questions

Category of Respondents	Topics Covered	Questions
Dry-fish traders	Dry-fish trade	• How do you prepare the dry-fish? Please share the process. • What kind of risk involved in your profession? • Do you have any association for dry-fish traders to regulate the market price so that you can avoid the market in contingencies? • Have you experienced any change in last few years?
Fresh-fish traders/ Transport companies	Fresh-fish trade	• How do you collect fish? • How do you contact buyers? • So how many companies are in Rajpara? Do you have any competitors? • Do you have loss at all? Do you manage to recover all the investment which you do? • In case if someone fails to return the amount, do have any association or leader to whom you may complain?
Middlemen	Fish trade and transactions	• So what kind of fish normally fishers harvest and what is the use of those? • Do you always recover your investment in the trade? How does it work? • What do you do after getting all the harvest? • If a boat owner fails to repay the money he has taken from you, what do you do in that case? • Do you consider fresh fish trade is profitable than dry-fish trade? • Do you sometimes receive degraded quality fish? How do you deal with that?
Saleswomen	Petty trading and local market demand	• What kind of changes have you experienced in this trade from earlier times? • What is the current status of our trade? • Is there any season in which you make maximum profit? • How do you actually sell your product? • What kind of challenge do you face in your

		trade?
Wage earner in transport company	Working condition in Transport companies	• Tell me something about your work. • What is the status of women within a fishing community? Do you think women get the same respect as men in your society? • Do you think there is a future in this occupation?
Ex-fishermen/boat owners	Recent changes in fishery than past	• What difference do you see in fishing at present than the earlier times? • Do you see a future in this occupation? What do you think of fishing at present? Is there any alternative livelihood option for the Koli people of Rajpara? • Did you have any *Pate*l to manage the harbour?
Local leaders	Local fishery and management	• What was the main responsibility of the president of the boat owners' association? • What changes do you see between the earlier time and the present time in relation to fishery in Rajpara? • What is the main role of a 'Patel'? • What do you think of the life of fishers in Rajpara?
Fisheries Department	Legal aspect of Fishery	• Is there any border or area for the local fishers in which outsiders are not supposed to fish? • The fishers from Rajpara often complain about the purse seine net users from Maharastra. Is there anything from the fishery department to address the problem? • What is the main responsibilities of fisheries department at the harbour? • What kind of facility does anyone get from the department? • Almost all the harbours have reached the maximum capacity. Do you have any authorisation to control the number of new boats in any harbour?
Old women	Socio-cultural life in the past	• What kind of work women do in fishing? • What differences do you feel at present than the past time? • What status women have at present? • What do you think of women's work load at

		present? • What difference do you see in current fishing from earlier times?
Old men	Socio-cultural life in the past	• Could you share me something about the history of Rajpara? • Why everyone in Rajpara gets married in particular one month? • What difference do you see in fishing in your time and what the fishers harvesting at present? • Do you think the lifestyle has drastically changed in Rajpara? • How was the society in your time?
Local businessmen	Current social life in coastal Gir Somnath	• What kind of business do you do in this place? • What do you think the life of local fishermen? • How does fishery contribute to your business?