Indigenous Fisheries and Food Security: Norway House Cree Nation, Manitoba, Canada

By

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A mural painted inside the mall at Norway House Cree Nation which says:

"Treat the Earth well: it was not given to you by your parents, it was loaned to you by your children. We do not inherit the Earth from our Ancestors, we borrow it from our Children"

-Ancient Aboriginal Proverb

ABSTRACT

This thesis addresses food insecurity from an Indigenous fisheries lens and presents a conceptual model by integrating three different but inter-related domains (ecological, cultural, and business) that impact Indigenous food security. Under the broader umbrella of fisheries and food security, the thesis addresses four objectives: (i) to investigate the co-existence of commercial and subsistence fisheries, (ii) to assess food security among commercial and subsistence fishing households, (iii) to explore the meaning of traditional food by engaging Indigenous youth with an objective to revitalize culture, and (iv) to examine the role of the fisherman's co-operative as a social enterprise to address community economic development. The study was conducted over a period of 14 months (from September 2013 to December 2014) in Norway House Cree Nation, northern Manitoba, Canada.

Community members are engaged in both subsistence and commercial fishing. The two kinds of fisheries co-exist, and potential problems of overlap are handled by temporal separation; spatial separation; formal mechanism of monitoring of net ownership; and informal communication for conflict resolution consistent with Cree values. The study found that extensive sharing of fish and other traditional foods by commercial fishers reached almost half of the total population in the community and contributed to improving food security. I used a participatory research approach to engage Indigenous youth to explore the meaning of traditional food. Participants produced a collaborative artwork on the theme of "what traditional food means to you?" This art work functioned as a boundary object, initiating discussion about food security planning in the community. Norway House Fisherman's Co-op operates as a social enterprise mainly because of fish sharing and its role in business diversification for community economic development. The Chief and Band Council requested an exploration of ways to add value to their existing commercial fisheries. Based on the findings, further development can rely on: (i) better use of existing fish resources, such as the by-catch, (ii) fishing related economic development, such as value-added fish products, and (iii) use of options regarding regulatory bodies, such as eco-certification.

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DEDICATION

To my parents

Dr. Anjuman Ara Islam and Ustad Azizul Islam—*I am who I am because of you. Thanks for believing in me and being there for me. Thanks for raising me with love and good values.*

To my kids

Shamailah Shanzeh Islam and Shamel Umair Islam—*You challenge me to be a better version of me in every way. My world revolves around you. I love you with all my heart.*

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1.1 Introduction

Food insecurity is not only a challenge for developing countries in Asia and Africa, but also for North American developed countries. Although the majority of the world's undernourished and food insecure people live in the rural parts of the developing countries, food insecurity is also a problem for certain segments of the Canadian Population. The food insecurity rate among Indigenous[1] households is more than double than that of other Canadian households (Council of Canadian Academies, 2014). According to the findings from the Canadian Community Health Survey, more than 12% of Canadian households and almost 27% of off-reserve Indigenous households experienced food insecurity in 2011 (Council of Canadian Academies, 2014). Indigenous households mainly dependent on social assistance reported to have even higher rates of food insecurity (Health Canada, 2012). In 2011, 65% of Indigenous households living mainly on social assistance were food insecure (Tarasuk, Mitchell, & Dachner, 2013). More women experience food insecurity compared to men (Beaumier & Ford, 2010). Indeed, food insecurity rates were reported to be higher in female-headed households with children than that of male-headed households (Council of Canadian Academies, 2014). High food insecurity among Indigenous communities is a major challenge for Canada and needs further attention.

The food systems of Aboriginal[2] peoples are comprised of traditional food (also known as "country food" or "bush food") and market food. The "traditional food" is referred to as food collected from land, water, and sky; "market food" is store-bought and cannot be produced locally from the land (Council of Canadian Academies, 2014, p. 103). Market food costs

[1] Here the word "Indigenous people" is referring to "Aboriginal people". These terms are used interchangeably in the thesis to refer to same First people.

[2] According to Canadian Constitution three groups of Aboriginal people are recognized: Indians (First Nations), Métis, and Inuit (Council of Canadian Academies, 2014).

significantly more in northern communities than in southern parts of Canada. The same food basket costs 81% more in Nunavik (situated in the northern Province of Quebec) than in Quebec City (Duhaime & Caron, 2012). High cost of transportation, storage, and distribution of market food in northern communities are some of the main reasons behind healthy food being so expensive (Boult, 2004). As such, many Aboriginal households show extensive compromises in both food selection and total food intake (Health Canada, 2007; Tarasuk, 2009). Indigenous people living in these communities frequently consume market food that is of relatively low nutritional value compared with nutrient-dense traditional food. A single portion of traditional food (animal or fish) provides an increased level of energy, protein, and many essential vitamins and minerals (Kuhnlein & Receveur, 2007). Thus consumption of healthy traditional food is an integral part of Indigenous food security.

Indigenous people in the Canadian north[3] consider fishing as a part of their tradition and culture. Fishing brings people together for the celebration of Indigenous ceremonies (Berkes, 2012). Many Indigenous communities regard fish as a staple because of its relatively reliable nature and abundance (Berkes, 1990). The significance of freshwater fish to Aboriginal people is exhibited by their selection of reserves adjacent to fisheries (Tough, 1996). Fish and other wild resources are abundant enough in many northern areas to help with food security. Estimates of the annual harvestable fish supply greatly exceed the actual levels of fish harvest in different parts of northern Canada (Friesen & Nelson, 1978; McCart & Den Beste, 1979). A harvest study conducted in Hudson and James Bay Lowlands, in the province of Ontario, Canada, found that if wild food harvests were fully utilized and evenly distributed, they could meet the protein needs

[3] Canadian north refers to northern Canada, the land and ocean-based territory that lies north of the southern limit of discontinuous permafrost from northern British Columbia to northern Labrador((Council of Canadian Academies, 2014).

of the entire population of the region (Berkes, George, Preston, Hughes, Turner, & Cummins, 1994).

There is an abundance of natural resources, especially fish and bush food, in northern Aboriginal communities in Canada. Yet people are still suffering from food insecurity (Council of Canadian Academies 2014). Sen's entitlement theory has useful perspectives and insights for northern Indigenous food insecurity.

Nobel laureate Sen, in his ground-breaking book 'Poverty and Famines: an Essay of Entitlement and Deprivation', observes that "a person starves either because he does not have the ability to command enough food, or because he does not use his ability to avoid starvation" (Sen 1981, p.45). Sen (1981) has described the various channels a person can use to obtain food as "entitlements". The failure to obtain food, therefore, becomes an "entitlement failure" (Sen & Dréze, 1989). There are three basic forms of entitlements from which food can come: (i) a direct entitlement (when a family grows their own food), (ii) an indirect entitlement (when a family uses income to purchase food), or (iii) a transfer entitlement (when a family obtains food from charity) (Sen, 1981). The proposed study will focus on capacity building of the locals by building upon Amartya Sen's entitlement theory on poverty and famine (Sen, 1981).

Sen's (1981) work rejects the traditional food availability theory and argues that limited political freedom and economic resources reduce the capacity of the poor to obtain food. His studies in Ethiopia and Bangladesh show that during times of famine there was more food production than in earlier years (Sen, 1981). However, people could not afford to buy food due to various socio-economic factors which included, but was not limited to, unemployment, rising food prices, and poor food distribution systems (Sen, 1981). These issues led to starvation among

more marginalized people in society, creating an insecure food system irrespective of food availability (Devereux, 2001).

The concept of entitlement holds that food insecurity and persistent hunger are indicators of low livelihood resilience of the poor who lack the requisite capacity either to produce sufficient food themselves or the financial ability needed to purchase food in a sustained manner, although food might be available in the market (Sen, 1981). Day laborers, casual fishers, and beggars fall into this category as they lack productive assets and depend on irregular income from daily wage labor (Sen, 1981). Thus, food insecurity and acute malnutrition occur when the entitlement of a community or person is disturbed by various socio-economic factors. Such insecurity can be addressed through entitlement to food by capacity building (Sen 1981); these initiatives motivate people to start their own business ventures and generate employment at grassroots levels and thereby contribute to community economic development.

The entitlement framework is useful because it disaggregates the reasons why a person or group may become vulnerable to hunger and food insecurity (Chisholm & Tyers, 1982). The present research uses the entitlement approach to understand prevailing food insecurity in First Nation communities in northern Canada. Food insecurity in the Canadian North poses a paradox: how could Canadian Indigenous people, who are entitled to fish, be suffering from food insecurity while living in an area rich in fisheries and other traditional food resources? Will Sen's entitlement argument hold in a Canadian First Nations context?

Small-scale fisheries in many areas include both commercial and subsistence components (Berkes, 2015; Sowman & Cardoso, 2010). Commercial fishers and subsistence fishers in a small Indigenous community may be depending on the same natural resource base. There may be conflicts between both kinds of fisheries when they exist in the same area or community. For

instance, commercial fisheries may overexploit the resource base and limited resources may be left to meet subsistence needs, or commercial fishers' gear may intercept fish runs toward subsistence fishing areas (Ommer & team, 2007). How can conflicts between commercial and subsistence fisheries be addressed? Will conflict between these two fisheries impact local food security? This thesis tries to address the challenges that occur when commercial and subsistence fisheries overlap and it becomes necessary to deal with potential conflicts.

There is a decline in the number of Indigenous people living on subsistence fishing and harvesting traditional food from the land (Berkes & Fast, 1996; Usher, 2002). Decline in fishing is having an impact on access to fish as healthy food (Islam & Berkes, 2016b). There are multiple reasons for this decline, including loss of access to land and natural resources due to sanctions by the State; environmental problems such as pollution and climate change; and the decline of traditional knowledge and bush skills transmission (Ohmagari & Berkes, 1997). This decline appears to be related to families spending less time on the land and Indigenous youth moving away from traditional food harvesting (Council of Canadian Academies, 2014). There is an increasing awareness that meaningful engagement and understanding of the values of the younger generations is essential for predicting the involvement of youth in harvesting of traditional food (Zurba & Trimble, 2014; Islam, Zurba, Rogalski, & Berkes, 2016). How can Indigenous youth be encouraged to harvest traditional food?

An effective means to address food insecurity is to build capacity at the local level (Sen, 1981); commercial fishing (e.g., fisher co-ops) is a potential sector for such initiatives in the context of Indigenous communities in northern Canada (Islam & Thompson, 2012). Fishing could provide more self-sufficiency and local food for the community, as well as a viable income for commercial fishers. Commercial fisheries as a regular business enterprise would focus on

maximizing fish catch and profit, following government regulations (e.g., the quota system), and generating employment. Fishing as a social enterprise would address multiple objectives, both economic and social. It would focus more on social benefits than just profit maximization. A social enterprise[4] may address the community's various needs, including food security and Indigenous cultural values of sharing.

Can a commercial fishery function as a social enterprise? For instance, it is a challenge for commercial fishers to deal with wastage of low-value fish that the quota system inevitably produces. That is because any over-quota species and the incidental catch (by-catch) have to be discarded. However, some fishers are able to bring in the fish to share with family and friends. A social enterprise may help commercial fishers, on the one hand, to access markets to sell fish with high economic value (i.e., walleye (*Sander vitreus)*, lake whitefish (*Coregonus clupeaformis),* and sauger (*Sander canadensis*); on the other hand, it may also help divert the by-catch and low-value species (i.e., northern pike (*Esox lucius)*, locally called "jackfish"; and white sucker (*Catostomus commersonii)*, locally called "mullet") for community food consumption. It would further reduce wastage on one hand and increase the community's food security on the other. Is it possible to add values to fish and find new markets for them? The practical aspect of this thesis looks into the issue of new fish product development for generating more income and increasing local food security.

[4] Social enterprise mostly serves as a community enterprise with a primarily goal to respond to social needs rather than just profit-making (Quarter, 1992).

Quarter, J (1992), *Canada's Social Economy: Co-operatives, Non-profits and other community enterprises,* James Lorimer & Company, Publishers, Toronto, Ontario.

1.2 Objectives Of The Research

The purpose of this research is to study food insecurity with respect to Indigenous fisheries in the context of nothern Manitoba, Canada. This research is a collection of four individual papers discussed in subsequent chapters (Table 1.1). There are mainly four objectives of the study:

- to investigate the co-existence of commercial and subsistence fisheries in an Indigenous community;
- to analyze food security through the lens of Indigenous fisheries and to assess food security among commercial and subsistence fishing households;
- to explore the meaning of traditional food by engaging Indigenous youth; and
- to examine the role of Norway House Fisherman's Co-op as a social enterprise to address community economic development and foster food security.

Table 1.1 Research objectives, justification of the objectives, and research questions

Objectives	**Justification**	**Principal research question (s)**	**Chapter in thesis**
To investigate the co-existence of commercial and subsistence fisheries in an Indigenous community.	There is a gap in the literature regarding the interactions of commercial and subsistence fisheries. This research addresses this gap.	How do commercial and subsistence fisheries co-exist?	Chapter 2
To analyze food security through the lens of Indigenous fisheries and to assess food security among commercial and subsistence fishing households.	This objective attempts to test Sen's entitlement theory in a Canadian First Nation context. This adds to the literature of food security and entitlement.	Does Sen's theory of entitlement hold true in the context of Canadian First Nations in general?	Chapter 3
To explore the meaning of traditional food by engaging Indigenous youth.	Children's education is the key for transmitting culture for Cree people. This objective addresses this using art-based inquiry.	How can Indigenous youth be involved in food security planning?	Chapter 4
To examine the role of Norway House Fisherman's Co-op as a social enterprise to address community economic development and foster food security.	Indigenous commercial fishery has to deal with the wastage of fish due to commercial fishing quota. There is a gap of studies on ways to add values to non-quota fish.	Can Fisherman's Co-op work as a social enterprise? Is it possible to add values to non-quota fish and market them successfully?	Chapter 5

1.3 Significance Of The Research

The Council of Canadian Academies expert panel on food security identified a major gap of knowledge in the Canadian mid-North (Council of Canadian Academies, 2014). This research is unique because it is aiming to address this gap along with some potential solutions to food security by better use of fish resources in northern Manitoba and possibly other mid-northern Indigenous communities.

1.4 Contribution To Applied Issues

This study investigates an Indigenous commercial fishery and the impact of present policies on fishers, as well as explores opportunities for local food business by value addition of fish and fish products to attain community economic development and thereby enhance food security. The applied framework of the thesis will follow a fisheries-community food security continuum (Figure 1.1)**.**

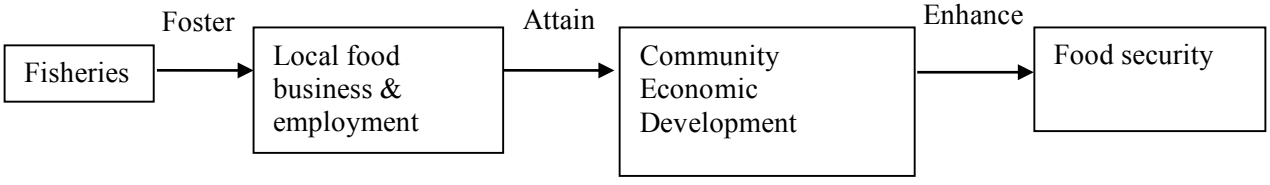

Figure 1.1 Fisheries-food security continuum

1.5 Contribution To Theoretical Knowledge

Food insecurity issues are complex and interdisciplinary in nature; they need to be addressed from a holistic perspective, especially to come to a solution for ensuring food security among Indigenous populations in Canada. The study addresses food security from the perspective of fisheries lens. Addressing food security with regards to fishing in Indigenous communities requires the consideration of three interrelated areas: ecological (resource capacity), cultural (traditional use and value), and business (commercial balanced against subsistence fishery; entrepreneurial skills development). The integrated approach (Figure 1.2) addresses the conceptual need in the literature of food security by exploring the connections and interdependencies of related but different domains.

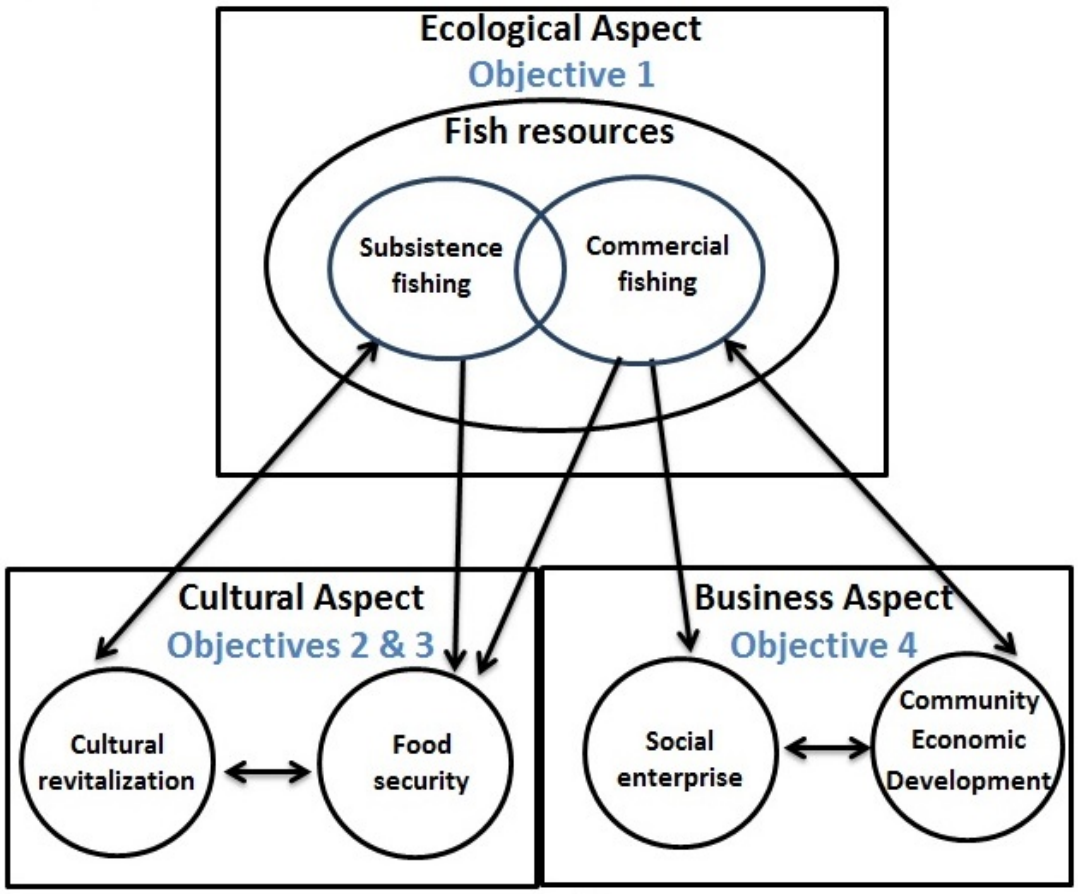

Figure 1.2 Using fisheries as a lens to address food insecurity

This conceptual model is the basis of the theoretical understanding of the whole thesis. In this chapter the model is introduced and it will be revisited in the discussion and conclusion chapter of the thesis (i.e., Chapter 6) and will be discussed in light of the findings of the research.

The first objective of the study falls under the Ecological aspect of the model. Ecological domain deals with the availability and the biological aspects of fish resources in both marine and freshwater (inland) fisheries. The scope of the study is limited to freshwater fisheries. In many fishing areas in Canada, commercial and subsistence fishers depend on the same fish resources. The overlapping parts of the subsistence and commercial fishing (shown in figure 1.2) represent fishers' conflicting interests over the same fish reserve. What happens when the two kinds of fisheries co-exist? How does it impact local food security? The first objective of the thesis addresses the gap in the literature regarding the interactions of commercial and subsistence fisheries.

The second and third objectives fall under the Cultural domain of the model. The second objective of the thesis looks into the food security rates among commercial and subsistence fishing households. What is the community doing to deal with food insecurity issues? What lesson can other communities learn from communities with food security? How is fishing contributing to addressing community food security? Objective three engages Indigenous youth to explore the meaning of traditional food through participatory art. What does traditional food mean to Indigenous youth?

Objective four includes the business aspect of the model. Can a commercial fishery run as a social enterprise and add value to the community and contribute to food security? All of these three domains, that is, ecological, cultural, and commercial components of the model, are interconnected and linked with the common thread of food security – fishing -- social enterprise.

Fishing contributes to food security on one hand and community economic development on the other hand. Commercial fishing may function as a social enterprise to add social values to the community.

1.6 Background Of The Study Area

The study was conducted in Norway House Cree Nation, one of the largest First Nations communities in Manitoba, Canada. Norway House had a resident population of 4,758 in 2011 (Statistics Canada, 2013). The community is situated 450 km north of Winnipeg, at the convergence of the Nelson River and Lake Winnipeg (Figure 1.3). Norway House was an important fur trade post in the 18th and 19th centuries. The majority of residents are Cree, one of the largest aboriginal groups in Canada. Fishing is a major part of livelihood for First Nations communities; Norway House is no exception, with fishers engaged in both subsistence and commercial fishing. Norway House community is run by The Chief and Band Council and they play an important role in keeping cultural activities alive by organizing traditional feasts year-round, when the whole community gets together to celebrate and enjoy traditional food and activities.

Historically, fishing was considered to be a family activity and this trend still continues. Most members of a household, including men, women and children, participate in subsistence fishing. According to a senior informant, in recent years, the role of women in subsistence fishing has declined to low levels. People mostly use angling, or gillnets and boats for subsistence fishing. People go to rivers and small lakes adjacent to the community for subsistence fishing. For those who go to hunting camps, there is also subsistence fishing in the lakes in the interior of Norway House's community harvesting area. Residents also participate in

other traditional activities, such as hunting, trapping, and berry picking. People share traditional foods (fish, moose meat, and small game, etc.) with their families, neighbors, and friends.

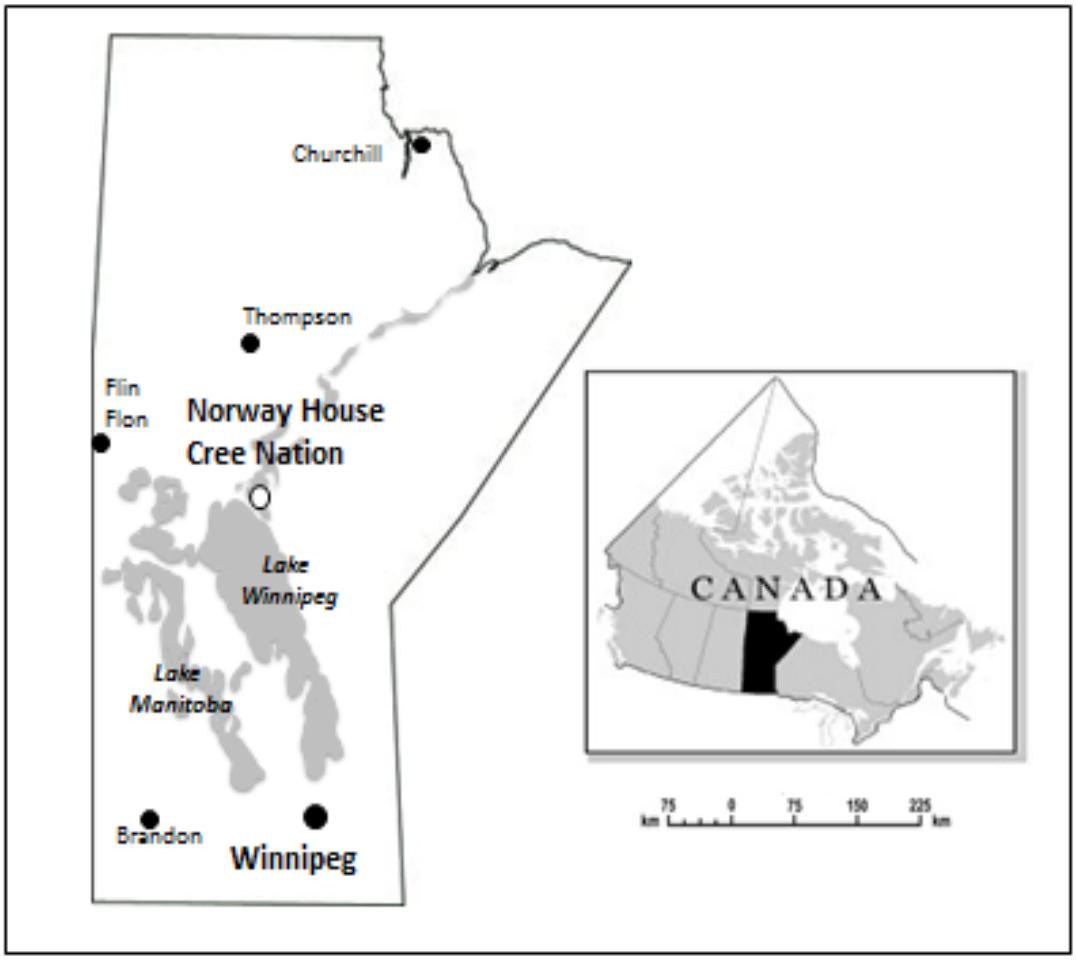

Figure 1.3 Location of Norway House Cree Nation in Manitoba, Canada

Norway House Fisherman's Co-op was established in 1962. The commercial fishing licenses are owned and regulated by the Co-op. The Co-op has 50 active commercial fishing licenses, all of them held by male fishers. The Co-op also has two inactive licenses. If a commercial fisher is inactive for two consecutive years, his license becomes invalid. Commercial fishers renew their fishing licenses every year by paying a small renewal fee to the Manitoba Department of Conservation and Water Stewardship.

Image 1.1 Prof. Berkes & I at Chief and Band Council of NHCN

Image 1.2 Me in front of Norway House Fisherman's Co-op

Image 1.3 People at Norway House participate in various traditional activities (i.e., Pow Wow)

Image 1.4 Commercial fishers catching fish at PlayGreen Lake at Norway House

Image 1.5 A fisher helper with his catch

Image 1.6 Commercial fishers cleaning and sorting fish to take to the Co-op

Image 1.7 Fish are sorted in red totes and ready to deliver at the Co-op

Commercial fishing in Manitoba is regulated and fishers are required to sell their catches to Freshwater Fish Marketing Corporation located in Winnipeg. Norway House fishers sell their catch through the Co-op. There are two commercial fishing seasons: spring/summer and fall. Most of the fishers have fishing cabins on the lake. During fishing seasons, some fishers take their families with them to live in fishing cabins. The majority of the commercial fishing takes place in Lake Winnipeg (the tenth largest lake in the world), Playgreen Lake, and Kiskittogisu Lake.

According to Lake Winnipeg commercial fishing regulations, three species are quota fish, managed under quantitative harvest limits: walleye, sauger, and lake whitefish (including lake herring, *Coregonus artedii*), and these quotas are controlled by the Co-op. During the fishing season, a commercial fisher is only allowed to bring 20 tubs (one tub is about 27 kg) of quota fish per day, and unlimited tubs of non-quota fish. Commercial fishing occurs in three places: Lake Winnipeg, Playgreen Lake, and Kiskittogisu Lake. During the spring/summer season fishers can only fish in Lake Winnipeg; during fall season they can fish in all three lakes. There are different quotas allocated for these different lakes. Commercial fishers have to fulfill their quota from a specific lake before they are allowed to fish in another lake. They are not allowed to sell fish of one lake under the quota of another lake. The Co-op has two fish landing stations: Playgreen station (operates in all fishing seasons) and Whiskeyjack station (operates only in fall fishing season).

Youth in the community have the opportunity to be elected for Youth Chief and council and they also help out in the community through different school-run groups and programs. Moreover, the Youth Chief and council work to create events for youth in the community as well

as run fundraising activities for different events that encourage youth to participate in traditional activities. Youth Chief and council usually serve the community on two-year terms.

There are three schools in the community: Jack River School, Norway House School, and Helen Betty Osborne School (HBO). HBO is the largest school in Norway House with regard to number of students and size. The school building is a state-of-the-art building and had 1285 students registered for the 2014–15 school year. Schools at Norway House encourage students to participate in traditional means of living by offering an outdoor education course which teaches students a variety of bush skills—for example, how to skin animals after hunting, make fish bait, and gut fish. Students travel around the community for hunting, trapping, and fishing and also to learn about different traditional plants and gather traditional knowledge.

1.7 Research Methods

There are different research methods available for conducting social research. A case study is an effective strategy of inquiry, which provides researchers with flexibility in choosing research designs and data collection methods (Creswell, 2009). It also opens a methodological tool box for comprehensive analysis of a phenomenon. The nature of this study required adopting a mixed method research design. Therefore, I employed a mixed method participatory research approach with various data collection procedures to address the overall research objective. For collection of data, I used questionnaire surveys, focus group discussions, participatory art, and interviews with key informants. This section begins with an explanation of the importance of following a participatory worldview with mixed method research approach and subsequently provides justification for my choice of inquiry and data collection procedures. The conceptual methodological diagram is presented in Figure 1.4.

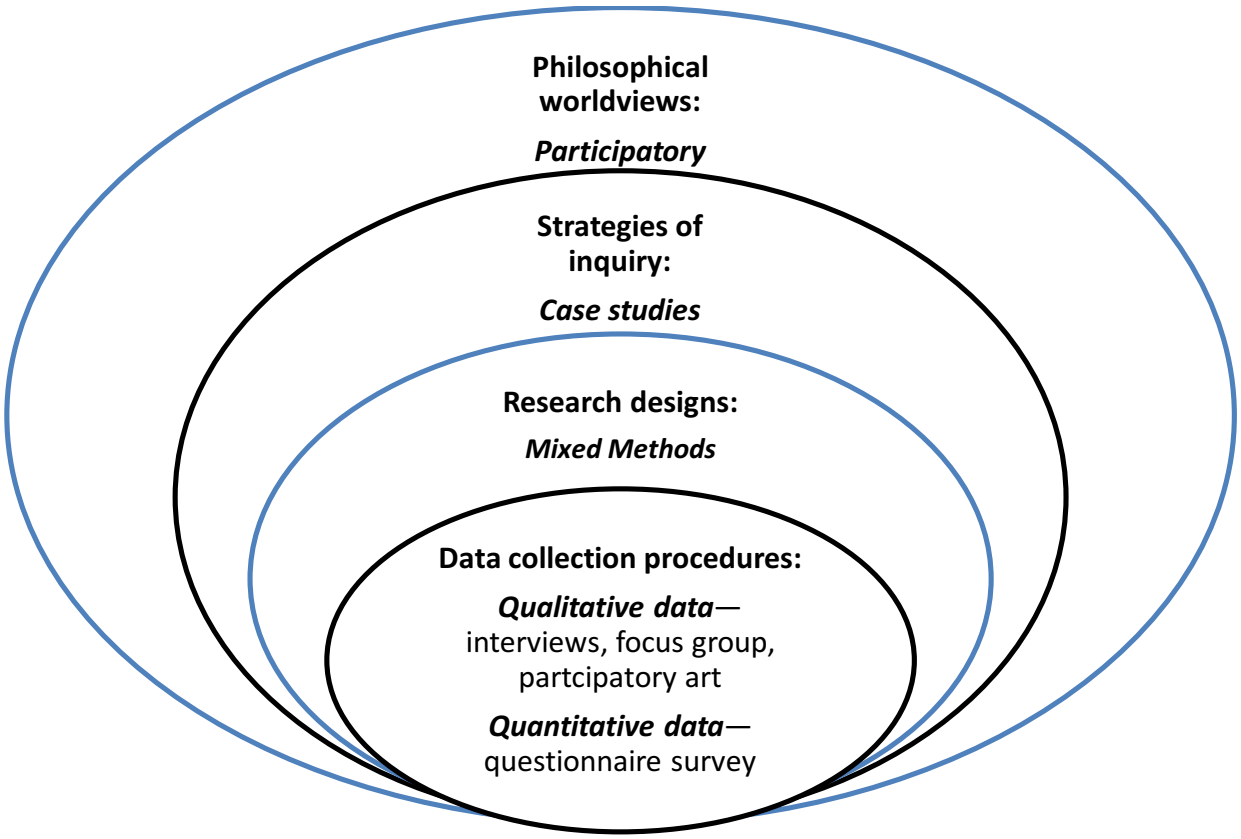

Figure 1.4 Conceptual Methodological Diagrams

Source: adapted from (Creswell, 2009)

1.7.1 Philosophical Worldview: Participatory

The philosophical orientation of this research is guided by a participatory worldview (Creswell, 2009). Participatory research puts an emphasis on collaborating with local people throughout the entire research process. Participatory research is unique in its content and focus due to the holistic nature of generating information (Hesse-Biber & Leavy, 2006; Ragin & Becker, 1992). Through this 'participatory' lens, I was able to obtain a better understanding about fishers and their livelihoods.

1.7.2 Strategies of Inquiry: Case study

Case study is considered an important strategy of inquiry for conducting research mainly grounded on participatory worldview (Creswell, 2007). Researchers adopting a case study approach collect detailed information using a variety of data collection procedures over a sustained period of time (Creswell, 2007). A case study enables an in-depth examination of a single instance or a case without having to follow a rigid protocol of variables (Yin, 2009). A case study approach emphasizes gathering multiple sources of information including quantitative data. For this research, I used a case study because this strategy of inquiry allowed me flexibility in using different methods to answer my research questions and address overall study objectives.

1.7.3 Research Design: Sequential Mixed Method

The strength of the case study approach is that it engages both qualitative techniques, and quantitative evidence (Yin, 2009). Mixed method research involves the use of both approaches in a way that the overall strength of a study is greater than either qualitative or quantitative research alone (Creswell & Plano, 2011). As such, I adopted a mixed method research design combining both qualitative and quantitative approaches, with an emphasis on the former. In my research, the quantitative study provided me with the tools to analyse food security rates and livelihood strategies among the fishing community, while qualitative methods allowed me to explain findings with narrative descriptions.

I adopted a sequential mixed method approach, which advocates expanding the findings of one method with another (Creswell, 2009, p.14). This strategy allowed me to analyse the data in phases. As discussed in Creswell (2009), I began my research with qualitative methods (interviews with key informants, focus group discussions) followed by a quantitative survey (questionnaire) and later took a qualitative approach again (follow-up interviews and focus group

discussions (Figure 1.5). This helped me in the process of triangulation (Stake, 1995) and data verification.

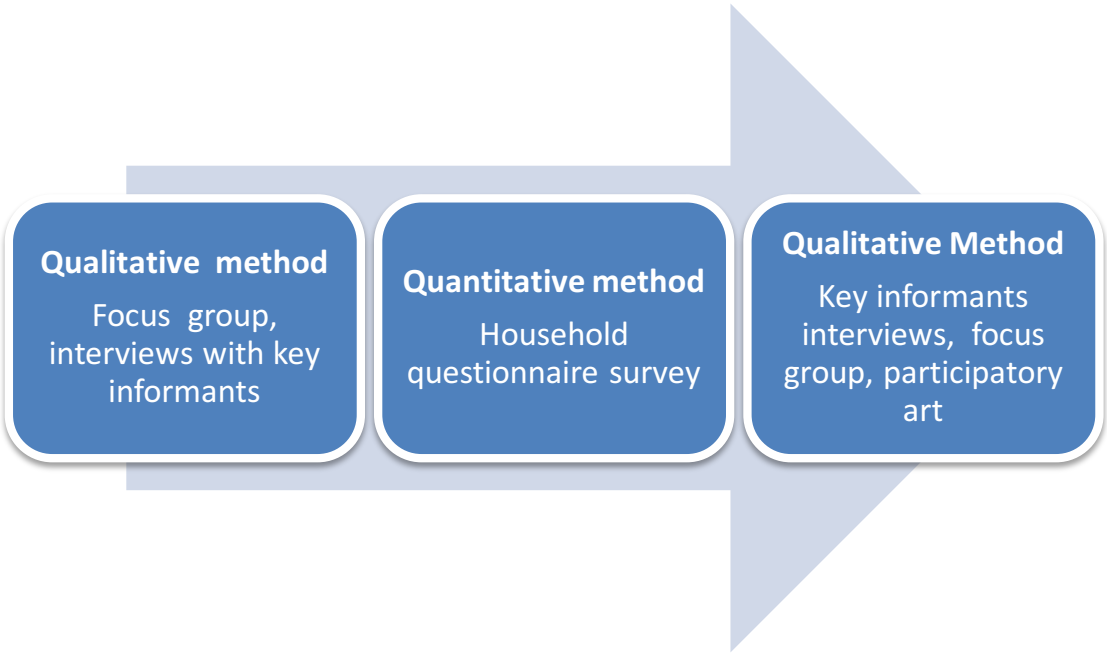

Figure 1.5 Sequential mixed method approach diagram

Source: adapted from (Creswell, 2009; p. 14)

1.7.4 Data collection procedures

Data collection in case study research is typically extensive drawing on multiple sources of information (Creswell, 2007). For quantitative data collection, I used household questionnaire surveys and for qualitative data gathering, I employed focus group discussions, semi-structured interviews, and participatory art-based approach.

The four thesis objectives have different methods of data collection (Table 1.2), and the details of each are in the relevant chapters (from chapter two to five).

Table 1.2 Objectives, research participants, and methods of data collection

Objectives	Research participants	Methods of Data Collection
To investigate the co-existence of commercial and subsistence fisheries in an Indigenous community.	Commercial and subsistence fishers, Officers of Manitoba Conservation and Water Stewardship, senior fishers (both commercial and subsistence)	• Semi-structured interviews • Focus group discussions • Household questionnaire surveys among 35 commercial fishers
To analyze food security through the lens of Indigenous fisheries and to assess food security among commercial and subsistence fishing households.	Commercial and subsistence fishing households at Norway House Cree Nation	• Household questionnaire surveys among 35 commercial fishers and 100 subsistence fishers
To explore the meaning of traditional food by engaging Indigenous youth.	Art students of Helen Betty Osborne School at Norway House Cree Nation	• Focus group discussions • Participatory art
To examine the role of Norway House Fisherman's Co-op as a social enterprise to address community economic development and foster food security.	President and members of Norway House fisherman's Co-op; Government officials and NGO members; Freshwater Fish Marketing Corporation	• Semi-structured interviews • Focus group discussions • Household questionnaire surveys among 35 commercial fishers

1.8 Organization Of The Thesis

This thesis consists of six chapters. Chapter1 introduces the thesis topic and has a brief discussion of the study area and research methods. It also includes significance of this study with respect to academic and practical implications. Four main objectives are presented as individual papers in the following four chapters, from Chapter Two to Five. Four chapters are articulated using a common thread of the thesis: fisheries and food security. Chapter 6 contains a general discussion, overall findings, and conclusion of the thesis.

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CHAPTER 2: CAN SMALL-SCALE COMMERCIAL AND SUBSISTENCE FISHERIES CO-EXIST?[5]

Abstract

Subsistence (or food) fisheries are under-studied, and the interaction between subsistence and commercial fisheries have not been studied systematically. Addressing this gap is the main contribution of the present paper, which focuses on how to deal with the challenge of overlapping commercial and subsistence fisheries. The study was conducted in Norway House Cree Nation, with qualitative data collection and questionnaire surveys. Commercial fishing in Norway House takes place during spring/summer and fall seasons, whereas subsistence fishing takes place throughout the year. Commercial fishing mostly occurs in the open waters of Lake Winnipeg; subsistence fishing in rivers adjacent to the reserve and in smaller lakes inland. How do fishers and the community deal with overlaps and potential conflicts between the two kinds of fisheries? The main mechanism is the separation of the two temporally and spatially. In the remaining overlap areas, conflict resolution relies on monitoring of net ownership and informal communication. The first mechanism is regulatory but really *de facto* co-management in the way it is implemented. The second is consistent with Cree cultural values of respect, reciprocity and tolerance.

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2.1 Introduction

Fishing is not only a livelihood but also a means of acquiring food for many people in various parts of the world. Small-scale fisheries make multiple contributions to local economies, society and culture (Weeratunge et al. 2014; Jentoft 2014), and may be pursued with multiple objectives (Nunan 2010, 2014). However, small-scale fisheries are not monolithic and may include both commercial and subsistence components (Sowman and Cardoso 2010; Berkes 2015). Commercial fishers and subsistence fishers may in some areas be depending on the same natural resource base. There can be conflicts if both kinds of fisheries exist in the same area or community. For example, commercial fisheries may overexploit the resource base, or commercial fishers' gear may intercept fish runs toward subsistence fishing areas (Ommer and team 2007). How can such conflicts be resolved? This article tries to address these challenges when commercial and subsistence fisheries overlap and it becomes necessary to deal with potential conflicts.

Subsistence fisheries exist in many parts of the world but are understudied (Berkes 1990; Zeller et al. 2014). In particular inland subsistence fisheries tend to be ignored and do not get as much attention as do marine fisheries (Cooke et al. 2015). Global fisheries data available from the FAO underestimates the contribution of subsistence fisheries and small-scale fisheries in general (Bartley et al. 2015**;** Pauly 2014; Harper and Zeller 2011; Lingard et al. 2011). FAO statistics are based on official landings, and often do not reliably account for fish harvests that do not enter market mechanisms. A system based on the commercial value of the catch underestimates the real value of subsistence fisheries and their role in local and regional economies (Pauly 2014; Bartley et al. 2015). In terms of research and management, subsistence fisheries are in a disadvantageous position, as financial resources are often allocated largely on

the basis of the commercial value of landed fish (Penn and Weinstein 2003). The literature of subsistence fishing is scarce and limited to few geographic areas such as South Africa (Branch 2002; Sowman 2006; Napier et al. 2005; Cockcroft et al. 2002), Australia (Barber et al. 2015; Busilacchi et. al 2013; Russell et. al 2015 and Jackson et. al 2012), and Canada (Ommer and team 2007; Harris and Millerd 2010; Berkes 2012).

Subsistence fisheries are important not only for food but also for culture. For example, fishing is considered to be part of First Nations culture in northern Manitoba and elsewhere in the Canadian North. Some Indigenous peoples in Canada are referred to as First Nations. The significance of fish to First Nations communities is exhibited by lands (reserves) set aside for the exclusive use of indigenous peoples. Reserves are almost always adjacent to good fishing areas, both inland and coastal (Tough 1996). Fishing plays an important role in bringing people together socially and culturally, for example in the celebration of First Salmon ceremony (Berkes 2015, p. 232). In many areas, fish is the most abundant and reliable subsistence resource (Berkes 1990). Even though the importance of subsistence resources is well known in the indigenous peoples food and nutrition literature, the role of subsistence fisheries is not explicitly discussed (Kuhnlein et al. 2013).

Canadian courts have established that food or subsistence fisheries of indigenous people have priority over all other uses of the resource (Harris and Millerd 2010). “Subsistence fishing” is referred in literature also as “food fishing”, “domestic fishing”, and “native harvesting” (Berkes 1988). Branch and colleagues (2002) refer to subsistence fishers as “poor people” who personally harvest marine resources as a source of food for household consumption or sell their harvest to meet the basic needs of food security, even though there are no data in the literature to show that subsistence fishers are necessarily “poor people”. The number of terms used in

literature regarding subsistence fisheries can create confusion (Clark et al. 2002). In this paper, we use the terms subsistence and food fishing interchangeably, and define subsistence fisheries as "local, non-commercial fisheries, oriented not primarily for recreation but for the procurement of fish for consumption of the fishers, their families and community" (Berkes 1988, p. 319). Sharing is often an important part of subsistence fishing and plays a significant role in ensuring community food security (Berkes et al. 1994).

The available literature on North America often equates subsistence fisheries with aboriginal (indigenous) fisheries, and the older literature includes detailed studies from parts of North America, such as the Great Lakes and the Pacific Northwest (Cooke and Murchie 2015). Historically, indigenous subsistence fisheries were impacted by commercial fisheries (Tough 1984). In the United States Pacific Northwest (Cohen 1986) and in the adjoining Canadian Province of British Columbia, the development of commercial salmon fisheries undermined local indigenous economies (Ommer and team 2007; Trosper 2009). In the Province of Manitoba, the development of commercial fisheries, mainly for lake whitefish *Coregonus clupeaformis* undermined native subsistence fisheries (Tough 1984, 1996). However, under certain circumstances, commercial and subsistence fisheries can co-exist. Experience in South Africa indicates that, for co-existence to occur, commercialization of subsistence fisheries needs to be socially beneficial and the fishery managed properly (Arnason and Kashorte 2006).

In many parts of the world, for example in Manitoba, Canada, commercial and subsistence fisheries in fact do co-exist. Manitoba statistics for 2013-14, compiled by the Freshwater Fish Marketing Corporation, indicate that 30 First Nations out of a total of 63 were licensed for commercial fisheries; we assume that all or nearly all 63 have subsistence fisheries as well. This raises the question of how these two kinds of fisheries co-exist in the same area,

often the fishing area of a small community. Limited published literature exists on the interaction between the two kinds of fisheries. The paper tries to address the challenge of co-existence by focusing on the mechanisms that make co-existence possible, using the case of a relatively remote First Nations community in northern Manitoba.

2.2 Study Area & Research Methods

The study was conducted in Norway House Cree Nation, one of the largest First Nations communities in Manitoba, with a resident population of 4,758 in 2011 (Statistics Canada 2013). Norway House is situated 450 km north of Winnipeg, at the convergence of Lake Winnipeg and the Nelson River (Figure 2.1). Norway House was an important fur trade post in the 18th and 19th centuries. The majority of residents are Cree, one of the largest aboriginal groups in Canada that extend across the boreal and subarctic regions from Labrador to British Columbia. Fishing is an important part of First Nations livelihoods; and Norway House is no exception, with fishers engaged in both subsistence and commercial fishing.

Norway House Fisherman's Co-op was established in 1962. The commercial fishing licences are owned and regulated by the Co-op. The Co-op has 50 active commercial fishing licences, all of them held by male fishers. The Co-op also has two inactive licences. If a commercial fisher is inactive for two consecutive years, his licence becomes vacant. Commercial fishers renew their fishing licences every year by paying a small renewal fee to the Manitoba Department of Conservation and Water Stewardship. It is by law in Manitoba that commercial fishers have to sell their commercial catches to Fresh Water Fish Marketing Corporation, and Norway House fishers do this through their Co-op.

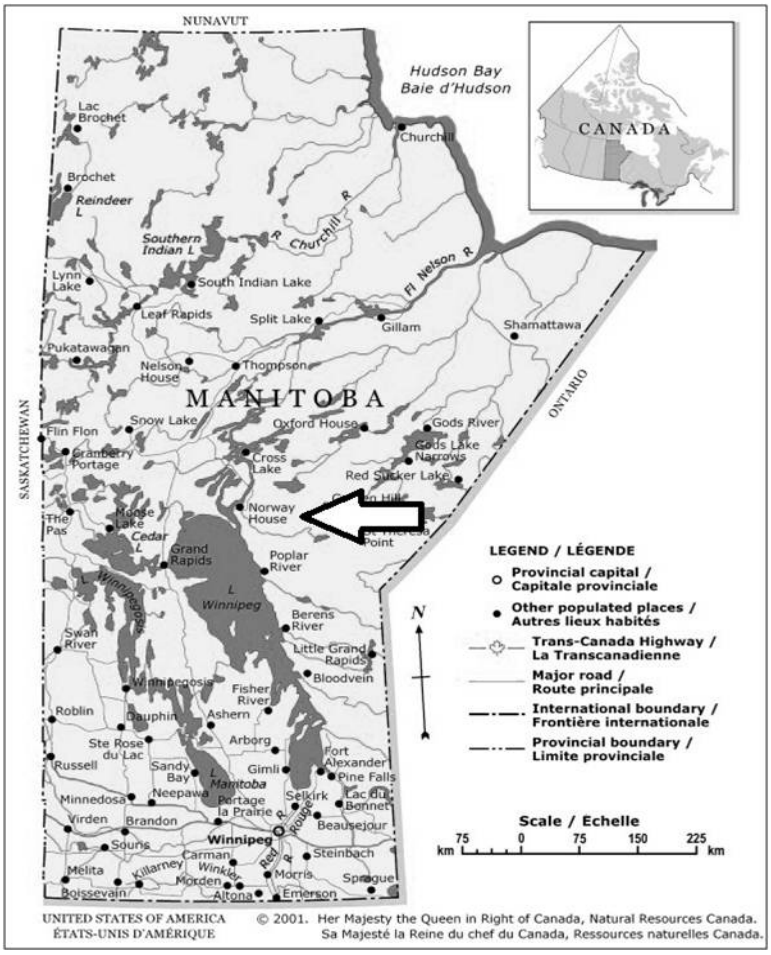

Figure 2.1 Location of Norway House Cree Nation in Manitoba, Canada

Adopted from http://www.knightsinfo.ca/mapmb.html

In the study area, only three species are quota fish, managed under quantitative harvest limits: walleye, *Sander vitreus* (locally called pickerel), sauger, *Sander canadensis*, and lake whitefish (including lake herring, *Coregonus artedii*), and these quotas are controlled by the Co-op. During the fishing season, a commercial fisher is only allowed to bring 20 tubs (one tub is about 27 kg) of quota fish per day and unlimited tubs of non-quota fish. Commercial fishing occurs in three places: Lake Winnipeg, Playgreen Lake and Kiskittogisu Lake. During the spring/summer season fishers can only fish in Lake Winnipeg; during fall season they can fish in all three lakes. There are different quotas allocated for these different lakes. Lake Winnipeg has

the highest quota of 608,000 kg round weight (of which only 280,305 kg can be walleye and sauger), Playgreen Lake has a total quota of 115,900 kg round weight and Kiskittogisu Lake has a total quota of 31,000 kg round weight. Commercial fishers have to fulfill their quota from a specific lake before they are allowed to fish in another lake. They are not allowed to sell fish of one lake under the quota of another lake. The Co-op has two fish landing stations: Playgreen station (operates in all fishing seasons) and Whiskeyjack station (operates only in fall fishing season).

Most members of a household, men, women and children, participate in subsistence fishing. Traditionally, fishing was a family activity. However, in recent years, the role of women in subsistence fishing has declined to low levels, according to a senior informant. People go to rivers and small lakes adjacent to the community for subsistence fishing. For those who go to hunting camps, there is also subsistence fishing in the lakes in the interior of Norway House's community harvesting area. Given the importance of fishing for the community, there is an outdoor education course in schools in Norway House for children to learn how to fish.

This study was conducted over a period of 14 months from September 2013 to November 2014. The study included commercial fishers and subsistence fishers as research participants. We also conducted interviews with the president, secretary and members of Norway House Fisherman's Co-op. This mixed-methods research study employed semi-structured interviews of key informants and focus group discussions, followed by two separate questionnaires surveys (administered to commercial fishers and subsistence fishers) and additional interviews to follow up on results of the questionnaires. Two community researchers were employed to help with questionnaire surveys. The questionnaire was pretested by fishers,

Co-op members and other community members to ensure that the questions were culturally appropriate and respectful.

The questionnaire survey for commercial fishers used snowball sampling. The sample size was 35 (out of 50, or some 70% of the Co-op membership). We asked commercial fishers if they perceived any conflict between the two kinds of fisheries. An interpreter was employed to help interview senior fishers who speak only Cree. A similar but different set of questions was used for subsistence fishers. The sample size was 100 households, and the interviews were held with both men and women household heads were possible and included the harvest of all members of that household. The household questionnaire survey was conducted by a community researcher from October 2013 to March 2014. He went from door to door and conducted the survey. The sample frame included all different groups of fishers, particularly seniors, female headed-households, old peoples' home and presumed low-income households. We identified key informants by discussing with senior fishers, Co-op officials and community researchers. We conducted detailed interviews of key informants to follow up on the questionnaire results and to validate the data. During the follow up interviews we asked questions on Cree cultural values and its role on resolving conflicts between two kinds of fisheries.

We obtained statistical data on seasonal catch of commercial fishers from the Norway House Fisherman's Co-op and we conducted semi-structured interviews with the Conservation and Water Stewardship (the government regulatory body) district supervisor and his assistant to find out how they regulate commercial and subsistence fishers, for example, in making sure that commercial fishers follow the start and end dates of commercial fishing seasons, and in enforcing commercial fishing guidelines (e.g., the minimum allowable mesh size and the maximum boat size).

2.3 Results: Overlap Between Subsistence & Commercial Fisheries

Questionnaire data showed a high percentage of Norway House households (77 of 100 or 77%) participating in subsistence fishing in the year of 2012-13. We asked the head of each household to identify their fish harvesting pattern from a given list of four options. The list includes intensive harvesters (according to community members a fisher who brings a "lot of" fish), active harvesters (according to community members a fisher who brings "some but not a lot of" fish), occasional harvesters (according to community members a fisher who harvests fish only "occasionally") and non-harvester (who does not harvest at all). Results show that participation rate is high, but relatively few households fish intensively. About 58% of the subsistence fishing households are occasional harvesters (Figure 2.2).

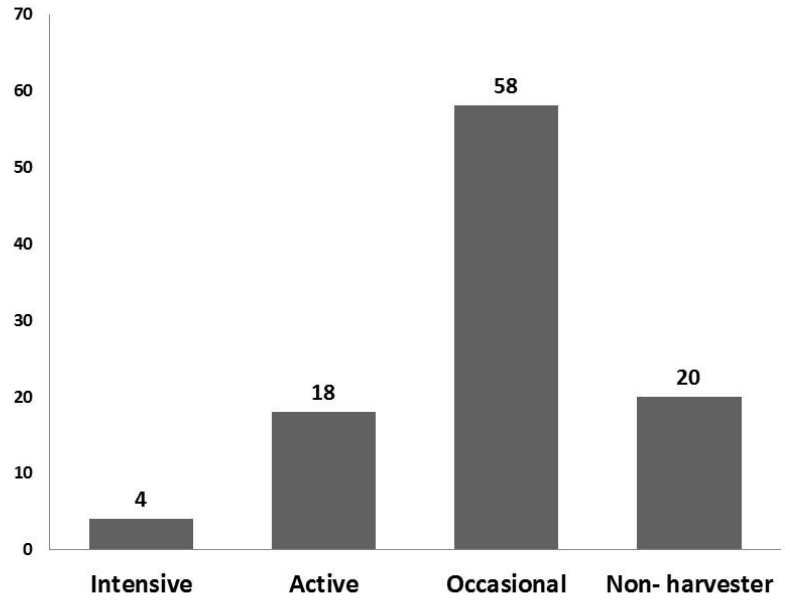

Figure 2.2 The number of subsistence fishing households based on their harvesting intensity in 2012-13 (N=100)

All commercial fishers in our sample (35 of 35) also took part in subsistence fishing. Out of 52 commercial fishers in Norway House Fisherman's Co-op, 47 were treaty (i.e., registered indigenous people) commercial fishers and five were non-treaty fishers. Treaty commercial fishers can participate in both kinds of fisheries, as subsistence fisheries is a treaty right (Figure 2.3). The potential overlap (and therefore conflict) between subsistence and commercial fishing was analyzed with respect to two factors: overlap in the species harvested and overlap in the fishing gear use.

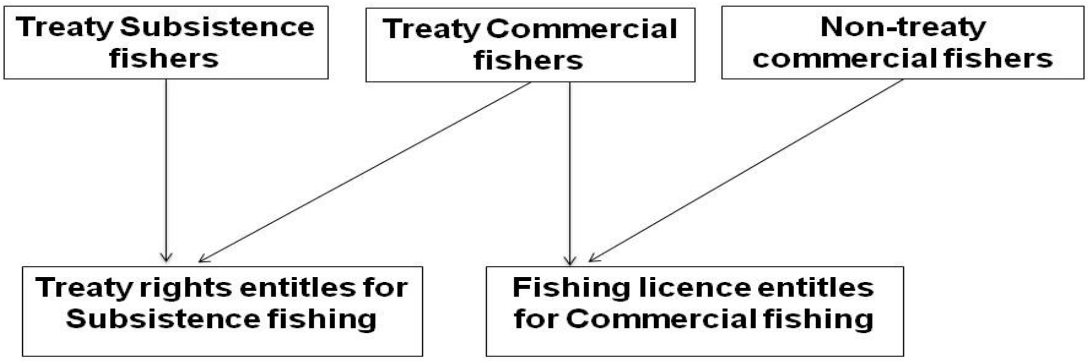

Figure 2.3 First Nations commercial fishers can conduct both subsistence and commercial fishing

2.3.1 Both kinds of fisheries target same fish species:

Commercial and subsistence fishers targeted similar species. In the questionnaire survey, subsistence fishers were asked to indicate their main species by season, in terms of their largest catch, medium catch and occasional catch (by weight) for the year 2012-13. Table 2.1 shows the results. In all seasons, the main species harvested was walleye, lake whitefish and northern pike, *Esox lucius*, locally called jackfish, were seasonally important, and the species of occasional catch varied from season to season.

Table 2.1 Species harvested by subsistence fishers at Norway House in 2012-13

Seasons	Largest catch	Medium catch	Occasional catch
Summer/Fall	walleye	lake whitefish	whitefish, sauger, northern pike and white sucker(*Catostomus commersonii*, locally called mullet)
Winter	walleye	whitefish, northern pike	northern pike, sauger, white sucker and burbot (*Lota lota,* locally called mariah)
Spring	walleye	northern pike	whitefish, northern pike

Walleye is also the commercially most significant species, followed by lake whitefish, northern pike and white sucker. In fact, every single fish species that occurs in the subsistence list (Table 2.1) also occurs in the commercial list (Table 2.2) with the exception of burbot. This latter species is only harvested for subsistence purposes during the winter season. The liver of burbot is considered as a delicacy for First Nations people, and presumably important for nutrition in winter, as burbot is a freshwater cod and the liver is rich in vitamin D ("cod liver oil"). According to informants, burbot was very popular in the past and it is still popular among elders in the community but not among the younger generations.

Table 2.2 Commercially significant fish species according to catch and sale records of Norway House Fisherman's Co-op in the year 2012-13

Rank	Species	Percent of total revenue
1	walleye including sauger	51
2	lake whitefish including lake herring	44
3	northern pike	3
4	white sucker	1
5	Other	1

2.3.2 Both kinds of fisheries use similar fishing gear

Commercial fishers usually use gill nets from open boats to catch all commercial species. They cannot have more than 1,400 m of fishing net in the water at one time which means they are only allowed 15 nets at a time. Subsistence fishers typically use one or two nets, but there is no legal restriction on the number of nets as long as the catch is used for personal and household consumption. In Norway House, as elsewhere in the Canadian subarctic and boreal zone (Berkes 1977; Berkes et al. 1994), most subsistence fishing used to be carried out by the use of gill nets, supplemented by set lines and rod-and-reel fishing, with fish traps and seining, as appropriate for an area. However, the imported technique of rod-and-reel fishing has become increasingly more important; as it is cheaper compared to gill nets to purchase and easier to use. According to a knowledgeable informant, the use of gillnets in Norway House has declined mainly due to increasing cost of gas as one needs a boat to use gillnets for fishing, and probably more than half of the subsistence fishing is done by rod-and-reel.

There are a number of differences in the equipment used and applicable regulations for the two kinds of fisheries. According to questionnaire data, 57% of commercial fishers used fiberglass boats and the rest aluminum boats. These boats were usually equipped with two 120 HP engines for speed and safety. Subsistence fishers use a variety of boats including paddle canoes and canoes with engines (mostly less powerful). Commercial fishers can use various mesh sizes but not smaller than 4.25 inch (108 mm) as specified in their fishing licences. For subsistence fishers there is no restriction on mesh size. Commercial fishers are not allowed to fish in rivers or within 1.5 km of river mouths (to protect spawners and spawning areas). Subsistence fishers do not have such restrictions and they can put nets anywhere, as long as the area is not closed for conservation purposes.

In summary, both commercial and subsistence fisheries target the same species and use similar fishing gears (gillnets) but the subsistence fishery increasingly uses rod-and-reel as well.

However, the two kinds of fishing differ in terms of the scale of operations: small number (50) of commercial fishers harvesting intensively vs. large number (some 1,800, assuming two fishers per active household) of subsistence fishers fishing sporadically and lightly. Based on survey results, 77% of households participate in the subsistence fishery, that is, some 610 to 620 out of a total of about 800 households, assuming 4,758 residents and six persons per household. (Exact numbers are not available due to seasonal movements of families in and out of the community.) However, these large numbers of subsistence fishers fish a few locations only a few days of the year. Table 2.3 shows the number of households (N=100) participating in subsistence fishing by season in 2012-13.

The two kinds of fisheries also differ in the size of boats and engines used and the applicable regulations. Nevertheless, it is clear that there is substantial overlap between the two kinds of fisheries. How do the fishers and the community of Norway House deal with the potential conflicts, such as damaging one another's gear or blocking fish movements?

Table 2.3 About how many days did you spend subsistence fishing during the year 2012-13?

Number of days	**Number of subsistence fishers fishing in Summer/Fall**	**Number of subsistence fishers fishing in Winter season**	**Number of subsistence fishers fishing in Spring Season**
1-5 days	21	13	25
5-15 days	31	10	31
15-45 days	4	3	8
Over 45 days	7	2	5

2.4 Dealing with potential conflicts between subsistence and commercial fishing

In Norway House, the potential conflict between the two kinds of fisheries is handled by temporal and spatial separation of the two. Temporal separation refers to the segregation of the two fisheries temporally, with the two fisheries taking place in different times of the year. Spatial separation refers to fisheries taking place in different geographical locations within the community's fishing area. These two measures provide separation but not absolute separation, requiring some additional arrangements to avoid potential conflicts. These include monitoring of net ownership and informal negotiation and communication.

2.4.1 Temporal Separation

We interviewed community members and asked if they perceived a conflict between commercial and subsistence fisheries. No one perceived a conflict between the two, and many commented on the complementarity of the two.

> "There is no conflict. We don't have commercial fishing three weeks in summer and three weeks in the fall. We can pretty much harvest domestic fish in between commercial fishing seasons. During commercial fishing season, if people ask for fish, we usually give it to them. We share our catches. If I am done my quota [reached the legal catch limit] and I have extra walleyes, I will usually give it to somebody whose asking for it or [someone] I know hasn't eaten fish for a while"- Commercial fisher A, personal communication, January 2014.

Commercial fishing in Norway House takes place during spring/summer and fall seasons. Spring/summer commercial fishing lasts for 5 weeks and fall commercial fishing lasts for 6 weeks. In total, commercial fishing is carried out over 11 weeks of the year. Commercial fishing

does not take place in winter. However, subsistence fishing takes place throughout the year, including the winter season.

2.4.2 Spatial separation

> "In our domestic fishing areas, we cannot do commercial fishing as we do not get enough volume of fish. The domestic fishing areas are mostly in the rivers, and the commercial fishing areas are in the lake where there are deeper and more water."- Commercial fisher B, personal communication, March 2014.

Commercial fishing occurs mostly in the open waters of Lake Winnipeg where commercial fishers can obtain large catches of walleye and lake whitefish, the two species that are economically most profitable. During fall fishing season, commercial fishers can fish in Lake Winnipeg, as well as in the smaller Playgreen and Kiskittogiso lakes; however during spring/summer season they can only fish in Lake Winnipeg. Commercial fishers first fish in Lake Winnipeg, as it is more profitable to fish there, and the Fisherman's Co-op monitors the fish coming into the station. After the quota is filled in Lake Winnipeg, Co-op then opens Playgreen Lake for fishing. Subsistence fishing occurs mainly in rivers, small lakes adjacent to the community, and in lakes in the interior to the north and northeast of the community. It does not take place in the open waters of Lake Winnipeg. Subsistence fishers were asked to list the areas where they go for food fishing. The areas included Playgreen Lake, Little Playgreen Lake, Blackwater, Jam Rapids, Paimusk Creek, Molson Lake, Spider Lake, and Whiskeyjack. All of these are non-commercial water bodies (with the exception of Playgreen Lake) or lakes in the interior.

> "Playgreen is the only place where I do domestic and commercial fishing. There is never really a conflict… There [are] lot of places to fish and not too many people go out to Lake Winnipeg to do domestic fishing. They usually do it in rivers around their area or close by rivers"- Commercial fisher A, personal communication, March 2014

There is evidence that spatial separation has been evolving over the years to reduce conflicts. According to a senior fisher, there used to be conflict between the two kinds of fisheries around 20 years ago when subsistence fishing was not allowed in Playgreen Lake, and both kinds of fishing took place in Lake Winnipeg. This is not the case any longer. Further, the current distributions of the two kinds of fisheries seem to suit local preferences. Many subsistence fishers prefer non-commercial areas, and many would agree with the following comment that river fish taste better.

> "People say there is a difference between Lake Winnipeg fish and river fish. I also think they are different in taste and size. [That is because] fish from river are smaller and the ones in the Lake are larger. Tastewise, river fish do not have that fishy odor [and] taste. The smaller the fish, it tastes better. Lake fish is bigger in size and has a fishy taste. River fish is smaller in size and does not have a fishy taste. River fish tastes better than lake fish."- Commercial fisher B, personal communication, March 2014.

Although commercial and subsistence fisheries are separated to a large extent temporally and spatially, there are places where overlap occurs between the two (Figure 2.4). These are the two relatively small lakes near the community, namely Playgreen Lake (with 45 commercial fishers in the 2014 summer/fall season) and Kiskittogiso Lake (11 commercial fishers),

according to data from the Manitoba Department of Conservation and Water Stewardship. It is these two areas that require additional arrangements for the resolution of potential conflicts.

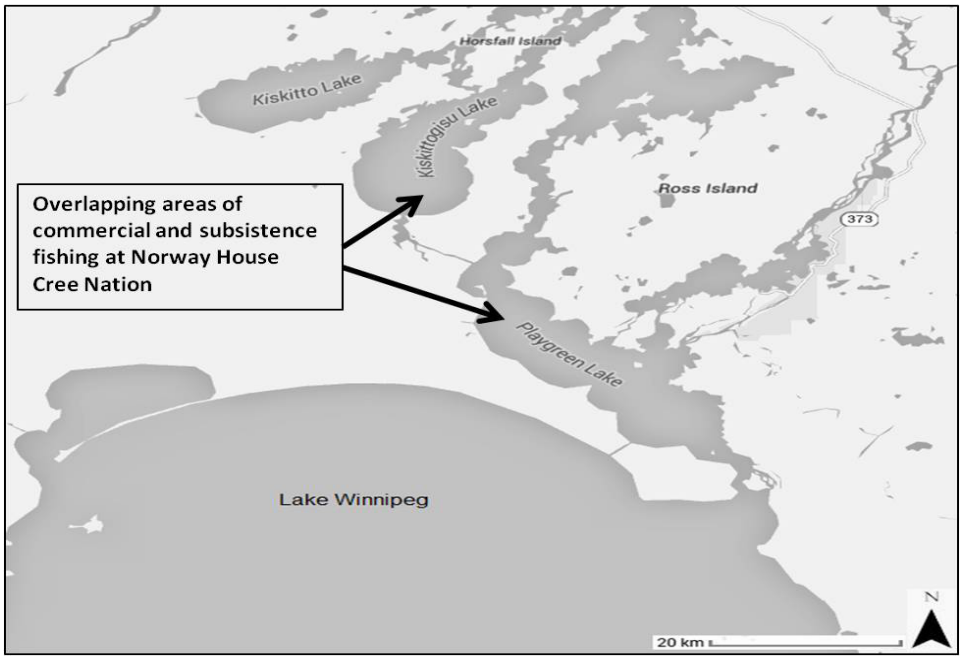

Figure 2.4 The overlapping areas of commercial and subsistence fishing at Norway House

2.4.3 Monitoring of net ownership

To enforce regulations, the provincial conservation officer teams up with an assistant officer who is a senior member of Norway House, well respected in the community by other fishers and community members. The officer takes an educational approach in dealing with rule enforcement, which includes creating awareness about fishing regulations. At the beginning of each fishing season, the conservation office puts announcements in the local radio to remind fishers to tag their nets. All nets need to be tagged in order to establish the authority under which the net is set. Every First Nation member has a treaty number; by law, every subsistence fisher has to tag his net with his name and unique treaty number. And every commercial fisher has to tag his net with his commercial licence number. When conservation officers find a net that is not

tagged, they first put their cards as a warning. According to the officers, in recent years they have not had to lay charges or fine anyone, as the informal warning seems to be effective.

According to conservation officers, in the recent past there has not been any conflict between subsistence and commercial fishers in the community. The ease of monitoring net ownership has probably been a factor in this, as it helps conservation officers detect any commercial fishing nets set in non-commercial fishing areas such as rivers. The prevailing net monitoring system also makes it easier for conservation officers to track any discrepancies in commercial landings vs. quotas by lake, discouraging commercial fishers from setting nets in areas that they should not be fishing and generally keeping the two kinds of fishing separate.

2.4.4 Informal negotiation and communication

Even though the two fisheries are separated by the mechanisms described above, there are nevertheless some possibilities for conflict, as for example, a subsistence fisher setting nets in the commercial fishing area. This kind of problem tends to be resolved by informal negotiation and communication, consistent with Cree cultural values of mutual tolerance, respect and reciprocity. For example, an old fisher with a single net in a commercial area is tolerated. As well, there are some customary sites for specific families or senior subsistence fishers, and other parties mutually respect that. For example, older people go to Nelson River for subsistence fishing and younger fishers respect their fishing areas and fish elsewhere to avoid conflict.

> "Most of the domestic fishing happens along the rivers here in Norway House. Older people will go down the bank to put their net and they also put their treaty number on their marking. As long as they are not covering the whole river [and blocking fish passage] it is ok. Nelson River is the place where most of the older people go for fishing.

> We usually know who they are because when we drive our boats, we see the person with their nets. So word of mouth goes around pretty fast that 'so and so' is fishing in this area. People usually know that this fellow usually puts their net in this place."- Subsistence fisher B, personal communication, March 2014.

Much of this informal communication for resource allocation is part of the self-management of subsistence fisheries, whereby different fishers or different groups of fishers solve their own problems through communication and negotiation (Berkes 1977; Berkes 2012). The fact that the customary practice is backed up by government regulation and enforcement helps maintain good social relations. The presence of the assistant conservation officer, a respected member of Norway House community, is an important factor in this equation.

2.5 Discussion & Conclusions

Both subsistence and commercial fisheries are important: the commercial fishery brings cash income, and the subsistence fishery provides food for local consumption. Both kinds of fishing may be contributing to food security either directly or indirectly through the purchase of other food from commercial fishing income (Sen 1981). In Norway House, both kinds of fisheries do contribute to food security (Islam and Berkes, in review). Food security is a large topic in its own right, and is not dealt with in the present paper. Managing small-scale fisheries for food security is likely to become increasingly important (McClanahan et al. 2015). This is specially so considering that even in middle income countries such as Brazil, small-scale fisheries provide more human food than do large-scale fisheries (Begossi 2010). Further, the global significance of subsistence fisheries for food security is increasingly recognized (Branch 2002; Sowman 2006; Pauly 2014). In the case of Norway House, for example, both subsistence and commercial fishers share their catches with other households and contribute to food security at the community level.

In Southern Africa, many small-scale fisheries have a subsistence component in the sense that a part of the catch is diverted to household and community needs, such as local food and income (Sowman 2006; Béné et al. 2007). Globally, inland capture fisheries, and its subsistence component, are underestimated. This is because much of the harvest is for local food and local and regional trade, and none formally enters the market economy (Béné et al 2007; HLPE 2014; Bartley et al. 2015). However, commercial and subsistence fisheries are treated as distinct if they come under different sets of government regulations. Such is the case in Canada's indigenous fisheries (Harris and Millerd 2010). The rules that apply to commercial fisheries do not apply to food fishing, which is an indigenous right, subject to conservation considerations. However, if the two kinds of fisheries take place in the same area, there is potential for conflict, a topic that does not seem to have been addressed in the literature to any extent.

This gap in the literature was addressed here by examining the case of Norway House Cree Nation in northern Manitoba, at the northern tip of the tenth largest lake in the world. The commercial fishery is organized along the lines of most commercial fisheries in Canada, at sea and in large lakes, with a catch quota system, open and closed seasons, and fishing gear regulations. At Norway House, the entire fish quota is held by a 52-member fisheries co-op, which also harvests and sells non-quota species. Much larger numbers of people, catching smaller amounts of fish per capita, comprise the subsistence fishery. About three-quarters of households of this relatively large indigenous community participate in the food fishery. Subsistence fishing is an aboriginal right, and the fishery does not come under direct government regulation, except for species and areas closed for conservation reasons.

In Norway House, there appeared to be a potential for conflict because the two kinds of fisheries harvested the same species of fish, with walleye as the top commercial species as well

as the most highly preferred subsistence species. Further, the two fisheries employed similar gear, with the commercial fishery using gillnets and the subsistence fishery using a mix of gillnets and rod-and-reel. One potential reason for lack of conflict is that northern Lake Winnipeg is a large area and the number of fishers is relatively small. However, northern lakes in Canada are low in biological productivity, and walleye stocks are fully exploited (Ayles et al. 2011).

The potential conflict between the two kinds of fisheries is resolved by a mix of mechanisms. First is the temporal separation of the two fisheries. The commercial fishery takes place over 11 weeks of the year; the subsistence fishery is year-round. A more clear-cut temporal separation is practiced in some indigenous communities in British Columbia, Canada, where separate days for subsistence and commercial fishing are in effect during the salmon season. For instance, on food fishing days, a commercial fisher with the same boat and gear (e.g., a drift net) may catch fish for subsistence purposes (Berkes, unpublished field notes).

Second, commercial and subsistence fisheries in Norway House are separated spatially, a mechanism also used in some areas in British Columbia, Canada. The commercial fishery takes place mostly in the open waters of Lake Winnipeg, whereas the subsistence fishery takes place mostly in rivers and small lakes. In two relatively small lakes, the two kinds of fisheries overlap. How then does one ensure that the commercial fishery does not impact the subsistence one, or conversely, food fishers do not get in the way of commercial fishers as they try to fill their catch quotas in the limited number of weeks available?

Two additional conflict resolution mechanisms come into play. First, the local conservation officers monitor net ownership. Commercial nets and subsistence fishing nets need to be marked with commercial fishing tags or tags bearing the name and treaty number of the

subsistence fisher, respectively. The tagging system helps enforce regulations, and community members consider this monitoring and enforcement as legitimate, partly (or perhaps largely) because the conservation officer (an outsider) is accompanied by an assistant officer who is a community member. According to our interview results, this arrangement appears to be very effective. Further, both officers strongly agreed in interviews that the arrangement constitutes *de facto* co-management, creating a problem-solving dialogue between government management and local management (Armitage et al. 2007). The second additional mechanism involves informal negotiation and communication, again aided by the low-cost locally effective co-management of the two conservation officers working together, solving problems as they appear without having to resort to legal charges or fines.

Understanding Cree cultural values is helpful in illuminating the workings of these additional conflict resolution mechanisms. Commercial fisheries are not a good fit with Cree values in the first place because they are production and surplus oriented. As pointed out by the President of the Fishermen's Co-op, the objective of the commercial fishery is to catch fish and make as much money as possible, in theory. In reality, however, the Co-op does not operate as an outsider organization but is very much integrated into the community. Most profits of the Co-op are reinvested in the community to promote development. For example, Fisherman's co-op runs a gas station, a timber business, a convenient store and a fast-food store which generate employment and income in Norway House. Almost all commercial fishers are also subsistence fishers at various times of the year. Perhaps most importantly, many commercial fishers share their harvests with other community members and contribute to the community's food security (Islam and Berkes, 2016). All of these are consistent with Cree values of sharing and using

natural resources, not for individual profit, but for the well-being of the community as a whole. This makes the commercial fishery a good corporate citizen.

Subsistence fisheries operate according to the Cree cultural logic of self-sufficiency. Subsistence fishers do not have any incentives to create a surplus; extra fish they catch cannot be sold but will be given away. Consistent with Cree values of not wasting natural resources, a Cree fisher catches only as much as he/she needs (Berkes 1977). According to Cree culture, a good fisher or hunter is a person who catches what is needed, not someone who harvests a surplus above and beyond what would be needed by the family and shared with a few additional households (Feit 1978).

Informal negotiation and communication for handling conflict are also consistent with Cree cultural values of tolerance, reciprocity and respect. Small infractions are tolerated; elders are shown respect by not being contested in good fishing spots near the community. Significantly, conflict resolution by quiet communication and mutual respect are preferred over litigation and the embarrassment of charges and fines. Thus, a conservation officer who can solve problems by such civil (as opposed to confrontational) means gains social acceptance in the community. He/she will be more effective in enforcement in the long term. The lesson from the case is that government officers working with subsistence fisheries need to be tuned into the cultural values of the communities in which they work, as also pointed out by Arnason and Kashorte (2006).

In reference to the objectives of the paper, we argue that small-scale commercial and subsistence fisheries can co-exist, provided appropriate measures are taken by fishers, community members and authorities to avoid the conflict when two kinds of fisheries overlap. These measures need to be collaborative, flexible and adaptable, evolving through

communication and negotiation to solve problems learning-by-doing in a step wise fashion, that is, adaptive learning (Idrobo and Davidson-Hunt 2012). They may be innovated through *de facto* co-management, as in the Norway House case. There likely is no single solution that is universally applicable. The lesson from Norway House is that conflicts can be avoided by temporal separation, spatial separation, formal monitoring and informal negotiation. The Conservation and Water Stewardship office in Norway House follows an educational approach in implementing regulations and eliminating conflict before it occurs. Lessons from Norway House are relevant to other indigenous communities elsewhere in Canada, and internationally where small-scale fisheries and subsistence fisheries are found to co-exist.

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CHAPTER 3: INDIGENOUS PEOPLES' FISHERIES AND FOOD SECURITY[6]

Abstract

Indigenous peoples in northern Canada (at least the off-reserve part of the population) experience food insecurity at a rate that is more than double that of all Canadian households. The Cree community of Norway House in northern Manitoba, which harvests and consumes a great deal of fish, may be an exception and may offer some lessons. The objective of this paper was to address food security through the lens of local fisheries, both commercial and subsistence, of a northern indigenous community, and to develop an integrated approach to analyze food security. The approach uses Sen's entitlement theory and the concept of food sovereignty. This mixed-methods research study employed questionnaire surveys among on–reserve commercial and subsistence fishing households; semi-structured interviews, focus group discussions and follow-up interviews for verification. During commercial fishing seasons (spring/summer and fall), fishers and their helpers shared their fish harvest extensively through their families and communal networks, reaching almost half of the total population of the community. Such extensive sharing and the continuing community-based fishery have contributed to Norway House having more than 90% food secure households, comparable to the Canadian average. Norway House may provide an example for other northern indigenous communities regarding food insecurity through use of fish and other traditional foods. The proposed integrated approach may be useful for analyzing food security in general.

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3.1 Introduction

Most of the world's undernourished and food insecure people live in low-income areas of developing countries; however, food insecurity is also an issue for Canada (Council of Canadian Academies 2014). More than 12% of Canadian households experienced moderate to severe food insecurity in 2011 (Council of Canadian Academies 2014). This rate was higher among Indigenous communities but data are incomplete because on-reserve populations are not represented (Council of Canadian Academies 2014). According to data from the 2011 Canadian Community Health Survey, off-reserve aboriginal households across Canada experienced food insecurity at a rate more than double than that of all Canadian households (i.e., 27%) (Council of Canadian Academies 2014). Female-headed households with children consistently reported even higher rates of food insecurity. More women than men were affected (Beaumier and Ford 2010). Food insecurity rates were even higher among the poorer aboriginal households, that is, those on social assistance. In 2007-2008, 55% of off-reserve aboriginal households living on social assistance were food insecure (Health Canada 2012).

Food insecurity is often associated with a nutrition transition from a high protein low carbohydrate diet to a high sugar and fat diet of processed foods (Kuhnlein et al. 2004; Kuhnlein et al. 2013). This changing dietary pattern is, in turn, linked to the decline of the Indigenous way of life, less time being spent on the land, and the abandonment of traditional ways of obtaining food by fishing, hunting and trapping. For example, in the James Bay area, northern Quebec, there has been a sharp decline, from about 46% in the 1976-81 period to 15% in the 2004-08 period, in the proportion of Cree families going on the land for lengthy periods (Council of Canadian Academies 2014). Similarly, Usher (2002) found a sharp decline of fish and wildlife

harvesting on a per capita basis from the1960-65 period to the 1988-97 period in the Northwest Territories.

The reasons for these declines and the failure of the development of a new economy and a nutritionally viable lifestyle to replace the old way of life in the Canadian North and specifically among Indigenous people are complex, and beyond the scope of this paper. As analyzed by the Council of Canadian Academies (2014), the reasons include the high cost of access to and purchase of healthy foods; problems of access to resources, caused by environmental change and increasingly by climate change; environmental damage and pollution from large projects, such as dams and mines with ensuing heavy metal problems; government's social policies, including those that have been characterized by some as cultural genocide; loss of skills and knowledge to obtain local foods; lack of nutrition education for store-bought foods; and changing food preferences, away from healthy local wild foods and toward store-bought processed foods, high in sugars and fats. Interestingly, nutrition-related problems among Canadian Indigenous peoples have a great deal in common with that elsewhere in the world (Kuhnlein et al. 2013).

Food security issues are complex and interdisciplinary in nature, and they need to be addressed from a holistic perspective, focusing on the interconnectedness of various sectors of the food system, the ecological, economic/business, and the social. The ecological dimension includes the biological management of the resource (Ayles et al. 2011) and the overlap of commercial and subsistence fisheries (Islam and Berkes 2016). Moreover, food security studies for Indigenous people would be incomplete without the social dimension, including the consideration of their perspectives and cultural values (Power 2008) and attributes of traditional foods (Lambden et al. 2007). In the present paper, we approach this problem through the lens of

local fisheries, both commercial and subsistence, in one northern Indigenous community in Canada. There is evidence that fishing livelihoods play an important role in household food security both in mid-northern Canada (Morrison 2011; Rudolph and McLachlan 2013; Thompson et al. 2014) and internationally (Hanazaki et al. 2013; Fiorella et al. 2014; Kawarazuka and Béné 2010). However, the role of fisheries in food security has been understudied in the literature (Grafton et al. 2015; Kittinger et al. 2015). Fish is an important source of protein and different types of essential nutrients, such as vitamin A, calcium, iron and zinc. Fisheries need more attention in addressing food security (Pilling et al. 2015; Béné et al. 2015; Población 2013; Kawarazuka and Béné 2010).

Among Indigenous communities in the Canadian north, including the northern parts of the Province of Manitoba, fishing is considered as a part of culture. Many aboriginal communities regard fish as a staple resource because of its relatively reliable nature and abundance. In large parts of northern Canada, of the various groups of wild foods (big game such as moose, small game, migratory waterfowl such as ducks and geese, and plant foods such as berries), fish have the highest potential for helping meet local food needs (Berkes 1990, 2012). In different parts of northern Canada, estimates of the annual harvestable fish supply greatly exceed the actual levels of harvest (Friesen and Nelson 1978; McCart and Den Beste 1979). There has also been a major decline in the number of small-scale Indigenous commercial fisheries that once dotted the mid-northern Canadian landscape, indicating a presently unused fishery potential.

Despite reduced productivity due to environmental problems, fish and other wild resources are abundant enough in many areas to help with food security. Berkes et al. (1994) conducted a harvest study in Hudson and James Bay Lowlands, Ontario, and their findings

indicated that if wild food harvests were distributed equitably and fully utilized, they could provide the protein needs of the entire regional population. Traditionally, fish was a major part of local food resources almost everywhere in Canada, and the significance of fish to Indigenous peoples is illustrated by their selection of summer meeting places (and later, reserves) adjacent to good fishing areas (Tough 1996). Fishing plays an important role in bringing people together socially and culturally, including the celebration of Indigenous traditions, such as the First Salmon ceremony in the Pacific Northwest (Berkes 2012).

To deal with the complexities of food security issues, we use two concepts to analyze our case. The first is Sen's (1981) idea of entitlements, which addresses the relationship between food consumption and distribution. The second is the concept of food sovereignty, which addresses the relationship between production and distribution.

In the 1980s Nobel laureate Amartya Sen brought a paradigm shift in the literature by turning the focus of food security from "availability" to "entitlement". Sen (1981) theorized food security as "entitlement to food" and analyzed its relevance in famine situations (Devereux 1993; Maxwell 1996). Theory of entitlement became a major part of food security analysis, and food security was defined as being a "problem of food supply with reference to the importance of access and entitlement" (Maxwell 1996, p.156). Sen (1981, p. 45) pointed out that "A person starves either because he does not have the ability to command enough food, or because he does not use his ability to avoid starvation; a person is reduced to starvation if some change occurs either in his endowment (e.g., alienation of land, loss of labor power, ill health) or in his exchange entitlement (e.g., fall in wages, rise in food prices, loss of employment, drop in price of foods he produces)". Therefore, the failure to obtain food may be characterized as an "entitlement failure" (Sen and Dréze 1989). The concept of entitlement holds that food insecurity

and persistent hunger are indicators of low livelihood resilience of the poor, who lack capacity either to produce sufficient food for them or lack financial ability to purchase food through regular food system (Sen 1981, 1984). Typically, people who depend on irregular income from daily wage labor (for example barbers, weavers , shoemakers) and lack productive assets fall into this category (Sen 1981). Severe food insecurity and acute malnutrition may occur when the entitlement of a person or community is disturbed by various socio-economic and environmental factors. The entitlement framework is beneficial for analyzing causes of food insecurity as it helps disaggregate the reasons why a person or group may become vulnerable to access food (Chisholm and Tyers 1982).

In the 1990s, another major paradigm shift occurred in the literature of food security, "food sovereignty", which is conceived as a genuine precondition of food security (Patel 2009). Food sovereignty is a term that was coined by the members of Via Campesina, a peasant movement, in 1996 (Nyéléni 2007). "Food sovereignty is broadly defined as the right of nations and peoples to control their own food systems including their own markets, production modes, food cultures and environments" (Desmarais et al. 2011, p.20). Food sovereignty refers to a policy framework advocating for the rights of peasants, farmers, women, Indigenous peoples, and minorities to define their own food and agriculture system and not to become victims of international markets (Windfuhr and Jonsén 2005; Rosset 2008; Wittman 2009). The conventional definition of food security does not cover the social aspect of the food system (Haugen 2009; Patel 2009; Morrison 2011). The food sovereignty approach tries to address this gap. For example, inmates of a prison can be food secure; or a northern Indigenous community can be made food secure by flying in low cost nutritious food (as has been suggested by some scholars), but this does not provide food sovereignty. A rights-based approach is the hallmark of

food sovereignty in addressing the interplay between production and distribution, while Sen's theory uses entitlement thinking to analyze why food insecurity occurs in the first place. Both theories have contributed to the food security literature by shifting the paradigm from availability to entitlement to a rights-based approach.

Our objective in this paper is to address food security as related to fish and local fisheries of an Indigenous community, and to develop an integrated approach to analyze the role of these fisheries. The results are presented in four headings: (1) background findings and the community context, (2) frequency of fish consumption, (3) sharing fish and other wild foods, and (4) significance of fisheries in household food security, followed by the Discussion in which we develop an integrated model to analyze food security applicable to Indigenous communities. The findings of this study help to understand food security through the lens of fisheries which may be useful for similar Indigenous communities elsewhere.

Regarding terminology, "subsistence fishing" is referred in the literature also as "food fishing", "domestic fishing", and "native harvesting" (Berkes 1988). In this paper we use the term subsistence fishing and food fishing interchangeably, and define food fisheries as "local, non-commercial fisheries, oriented not primarily for recreation but for the procurement of fish for consumption of the fishers, their families and community" (Berkes 1988, p. 319). Commercial fisheries are often defined as those conducted by licenced fishers for sale. The term "Indigenous people" may be used interchangeably with "aboriginal people", in preference to "native people". The term "Indian" is no longer used in Canada, except in a legal sense. Indigenous peoples in Canada are referred to as First Nations, and also include Inuit and Métis.

3.2 Study Area & Methods Of Data Collection

Norway House Cree Nation is located 450 km north of Winnipeg on the convergence of Lake Winnipeg and the Nelson River in northern Manitoba, Canada. Norway House is accessible by an all-season road and by air. The resident population is 4,758 (Statistics Canada 2013).The majority of community members are Cree, one of the largest Indigenous groups in Canada that extend across the boreal and subarctic regions from Labrador to British Columbia. There are few job opportunities available considering the relatively large population of the community. The majority of the community members support themselves with limited social assistance from the government. The band council, schools, hospital and fisherman's co-op are the largest employers in the community.

Fishing is an important part of livelihood in Norway House, similar to many other Indigenous communities elsewhere in Canada. Community members engage themselves both in commercial and subsistence fishing. Norway House Fisherman's Co-op was established in 1962. The Co-op owns and controls all commercial fishing licences. There are 50 active (and two inactive) commercial fishing licences. If a commercial fisher is not actively fishing for two consecutive years then his commercial fishing licence becomes inactive. All commercial fishers have to be a member of the Fisherman's Co-op. Commercial fishing in Manitoba is regulated and fishers have to sell their catches to Freshwater Fish Marketing Corporation located in Winnipeg. Norway House fishers sell their catch through the Co-op. There are two commercial fishing seasons spring/summer and fall. Most of the fishers have fishing cabins on the lake. During fishing seasons, some fishers take their families with them to live in fishing cabins. The majority of the commercial fishing takes place in Lake Winnipeg (the tenth largest lake in the world), Playgreen Lake and Kiskittogisu Lake.

Historically fishing was considered as a family activity and this trend still continuous. Community members of all ages go for food fishing throughout the year. People mostly use angling, or gillnets and boats and go to nearby rivers for subsistence fishing. Residents also participate in other traditional activities, hunting, trapping and berry picking. Schools at Norway House encourage students to participate in traditional means of living by offering outdoor courses and providing them with hands-on training on fishing and hunting. People share traditional foods (fish, moose meat and small game) with their families, neighbors and friends. The Chief and Band council plays an important role in keeping cultural activities alive by organizing traditional feasts around the year, when the whole community gets together to celebrate and enjoy traditional food and activities.

We conducted the study over a period of 14 months from September 2013 to November 2014, asking about household harvests in the previous year, that is, 2012-2013.The study included commercial fishers and subsistence fishers as research participants. We also interviewed president, secretary and members of Norway House Fisherman's Co-op. This mixed-methods research study employed semi-structured interviews with key informants and focus group discussions. This was followed by household questionnaire surveys and follow up interviews. The questionnaires included two questions on food security based on Health Canada (2007) (for details see "Results" sections regarding Figures 3.4 and 3.5).

Interviews and surveys questions were designed to follow community norms for acceptable language and respect. The questions were pretested with selected fishers and co-op members; we made modifications based on their feedback. We employed two community researchers and trained them to conduct questionnaire surveys. The follow up interviews and

focus group discussions were conducted by the principal investigator, with the help of community researchers.

We conducted a total of 23 follow up interviews. For these interviews, we sampled by dividing fishers into four subgroups (1) commercial fishers (N=8) (2) subsistence fishers (N=8) (3) retired elder commercial fishers (N=3), and (4) elder subsistence fishers (N=4). We interviewed these seven elders to gain some historic insights into commercial and subsistence fisheries. Some of these senior fishers could only communicate in the Cree language, requiring a translator. All commercial fishers and the majority of the subsistence fishers were male. In the past females used to participate in subsistence fishing; however, that happens rarely at present. Additionally, we interviewed two female elders who had been active in subsistence fishing.

We conducted two sets of questionnaire surveys among commercial and food fishing households. Among 50 commercial fishing households, the study covered 35 households (i.e., 70% of the total). We used snowball sampling for commercial fishing household survey.

For subsistence fishing households, we had 100 completed surveys or about 10% to 15% of the total number of households in the community (assuming 6 persons per household). We used stratified sampling because harvesting tends to be highly skewed, with a few households contributing a disproportionate share of the harvest (e.g., Berkes et al. 1994). To choose the sample, we asked household heads to identify themselves as “intensive” or “active” or “occasional” harvesters or non-harvesters. “Intensive harvesters” were defined as harvesters bringing home “a lot” of traditional food. “Active harvesters” were those bringing home “some but not a lot” of traditional food. “Occasional harvesters” were those bringing traditional food only occasionally. We included some commercial fishing households in the sample of subsistence fishing households because the majority of the commercial fishers did participate in

food fishing outside of the commercial fishing seasons (only 11 weeks of the year). We also included "poor" households (those living only on social assistance), non-harvesting households, old-age homes, and female-headed households to cover the vulnerable segments of the community. Thus, "subsistence fishing households" in the results sections include some households that are in fact non-harvesters.

The data gathered from questionnaire survey were verified by follow-up interviews and focus group discussions. The follow-up interviews were used to verify specific household questionnaire results and to expand on some of the points raised. For verifying general, community-wide findings, we arranged two separate focus group discussions involving five commercial fishers and five subsistence fishers. For data verification, we prepared visual displays (posters, graphs and charts), to present to the Chief and Band Council, the Fisherman's Co-op, and key informants. All data of household surveys were anonymous. We used Excel spreadsheets to process the data from household questionnaire surveys and to create tables and figures.

3.3 Results

3.3.1 Background findings and the community context

Community members participate in various activities that produce food such as fishing, hunting, and berry picking. Some kinds of tourism also produces game and fish, caught by tourists for pleasure and given away to local households for consumption. We were interested to find out which activities produced food for domestic purposes. We asked participants in commercial and subsistence fishing households to describe activities that produced food for household consumption. The major food producing activities were fishing, hunting and trapping, followed by berry picking , tourism and other (Fig. 3.1). Commercial fishers would fish for

commercial purposes during fishing season, and many would be involved actively in food fishing as well when commerial fishing season was over. Most of the commercial fishers we interviewed also hunted and trapped in the off season. In both commerical and food fishing households, fishing was the number one traditional activity in producing food for household consumption.

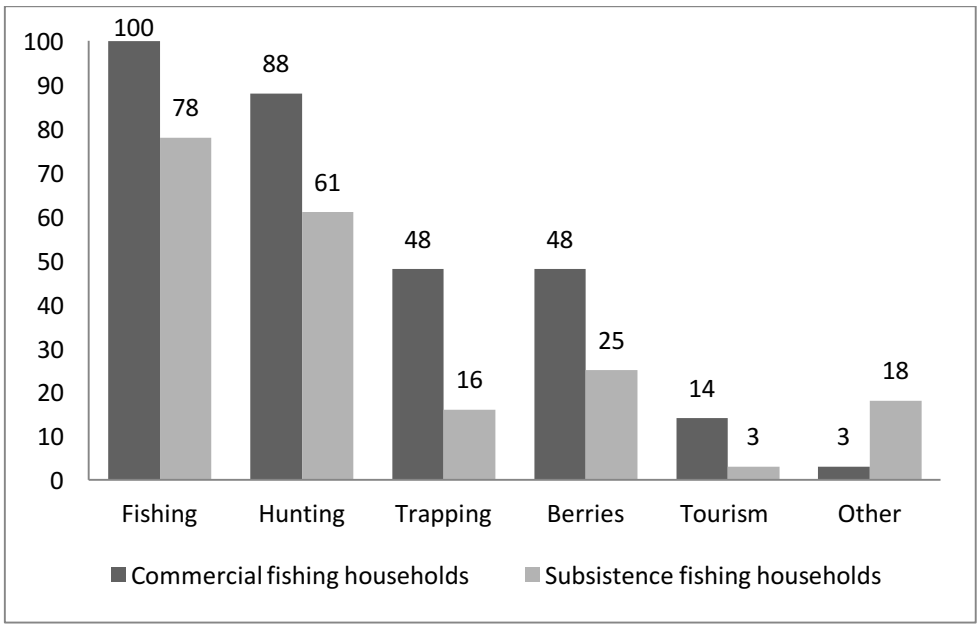

Figure 3.1 The activities that produced food for household consumption in 2012-13

Commercial fishing in Norway House takes place for 11 weeks spread over spring/summer and fall seasons. Food fishing does not have such restrictions, and can occur anytime during the year, including winter under the ice. Some77% of households reported that they participated in food fishing (including angling) activities. Of those households reporting fishing, the majority took part in spring/summer fishing (90%) and fall fishing (80%); fewer reported winter fishing (35%). Table 3.1 shows the number of participants and their level of activity in each season for subsistence fishing activities.

Image 3.1 Prof. Berkes with Mr. Langford Saunders, the president of Norway House Fisherman's Co-op

Image 3.2 In a focus group meeting with commercial fishers inside a fisherman's cabin

Image 3.3 Interview with an elder commercial fisher at Norway House

Image 3.4 Interview with an elder subsistence fisher at Norway House

Image 3.5 A commercial fisher takes part in trapping

Image 3.6 A commercial fisher participates in rabbit snaring

Image 3.7 A commercial fisher hunts and share his meat. Here is Darrell Evans with his hunted moose.

Table 3.1 Number of participants reporting their seasonal fishing effort (1-5 days to over 45 days) for subsistence fishing during the year 2012-13 (N=100)

B	**1-5 days**	**5-15days**	**15-45 days**	**Over 45 days**
Fall	21	31	4	7
Winter	13	10	3	2
Spring/Summer	25	31	8	5

Both subsistence and commercial fishers at Norway House target similar fish species (Islam and Berkes 2016). The harvests of commercially profitable fish species are controlled and regulated by fishing quotas. Walleye *Sander vitreus* (locally called pickerel), lake whitefish *Coregonus clupeaformis* and sauger *Sander canadensis* are quota fish; the other species are not. Walleye was the top species harvested in all seasons; seasonally important species included lake whitefish and northern pike, *Esox lucius,* locally called jackfish (Islam and Berkes 2016). Burbot *lota lota* (locally called mariah, with high vitamin D in liver) was the only fish that was not sold commercially but considered as a local delicacy in winter. Seniors in the community appreciates this fish; however, younger generations do not like it as much.

3.3.2 Frequency of fish consumption

> *"My mother once told me as a little kid we used to have fish and potatoes mixed together as baby food. She fed us with boiled whitefish. She would pour some of the fish juice and mix it with potato to make it soft and that was our baby food."-Food fisher B (active harvester), in his 70s, March 2014*

We wanted to find out the frequency of eating fish in both commercial and subsistence fishing households. The majority of the households reported eating fish once a week during the year as a whole (Fig. 3.2). Judging by the results of open-ended questions and follow-up

interviews, commercial fishing households ate fish every day, or nearly so, during the fishing season. Again, availability of fish is seasonal (since fish runs are seasonal) also in the subsistence fishery. So it was important to find out household strategies when there was “no fish coming in”.

Commercial fishing households mostly used fish from their own freezers (77%), and subsistence fishing households mostly received fish from others (70%) as well as using fish from their own freezers (61%) (Table 3.2). The only traditional fish preservation technique still used is smoking. According to an elder fisher woman in her 80s, in the past, people in Norway House also used underground storage (the area has, or had, discontinuous permafrost) and made fish pemmican (dried fish pounded with berries and fat). Households reported preparing fish using different cooking methods: frying (99%), boiling (21%), smoking (9%) and baking (1%). It was interesting to note that people were more inclined to frying fish than using the traditional methods of preparing fish (boiling and smoking).

Commercial (6%) and subsistence (4%) fishing households rarely bought fish from local stores, but bought substitute foods instead. Some community members believe that fish collected from the adjacent river are not safe for consumption and they also think fish from lake are not as tasty as river fish. This motivates them to buy other foods from local grocery store, passing up the option to catch fresh fish from the river.

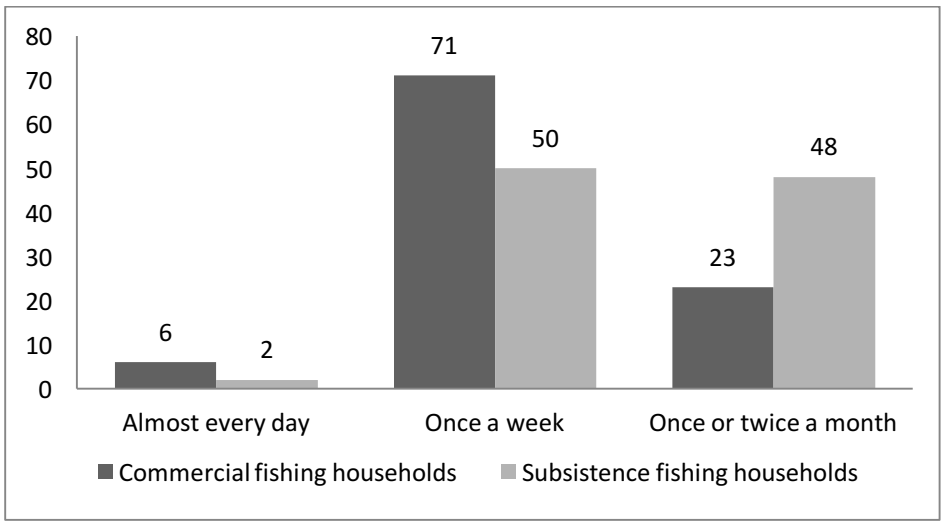

Figure 3.2 How frequently did your family eat fish in the year 2012-13?

Table 3.2 When there is no fish coming in, what does your family eat instead?

	Commercial fishing households (%)	**Subsistence fishing households (%)**
Someone shares fish with us	26	70
We use fish from our own freezer	77	61
We buy fish from the store	6	4
We buy other food from the store	69	37

In the household survey, when we asked household heads if children were eating fish, 100% of the respondents replied "yes". However, during follow-up interviews, many household heads commented that children were, in fact, not eager to eat fish; they were more inclined toward market food. When we conducted focus group discussions with school children, the majority of them (about 70%) mentioned that they do not prefer to eat fish unless it is cooked in a special way, for example, prepared by grandparents. As well, children who go fishing with their families tend to like and eat fish. There are varying opinions within the community regarding why children are reluctant to eat fish. According to several elders, children develop a taste for fish when they start to eat fish at an early age.

3.3.3 Sharing fish and other wild foods

> *"Us… First Nations people have been sharing with each other for generations and generations. That's how we thrive; when one family did not have much and another family had many… they share with each other… that's what we do in our communities. It was never about who has this and who has that, not about greed and power. Our tradition is to share with each other to make sure we thrive as a community. When we have fish and wild meat, we share it with each other. Nowadays the government is providing all these government food… everybody is getting caught up with paying bills and losing our tradition of living off the land."- Commercial fisher A (intensive harvester), March, 2014*

Sharing is a big part of Cree culture. We asked both commercial and food fishing households about the number of households with whom they shared their harvests of fish and wild food (Fig. 3.3), and also the number of households from whom they received fish and wild food (Table 3.3).

Both commercial (40%) and food fishing (54%) households shared their harvests mostly with one or two other households. Some 34% of commercial fishing households shared their harvests with six or more households. Only 3% of the commercial fishing households reported not to share their harvests. However, these numbers are misleading in estimating the actual level of sharing, based on in-depth interviews with commercial fishers. During fishing season each commercial fisher typically has two fisher helpers with them on the boat at all times. Almost all the commercial fishers share their catch with their own circle of households as well as the households of their helpers.

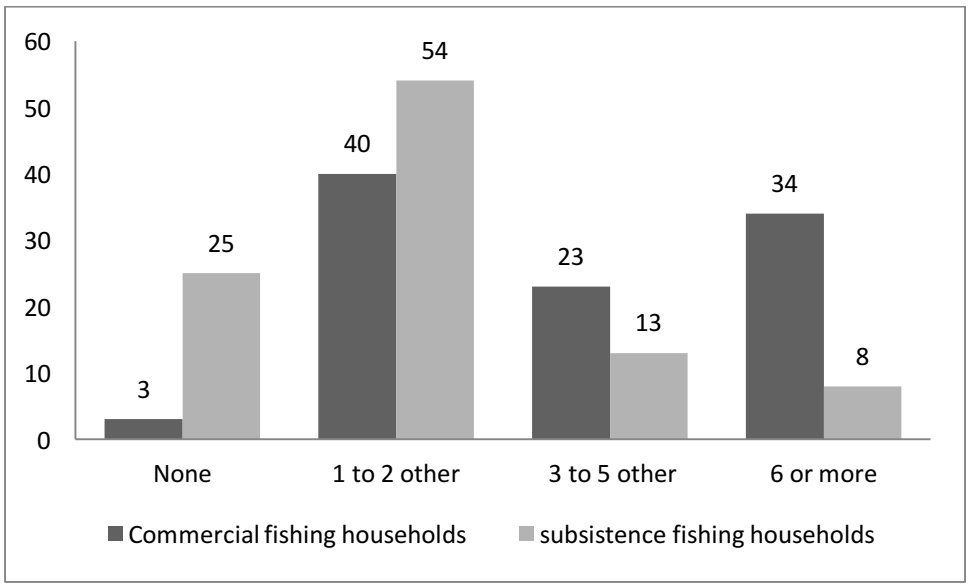

Figure 3.3 With how many Norway House households did you regularly share your harvest (fish and other wild foods) in the year 2012-13?

Table 3.3 How many other Norway House households regularly shared their harvest with yours in the year 2012-13?

	Commercial fishing households (%)	**Food fishing households (%)**
None	31	19
1 to 2 other	54	59
3 to 5 other	9	14
6 or more	6	8

Based on Fig. 3.3 (where the numbers indicate percentages), the 50 commercial fishers seem to be sharing their fish with a minimum of 125 other households. If the two helpers shared their fish in a similar pattern, the fish taken by the commercial fishery may be reaching three times that number or 375 households. At six persons per household (based on our community survey estimate), this catch may be reaching 2,250 people or nearly half of the total population of Norway House. Such widespread sharing is often highlighted by commercial fishers:

"In our community everybody shares food with somebody. When a person is not fishing, he is getting fish from somebody else. And if a person fishes, he shares his catch with somebody else. Everybody is sharing"- Commercial fisher B (active harvester), March 2014

Some of the commercial fishers indicated that they have a certain number of households (parents, siblings, elderly relatives) with whom they regularly shared their harvests. Other kinds of sharing often follow rules of reciprocity, and may be initiated by someone wanting fish. Culturally appropriate asking usually involves indirect questions and dropping hints of need. Nevertheless, it is a common phenomenon during fishing season that people who need fish ask for fish.

"I would go and ask a commercial fisher or an old person who has a net in the water, if he would share some of his fish with me. Anybody who has a net in the water, I would go and ask them for fish"-Food fisher C (occasional harvester), May 2014

We asked a commercial fisher about his methods of sharing as he reported to share his catch with six or more other households. In addition to households in his usual sharing network, he indicated that he would share his extra fish by announcing it on the local radio. Whoever in the community wants fish would be welcome to receive it from his house. This way, he estimated that he shared his catch with some 10-12 additional households during fishing season in a given year.

"Say I have extra fish, I don't throw them away. I put it on a radio for people to come and take it from my house. Sometimes I have seven to ten tubs of fish I bring home"-Commercial fisher C (intensive harvester), March 2014

Despite extensive sharing, some people commented on a decline of the sharing ethic and a narrowing of sharing circles, perhaps most seriously affecting people who are not part of food sharing networks. Some of the elderly persons we interviewed mentioned that they would like to see more sharing of fish and other traditional food among community members. An elderly widow mentioned that when her husband was around, she had many people offering fish and wild foods. Now that she is on her own, she hardly receives fish and other traditional food. She feels that band council could take some initiatives to make sure that fish and traditional foods are equally distributed to elderly persons, widows, female-headed households who are not in a position to harvest fish and other traditional foods themselves.

Turning to receiving fish and other traditional foods (as opposed to giving away), we see that the majority of the commercial (54%) and food (59%) fishing households receive harvests from one to two other households, indicating a narrowing of food sharing networks (Table 3). These households fall under the category of "intensive" or "active" harvesting and other community members perceive them as harvesting their own food and sharing (giving) more than receiving. Perhaps surprisingly, 31% of the commercial fishing and 19% of the food fishing households reported that they did not receive any harvests from other households (Table 3).

3.3.4 Significance of fisheries in household food security

To understand the state of food security in Norway House, we used the standard questions for food security analysis using Health Canada (2007) to make our results comparable with other communities. One of the questions was modified on the basis of pretesting with Norway House community members. We asked respondents how they would best describe their household food consumption over "the past one month". Because the surveys were conducted over several months, "the past one month" for different households occurred during the period,

September- December, 2013. There were three response options: “not adequate”; “just adequate”; and “more than adequate”. Almost two-thirds of the commercial fishing households (63%) reported that they had “more than adequate”; about one-third (34%) reported “just adequate” food consumption over the past month in their households. Of the subsistence fishing households (81%) reported to have “just adequate”. Only 3% of the commercial fishing households and 9% of the food fishing households reported “not adequate”, that is, food insecure (Fig. 3.4).

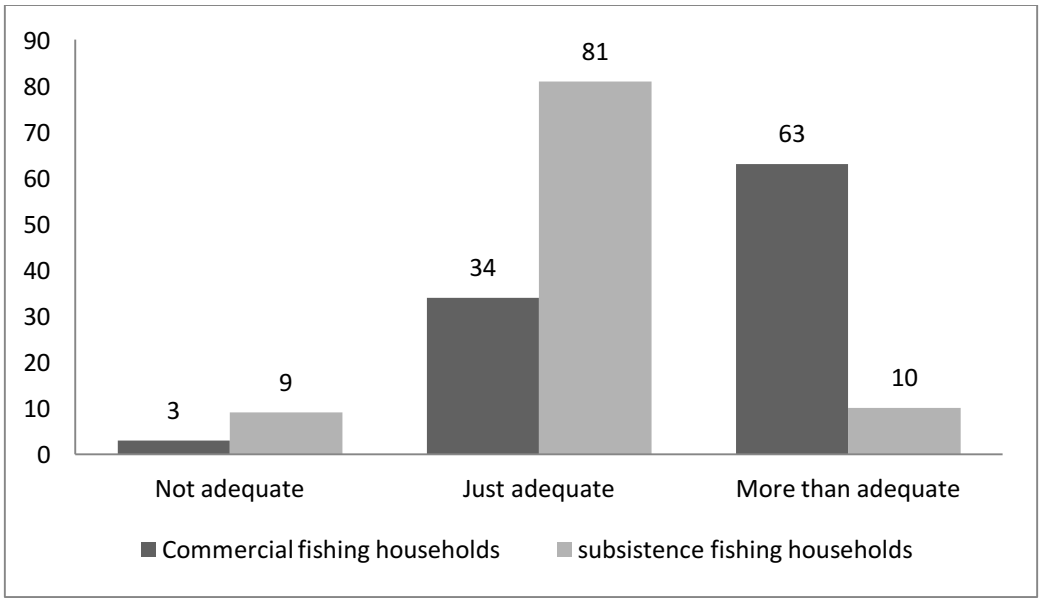

Figure 3.4 Food consumption status of Norway House households over one month, (any month from September to December 2013)

In another food security question, we asked respondents to describe the food eaten in their households in the past 12 months (2012-13). They had to choose from four given options: (1) “always had enough of the kinds of food you wanted to eat”; (2) “always had enough but not always the kind of food”; (3) “sometimes did not have enough to eat”; and (4) “often did not have enough to eat” (Health Canada 2007). Some 71% of the commercial fishing households reported to always have enough of the kinds of food they wanted, and 26% reported that they

always had enough but not always the kind of food they wanted (Fig. 3.5). Among subsistence fishing households, 49% and 43% reported, respectively, "to always have enough of the kind of food they wanted to eat" and "always had enough but not always the kind of food". Only 5% of subsistence fishing households indicated that they "sometimes did not have enough to eat", while only 3% of the commercial fishing households fell in the same category. None of the commercial fishing households responded with "often did not have enough to eat", that is, extreme food insecurity; however 3% of the subsistence fishing households did.

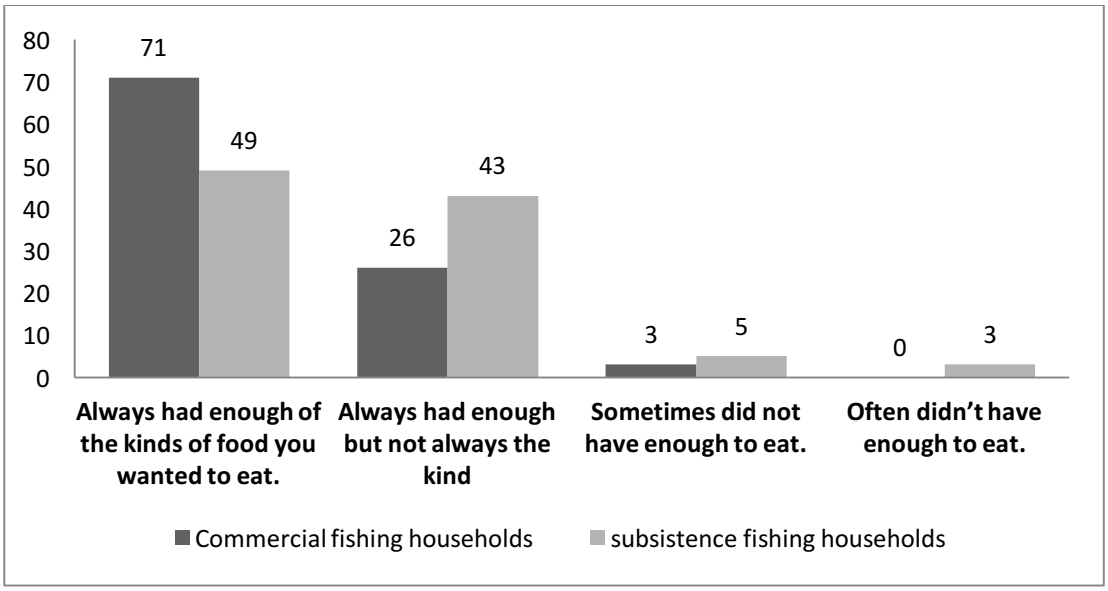

Figure 3.5 The statements that best describes the food eaten in your household in the past 12 months (2012-13)

3.4 Discussion: Towards An Integrated Approach

Findings of the household food security questionnaire survey indicate that the 97% of the commercial fishing and 91% of the subsistence fishing households are food secure in Norway House, keeping in mind year-to-year variations and other uncertainties inherent in such studies. Numbers in Norway House are comparable to the Canadian average of 92% and seem to be considerably better than that for many other communities in the Canadian North for which data

are available, but these data are not strictly comparable in part because of lack of representation of on-reserve populations, as First Nations have opted out of such government surveys (Council of Canadian Academies 2014). Can Norway House be a model for other northern communities? What is it that Norway House community is doing that makes a difference in food security?

Part of the explanation is that people still go on land and participate in traditional activities of fishing, hunting, and trapping. However, all of these activities have declined considerably over the decades. For example, according to our surveys, only about 4% of the Norway House households consider themselves as "intensive" harvesters (along with 18% "active", 58% "occasional", and 20% non-harvesters). We only have qualitative information in the present study, but the number of days spent on the land has declined, consistent with other northern communities (Council of Canadian Academies 2014). Fewer people go subsistence fishing, spend fewer days in harvesting, and tend to use rod-and-reel fishing, as opposed to gillnets which often help bring back a surplus catch to the community. Hunting is reduced to a few days at a hunting camp and weekend hunting. Because of the collapse of fur markets since the 1980s, trapping does not even cover the cost of equipment and fuel. In Norway House, trapping is reduced largely to snowshoe hare (locally called rabbit) snaring. The sharing ethic is still relatively strong, but there is not much to share from the food that comes from the subsistence harvest. Nevertheless, the sharing of fish from the commercial fishery is part of the explanation for the relatively high level of food security. Norway House is fairly unique in having a well-functioning commercial fishery; most Indigenous communities do not.

Another major factor behind high food security is that Norway House has an all-season road connection to the south and hence cost of southern foods in the community is not as high as elsewhere. By comparison, many northern Indigenous communities only have air connection or a

seasonal winter road (using compacted snow and ice) to the south and seem to suffer from severe food insecurity (Thompson et al. 2012). Norway House does have resource access problems due to hydroelectric development, similar to many other Indigenous northern communities, and mines in the area, but perhaps not as much as elsewhere.

Having a commercial fishery and a strong sharing ethic are no doubt important, but not sufficient in themselves to fully explain food security in Norway House. To understand the larger picture of food security in Norway House and elsewhere, an integrated approach is needed. To do so would help analyze Indigenous food systems, and to tease out what distinguishes Norway House from others.

Allen (1999) has argued that, the food system in Canada has produced abundance on the one side and food insecurity on the other, because production and consumption of food have been dealt with as separate issues. To address food insecurity, it is important to consider the entire food system and the linkages between different parts of the system -- production, distribution and consumption. In this respect, we argue that a holistic understanding of Indigenous food security requires an integrated approach which takes production, distribution and consumption into consideration. Such an approach effectively combines Sen's entitlement thinking (Sen 1981) and the food sovereignty concept (Desmarais et al. 2011). The reason why both approaches are necessary is that food sovereignty considers production and distribution aspects of the food system, whereas entitlement theory emphasises distribution and consumption (Fig. 3.6).

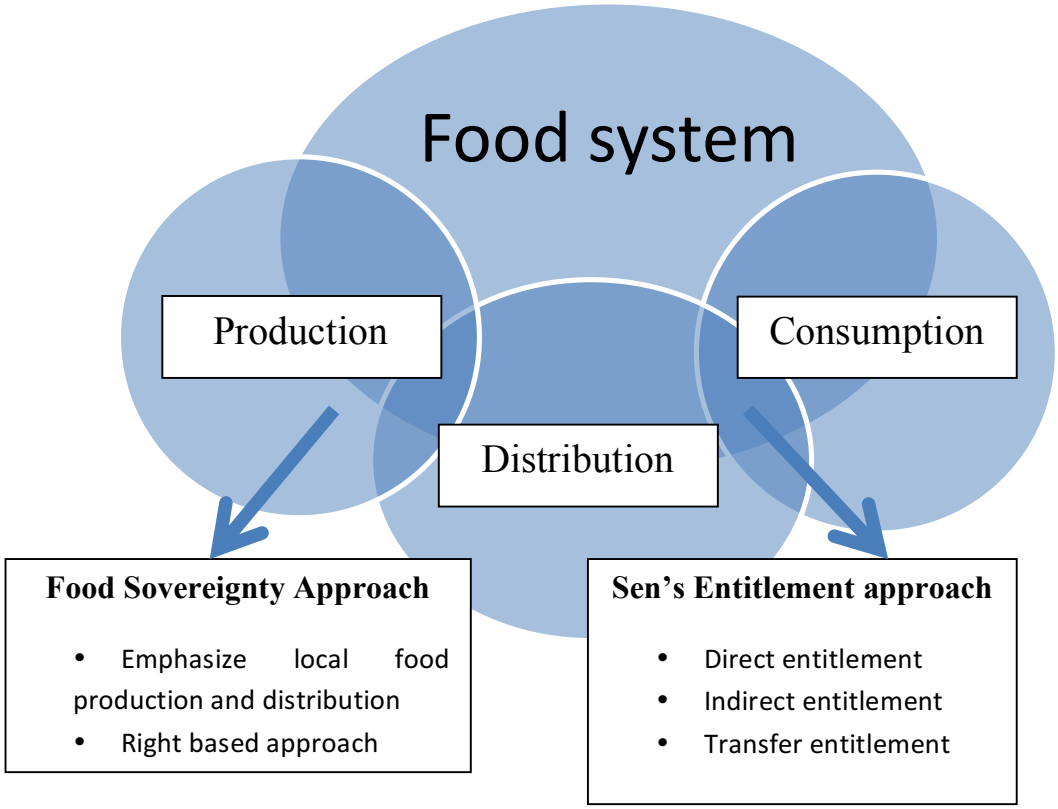

Figure 3.6 An integrated approach to look at the overall food system to address food security/insecurity

Sen's entitlement theory and the food sovereignty concept, which use a rights based approach, complement each other. Sen's entitlement theory is applicable in the context of Indigenous people in Canada, as there is a surplus of aquatic food resources in most places in northern Canada (McCart and Den Best 1979) and yet many communities are food insecure (Council of Canadian Academies 2014). Sen (1999, 1981) pointed out that famine occurred in Bangladesh in 1974 despite peak grain production. He argued that people suffered from severe food insecurity and died of starvation in the middle of abundance, as they did not have access or entitlement to food. Similarly, in the Canadian Indigenous context, there is an abundance of natural resources, especially fish, and yet many communities are suffering from food insecurity. Sen's argument holds here as communities have in part lost their entitlement due to the complex

of reasons summarized in the introduction of this paper. This loss is manifested by a decline in the Indigenous way of life and in the nutrition transition from traditional foods to store-bought foods (Council of Canadian Academies 2014).

The apparent high levels of food security in Norway House can be interpreted using Figure 3.6. Focusing on the food system with respect to fisheries, there is no overfishing problem (at least at present, Ayles et al. 2011). Norway House fishers can use this production since they have harvesting rights for both commercial and subsistence fisheries. Food production and distribution overlap through an effective sharing system (Figure 3.3 and Table 3.3) that reaches half of the total population, when sharing from the commercial fishery is factored in. Beneficiaries of the sharing include non-harvesters of traditional foods, providing direct and transfer entitlement and resulting in increased food security.

However, the local fishery can never be only answer to local food security problems. The contemporary Indigenous food system comprises of traditional foods and market foods (Lambden et al. 2006). The production, distribution and consumption of these two kinds of foods are fundamentally different (Table 3.4). Because of shifting cultural values, as well as the complex of factors militating against traditional foods, the consumption of traditional food has declined, and the consumption of market food has increased (Kuhnlein and Receveur 1996; Council of Canadian Academies 2014). Nutrition transition in the Canadian north need not necessarily lead to food insecurity. However, high unemployment and lack of financial resources result in people purchasing market foods of low nutritional quality. Thus, the combination of the financial inability to afford nutritionally high quality market foods, and lack of access to traditional foods, contribute to poor nutrition and food insecurity within Indigenous communities (Kuhnlein et al. 2013; Kuhnlein and Soueida 1992).

Indigenous people collect traditional foods through harvesting, that is, Sen's (1981) "direct entitlement". When it comes to distribution of traditional foods, Indigenous people share their harvest, known as "transfer entitlement" (Sen 1981). Consumption of traditional foods play an integral role in maintaining nutritional quality in the diet, as compared to cheap market food, which is often of inferior nutritional quality (Kuhnlein and Receveur 1996; Council of Canadian Academies 2014). Although, traditional food is nutritious, tasty, healthy, inexpensive (assuming people have the appropriate equipment and skills/knowledge), socially and culturally beneficial (Kuhnlein et al. 2004), Indigenous communities are inclining more towards market food, "indirect entitlement" in Sen's (1981) terminology.

The Council of Canadian Academies (2014) advocated a complex of measures, including the import of higher nutritional quality store food and reducing transportation costs to make good food more accessible to communities. In fact, it is entirely feasible to achieve food security by making inexpensive, high quality food available. However, to achieve food sovereignty, which encourages food autonomy and the rights of Indigenous people to enjoy, consume and produce their traditional food in a culturally acceptable manner (Pimbert 2007; Patel 2009), communities need to be able to produce more of their own food, especially protein rich food. Therefore, we argue that food policy emphasis should be on decreasing indirect entitlement and increasing direct entitlement, in this case, by the use of traditional foods. However, this is not easy to do so in the context of economic realities and changing cultural values. What can be done to increase direct entitlement?

Table 3.4 First Nation food system comprises both traditional food and market food

Type of food	Production	Distribution	Consumption
Traditional food	Local natural resources; based on traditional knowledge and skills	Locally harvested and shared within family and communal networks	Culturally important; based on traditional taste and values
Market food	Industrially produced and processed	Usually imported from southern urban centers; bought from grocery stores; often expensive; not shared	Related to economic ability to purchase; convenience; change in taste

One possibility is the development of one of the sectors of the traditional economy to act as an "engine" to increase the production of local food. In the case of Norway House, the commercial fishery provides this function; it acts as the engine of traditional food production through the community-wide sharing of the fish, including the by-catch and commercially under-utilized species. The traditional economy that supplies fish is supplemented by a continuing subsistence fishery. But the subsistence fishery alone is not sufficient for food security, simply because it does not provide much of a surplus to be shared.

3.5 Conclusion

Subsistence or food fisheries are often important for local food security but have been neglected in the literature (Kittinger et al. 2015). Our study shows some of the potentials and limitations in using the local fishery potential for increasing food security. Norway House, with more than 90% food secure households, provides an example for other Indigenous communities in northern

Canada in how to deal with food insecurity through fuller use of fish and other traditional foods, consistent with the recommendation of Council of Canadian Academies (2014). The key to food security of Norway House is the commercial fishery which brings in a greater harvest to share through communal networks than does the subsistence fishery alone.

Even though the commercial fishery involves relatively small number of fishers and is primarily carried out to produce a profit, as in any commercial venture, it plays a major role in food security. Commercial fishers and their helpers share their catch with a large network of other households. The sharing ethic in the community results in an infusion of high quality protein mostly from species other than those that have a high market value, reaching about half of the Norway House resident population. This comes at a time when traditional fish and wildlife harvesting have declined throughout the Canadian north (Council of Canadian Academies 2014). Subsistence fisheries which used to produce much food for the community (Berkes 2012) no longer do so. Many food fishers use angling to cut down on fishing costs; this results in an individualized approach, fishing mainly for one's own household consumption, and results in the reduction of sharing within the community.

The commercial fishery is seasonal (spring/summer and fall) and takes place over only 11 weeks. However, households in the community use freezers to store fish to tide over lean periods, and also carry out food fishing. Nevertheless, there are periods in which households are vulnerable to lack of local fish protein. As well, there are vulnerabilities by social group. Some people and households are vulnerable because sharing of food mostly occurs among households of extended families and a common network of people. Basically, this leaves out those who are not part of these networks, for example, widows, seniors, and female-headed households. Some community members, mostly seniors, recommended that a list of food sharing households be

prepared and updated by the First Nation's Band office so that traditional foods may be distributed and shared more equitably among households to ensure increased food security at the community level. Such measures, and the more complete utilization of the available traditional foods, can result in the increase of direct entitlement and transfer entitlement, and thus improved food sovereignty.

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CHAPTER 4: ENGAGING INDIGENOUS YOUTH TO REVITALIZE CREE CULTURE THROUGH PARTICIPATORY EDUCATION[7]

Abstract

Traditional food harvesting is an integral part of culture and food security for Indigenous people in Canada and elsewhere. However, new generations are more inclined to consuming market foods rather than traditional foods. We report on a project in Norway House Cree Nation, northern Manitoba, Canada, to engage youth to express their thoughts about traditional food. The objective was to explore the understanding and values of Indigenous youth about traditional foods and to engage them in revitalizing culture towards long-term food security. We used participatory research approaches and engaged participants in focus group discussion followed by a collaborative art project. Our conceptual framework postulates a cycle whereby food security planning depends on engaging youth and the community, and planning in turn energizes further planning and participatory education. The findings of the paper are likely of interest to Indigenous communities dealing with planning and intergenerational issues around food security.

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4.1 Introduction

This paper is the outcome of an outreach project involving participatory art to encourage and restore interest in traditional foods. This project involved working with Indigenous youth in a First Nations community in northern Manitoba, Canada, with the objective to explore their thoughts and understanding about traditional food systems through participatory art, and to engage youth in revitalizing Indigenous culture and tradition towards long-term food security planning for the community.

First Nations in Canada have been compared to developing countries because of issues in socio-economic conditions, education levels, poverty and food insecurity (Council of Canadian Academies, 2014). The food insecurity rate among Indigenous households has been consistently higher than the Canadian average. In the year 2007/2008, 7.7% of average Canadian households but 55% of Indigenous households experienced moderate to severe food insecurity (Health Canada, 2012). The reasons behind this condition are multiple and complex. Food insecurity among First Nations is often associated with a transition to a high fat and high carbohydrate diet as people move away from traditional ways of living and get accustomed to store bought food items which are often unhealthy, as well as more expensive, as compared to traditional foods (Kuhnlein, Receveur, Soueida, & Egeland, 2004). These trends are surprisingly similar among Indigenous communities throughout the world (Kuhnlein, Erasmus, Spigelski & Burlingame, 2013).

Food security studies for Indigenous people need to consider their cultural perspectives and values (Power, 2008) and attributes of traditional foods (Lambden, Receveur & Kuhnlein, 2007). A traditional food system is defined as "all food within a particular culture available from local natural resources and culturally accepted. It also includes the socio-cultural meanings,

acquisition, processing techniques, use, composition and nutritional consequences for the people using the food" (Kuhnlein & Receveur, 1996, p. 418). In this paper we use the terms "traditional food" or "bush food" interchangeably. Food security is said to "exist when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (Council of Canadian Academies, 2014, p. xxv, from FAO sources).

Use of traditional foods is important for food security and health of Indigenous people. Despite the availability of market foods (i.e., bought from the grocery store) in northern Indigenous communities, traditional food rich in protein is central for good nutrition and for the identity and well-being of Indigenous people in Canada (Council of Canadian Academies, 2014). Thus harvesting, consumption and sharing of traditional foods are linked to food security; and revitalization of traditional food culture is linked with long-term food security planning. However, participation in traditional havesting activities (such as fishing, hunting and trapping) and the consumption of bush food have been decreasing in northern communities in recent years (Usher, 2002). There are multiple reasons for this decline, including loss of access to land and natural resources, and environmental problems such as pollution and climate change, and the decline of traditional knowledge and bush skills transmission (Ohmagari & Berkes, 1997).

Traditional ecological knowledge may be defined as, "a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission" (Berkes, 2012, p.7). The term Indigenous knowledge can be used interchangeably with traditional knowledge, and generally refers to knowledge held by an Indigenous group. Related to food security, traditional knowledge refers to knowledge of the land, where to find the food animals and plants, how to harvest them, how to harvest them

sustainably, and how to prepare them for food. Such knowledge is dynamic; it does not come from book learning but from hands-on experience on the land and transmission of skills from knowledgeable elders to younger generations.

Traditional intergenerational education, learning from the elders, continues to be important for Indigenous communities in Canada but knowledge transmission has been declining (Goulet & McLeod, 2002; McKeough, Bird, Tourigny, Romaine, Graham, Ottmann & Jeary, 2008), perhaps related to families spending less time on the land (Council of Canadian Academies, 2014). As pointed out by a Norway House elder, when youth become accustomed to traditional food at an early age, chances are that they will continue to incorporate traditional food in their adult lives. Additionally, there is an increasing awareness that meaningful engagement and understanding of the values of the younger generations is essential for predicting the involvement of youth in resource planning and activities, such as harvesting food (Zurba & Trimble, 2014).

While education outside the school system continues to be important for First Nations, a large proportion of youth education is delivered through primary and secondary schools which are federally funded and run by the Frontier School division. First Nations schools therefore are continuously developing educational approaches that incorporate traditional values, and tend to focus on engaging youth in discussions and practices relating to their traditional way of life (Goulet & McLeod, 2002; McKeough et al., 2008). Traditional livelihoods and cultural awareness are therefore integral components of educational programs in First Nations schools (Frontier School Division, 2014). Programs emphasizing participatory learning and engagement are particularly useful for eliciting perspectives on community issues (Zurba, Islam, Smith & Thompson, 2012; Alexenberg & Benjamin, 2004; Ball, 2004). Often such programs are geared

towards creative projects that are capable of engaging youth in reflection and visioning. Examples include, but are not limited to, visual art projects, crafts, theatre, and creative literature which are coming into increasingly wider international use (Rathwell & Armitage, 2016; Fernández-Giménez, 2015; Suchet-Pearson, Wright, Lloyd & Burarrwanga, 2013; Curtis, Reid & Ballard, 2012; Cahnmann-Taylor, 2008; Alexenberg & Benjamin 2004; Cahnmann, 2003).

There have been a number of studies in which the participation and views of the youth were integrated into community development (Barnett & Brennan, 2006) municipal transportation planning (Wurtele & Ritchie, 2005), and human settlement planning (Chawla, 2002). However, no systematic studies have been done (to our knowledge) to understand the role of youth in food security planning. The paper addresses this gap in the literature, and explores the question of how Indigenous youth can be engaged to revitalize Cree culture and traditional values, with a view to impact food security planning. The objective of the project was to explore the understanding and values of Indigenous youth, and to spark renewed interest, with regard to the traditional food system.

The participatory art project described here was the major component of a cluster of participatory education initiatives towards cultural revitalization. These initiatives, in turn, were part of a three-pronged approach in our larger project toward food security in Norway House: cultural revitalization, community economic development (Islam and Berkes, 2016b), and the management of local food resources, mainly fisheries (Islam and Berkes, 2016a). Of the three participatory education initiatives, we chose to focus on the participatory art project as it was the best developed of the three, and because our previous work demonstrated the significance of exploring local values through such an approach (Zurba and Berkes, 2014). The Discussion section of the paper puts the project into perspective by addressing the broader aspects of cultural

revitalization in Indigenous societies in which engaging youth through participatory education, using art as a medium, is but one tool. The findings of the paper apply to Canadian Indigenous communities in particular, and more broadly to other Indigenous communities that are exploring intergenerational issues around cultural revitalization and food security planning.

4.2 Study Area

Norway House Cree Nation is one of the largest First Nations communities in Manitoba, Canada, with a resident population of 4,758 in 2011 (Statistics Canada, 2013). The community is situated 450 km north of Winnipeg at the convergence of Lake Winnipeg and the Nelson River (Figure 4.1). Norway House Cree Nation has all-season roads to Winnipeg and community members can commute either by road or air. Norway House was an important fur trade post in the 18th and 19th centuries. The majority of residents are Cree, one of the largest aboriginal groups in Canada that extend across the boreal and subarctic regions from Labrador to British Columbia. People participate in various traditional activities including fishing, hunting, berry-picking and snaring throughout the year.

The community is run by a Chief and Band Council but also has major portions that are Crown land. The Chief and Band council arranges different traditional events throughout the year. Beside the Band council, Parks and Recreation office of provincial government also organize different sports events that are open to all community members. 'York Boats days' is an annual traditional event at Norway House where community members from all parts of Canada come to visit the community and get together with their family and friends. The band arranges a number of fishing derbies throughout the year and also organizes several winter festivals including snow sculpture-making, ice-fishing, trapping and sports competitions for youth and community members.

Youth in the community have the opportunity to be elected for Youth Chief and council and they also help out in the community through different school run groups and programs. Moreover, the Youth Chief and council work to create events for youth in the community as well as run fund raising activities for different events that encourage youth to participate in traditional activities. The Youth Chief and council usually serve the community on two year terms.

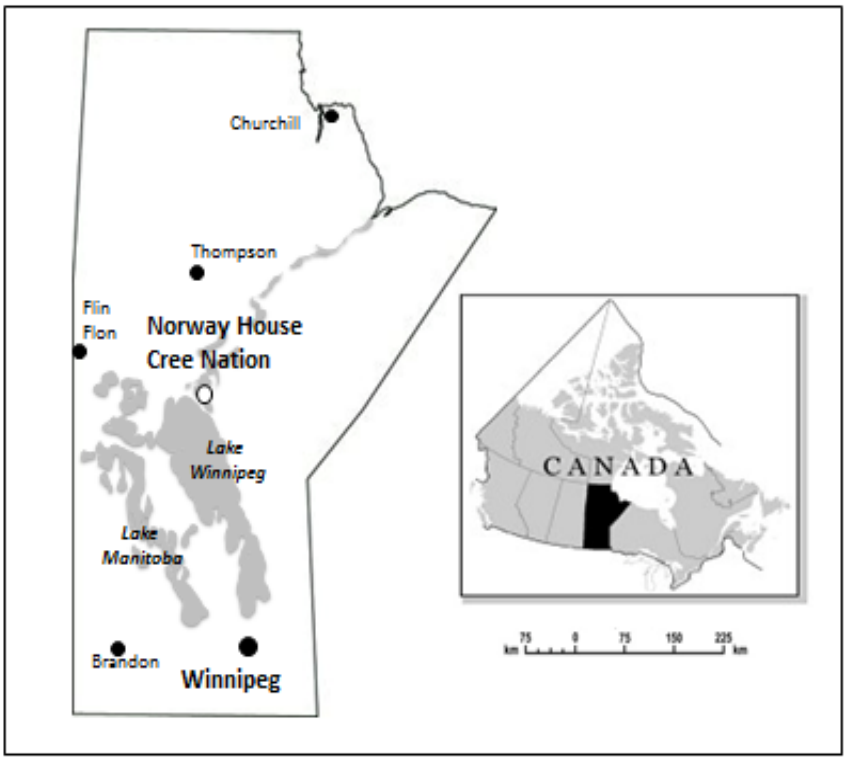

Figure 4.1 Location of Norway House Cree Nation in Manitoba, Canada.

Source: adopted from http://www.knightsinfo.ca/mapmb.html

Frontier school division operates the schools in Norway House. There are three schools in the community, Jack River School, Norway House School and Helen Betty Osborne School (HBO). HBO is the largest school in Norway House with regards to number of students and infrastructure. The school building is a state of the art building and had 1285 students registered for the 2014-15 school year. HBO School opened its door to students in 2004. The school runs

from Kindergarten to grade twelve and comprises of three sections, junior section, middle section and senior section. HBO School offers a variety of elective subjects for students; Arts, Graphic Arts, Power Mechanics, Information Technology and Computer, Home Economics, Wood Work, Cosmetology, Cree Language, Native Studies, Music and Outdoor Education. Among all these elective courses, the outdoor education course teaches students a variety of bush skills; for example, how to skin animals after hunting, how to fish, make fish bait and how to gut fish. Students travel around the community for hunting, trapping, and fishing and also to learn about different traditional plants and gather traditional knowledge.

4.3 Research Methods

We used a qualitative case study approach to addressing research questions and participatory art approach. Arts-based inquiry is a new and emerging field of social studies (Cahnmann-Taylor, 2008; Fernández-Giménez, 2015). Participatory visual arts were used as the main approaches for exploring community food security with Norway House youth because: i) the community has a strong tradition in the visual arts; ii) the HBO school has a group of secondary students who are studying art incorporating traditional values; iii) and, the visual arts have proven to be meaningful for engaging community people in resource planning (Zurba & Berkes, 2014; Zurba & Friesen, 2014) (iv) art-based methodologies provide new means of seeing by uncovering cultural and emotional dimensions of social phenomena (Cahnmann, 2003) and (v) presenting research findings in artistic form makes them more convincing and accessible to broader audiences (Fernández-Giménez, 2015; Cahnmann, 2003).

The project was fully conducted and administered in the art classroom by the art teacher of Helen Betty Osborne School at Norway House Cree Nation. The principal of the HBO School granted us permission to administer this participatory art project through the request of the art

teacher of the senior section. We arranged the supplies and initiated the project with the school and then the art teacher facilitated and ran the project with her art class. We advised the teacher with regards to participatory education that connects to food security planning. Participants of this project were students of the senior art class who were studying from grade nine to grade twelve. A total of ten students participated in the focus group discussion initially and eight of them were part of the art project. We asked the art teacher to advise us about the medium of the artwork. She discussed with her students and advised the participatory artwork would be done using acrylic on canvas.

The project was mainly conducted in four phases, which included different pedagogical approaches and activities:

4.3.1 Focus group discussion with students

Moderated Focus groups are useful for exploring topics related to people's attitude and perspectives about a topic (Berg, 2004). In this project, the art teacher introduced the project to the students through discussion. They were asked about traditional food and traditional food practices in their families. The teacher did not provide students with the formal definition of traditional food. During the focus group discussion, the teacher asked students, 'What does 'traditional food' or 'bush food' mean to you?' She wrote the question in the white board then encouraged students to brainstorm for ideas and share their stories related to traditional food.

4.3.2 Writing workshop of individual ideas and stories

Students were encouraged to select a traditional food that was particularly meaningful to them to paint on the canvas. In this phase, students were asked to write their stories or ideas related to their chosen traditional food. Some students came up with personal stories, some wrote about

their favorite traditional foods, and some mentioned different activities for traditional food acquisition.

This step in the project also helped evaluate how the methodology worked, and whether it was useful and feasible towards food security planning. The students came up with ideas on how to engage youth more effectively in Norway House programs that deal with food security. One participants of the project suggested that, "It would be great if everyone tried to eat traditional foods for just two days in a week and give up what they normally eat and see the difference and health benefit of traditional food compared to market bought food."

4.3.3 Individual artwork based on students' own ideas

The teacher asked students to think about how they would express their ideas through painting by draft sketching individual art pieces. They then sketched their traditional foods in their sketchbooks. Students had liberty in using different colors and themes for their project. Students were also able to continue their sketches at home and were given deadlines to bring their artwork to share with the rest of the class. The art teacher was there to help them and guide them when they needed advice; however, the art piece was their own work. Once the sketches were complete, the art teacher facilitated the students in placing their contribution on the canvas in preparation for the collaborative painting (Figure 4.2).

Figure 4.2 Individual artwork by students placed on the canvas

4.3.4 Participatory artwork using acrylic on canvas

Participatory art is an empowering tool for research as it allows the participants to define the topic of the conversation through their own expressions (Pink, 2007).The teacher asked students about the choice of background colors for the painting. Initially students gave suggestions of different colors. The teacher asked them to think of the different colors they see in the community throughout the year. This motivated students to choose a gradient of colors containing blue, white and green as the background color. All these colors resembled something meaningful in the community. For example: blue represents water and sky, white is the symbol of snow in winter, and green represents grass and trees in the community.

The teacher discussed how the traditional foods should be arranged on the canvas, which was of the dimensions 1.5m x 1.25m. They all decided to place campfire tea in the middle, as most students were familiar with this traditional practice and constructed other foods around the campfire. Students decided to draw moose over a green color which resembled land; and to draw fish and geese over a blue color which symbolized water.

Most students had never worked with acrylic paint and did not have any experience in collaborative art projects. Students were introduced to basic acrylic painting techniques. Students then worked on the painting in pairs, transferring their designs and painting. The teacher co-ordinated the project and gave each student time slots to complete their art on the canvas. Students took almost three months to complete the entire project.

4.4 Results

4.4.1 Participatory education workshop: What does traditional food or bush food mean to you?

Participatory projects usually start with a question, and the participants have the liberty to express their opinion on the topic without any restriction (Berg, 2004). The focus group discussion began with a moderated discussion by the art teacher to explore the theme *What traditional food or bush food means to you?* The question initiated different ideas about traditional food which then allowed participants to express their unique individual thoughts. Participants were at liberty to express their ideas and opinion about traditional foods and provided diverse responses. The different expressions that students used to describe traditional foods were grouped into eight main themes, for example, fruits, activities, cooked food, memories/experiences, fish, birds, animals and plants. These various themes about traditional foods are shown in Figure 4.3.

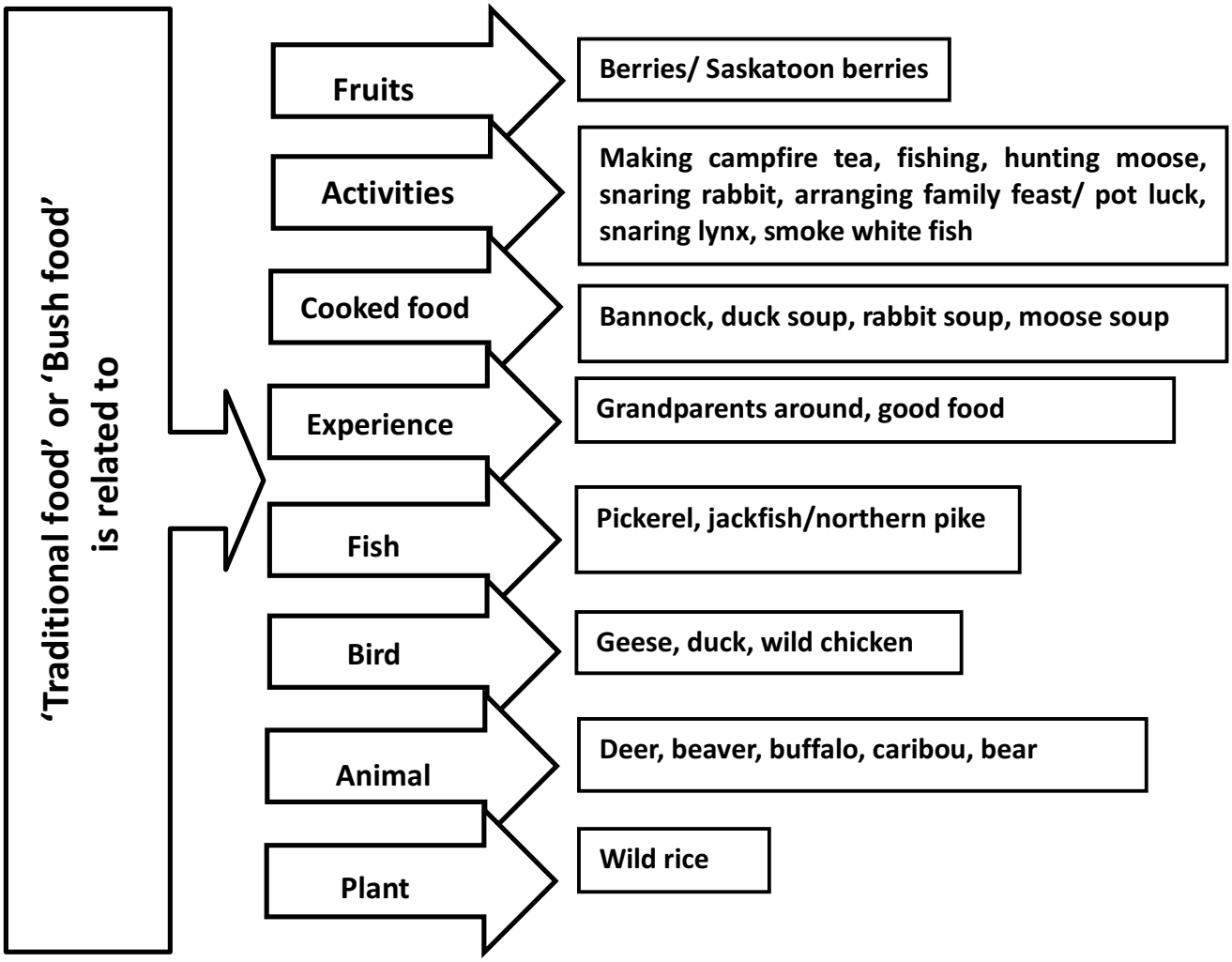

Figure 4.3 Various themes about traditional foods emerged from the focus group discussion

Some participants connected traditional food with traditional activities they took part in, for example fishing, hunting, snaring and berry picking. Some expressed their own experiences and stories associated with traditional foods. One participant commented, "Traditional food is the food that is given to us from Nature. We give thanks to the plants and animals that we kill and take to feed our family".

For a number of participants, traditional foods meant different types of berries, while for others bush foods meant fish (pickerel, jack fish, northern pike), wild animals (deer, beaver, buffalo, caribou and bear) and birds (Geese, duck and wild chicken). For some participants wild rice and bannock resembled traditional foods. The common thread of this discussion was that traditional foods is rooted in the culture, values and day to day lives of the people of Norway House. Young generations are learning about their traditional foods not only from their family members and elders in the community, but also by participating in their schools and community activities.

4.4.2 Youth engagement through participatory art

The collaborative artwork (Figure 4.4) shows the combination of different meanings of traditional foods composed by a group of school students. Each student contributed to the art piece by expressing their unique meaning of traditional foods by drawing on canvas. The meaning of traditional foods was different for everyone. By sharing individual experiences about bush foods, the art exercise encouraged students to learn from each other, respect different perspectives and look beyond the conventional definition of traditional foods and define their own meaning of traditional foods. According to a student, “This canvas represents Norway House’s tradition and culture about traditional foods”.

Artwork is not easily understood by all observers and the same art piece may mean different things to different audiences. Thus, the interpretations of the artwork by artists are as important as the artwork itself (Zurba & Berkes, 2014). The art teacher asked students to interpret their drawing on canvas. She encouraged students to tell their stories about how their drawings were related to their own meaning of traditional foods. She recorded their interpretations on paper.

Figure 4.4 Participatory artwork of students on 'traditional food' or 'bush food'

For the purpose of discussion, we analyzed the various interpretations of the artists and tried to find some common categories among them. Based on the similarities in categories, we

have divided the art piece into eight segments or plates from A-H (Figure 4.5). These plates relate to eight different themes that represent different aspects of traditional foods. The general identifier of each of these plates and the artists' interpretation is presented in Table 4.1.

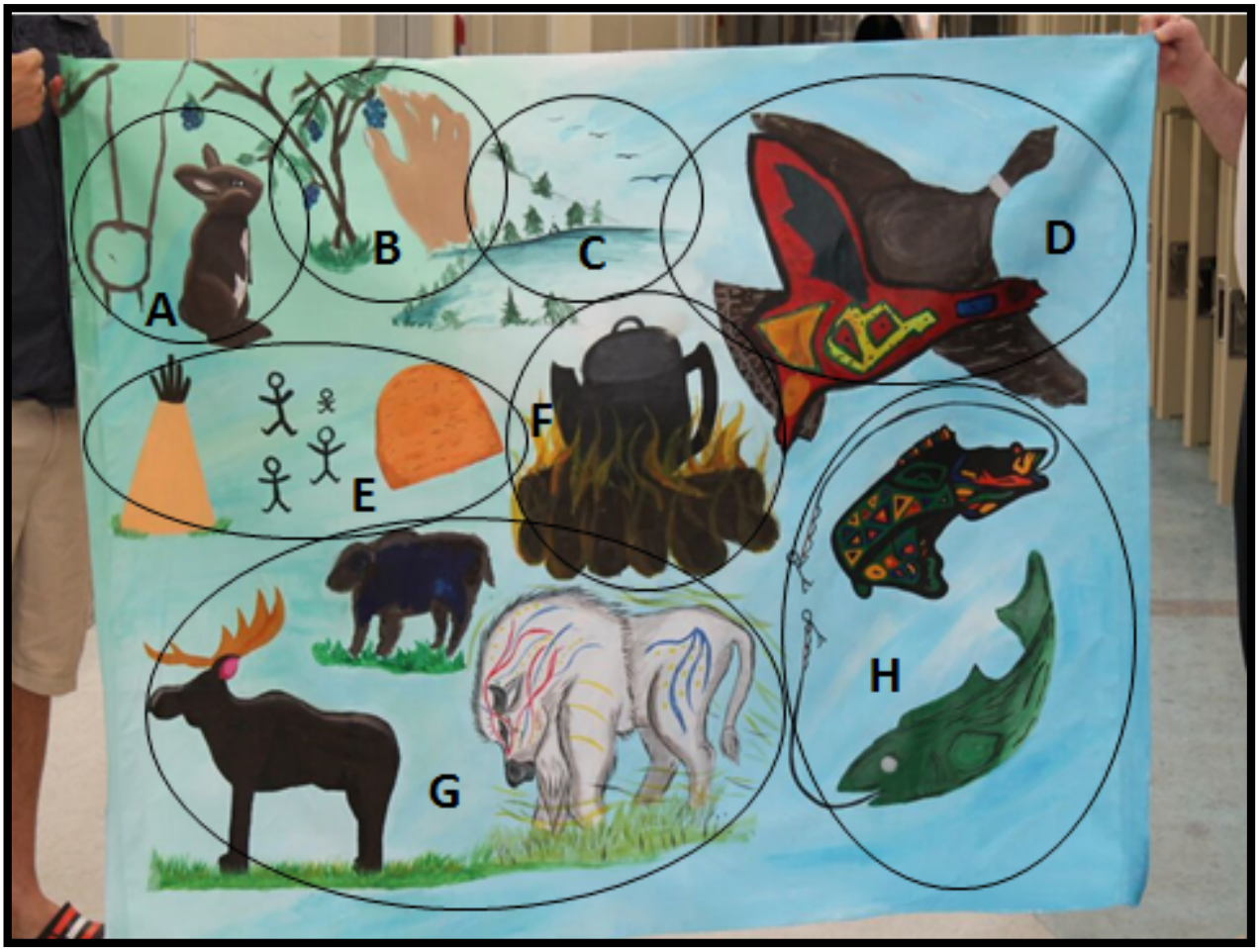

Figure 4.5 Different plates/segments (A-H) of the artwork

Table 4.1 Artists' interpretations of the different plates of the participatory painting on canvas about the meaning of 'traditional food'

Plates	**General Identifier: subject of the art piece**	**Interpretations of the art piece by artist**
A	Activities/processes: rabbit snaring	"We set snares for rabbits. We make rabbit soup or roasted rabbit with the rabbits we catch. We normally do this in the winter. We catch about two to three rabbits. We normally share what we catch with family, elders and people who ask for it."- student C
B	Activities/processes: berry picking	"The reason why I drew berry picking and hands is I wanted to represent berry picking and sharing among families and friends."- student F
C	Location: Playgreen lake	People at Norway House go to Little Playgreen lake for subsistence fishing. Traditionally fishing is considered as a part of family activity. Kids accompany their families for fishing trips.
D	Birds: Geese	"I drew a goose because I love birds and I think they are good looking birds. Geese really taste good with bannock. Goose means a lot to me as they provide us with food and we can use their feather in making dream catcher. We believe that dream catcher keeps us away from scary or bad dreams."-student I
E	Activities/processes: Camping with family	"For me traditional food means going for camping with my family. That's why I wanted to paint my camping experience with my family. I painted bannock, tipi and people to represent fishing camp."-Student G
F	Activities/processes: Making tea in campfire	Making tea on a campfire is a common traditional activity among Indigenous people at Norway House. People usually drink campfire tea when families get together for a feast or when they go out for fishing and hunting camps.
G	Animals: Moose and caribou	Community members hunt mostly Moose and Caribou during hunting seasons. Kids often accompany their father or grandfather in hunting trips. Hunters keep some portion of meat for their families and share the rest with other family members and friends.
H	Fish: Pickerel	"For the traditional food painting I drew a fish because I like eating fish. My family and I always go for fishing in the weekends. I drew pickerel because it is the only kind of fish I like to eat. I go fishing in sea falls, pine creek or molson lake. Sometimes we fry fish and eat it with fried bannock. We also make campfire tea to drink with it." Student-H

Image 1 White fish patties

Image 2 Campfire tea

Image 3 Moose meat stew

Image 4 Fried white fish roe

Image 5 Rabbit soup

Image 6 Rabbit meat

Image 7 I am trying boiled white fish at fisherman's cabin

Image 8 Boiled sturgeon fish—a delicacy for local people

Most of the participants related traditional foods with traditional activities from the community that they took part in. The plates A, B, D and E represent such activities in the artwork on canvas. Plate A shows snaring of rabbit which is a common traditional activity in Norway House. The artist drew a picture of a rabbit and a snare to describe his experience with harvesting of traditional food (rabbit). Once a year, he goes out for snaring rabbits with his father. His father teaches him how to prepare snares, catch rabbit and then skin the rabbit. They usually bring a couple of rabbits to eat and share with other family members. His mother makes rabbit soup and bannock for supper. According to the artist, "I drew rabbit as I have fun when I go for rabbit snaring with my family in every winter and I learn something new from elders every time I go. I learn how to skin a rabbit and cook it".

For the artist *traditional foods* mean berry picking with family members (Plate-B). A number of family members go together for berry picking and elders also join them. He said that he loves picking berries. He drew a tree with berries and a hand resembling the berry picking traditions in his family. By drawing hands he wanted to show that they share the berries they collect with other families and friends. According to the artist, "we usually pick berries in summer…we pick different types of berries…chokecherries, raspberries, blueberries, strawberries. Berry picking is usually a huge family event. We sit on the road like bears picking berries. Sometimes we bring chairs for the older family members."

Traditional food means going camping with family (plate-E). The artist drew a tipi, some people and bannock. He goes camping with his parents, siblings and other family members and lives inside a tipi. He loves going to camping with his family and harvesting traditional foods. His mother often makes bannock when they are camping. During camping, elders will drink tea beside the camp fire at nights and kids will seat in a circle. Elders will tell stories to kids about

their childhood, traditions and culture. They often include stories about how different the community was when they grew up. Most people in the community lived on traditional foods from land and raised domestic animals for milk and meat. Every home had a garden to grow vegetables. He was told that people were happy and healthy by living off their lands.

The importance of making campfire tea as a common tradition came out in the discussion of traditional foods (plate-F). All the participants agreed to put campfire tea in the middle of the canvas as it is a very common activity that takes place throughout the year when families get together for a feast.

The artist drew Playgreen Lake (plate-C) to relate with his meaning of traditional foods. Many community members at Norway House go to Playgreen Lake to catch fish for subsistence throughout the year. Commercial fishers also catch fish from there. In his interpretation, the artist mentioned that he likes the taste of fish caught from this lake. He also expressed his concern about the pollution of the river caused in recent years. His grandfather told him stories about the lake and it's clear water enabled them to see fish swimming far. However in recent days due to the development of hydro dam, the lake water became muddy and polluted. Elders in the community think that polluted water has badly affected the size and taste of fish.

Goose means traditional food to the artist who drew Plate-D on the canvas. According to him, "For the traditional food painting, I drew a goose as I love eating it's meat and it reminds me of my childhood". Geese are a very popular traditional food and visitors in Norway House will find a number of artificial geese in the front yard of many houses. People use these artificial geese to attract live geese in their yard and then they can harvest them easily.

For a number of participants, moose and caribou meant traditional foods (Plate-G). The participants commented about the delicious taste of moose and caribou meat. Traditional hunters often take their young boys to hunting trips to teach them how to use guns, hunt animals and how to skin animals. Some families teach kids to follow traditional practices of offering tobacco to the animal after hunting. People usually share meat with family and friends. Indigenous people's show respect and gratitude to the animal for providing its life for their food.

Fish means traditional foods to the participants who drew in plate-H of the canvas. He drew pickerel as it is his favorite fish. According to him, "I painted a fish as it means traditional food to me. Once a year my family and I go for fishing. We stop fishing when we catch enough fish for the family. My favorite fish is pickerel". Norway house has a long tradition of commercial and subsistence fishing. People go for food fishing throughout the year and commercial fishers fish only in two seasons summer/fall and spring season. Fishers share fish with their family and friends. One participant commented, "I want to share my family's fishing practices with future generations".

4.4.3 Traditional foods for evoking experience and memory

Most of the ideas related to traditional foods discussed in focus group are present in the final artwork on canvas. However, there are different ideas that students discussed in focus group and did not paint on canvas and *vice versa*. A number of participants talked about their perspectives, values and views related to traditional foods in focus group discussion. Often, these perspectives included experiences and memories related to traditional food harvesting and consumption. For example one student described *traditional foods* as "good foods" and related to grandparents being around. One of the participants mentioned, "To me traditional food means my grandmother's cooking". However, such memories did not show up in the artists' paintings.

There may be a number of reasons behind this. We assume these are abstract concepts that are difficult to visualize and draw on canvas.

Similarly, in individual segment of artwork on canvas, one student related traditional food to a location in the community (that is Playgreen Lake). He said that the location "resembles", or perhaps more accurately, evokes memories of, traditional foods to him as he goes there for fishing with his family every year. However, the idea of locations connecting to traditional foods did not come up in the focus group discussion. Thus the focus group discussion and the individual interpretations of the artwork are complementing each other with regards to the meaning of *traditional foods.*

Combining the focus group discussion and the interpretations of the artwork, we find total of nine different themes related to traditional foods. These are,(1) traditional activities (making campfire tea, fishing, hunting, snaring, berry picking, camping with family), (2) cooked food (bannock, duck soup),(3) fish (pickerel, jackfish, whitefish), (4) birds (geese, duck, wild chicken), (5)animals (moose, caribou, deer, beaver, buffalo, bear), (6) plant (wild rice), (7) fruits (berries), (8) memories/ experiences (grandparents around, good food) and (9) location (Playgreen Lake).

4.5 Discussion

Successful cases of Indigenous cultural revitalization have often involved the youth. For example, the Nisqually Tribe in Washington State (USA) have been engaging the youth in tribal initiatives, such as the Tribal Canoe Journeys program. Such initiatives have accompanied the restoration of cultural ceremonies, reaffirmation of resource use rights, and economic revitalization (Grossman, 2010). The present project focused on the role of participatory education in Cree cultural revitalization. Norway House people have always emphasized the

importance of engaging youth and the intergenerational transmission of traditional food knowledge and values. This finding is consistent with those elsewhere in northern Canada (Council of Canadian Academies, 2014), and supports the assumption that participatory education projects with Indigenous youth can be used in community planning.

The older Cree in Norway House, as with many indigenous people elsewhere (Berkes, 2012) prefer traditional knowledge transmission whereby the youth are educated by their family members and by elders through learning-by-doing. However, in the contemporary world, Indigenous youth are under assault from non-Indigenous cultural values, tastes and neoliberal influences. They also spend long hours at school; therefore, the role of the school in Indigenous cultural education is critical. As with many schools in Indigenous communities, the school at Norway House seeks to incorporate education on traditional foods and cultural values in their curriculum, fostering awareness of culture and traditions.

The use of art as a medium of participatory education is a powerful tool to explore the views and values of Indigenous youth about traditional foods in part because the participatory artwork (Figures 4.4 and 4.5) provides a boundary object. As defined by Cash & Moser (2000, p. 115), boundary objects are "valued on both sides of a boundary [such as science and policy] and provide a site for cooperation, debate, evaluation, review, and accountability". The participatory artwork in this project initiated deliberation and reflection among Indigenous youth and their teacher about traditional foods (Star & Griesemer, 1989; Zurba & Berkes, 2014). The outcome of this work may also be used as a catalyst for communication among different groups in the broader community about cultural revitalization.

The involvement of Indigenous youth in participatory education with regard to traditional foods had a direct impact on the participants, as Section 4.4.2 shows, and perhaps indirect

impacts on the community as a whole on increasing awareness of the relationship between food security and the use of traditional foods. For example, some students discussed the inclusion of more youth in organizing community feasts using traditional foods, and expressed desire to participate in more camping activities which would provide opportunities for youth to learn from elders about their culture and traditional foods. The conceptual diagram (Figure 4.6) illustrates the relationship between long-term planning and participatory education. It depicts a cycle whereby food security is achieved through engaging youth and the community. Enhanced food security through greater and more specialized planning in turn energizes further planning and participatory education.

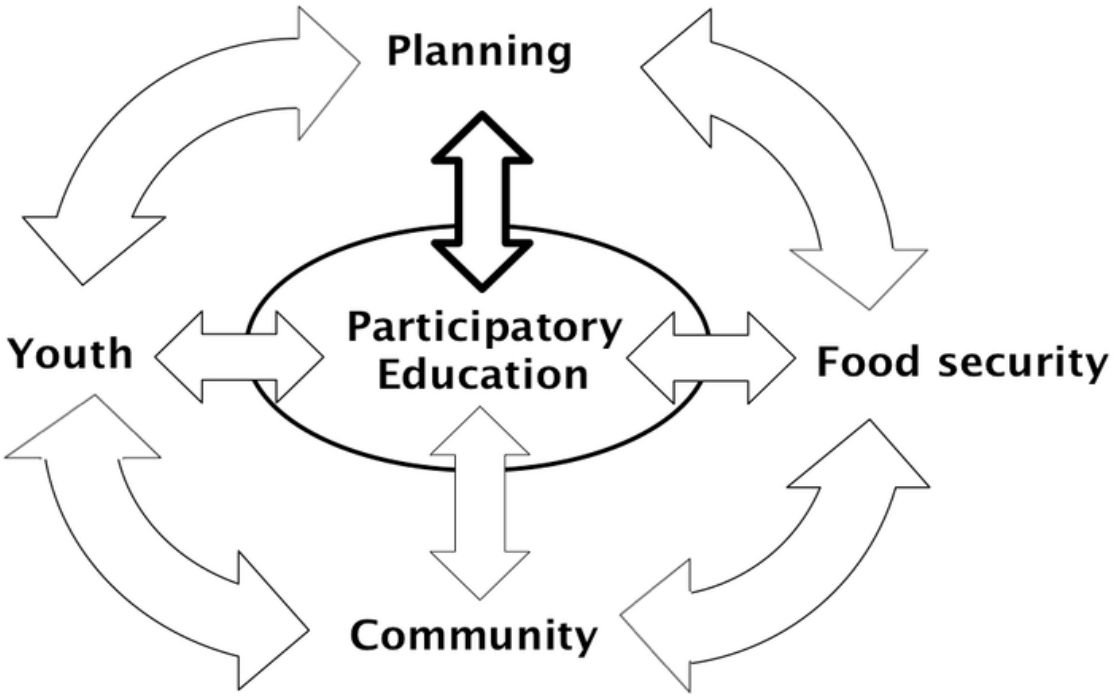

Figure 4.6 Integrating youth in food security planning through participatory education is an effective means to address Indigenous food insecurity

Participatory education enables planners to include different voices of youth and their interaction with the community. Indigenous youth's involvement in food security planning can provide benefits to the whole community, as they are the ones who will be leading the community in the future. Youths also have the ability to provide solutions that are culturally appropriate through their knowledge about their culture and traditional foods that they acquire through their interactions with nature, each other, and other members of their community (Figure 4.7). Traditional ecological knowledge and its practice play an important role in various means of learning and knowledge transmission: youth to youth, elders to youth, and nature to youth (Berkes, 2012). In the long run, youth participation in education and planning can help to address food insecurity and create awareness related to traditional foods in food insecure Indigenous communities.

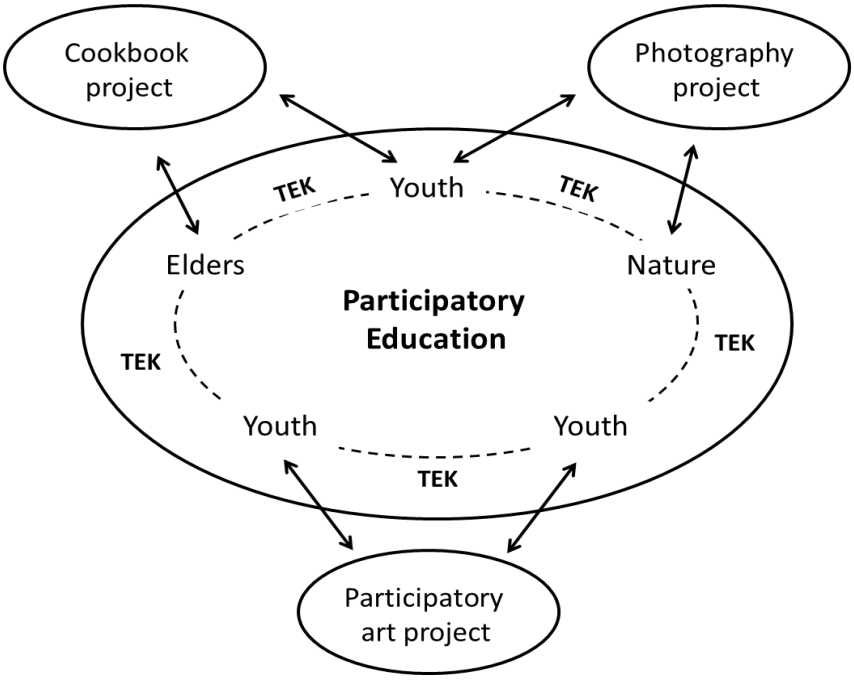

Figure 4.7 Different means of conducting participatory education among Indigenous youth about the meaning of traditional foods

However, the participatory art method has its limitations because of participant selection and project timeline. The art-based approach engaged only a small number of Indigenous students with art skills, excluding the majority of the youth group in the community. It took a long time to complete the collaborative art piece as the students could only work during class time. Incorporating more research participants (for example, through story-telling and craft-making) could enrich the discussion of the meaning of traditional foods. The findings of this initial foray into exploring experiences of Indigenous youth provide insights for future research and education in revitalizing culture. Such research could be designed to facilitate various kinds of learning and education (Figure 4.7).

One initiative, in Norway House, was the production of a cookbook on traditional food preparation (Shukla, 2007; Andre, Ross, Parlee & Firth, 2003), inviting students to collect recipes from their elders. The cookbook project could be an ongoing work, with students contributing to the collection each year, facilitating learning between elders and youth (Camino, 2000). A second initiative (inconclusive at the time of writing) was a photography project on harvesting traditional foods. Carried out through the outdoor education course at the school, such a project would facilitate youth-nature connection by providing time on the land and reflection. Photos can be used to elicit stories and a discussion of why a particular activity was important (Ruby, 1981; Foley, 2004).

Different methods of learning about traditional foods would facilitate a peer-learning process (Webb, 1989) focused on youth learning from each other (participatory art project), from their elders (cookbook project), and from nature through hands-on experience (photography project). These different aspects of learning about traditional foods are an important part of aboriginal culture education (Ohmagari & Berkes,1997).

4.6 Conclusions

We explored Indigenous youth's understanding about traditional food system through participatory education. We presented the findings of a project that connected youth to other youth using art as a medium and encouraging them to share their traditional ecological knowledge with each other. We found that the medium worked well for encouraging youth to express their knowledge and values around traditional food. We then explored the role of schools in fostering further types of connections (youth-nature and youth-elder) for reinventing cultural values and tradition by sharing knowledge and actively engaging Indigenous youth in community planning around food security planning.

The participatory art project was the major component of three participatory education initiatives for cultural revitalization which, in turn, were part of a larger project toward food security in Norway House. Cultural revitalization was considered one leg of a tripod, along with community economic development and fisheries management, as fisheries is the resource with the highest potential to help with food security and local economic development. Likewise, in the present paper, we focused on the participatory art project because it had the highest potential to impact cultural revitalization.

Our work with Indigenous youth demonstrates that values and memories of bush food consumption are central to how traditional food systems are understood, as they uniquely connect to traditional knowledge through different experiences with nature and people, including peers and elders. Our conceptual framework shows the interconnections among participatory education and importance of youth's role in long-term food security planning. The various parts of the framework are interwoven and important, and need to work in harmony for implementing successful food security planning.

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CHAPTER 5: BETWEEN A BUSINESS AND A SOCIAL ENTERPRISE—THE NORWAY HOUSE FISHERMAN'S CO-OP, NORTHERN MANITOBA, CANADA [8]

5.1 Introduction

Social enterprise is considered a tool for community economic development, as the primary mission of these enterprises is to create value for the overall benefits of the community rather than just for profit maximization (Quarter, 1992; Berkes and Davidson-Hunt, 2007). This form of entrepreneurship helps serve community directly with products, services and employment generation, or indirectly by the use of financial surplus (Kerlin, 2006). Social enterprise may be defined as, "any private activity conducted in the public interest, organized with entrepreneurial strategy, but whose main purpose is not the maximization of profit but the attainment of certain economic and social goals, and which has the capacity for bringing innovative solutions to the problems of social exclusion and unemployment" (OECD, 1998, p. 12). Social enterprises use capital and other assets mainly for the purpose of supporting services for its members or the public in a manner which will permit the organization to meet its social objectives (Loxley and Lamb, 2005; Loxley, 2010).

Social enterprises are a good fit for Indigenous economic development. Use of social enterprises for Indigenous community development is well illustrated in the literature (Anderson, 2002; Anderson, Dana and Dana, 2005; Dana and Anderson 2007). Social enterprise can be considered as an important vehicle for development for Indigenous communities as it helps them to establish control and manage their own natural resources. Specifically, it is a good fit for Indigenous development because it addresses social needs (Anderson, 1999; Giovannini, 2012).

[8]This paper was in press at the time of the thesis submission: Islam, D. & Berkes, F. Between a business and a social enterprise: the Norway House Fisherman's Co-op, northern Manitoba, Canada. *Journal of Enterprising Communities* (Accepted October, 2016).

Social enterprises may be characterized as community enterprises whereby capital and other assets can be used for the purpose of supporting community services, not primarily to satisfy investment profit-making but for responding to social needs (Quarter, 1992). Social enterprise often serves the community directly through its products, services and employment generation, or indirectly by the use of its financial surplus (Kerlin, 2006). The success of social enterprises depends on its independent operation without influence of local government or other external institutions, often a plus for Indigenous development (Cornell and Kalt, 1992).

Indigenous people all over the world are striving to improve their social and economic condition through entrepreneurship and enterprises that reflect their unique identity based on their history, culture and values (Dana and Anderson, 2007). Therefore, many scholars suggest rejuvenating Indigenous community development through entrepreneurial activities that enhance their traditional and cultural values (Peredo, Anderson, Galbraith, Honig, and Dana, 2004; Peredo and Chrismas, 2006; Dana, 2010). Studies have shown that Indigenous entrepreneurial activities are mostly influenced by culture (Dana and Dana, 2005), religious values (Dana and Dana, 2008), economic benefits (Dana, Meis-Mason, and Anderson, 2008; Dana, Anderson and Meis-Mason, 2009); business opportunities (Missens, Dana and Anderson, 2007) and also cultural perception of new opportunities (Dana, 2007; Dana, 1996).). Response to opportunities based on cultural views is a driving factor behind many Indigenous enterprises (Dana, 1996).

Indigenous entrepreneurship has rich potential for building a vibrant economy geared towards rebuilding community (Anderson et al., 2004; Anderson and Giberson, 2004). The Indigenous way of life may contribute to regular businesses by bringing its worldview grounded in nature, spirits, emotions and caring values (Wuttunee, 2004). This is in contrast to the contemporary world in which businesses tend to be profit-driven and detached from the

ecological, cultural and social system (Restakis, 2010). Integration of values of healthy societies, caring communities, and personal well-being is required to build a more humane society which is seen as the social enterprise (Restakis, 2010).

The objective of this paper is to examine the potential of social enterprises to foster community economic development in Norway House, a First Nation (Indigenous community) in northern Manitoba, Canada. The study was conducted in the context of Norway House Fisherman's Co-op. The next two sections cover the study area and background of the Co-op, followed by the methods of study. Then, we make the argument that the Co-op is functioning as a social enterprise and has the potential to develop further as the engine of community economic development. The argument is developed in two parts. The first part uses data from a household survey, establishing the importance of the commercial fishery in the community, both as a source of income and a major enabler of food security. The section is based on a household questionnaire, which included open-ended questions inviting comments from commercial fishers regarding job satisfaction and how to develop the fishery further. The second part uses these open-ended questions as a starting point to investigate further development opportunities. This section responds to our mandate from the Norway House Band Council to extend our academic study to provide practical suggestions for further community economic development through the fishery.

5.2 Study Area & Background Of Norway House Fisherman's Co-Op

In Norway House Cree Nation the majority of residents are Cree, one of the largest aboriginal groups in Canada. Norway House is situated 450 km north of Winnipeg at the convergence of Lake Winnipeg and the Nelson River (Figure 5.1), an important fur trade post in

the 18th and 19th centuries. Almost 4,758 people lived in the community in 2011 (Statistics Canada, 2013). The majority of the population lives on reserve and some live off-reserve. We conducted our survey with the on-reserve populations only. There are few job opportunities available considering the large population. Many community members support themselves with limited social assistance they receive from the government. The Chief and Band Council, schools, hospital and fisherman's Co-op are the largest employers in the community.

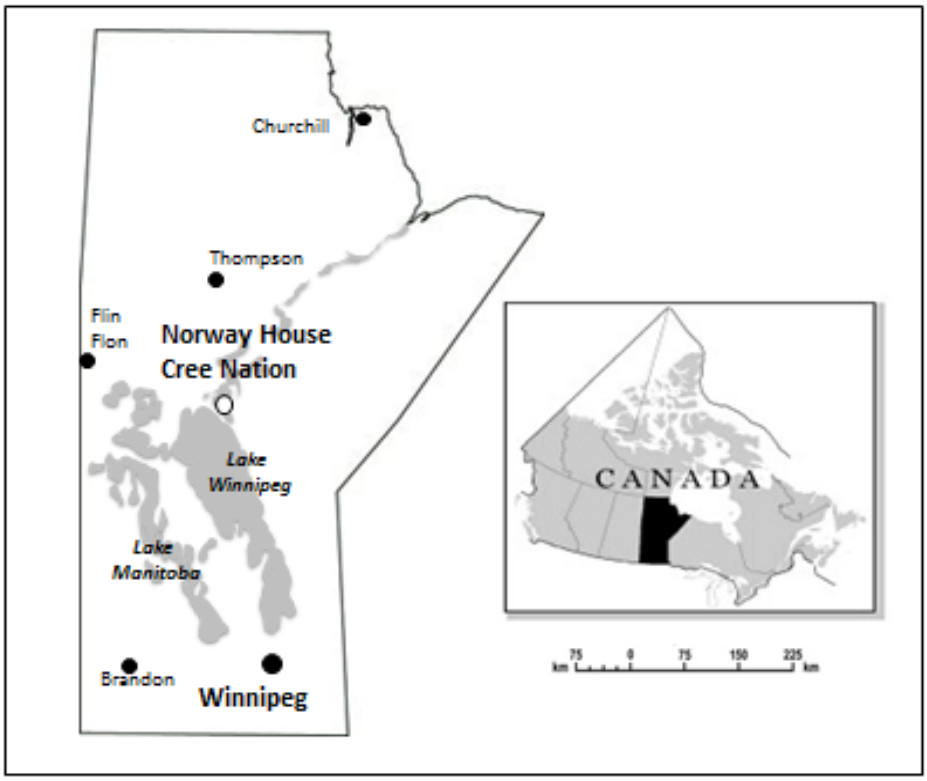

Figure 5.1 Location of Norway House Cree Nation in Manitoba, Canada

Source: adopted from http://www.knightsinfo.ca/mapmb.html

Fishing is an important livelihood activity for many Indigenous communities and Norway House is no exception. Fishers engaged in both subsistence and commercial fishing. Historically commercial fishers went fishing with their families and stayed overnight in camps. In recent

years, commercial fishers go fishing without their families. All commercial fishers have to be members of Norway House fisherman's Co-op.

Norway House Fisherman's Co-op was established in 1962. The commercial fishing licenses are owned and regulated by the Co-op. The Co-op has 50 active commercial fishers and two inactive licenses. If a commercial fisher is not fishing for commercial purposes for two consecutive years, his license becomes vacant. Commercial fishers renew their fishing licenses every year by paying a small renewal fee to the office of Manitoba Department of Conservation and Water Stewardship. In Manitoba, it is mandatory by law that all commercial fishers have to sell their commercial catches to Freshwater Fish Marketing Corporation and Norway House fishers do this through their Co-op.

Commercial fishing at Lake Winnipeg is regulated by quantitative quotas on three economically valuable species. Walleye (*Sander vitreus*) locally called pickerel, lake whitefish (*Coregonus clupeaformis*), and sauger (*Sander canadensis*) are the quota species. Commercial fish catches are comprised of these three quota fish, non-quota fish or by-catch and over-quota fish (Table 5.1). During fishing season, a commercial fisher is only allowed to bring 20 tubs (one tub weighs about 27 kg) of quota fish per day, unlimited tubs of non-quota fish and no over quota fish. "Over quota fish" refers to the three quota species that have been harvested over and above the legal quota limit of 20 tubs per day per license.

Table 5.1 Commercial fish catches comprise quota fish, by-catch, and over-quota fish

Commercial catch consists of	Market value	Number of tubs allowed daily to sell to FFMC
Quota fish	High	20
Non-quota fish/by-catch	Low	Unlimited
Over-quota fish	High	None

Commercial fishing occurs in three places: Lake Winnipeg, Playgreen Lake and Kiskittogisu Lake. During spring/summer season fishers can only fish in Lake Winnipeg; during fall season they can fish in all three lakes. There are different quotas allocated for these three different lakes. Lake Winnipeg has the highest quota of 608,000 kg round weight (of which only 280,305 kg can be walleye and sauger), Playgreen Lake has a total quota of 115,900 kg round weight and Kiskittogisu Lake has a total quota of 31,000 kg round weight. Commercial fishers have to fulfill their quota from a specific lake before they are allowed to fish in another lake. They are not allowed to sell fish of one lake under the quota of another lake (Islam and Berkes, 2016a).

The Co-op has two fish processing stations: Playgreen point (operates in all fishing season) and Whiskeyjack station (operates only in fall season). Commercial fishers bring all their catches to these two stations. Fish are then packaged in big containers to be transported (by road) to Freshwater Fish Marketing Corporation plant located in Winnipeg for further processing and marketing. Commercial fishers have to bear the cost of fish transportation from Norway House to Freshwater Fish Marketing Corporation in Winnipeg.

5.3 Methods Of Data Collection

We used household questionnaire surveys and semi-structured interviews for data collection. Initially, we interviewed several key informant commercial fishers to get background about the Co-op and fishing livelihoods. We had three phases of data collection. Outcome of each phase was used as the starting point for the next phase (Table 5.2)

Image 5.1 Commercial fishers' cabin near Playgreen Lake at Norway House Cree Nation

Image 5.2 Two helpers of a fisher pulling the net out of the Playgreen Lake

Image 5.3 Fish guts and other low-value edible fish are thrown away on an island to feed eagles

Image 5.4 The blue totes filled with fish are then loaded into big containers

Image 5.5 Commercial fishers bring their catch in red bins to the Playgreen point of the Co-op, which are weighed and transferred to blue totes

Image 5.6 The containers are then transported to Winnipeg from Norway House by road using big trucks

Image 5.7 Freshwater Fish Marketing Corporation (FFMC) receives the containers of fish from Norway House

Image 5.8 Further processing and packaging of fish is done in FFMC and is marketed from here

Table 5.2 Summary of three phases of research

Phases of research	Methods of data collection	Participants	Total number of participants (N)
Phase 1	questionnaire survey	commercial fisher households	35
Phase 2	semi-structured interviews	key informants in community	11
Phase 3	semi-structured interviews	fisheries experts, officials at govt., and NGO. Sectors.	11

In the first phase of research, we used questionnaire survey among commercial fishing households. Before conducting survey, we pre-tested our questionnaire with few commercial fishers and officials of the Co-op and other community members to ensure that the questions were respectful and culturally appropriate. Co-op officials requested us to include questions about the type of gears commercial fishers use. Household survey among fishers was conducted over a period of three months from Sept 2013 to November 2013. However, we asked each household to provide us with information based on the previous year, 2012-2013.

We employed two community researchers to help with questionnaire surveys. We trained them to conduct household surveys independently. Of the 50 licenced commercial fishers who were the members of the Co-op, the study covered 70% (N=35). We selected participants of the household survey by snowball sampling. We asked open-ended questions at the end of each household questionnaire in which fishers had the opportunity to provide opinions for improving livelihoods and the commercial fishery.

In the second phase, we conducted semi-structured interviews with key informants (N=11) based on the outcome of the open-ended questions. We selected a few experienced and resourceful persons in community and asked them to provide suggestions to improve the

commercial fishery at Norway House. Regarding a few senior commercial fishers (key informants) who spoke only Cree, an interpreter conducted the interviews.

In the third phase, we conducted detailed follow up interviews (N=11) with fisheries experts related with commercial fisheries in Lake Winnipeg. As a part of our work in the community, the Band Council requested us to research for value-added fish products with the goal of further development of the commercial fishery in Norway House. We investigated if further fishery development was feasible biologically, and in terms of business development and marketing. To address this, we interviewed a wide range of participants from officials responsible for managing Lake Winnipeg fish stocks to organizations dealing with fish marketing and business development (Table 5.3). We selected two organizations from each sector, Manitoba Conservation and Water Stewardship (N=3), and Lake Winnipeg Consortium (N=2) which deal with managing biological aspects. We discussed business development feasibility with officials from Freshwater Fish Marketing Corporation (N= 2) and the Food Development Centre (N= 2), which is a Provincial government agency.

Table 5.3 List of Agencies and their mandate or specialization

Agency name	**Mandate or specialization**
Manitoba Conservation and Water Stewardship	Status of stocks in lake Winnipeg
Lake Winnipeg Consortium	Status of stocks in lake Winnipeg
Food Development Center	Development of new food businesses
Freshwater Fish Marketing Corporation	Federal body buys and sells freshwater fish
Neechi Commons	Direct marketing of fish in Winnipeg
“Off the Hook”	Community-supported fishery

To explore market development opportunities for Norway House fishers to sell their catch or to produce value-added product directly for the market, we interviewed Neechi Commons (N=1) and Off the Hook (N=1). Neechi Commons is a Winnipeg based store that specializes in carrying Indigenous traditional foods including fish and bannock. We interviewed the operations coordinator of Off the Hook (N=1), a community-supported fishery located in Halifax, Nova Scotia, Canada. We sought advice regarding opportunities for starting a community supported fishery at Norway House.

Data gathered from the different phases enabled us to identify some potential development opportunities for Norway House fisheries. We then conducted a SWOT (strength-weakness-opportunity-threat) analysis to understand strength, weakness, opportunity and threats of these options. In recent years, SWOT analysis is commonly used in different sectors of natural resources management in many countries around the world and in Canada (Fertel, Bahn, Vaillancourt and Waaub, 2013), environmental analysis in Middle East and North Africa region (Rachid , and Fadel, 2013), waste management in China (Yuan, 2013) and disaster management in Indonesia (Anjasni, 2013). However, SWOT analysis is rarely used in fisheries management and the study aims to address this gap.

5.4 Results

5.4.1 The Norway House Fisherman's Co-op as a social enterprise

Most of the commercial fishing households (91%) were male headed. The majority of the households (83%) had three to eight family members. The number of persons generating income varied from household to household. The majority of the households (43%) were supported by two persons' income, followed by income generated by one person (26%), three or four persons (20%) and five or more (11%).

Fishing was the main sources of income for commercial fishing households. Fishers engaged in commercial harvesting five weeks in spring and six weeks in the fall. In total, commercial fishing took place for 11 weeks a year. (There is no winter commercial fishing at Norway House.) Fishers had other sources of income besides commercial fishing. These sources included, but not limited to, unemployment insurance, working with fisherman's Co-op, trapping and seasonal employment (Figure 5.2).

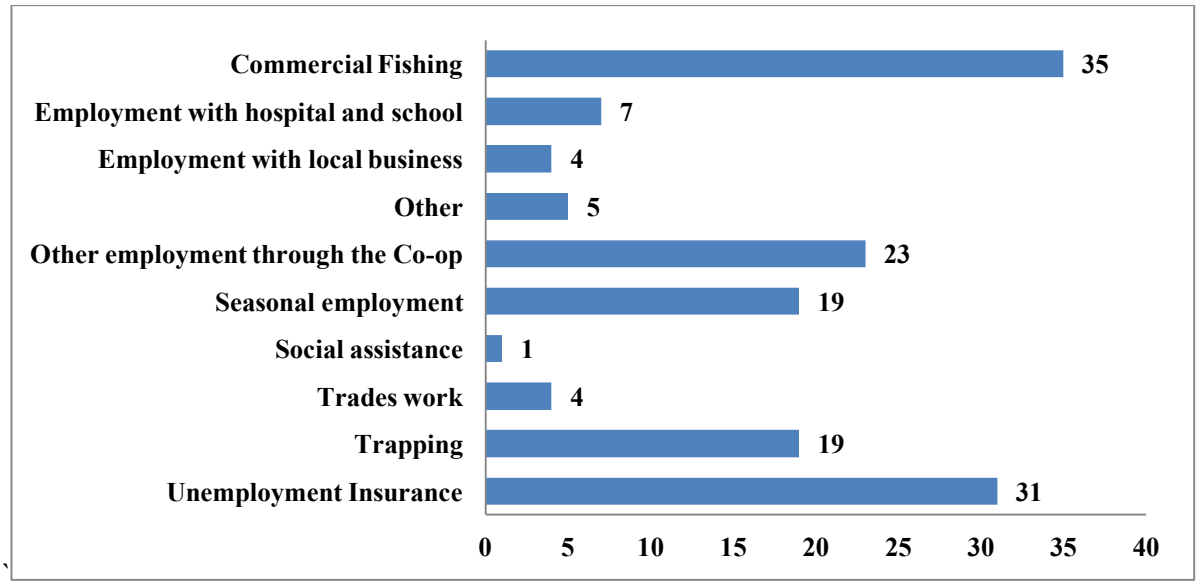

Figure 5.2 Activities that produced income for commercial fishing households in 2012-2013

If a fisher's yearly income is eligible for unemployment insurance, he can claim it for himself and for his two helpers to support their families. Norway House fisherman's Co-op also employs fishers for brush cutting on the water intake channel maintained by Manitoba Hydro for power generating purposes. Brush cutting provides some extra income for fishers during the off-season. A number of commercial fishers go for trapping and participate in other seasonal employment. We asked fishers if they considered their livelihood as economically viable. Our

findings showed that 86% of the fishers reported their livelihoods as “always viable” or “mostly viable”. Our result was consistent with the community views about fisher household as being financially better-off.

We asked if fishers would encourage their children to follow their footsteps and earn their livelihood by commercial fishing. The majority of the fishers (79%) reported that they would encourage their children to become commercial fishers. However, some fishers preferred that their children choose different livelihoods by pursuing higher education.

Majority of the commercial fishers at Norway House indicated that they were satisfied with their fishing livelihood in-terms of economic viability. However, they also indicated that they have to deal with the challenges of low-value by-catch that quota policies inevitably produce. Commercial fishers cannot make profit by selling these low-value species. We asked what fishers did with their by-catch (Figure 5.3). The majority of the fishers (37%) commented that they shared it with other households or fed their by-catch to eagles (37%); some fishers (25%) brought home their by-catch for household consumption.

We had to be careful in choosing language for the questions. We asked, “what do fishers do with low-value by-catch?” We asked them to choose between options (they could choose more than one). Initially, one of the four options was to “throw away fish”. Some fishers were sensitive about this and argued that they did not waste fish as it contradicted Cree cultural values. (Cree people believe only in taking what they need, Berkes, 2012). Fishers told us that they returned their catch to nature by feeding them to eagles. In the report of the Task Force, this process is described as “bushing” (Ayles et al., 2014). Most Lake Winnipeg commercial fishers (Indigenous and non-Indigenous) discard some of their by-catch and over-quota fish (because it is illegal to land over-quota fish). In the case of Norway House, some fishers leave their catch on

the rocks by the lake to feed eagles. It is interesting to note that the notion of "discarding fish" can be context-dependent, and hold different meanings to different group of people. Cree fishers see it at as giving thanks to nature by feeding eagles.

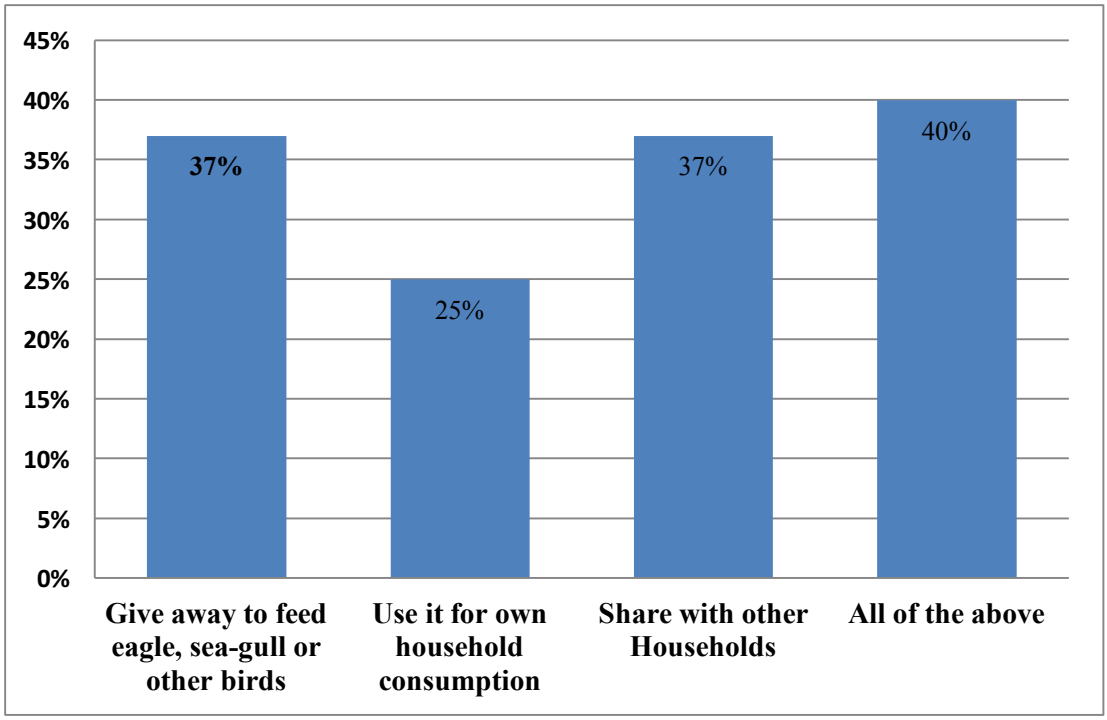

Figure 5.3 What do you do with the by-catch that you can't sell commercially?

We interviewed an official at Freshwater Fish Marketing Corporation (FFMC) and asked his opinion about the wastage of low-value by-catch in commercial fishing. According to him, "Commercial fishers are unhappy with low value of by-catch [species] especially carp (*Cyprinus carpio*) and suckers (*Catostomus commersonii*). We buy them at the Freshwater Fish Marketing Corporation. However, some fishers choose not to sell it to us. Because it is not economical for them to ship these low-value fish to Winnipeg for processing and they are better off discarding them".

We asked fishers to share their ideas on how to improve their fishing livelihoods (Figure 5.4). Most of the fishers wanted an increase of the pickerel quota (N=30), additional quota (N=26), starting up a fish processing plant (N=15), followed by new markets for by-catch (N=12), and value-added products (N=6).

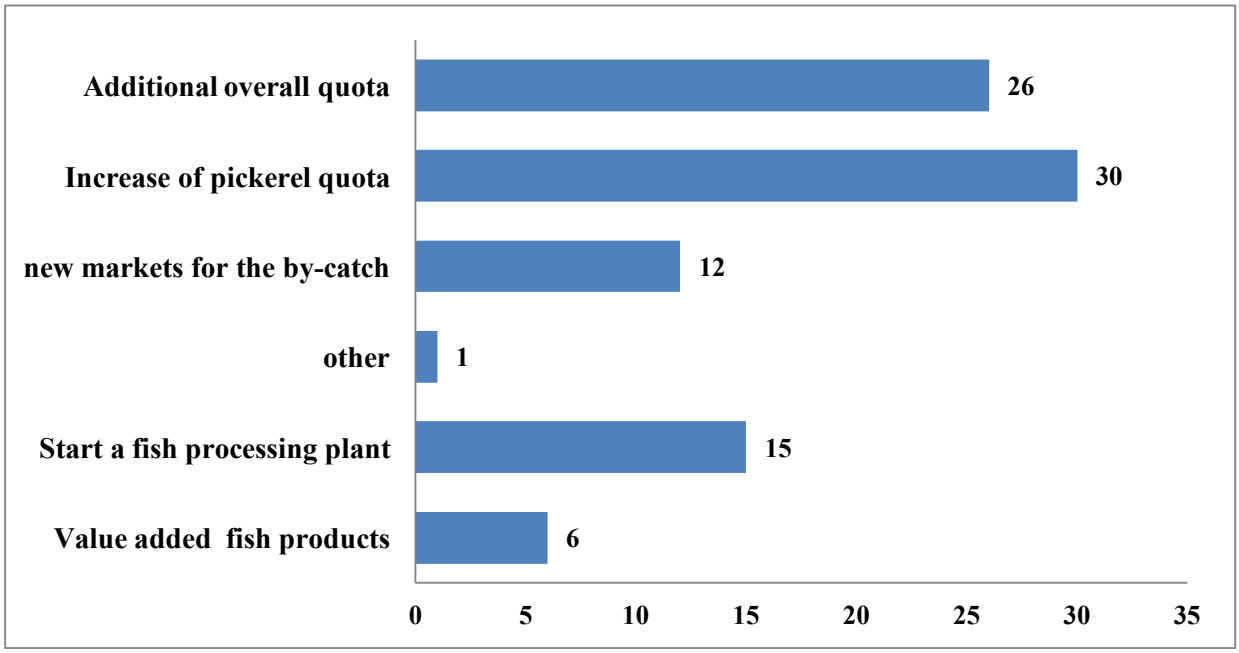

Figure 5.4 Priorities to improve commercial fishing at Norway House, according to commercial fishers

Fishing households at Norway House follow the Cree tradition of harvesting and sharing of fish and other wild foods with other community members. Most fishers do that through their sharing networks of family and friends. It is a common practice that community members would ask commercial fishers to share their catch during the fishing season. Fishers often take part in other activities that produce food, and these activities may include subsistence fishing, hunting, trapping and berry picking. The vast majority of the fishers share fish and other wild harvests with other households. Some commercial fishers share with six or more households depending on the amount of catch they bring home (Islam and Berkes, 2016b).

Norway House Fisherman's Co-op invests their yearly profit in business diversification and runs few other businesses that generate employment and contribute in community economic development. For instance, the Co-op runs a lumber business, a convenience store and a gas station. Recently, Co-op started a fast food franchise at the community where they will have a separate corner to sell value-added fish products (fish and chips). During fishing season, Co-op sells fishing equipment. These services help fishers and other community members get products and services at a reasonable cost. Thus, Co-op contributes to community economic development by generating further employment.

Fisheries as a regular business would focus on maximizing profit; fisheries as a social enterprise would focus more on social benefits rather than just profit maximization. Fisherman's Co-op at Norway House deals with the fine line between fisheries as a regular business and fisheries as a social enterprise. From our findings, we argue that Norway House Fisherman's Co-op functions as a social enterprise mainly because of their two major contributions in the community. First, commercial fishers contribute to local food security by sharing fish and other traditional foods through their extensive networks reaching nearly half of the total population of Norway House (Islam and Berkes, 2016b). Second, Fisherman's Co-op contributes in the overall community economic development by investing locally and operating other business ventures (lumber yard, gas station, convenience store and fast-food restaurant).

Based on meetings with the president of the Norway House fisherman's Co-op, the Chief of Norway House, and later on the findings of our questionnaire survey, we explored the various avenues for the further development of commercial fisheries at Norway House. The following section discusses our findings with regards to further development opportunities.

5.4.2 Development opportunities for Norway House commercial fishery

We conducted a series of interviews with government officials and related personnel related with Lake Winnipeg fisheries. Based on their suggestions, we propose three sets of development options for the Norway House commercial fishery: (i) better use of existing fish resources (ii) fishing-related economic development and (iii) options regarding regulatory opportunities. The details of these options are shown in Table 5.4.

Table 5.4 Further development options for commercial fisheries at Norway House Cree Nation

Development Options	Description

1. Better use of existing fish resources
• fuller use of "over-quota" fish
• better use of the by-catch
• better use of fish waste
  o as pet food
  o for fish reduction into pellets and oil
  o as organic fertilizer
	At present, three quota fish (walleye, whitefish, and sauger) are economically profitable for fishers but other low-value by-catch are not. At Norway House, some fishers bring low-value by-catch to consume or share with families or feed them to eagles. Over-quota fish can be shared for household consumption, and the by-catch or fish waste may be used for other products; for example, for pet food, organic fertilizer, or fish meal or oil.

2. Fishing related economic development
• marketing specialty products
  o Smoked fish
  o **Fish patties**
  o Fish pemmican
• filleting or individually quick frozen (IQF) fillets
• vacuum-packed products
	This development option is about producing value-added fish products. It will generate employment for community members and help revitalize some of the specialty fish products (i.e., smoked fish, fish pemmican, and fish patties). Food Development Centre in Manitoba may provide technical support and advice in developing value-added fish products, IQF (individually quick frozen) fillets, and vacuum-packed products.

3. Options regarding regulatory opportunities
• eco-certification
• special license from FFMC for
  o direct marketing of fish
  o community-supported fishery
	Fish markets are increasingly more inclined to buy fish from eco-certified commercial fisheries around the world. Lake Winnipeg commercial fisheries lack eco-certification at present. The Waterhen First Nation fishery is the only commercial fishery in Manitoba with eco-certification. According to experts, Norway House is in a good positon to apply for eco-certification as compared to many other commercial fisheries in Lake Winnipeg. Having eco-certification would enable Norway House to gain competitive advantage in fish markets.
	Norway House fisherman's Co-op requires a special license from the Freshwater Fish Marketing Corporation in order to sell fish directly to the consumers. This will enable fishers to sell value-added fish products locally in Canada. The Co-op may also initiate a community-supported fishery whereby fishers may sell directly to consumers. That would be the first of its kind in the Province of Manitoba.

(i) Better use of existing fish resources

Quota policy restricts catch of high value quota fish (i.e., lake whitefish, walleye and sauger) in Lake Winnipeg. Quota fish have higher market values than non-quota fish. On some days fishers catch over-quota fish (more than 20 tubs of allowable quota fish) and are not able to sell them legally to the Freshwater Fish Marketing Corporation. Some of this fish may be wasted. Fuller use of these over quota fish may be possible with special permission of regulatory agencies.

Low value by-catch that are often discarded may be utilized through measures taken by the Fisherman's Co-op. Commercial fishers bring their catches to Playgreen Station for further shipping to Freshwater Fish Marketing Corporation located at Winnipeg. If necessary arrangements are made, fishers may also bring their by-catch and fish waste to the Playgreen point for delivery. Opportunities may include developing new markets for products from low value fish. Fisherman's Co-op may supply low value by-catch for pet food, fish reduction for pellets, fish meal or fertilizer. Volume and low return may be a problem.

The by-catch includes species that are not presently targeted. There are potential challenges related with this development option, as presently these species are not profitable, unless new markets are developed. If a market is established, cautions need to be taken so that the resources are sustainable in the long run. Norway House Fisherman's Co-op may apply for government grants to research the marketability of under-utilized species.

(ii) Fishing-related economic development

Marketing value-added fish products may generate revenues and employment opportunities. Smoked fish, fish cakes, and fish patties are some examples of traditional fish items that community members know how to prepare. During our survey, we found out that only

a few people still make smoked fish. A few seniors mentioned fish pemmican, made with dried fish mixed and pounded with fish fat and dried berries. In the past, hunters and travelers would take fish pemmican with them when they travelled. Revitalizing fish pemmican unknown to younger generations will be unique, and finding a market will be challenging.

Fish patties are a common and popular fish item at Norway House. Community members eat fish patties (usually made of whitefish) in family get-togethers, special occasions or formal meetings. During the fishing season, home-makers prepare fish patties. One lady runs a home-based catering business and takes orders for fish patties, sometimes even from neighboring communities. As fish patties are not available in the store, there is potential for local marketing. Hence launching a pilot project for fish patties at Norway House can be a good start for local economic development.

The Food Development Centre, located in Portage la Prairie, Manitoba, can help with this new business opportunity, as it provides consultancy and support for new food related business development. The Center has worked with other agencies to develop various food products but so far not with fish products. We communicated with the officials of Food Development Centre and discussed fish patties and other value-added products. Fisherman's Co-op needs to take the next step by initiating a dialogue with the Centre. The Freshwater Fish Marketing Corporation has also shown interest to develop fish products with the Food Development Centre, but no projects have yet been implemented.

To launch a new food product, such as fish patties, the facility needs to be certified by appropriate agencies. The community already has one certified facility (the community kitchen) where school lunches are prepared. Fisherman's Co-op may run a pilot project from this community kitchen, and the Food Development Centre may provide consultancy and advice in

product development, packaging, branding and marketing. The machinery required for grinding fish is not expensive, and may be used for other value-added products for local consumption when not in use for commercial products. Patties can be made of whitefish or other species. In the first phase, fish patties can be included in the school lunch program and meals for the local hospital.

(iii) Options regarding regulatory opportunities

Regulatory options may provide more business opportunities for the Norway House commercial fishery. For instance, eco-certification may open opportunities to sell fish to outside markets through the Freshwater Fish Marketing Corporation. However, applying for eco-certification is challenging as it requires biological data showing sustainability but Lake Winnipeg is data-poor (Ayles et al., 2011).

Another opportunity is direct marketing of fish and fish products. Fisherman's Co-op may do this in two ways. First, the Co-op may apply for a special license from the Freshwater Fish Marketing Corporation to sell fish and/or value- added fish products directly to markets in Manitoba or elsewhere. Some other Manitoba First Nations communities do have such a license to sell directly to other Provinces inside Canada (Thompson, Rony, Temmer and Wood, 2014).

Second, the Co-op may collaborate with some fish stores or outlets in Winnipeg and legally sell their catch through them. For instance, Neechi Commons is an Indigenous specialty store in Winnipeg that sells fish mostly from Indigenous commercial fishers in Manitoba. Neechi Commons have special trade license that enable them to buy fish directly from licensed commercial fishers in Manitoba (Islam and Thompson, 2011). According to the manager of Neechi Commons, such an opportunity exists for the Norway House Fisherman's Co-op.

As well, there is growing interest for community supported fishery as a direct marketing strategy in North America (This Fish, 2013; Local Catch Org., 2015). Community supported fisheries are arrangements between fishers and consumers whereby consumers buy shares from fishers in exchange for scheduled fish deliveries. Consumers can order fish and track their purchase online. However, such arrangements do not seem to exist in Manitoba. In British Columbia, Skipper Otto is a successful community-supported fishery (Tansey, 2015). When Skipper Otto's customer base started to expand to other provinces, the company went into partnerships small farmers and distributors, enabling them to bring fish to customers in different locations without increasing their overhead expenses.

There are a number of community supported fisheries in Nova Scotia as well. Off the Hook is Atlantic Canada's first community supported fishery serving Halifax (Ecology Action Center, 2010). Manitoba, which has some 25 years of experience with community supported agriculture, has good potential for community supported fisheries as well. A business model that works in Nova Scotia is collaboration with local universities and activists groups (Ecology Action Center, 2010). Norway House Fisherman's Co-op may want to start with such a business model in Winnipeg.

Based on our findings of these three clusters of fisheries development options for Norway House, we present a SWOT analysis in Table 5.5 summarizing the strengths, weaknesses, opportunities and threats associated with various options. This analysis may be used as a tool for further exploring fishery related opportunities to contribute to community economic development.

Table 5.5 SWOT analysis of development opportunities for Norway House commercial fishery

Options	Strength	Weakness	Opportunities	Threats
Better use of existing fish resources	Reduction of existing waste	Low-value product; may not be economical to produce	- Developing new markets - Use of available government funds and grants	Profitable products may result in over fishing
Fishing-related economic development	Diversification: Creation of value-added products	- High cost for initial set up - High fees for feasibility study and consultant charges	- Value-added products - Generate jobs - Foster community economic development	Threat from other competing products and producers; slow start-up
Options regarding regulatory opportunities	Co-op can sell fish and fish products directly to the market	Lack of scientific data for eco-certification	Eco-certification will open new markets and/or get better prices	Declining ecological health of Lake Winnipeg

5.5 Discussion & Conclusions

Norway House Fisherman's Co-op is a community-based social enterprise, even though the president and board members indicated that the Co-op runs as a business organization primarily for generating profit. The facts on how the Co-op operates speak otherwise. Fishers share fish and other traditional foods through extensive sharing networks reaching nearly half of the total population of Norway House (Islam and Berkes, 2016b). Consequently, food sharing by commercial fishers contributes to local food security. The Co-op plays a significant role in the overall community economic development by operating other business ventures and generating employment. These two factors mainly determine Co-op's role as a social enterprise, consistent with the usual definition of social enterprise (Quarter, 1992; Kerlin, 2006; Anderson et al. 2006).

As Beckley et al. (2008) have observed, community capacity for development has multiple outcomes. It is often the economic outcomes, using indicators such as income and employment that are emphasized. But community capacity outcomes have other dimensions as

well. The operations of the Co-op as a social enterprise in Norway House produce some of the multiple outcomes as listed by Beckley et al. (2008): maintaining vital civic culture and values; helping the capacity to subsist and persist; and maintaining human health, especially with regard to food security. The development opportunities that we have identified for Norway House fisheries potentially add two more outcomes to the Beckley et al. (2008) list: linking to the global economy, which could be enhanced through eco-certification, and accessing state resources, such as capturing government dollars for infrastructure development and new product development. Hence, the potential community benefits from the Co-op as a social enterprise reach beyond cash income and employment, and address a number of additional dimensions of development.

The social context of the social enterprise is vitally important (Berkes and Davidson-Hunt, 2007). Social values drive people's behavior, including rules about sharing (McCay, 2002). Food sharing plays a central role among the Inuit of Nunavik (northern Quebec). For example, Makivik Co-op protects and promotes Inuit culture in Nunavik communities through sharing (Dana, 2010). Similarly, the sharing of fish by Co-op members in Norway House fosters Cree culture, and commercial fishers who share their catches are esteemed as generous people. Such generosity is culturally valued, and the sharing of fish leads to social prestige for the person giving the gift. This is consistent with many other Indigenous cultures. For example, in coastal British Columbia, Canada, traditional chiefs are generally expected to share food and other resources with their people. The more that a chief shares or gives away, the more prestige and respect he receives (Trosper, 2009). This dynamic of sharing or giving away is important in the social fabric of these communities, as well as for the stewardship of local resources (Trosper, 2009). Even in contemporary society, these considerations regarding community capacity for

development are likely as important as purely economic considerations and outcomes (Beckley et al., 2008).

Norway House Fisherman's Co-op, after the Band Council, is the second largest job provider (including fishing and other Co-op operated businesses) in the community. The majority (some 86%) of the commercial fishers consider their livelihoods as economically viable, and they are satisfied with the *status quo*. However, many fishers are frustrated with the fact that they have to discard a large amount of otherwise edible fish (the low-value by-catch) that the quota policies inevitably produce. Wasting resources are considered inappropriate according to Cree cultural values (Berkes, 2012). As such, some fishers feed these fish to eagles, as a means of giving back to nature, use it for household consumption, and share it with community members. The constraint is that it is technically illegal to land over-quota fish. However, Indigenous fishers have the right to fish for subsistence; they can land fish using their subsistence rights and share it with others (Islam and Berkes, 2016a).

When we asked fishers on how to improve their livelihood, the majority of them indicated that they would like to see an increased quota for pickerel (86%), overall quota (including whitefish, sauger and pickerel) (74%), and a fish processing plant (43%). Only a handful of commercial fishers suggested exploring new markets for by-catch (34%) and investigating opportunities for value-added fish products (17%). We explored these development options further, consistent with the request of The Chief and Band Council to examine various means to add value to commercial fisheries toward community economic development.

Based on research findings and interviews with fisheries experts, commercial fishers and key informants, three groups of development options were suggested. However, these development options for further commercialization may have impacts on fish sharing. At present,

fishers bring their extra fish catch to the community for sharing. If value-added products are developed for these fish, fishers will be financially motivated to deliver them to the Co-op. Consequently, commercial fishers will face a difficult choice between sharing fish on the one hand, and gaining further economic benefits from them, on the other. This issue may be seen as a trade-off. Monetizing under-valued resources may reduce sharing. Thus, increased community income might be offset by decreased availability of free fish.

Nevertheless, better use of existing fish resources, fishing-related economic development, and options regarding regulatory opportunities are likely to be beneficial to Norway House in the long run. This will generate employment and contribute to community economic development, and at the same time will increase local food security. As well, reducing wastage of fish would be consistent with Cree cultural values of not wasting resources. Norway House has a rich tradition of commercial fishing. Considering the history of fishing and the operation of the Co-op, commercial fisheries at Norway House hold a better future if they are able to engage with new opportunities.

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CHAPTER 6: DISCUSSION AND CONCLUSIONS

6.1 Ecological, Cultural, And Business Aspects Of Norway House Fisheries

Addressing food insecurity in terms of Indigenous fishing is complex and it needs a holistic approach by integrating ecological, social, and business perspectives. Ecological aspects include management of fish resources (Ayles et al., 2011) and also deal with conflicts between subsistence and commercial fishing (Islam & Berkes, 2016a). Social perspective of food security embraces sharing of food among community members (Islam & Berkes, 2016b) and also is reinventing the wheel of tradition and culture by involving Indigenous youth (Islam, Zurba, Rogalski, & Bereks, 2016). One possible means to achieve this is to encourage younger generations to learn about traditional food systems through participatory research. The business domain considers social enterprise as a driver to increase food security with regard to Indigenous fishing. In other words, it investigates the role of Norway House Fisherman's Co-op in adding social values and contributing to community food security through social entrepreneurship (Islam & Berkes, in press).

The following sections discuss the three domains of the conceptual model introduced in Chapter 1 in the context of Norway House fisheries. First, ecological aspects, including challenges to Lake Winnipeg fisheries, are discussed. Second, the cultural aspects, including the importance of fisheries for cultural revitalization and food security, are reviewed. Third, the business aspects are presented; these include the importance of the Co-op functioning as a social enterprise, and contributing to food security and adding social values to the community.

6.1.1 Ecological aspects: Lake Winnipeg fishery

Lake Winnipeg is the 10th largest freshwater lake in the world and home of the second largest commercial inland fishery in North America (Ayles et al., 2011). Manitoba Fisheries manage the

Lake Winnipeg fisheries under the Canada Fisheries Act and Manitoba Fisheries Act. The Lake's three major species–walleye (*Sander vitreus)*, lake whitefish (*Coregonus clupeaformi),* and sauger (*Sander canadensis)*—are caught and managed under a quota management system (since 1972) (Ayles et al., 2011). Initially, in 1972, the quota system restricted total commercial catch of these three species to 3.2 million kg per year, and later in 2009 total quota was increased to 6.52 million kg (Ayles et al., 2011). Commercial fishers at Norway House and other parts of Lake Winnipeg want to see an increase in allowable fish quota as it is directly proportional to the increase of their yearly income. However, increase of quota without proper management of fish stocks will put available fish stocks at risk.

In recent years, fisheries populations in Lake Winnipeg (mainly walleye) have declined, proving marine biologists' prediction right (Ayles et al., 2011). This decline may be linked with overfishing by commercial fishers, as well as lack of oxygen caused by excessive phosphorus and too much algae bloom in the lake water (Ayles et al., 2011). According to a knowledgeable informant, when a fisheries population is declining, decreasing the allowable fish quota will keep the commercial fisheries of Lake Winnipeg sustainable. However, the quota policy for Lake Winnipeg has no provision to reduce the amount of allowable fish quota when fish populations of particular species are decreasing (Ayles et al., 2011; Rollason, 2015). Some experts suggest that the quota policy needs to be revised based on the sustainable stock of fish population.

Fishers, biologists, and researchers are all concerned about the long-term sustainability of Lake Winnipeg fisheries. Consequently, the Minister of Water and Stewardship formed the Lake Winnipeg Quota Review Task Force consisting of a seven-member expert team in 2008, with a chairperson, three scientists, and three commercial fishers (Ayles et al., 2011). The objective of the Task Force was to assess the status, health, and sustainable harvest levels of commercial fish

species of Lake Winnipeg. The Task Force identified fish population decline and lack of scientific data on fisheries as a major challenge to manage Lake Winnipeg fisheries sustainably. The Task Force warned the Ministry of Fisheries to act soon and take proper steps to save the freshwater fisheries at Lake Winnipeg.

Lack of fisheries experts at the management level, insufficient biological data on fish species, and overall fish population decline indicate a "big red flag" for planning the future of Lake Winnipeg fisheries (Ayles et al., 2011; Rollason, 2015). The commercial fisheries at Lake Winnipeg face many challenges such as water pollution, algae bloom, decline of species, and lack of eco-certification (which requires biological data on species and their genetic compositions) (Ayles et al., 2011). Only a handful of biological studies were conducted on the species of Lake Winnipeg (Backhouse, 2009; Kristofferson & Clayton, 1990; Ulrich, Malley, & Watts, 2016). Scientific studies on Lake Winnipeg fisheries found that there were five different subpopulations of whitefish which were genetically different (Kristofferson & Clayton, 1990). The presence of multiple stocks of the two major species makes eco-certification even more difficult to achieve.

According to some experts, Manitoba Conservation and Water Stewardship could involve commercial fishers (both Indigenous and non-Indigenous) in the management of fisheries to address some of the challenges in managing Lake Winnipeg fisheries sustainably. This may be implemented by training fishers to collect data of required fish species for biologists to use to predict species health and population for the next fishing season. Another way is to find out how the fishers use their local and traditional knowledge from generation to generation to manage the fishery (Berkes, 2012). For instance, in the Great Lakes commercial fishers were able to predict the fish stock by observing the amount of abundant undersized fish caught in the nets (Berkes,

unpublished field notes). Therefore, ongoing inter-disciplinary research combining science with society and engaging multiple stakeholders is required to manage the Lake Winnipeg fishery (Ulrich, Malley, & Watts, 2016).

6.1.2 Cultural aspects: Indigenous culture of harvesting and sharing

Native harvesting plays a major role in Aboriginal livelihood, culture, and economies (Berkes et al., 1994; Condon, Collings, & Wenzel, 1995; Usher, Duhaime, & Searles, 2003). Indigenous people for generations have harvested bush food for subsistence purposes and it is considered a valued activity in their culture (Nuttall, Berkes, Forbes, Kofinas, Vlassova, & Wenzel, 2005; Pearce, et al., 2011). In earlier days when older generations of Inuit were growing up, there were few economic and food supply alternatives for subsistence available in the Canadian Arctic, and they had no other options but to live on native harvesting (Pearce et al., 2011). Leaders of the Cree community consider participation in bush life (i.e., hunting, fishing) important for Cree social and cultural health (Ohmagari & Berkes, 1997).

Native harvesting can be explained as a continuous process which is carried out from generation to generation to represent cultural continuity. For instance, a berry picking study among Teetl'it Gwich'in women in Northwest Territories investigated that Aboriginal women go to berry patches year after year to remember and show respect to their mothers and grandmothers who were there before them (Parlee, Berkes, & TGRRC, 2005). Women also hope that in the future, their children's children will continue berry picking in the same places and will remember them in the same way they remember their ancestors. In this respect, it is very important for Indigenous people to transfer traditional knowledge and bush skills to younger generations to maintain the flow of traditional means of living and livelihood (Ohmagari & Berkes, 1997;

Berkes & Farkas, 1978). Knowledge from the traditional system broadens conservation objectives and enriches livelihood opportunities (Berkes & Davidson-Hunt, 2006).

Indigenous livelihood embraces the culture of sharing and giving. People do not necessarily need to go to the grocery store to bring food for the table (Usher, 2003). It is very common for Indigenous people to share bush food with other families in the community (Berkes, 1990). Berkes et al. (1994) found that about 50% of the respondents in their study shared their bush food with three or more other families. However, the number varies from community to community (Berkes et al., 1994).

At Norway House Cree Nation both commercial and subsistence fishers share their fish harvests with other family members. Commercial (40%) and subsistence fishing (54%) households share their harvests mostly with one or two other households (Islam & Berkes, 2016b). Some 34% of commercial fishing households share their harvests with six or more households. In terms of receiving fish and other traditional foods, the majority of the commercial (54%) and subsistence (59%) fishing households receive harvests from one to two other households.

Commercial and subsistence fishing households harvest fish for household consumption and share surplus with a network of family and friends (Islam & Berkes, 2016b). Consumption of fish varies from season to season among households. During fishing season, commercial fishing households consume fish almost every day. Figure 6.1 depicts the production, consumption, and distribution cycle of fish at Norway House Cree Nation.

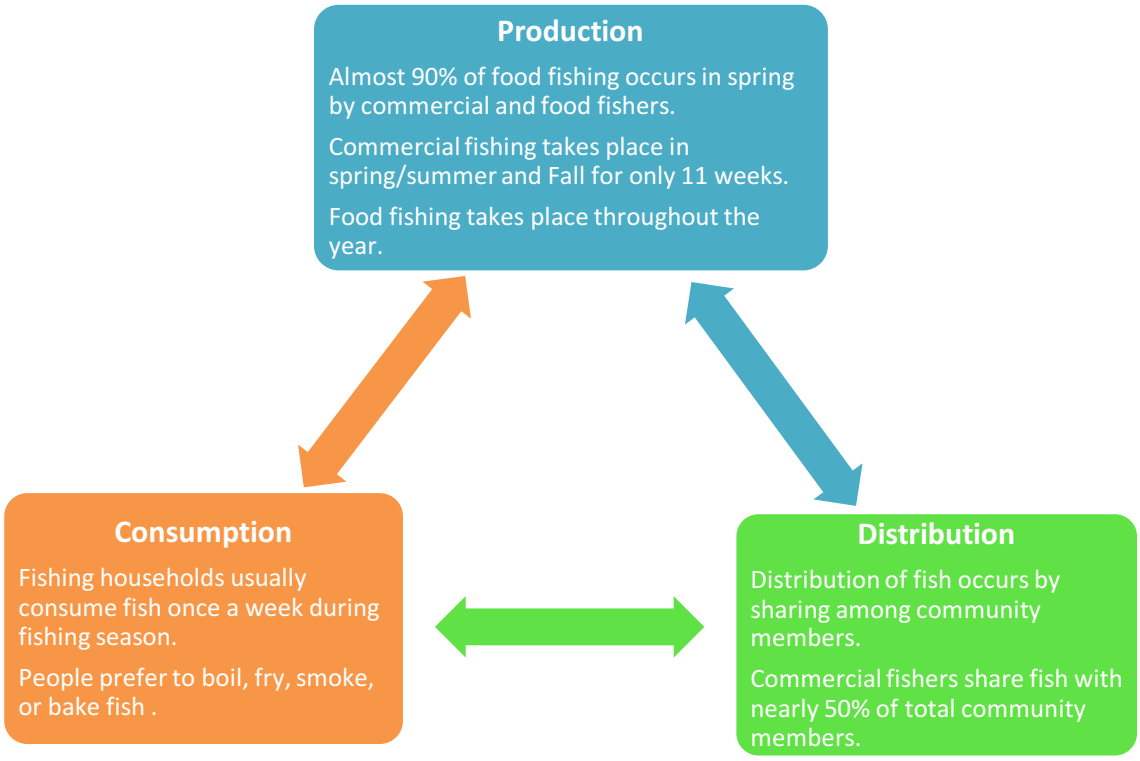

Figure 6.1 Production, distribution, and consumption cycle of fish at Norway House

This extensive food sharing from both commercial and subsistence harvests have contributed to increasing food security in the community. Findings of the household food security questionnaire survey indicate that 97% of the commercial fishing and 91% of the subsistence fishing households are food secure in Norway House (Islam & Berkes, 2016b). However, the result of such studies are affected by year-to-year variations and other seasonal uncertainties. Numbers in Norway House are comparable to the Canadian average of 92% (Council of Canadian Academies, 2014) and seem to be considerably better than that for many other Indigenous communities in the Canadian North.

6.1.3 Business aspects: Norway House Fisherman's Co-op

Norway House Fisherman's Co-op addresses the community's various needs, including food security, by following the Cree cultural values of sharing. Commercial fishers in the Co-op are not allowed to sell fish directly to the market; they have to sell through the Freshwater Fish Marketing Corporation (FFMC). Fishers bring their catch to the Co-op and FFMC buys fish directly from the Co-op.

It is a challenge for Co-op fishers to deal with waste of fish that the quota system inevitably produces. That is because any over-quota species and the incidental catch (by-catch) have to be discarded. However, some fishers are able to bring in the fish to share with family and friends. Partly as a result of this sharing, the level of food security in Norway House is higher than in many other northern communities (Islam & Berkes, 2016b). If fishers are given incentives by the Co-op to bring back more of the by-catch to the community for sharing, it would further reduce wastage on one hand and increase the community's food security on the other. If values can be added to the low-value by-catch and diversify into other feasible alternatives (for instance, making fish patties), this may bring social values and contribute to community development and increase food security.

6.2 Major Findings By Objectives

Norway House Cree Nation is a food secure community located in northern Manitoba, Canada. Community members participate in commercial and subsistence fishing. The high level of sharing of fish and other traditional foods is one of the main reasons for high food security at Norway House. Summary of the major findings of the thesis by research objective is given in Table 6.1.

Table 6.1 Major findings of the research by research objectives

Research objectives	Major findings
To investigate the co-existence of two kinds of fisheries at Norway House Cree Nation.	Subsistence and commercial fishing may co-exist in harmony in a small Indigenous community. Temporal and spatial separation between the two fisheries, negotiation, and Cree cultural values of reciprocity among fishers have enabled the resolution of conflicts between subsistence and commercial fishing in Norway house.
To analyze food security through the lens of Indigenous fisheries and to assess food security among commercial and subsistence fishing households.	Findings of the household food security questionnaire survey indicate that 97% of the commercial fishing and 91% of the subsistence fishing households are food secure in Norway House, keeping in mind year-to-year variations and other uncertainties inherent in such studies.
To explore the meaning of traditional food in the form of a collaborative art project by engaging Indigenous youth.	School students of Helen Betty Osborne school at Norway house explored the meaning of traditional foods by using participatory art (acrylic on canvas) as a means of revitalizing culture and transmitting traditional knowledge.
To examine the role of Norway House Fisherman's Co-op as a social enterprise, to address community economic development and foster food security.	Development opportunities for Norway House commercial fishery may be addressed by: (1) better use of fish resources (2) fishing-related economic development, and (3) regulatory options.

Based on the findings of the thesis, I revisited the conceptual model introduced in chapter 1 (Figure 6.1):

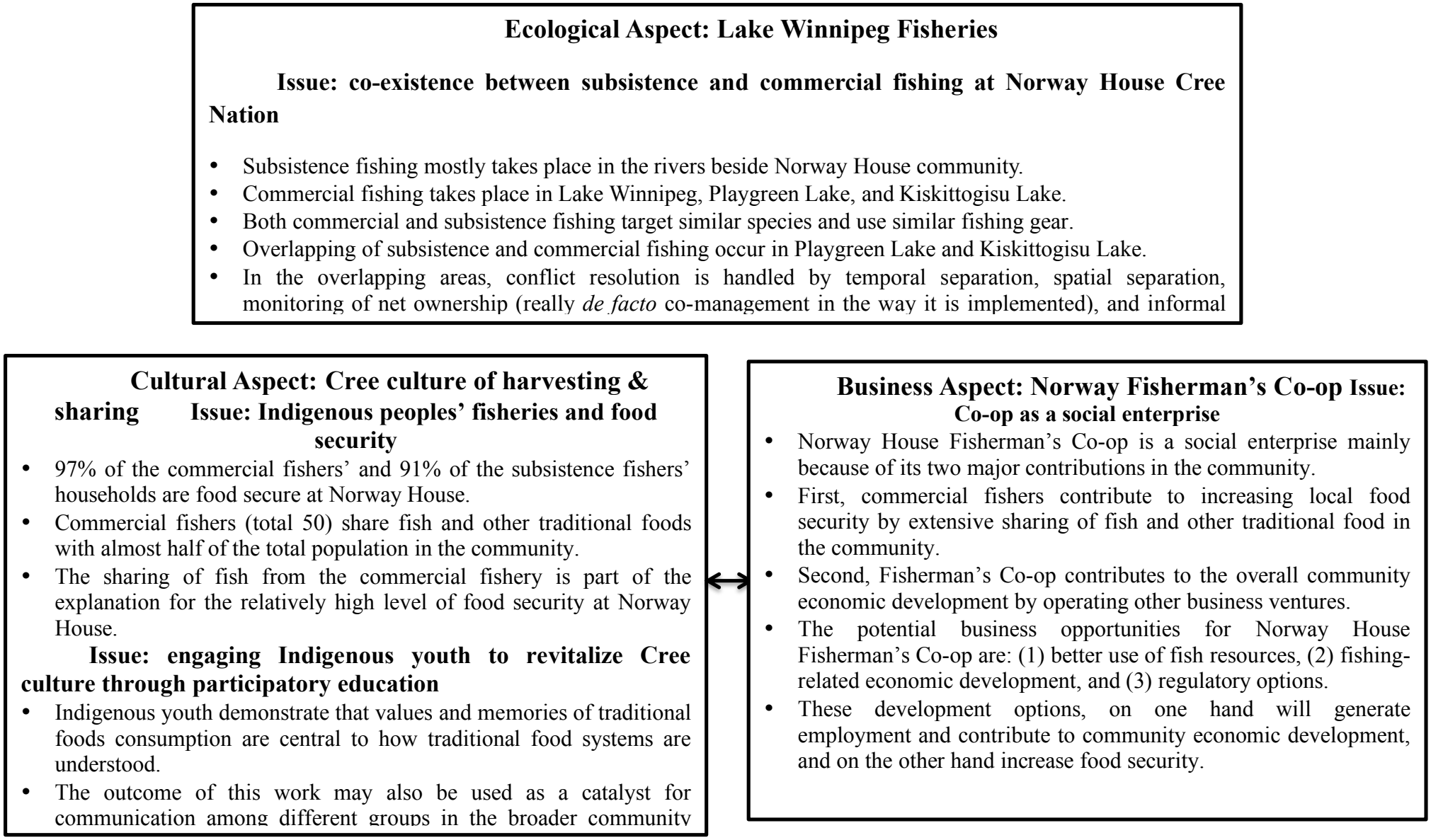

Figure 6.2 Revisiting the model—"Using fishery as a lens to address food security"

6.3 Major Contributions Of The Thesis

This thesis consists of four papers connected by the common thread of Indigenous fisheries–food security–social enterprise. The thesis brings three different domains—ecological, social, and business—into the discussion of food security by examining the interdependencies and connections among them. The contributions of this thesis in the literature of food security are unique and these consist of both theoretical and practical aspects.

6.3.1 Theoretical contributions

This thesis proposes an integrated model for food security analysis by combining Sen's entitlement approach and the food sovereignty concept. Application of Sen's entitlement argument in the context of Indigenous communities in Canada, and the analysis of food security, are significant contributions to the literature. In Chapter 1, I introduced Sen's entitlement theory and his argument about people starving in the middle of abundance, and raised the question of the applicability of Sen's theory in the context of Indigenous communities in Canada. Here I return to that question.

Sen's entitlement theory (1999, 1981) is based on the observation that thousands of people died of starvation during the Bengal famine in 1974, despite peak grain production in previous years. Sen (1981) argued that people starved to death, not because of lack of food, but because they lost their entitlement to food. Does Sen's entitlement theory hold in the context of Indigenous communities in Canada? There are no known cases of starvation in the Canadian Indigenous communities in recent decades (Council of Canadian Academies, 2014). However, according to recent definitions of food security, starvation is a rather crude criterion for food insecurity. Food security is said to exist "when all people at all time have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet

their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life." (Council of Canadian Academies, 2014: xiv).

According to this definition, which was proposed by the FAO Committee in 2013, off-reserve Indigenous households across Canada show food insecurity at a rate that is more than double that of all Canadian households (Council of Canadian Academies, 2014). The major reason for food insecurity in Indigenous communities is not starvation but poor nutrition, specifically the replacement of the traditional high protein diet with a high carbohydrate, high fat diet, low in nutrients (Kuhnlein, Erasmus, Spigelski, & Burlingame, 2013). In some ways it is surprising that Indigenous communities do not obtain a greater portion of their diet from traditional native harvesting. A majority of the Indigenous reserves in Canada are surrounded by waterbodies (Tough, 1996) with abundant fish resources in most places (McCart & Den Beste, 1979).

Sen (1981) argued that it is not the availability of food, but rather people having access to the food system that is the critical question. Sen (1981) emphasized people's control over the resources, and the question of who is in charge of the food resources. How is the overall food system controlled?

The context is given in Figure 3.6. Contemporary Indigenous communities are settled villages. Much of the food consumed in these communities comes from the market food system which is both expensive and often of poor quality (Council of Canadian Academies, 2014). The distribution and consumption aspects of market foods are very different from that of traditional foods (Table 3.4). Traditional harvesting is, according to Sen's (1981) terminology, direct entitlement, whereas market foods have to be purchased using indirect entitlement or transfer

entitlement. Thus reduction in traditional harvesting has resulted in some loss of direct entitlement and loss of control over the food system. It is the food sovereignty approach that emphasizes local food production (i.e., harvesting in this case) and distribution (i.e., sharing) and a rights-based approach for access to food (Figure 3.6). There are two groups of factors related to loss of direct entitlements and control over local food production: environmental change and governance (Council of Canadian Academies, 2014). I expand on each below.

The Council of Canadian Academies (2014) report lists five kinds of environmental change: climate change, natural resource development impacts, [limitations in] wildlife abundance and availability, contaminants in country foods, and emergent diseases affecting wildlife. In the case of Norway House, hydro dams for electric power generation have caused water pollution. Many believe that fish are not suitable for consumption due to mercury and other contamination. Some even prefer to buy frozen fish and other food from the grocery store rather than harvesting their own. During my data collection in the community, I interviewed many people who felt that they have lost entitlement and control of their own native land.

The Council of Canadian Academies (2014) report emphasizes the importance of the following factors for food sovereignty: self-governance, control of traditional lands and resources, local and traditional knowledge of harvesting, and access to these lands and resources through Indigenous rights. In the case of Norway House, having control over their food system is important. The Norway House Fisherman's Co-op is able to access the commercial fishery, and the thesis results show that the commercial fishery works as the 'engine' driving community economic development (Islam & Berkes, in press). The study findings show the importance of both subsistence and commercial fishing and its impact on increasing local food security (Islam & Berkes, 2016b). Sen's argument holds: direct entitlement (harvesting own food by subsistence

fishing) and indirect entitlement (ability to buy food with income coming from commercial fishing) contribute to food security.

This thesis elaborates on Sen's entitlement theory to make it applicable to the Norway House case and northern Indigenous communities in general, in the following ways:

1. In the context of northern Indigenous communities in Canada, starvation as Sen (1981) discussed is not applicable. Rather food insecurity because of poor-quality culturally inappropriate market foods is the issue, as opposed to access to nutritious traditional food.
2. A key component of Indigenous food security is the transmission of traditional knowledge to younger generations (Islam, Zurba, Rogalski, & Bereks, 2016). It can be referred to as the 'cultural entitlement' and can be added to Sen's (1981) theory.
3. Sen (1981) discusses people's access and control over food to avoid starvation. Similar arguments of access and control of resources is applicable to Indigenous communities in Canada. But in this case, access and control are also impacted by environmental change and loss of Indigenous governance over resources.
4. To address Indigenous food security it is necessary to combine the food sovereignty approach and Sen's entitlement theory. The former puts emphasis on the production and distribution, and the latter on the distribution and consumption domain of the food system (Islam & Berkes, 2016b).

6.3.2 Practical contributions

This thesis addresses food security from an Indigenous fisheries perspective and finds that both commercial and subsistence fishing impacts food security (Islam & Berkes, 2016b). Subsistence fisheries' impact on food security is well published in the literature (Branch, 2002; Harris & Millerd, 2010; Kawarazuka & Béné, 2010) but the role of commercial fishing and its impact on food security is not addressed as much. This thesis addresses the gap of such studies. In the case of Norway House Cree Nation, the role of commercial fishers was significantly larger than that of subsistence fishers with regards to increasing food security (Islam & Berkes, 2016b).

Revitalizing the native culture of harvesting among younger generations plays a vital role in Indigenous food security. It is very important for Cree people to teach their younger generations about their traditions and culture by transmitting traditional ecological knowledge (Ohmagari & Berkes, 1997), but knowledge transmission has been declining (Goulet & McLeod, 2002; Ohmagari & Berkes, 1997). This decline seems to be related to younger generations spending less time on the land (Council of Canadian Academies, 2014). Consequently, many have learned to become consumers rather than producers of traditional foods and prefer to consume market food, or may have never acquired the taste for bush food (Berkes & Farkas, 1978; Ohmagari & Berkes, 1997).

Focusing on the significance of revitalizing culture for food security, an art-based approach was used to understand Indigenous youth's view on the traditional food systems. Arts-based inquiry is the new emerging field of social studies (Cahnmann, 2003; Cahnmann-Taylor, 2008; Fernández-Giménez, 2015) and it provides various means to explore emotional and cultural aspects of social phenomena (Cahnmann, 2003). The participatory artwork employed in this study acts as a boundary object (Star & Griesemer, 1989; Zurba & Berkes, 2014), which

helped Indigenous youths to initiate discussion about traditional foods with their elders and peers. Students at a local school were asked to define the meaning of traditional foods and later they made a collaborative art piece with the help of their art teacher. This exercise made Indigenous youths explore what traditional food means to them in terms of their own experience, culture, and heritage; which in turn reflected their passion about Cree values and its impact on food security (Islam, Zurba, Rogalski, & Bereks, 2016).

Indigenous development lies in rebuilding communities through entrepreneurial activities on the basis of cultural and traditional foundation (Anderson, 2002; Loxley, 2010; Peredo, Anderson, Galbraith, Honig, & Dana, 2004). In this regard, Norway House Fisherman's Co-op functioning as a social enterprise can be an effective means to add social values and enhance community economic development. It was a request from The Chief and Band council to explore opportunities for value addition of commercial fisheries. This thesis proposes mainly three development options for commercial fishery for further value addition in the community. Table 6.2 shows the theoretical and practical contributions of the thesis by research objectives.

Table 6.2 Theoretical and practical contribution of the thesis by research objectives

Research objectives	Theoretical contributions	Practical contributions
To investigate the co-existence of two kinds of fisheries at Norway House Cree Nation.		There is a gap in the literature regarding the relationships of commercial and subsistence fisheries. This research addresses this gap.
To analyze food security through the lens of Indigenous fisheries and to assess food security among commercial and subsistence fishing households.	Using Sen's theory of entitlement in the Canadian First Nations context, the thesis adds to the literature on food security and entitlement.	
To explore the meaning of traditional food in the form of a collaborative art project by engaging Indigenous youth to revitalize Cree culture.		Norway House students of grades 8-12 used participatory art and compiled traditional food recipes towards revitalizing culture for food security.
To examine the role of Norway House Fisherman's Co-op as a social enterprise to address community development and food security		The project elaborated options for making better use of the fishery resource, and for value-added development.

6.4 Limitations Of The Thesis

This qualitative study is rooted in social science research. The component of biological sampling of the fish species is outside of the scope of the thesis. The recommendations for further development of commercial fisheries (i.e., producing and marketing value added fish products) are based on our research findings gathered from various stakeholders related with commercial fishing at Norway House Cree Nation. It is essential to know the biological data on the availability of different fish species to decide the long-term feasibility of these proposed projects. However, lack of biological data is a major challenge in determining long-term feasibility of different fish species (Ayles et al., 2014).

This research was conducted over a period of 14 months, from September, 2013 until November, 2014 at Norway House Cree Nation. During this period, I was travelling from

Winnipeg to Norway House to collect my data. I made a number of short trips (for approximately 7 to10 days) to the community due to my family responsibilities in Winnipeg. Prior to my trip, my community researcher would communicate and make appointments with research participants in advance. In this way, I tried to make the best use of my time in the community by conducting interviews and collecting as much data as I could. However, at times it was difficult to find participants available for interviews; for instance, I scheduled one field trip during hunting season and most of the commercial fishers were out hunting and I was not able to conduct as many interviews as I planned for. I tried to overcome this limitation by arranging more frequent short trips to the community.

There is a gap in this research in terms of traditional ecological knowledge. More work on traditional knowledge would have enriched the research especially for revitalizing Cree culture. I believe follow-up interviews on traditional means of living, food preparation, and fishing stories from elders would be interesting and strengthen present research findings. Language barrier was a major limitation in terms of conducting interviews with seniors. Most of the senior commercial and subsistence fishers speak only Cree language and I had to take help from an interpreter to conduct interviews and transcribe them.

This is one case study and there are limitations on generalizing from the findings. Although Norway House shares many of the characteristics of other First Nations communities in Manitoba, it is also different from the 'average' Indigenous community. It is a relatively affluent community with an all-season road connection to the south, a well-equipped modern school, and a successful commercial fishery. These differences are reflected in the level of food security at Norway House, which is comparable to the Canadian average (Islam and Berkes, 2016b).

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APPENDIX A: ETHICS APPROVAL FOR CONDUCTING PHD RESEARCH

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

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

APPROVAL CERTIFICATE

May 10, 2012

TO: **Durdana Islam** (Advisor F. Berkes)
Principal Investigator [redacted]

FROM: **Wayne Taylor, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2012:050**
"Fishing at Norway House Cree Nation: opportunities and constraints for future growth"

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, the auditor requires that you submit a copy of this Approval Certificate to the Office of Research Services, fax 261-0325 - please include the name of the funding agency and your UM Project number. This must be faxed before your account can be accessed.**

- **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.**

Commercial/ domestic fisher Household survey consent form

Research Project Title: Fishing at Norway house Cree Nation: Opportunities and Constraints for Future Growth

Principal Investigator and contact information: **Durdana Islam**

303 Sinnott Building
MB R3T 2M6
Phone- (204)-474-9050
Email: umislamd@cc.umanitoba.ca

Research Supervisor (if applicable) and contact information: **Dr. Fikret Berkes**

Email: berkes@cc.umanitoba.ca

Sponsor (if applicable): Canada Research Chair, Community Based Natural Resource Management (CBNRM)

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this study is to understand livelihood of commercial and domestic fishers in Norway House Cree Nation. The Chief and Band Council of the Norway House First Nation have approved to carry out the study.

We would like to ask some questions about your harvesting activities. We would also like to ask a few questions about your household. The questions will take about thirty minutes. Your answer will help figure out the activities of fishing. A plain-language summary of the study results will be available to the community members in the form of a poster or pamphlet in 2014.The results of the study will also be shared with the chief and Band Council of Norway House Cree Nation, and for a PhD thesis at the Natural Resources Institute, University of Manitoba.

You can choose whether or not to answer these questions. **All your answers will be kept confidential**. If you are willing to be interviewed, your answers are very important to us. The more people that help in this study, the stronger our document will be.

Please feel free to ask any questions you may have about the study. Before we start, there is a consent form to sign to show if you agree to take part. Please be advised that the information

you share with us today will be anonymous and confidentiality of the data will be maintained strictly.

Consent: I have had the study explained to me and I agree to be interviewed. I understand that this is voluntary, and that I can refuse to answer any questions.

Thank you.

Your verbal consent/signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba Research Ethics Board(s) and a representative(s) of the University of Manitoba Research Quality Management / Assurance office may also require access to your research records for safety and quality assurance purposes.

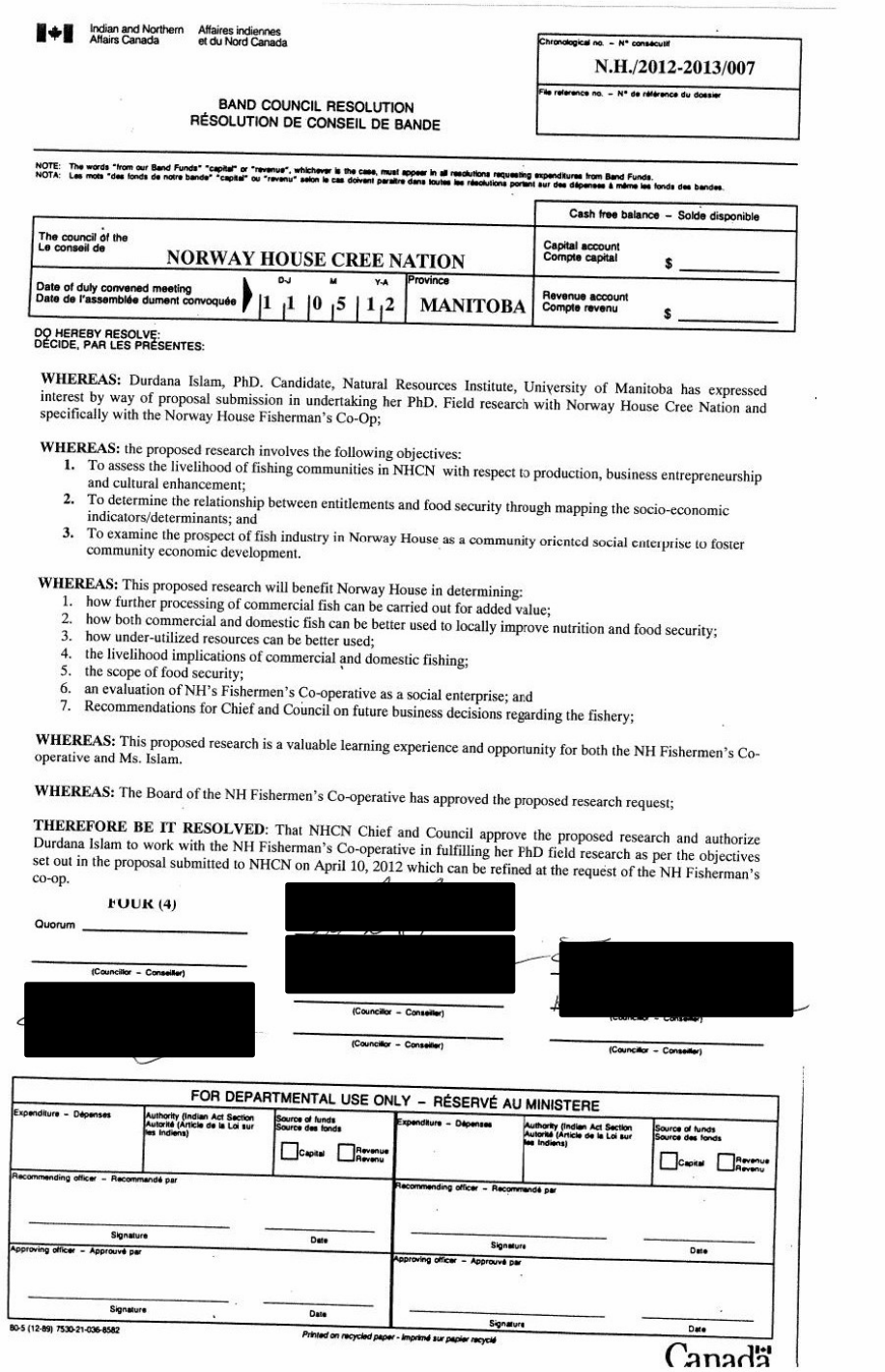
This research has been approved by the Joint-Faculty Research Ethics Board (JFREB). If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

Participant has given oral consent to participate in the study: ☐ yes ☐ no

Signature of the community researcher: _____

Date: _____

APPENDIX B: BAND COUNCIL RESOLUTION FROM NORWAY HOUSE CREE NATION



Indian and Northern Affairs Canada / Affaires indiennes et du Nord Canada

Chronological no. – N° consécutif: N.H./2012-2013/007

File reference no. – N° de référence du dossier:

BAND COUNCIL RESOLUTION
RÉSOLUTION DE CONSEIL DE BANDE

NOTE: The words "from our Band Funds" "capital" or "revenue", whichever is the case, must appear in all resolutions requesting expenditures from Band Funds.
NOTA: Les mots "des fonds de notre bande" "capital" ou "revenu" selon le cas doivent paraître dans toutes les résolutions portant sur des dépenses à même les fonds des bandes.

The council of the / Le conseil de: **NORWAY HOUSE CREE NATION**	Cash free balance – Solde disponible
Date of duly convened meeting / Date de l'assemblée dument convoquée: D-J 11 M 05 Y-A 12 — Province: **MANITOBA**	Capital account / Compte capital $ _____
	Revenue account / Compte revenu $ _____

DO HEREBY RESOLVE:
DÉCIDE, PAR LES PRÉSENTES:

WHEREAS: Durdana Islam, PhD. Candidate, Natural Resources Institute, University of Manitoba has expressed interest by way of proposal submission in undertaking her PhD. Field research with Norway House Cree Nation and specifically with the Norway House Fisherman's Co-Op;

WHEREAS: the proposed research involves the following objectives:

1. To assess the livelihood of fishing communities in NHCN with respect to production, business entrepreneurship and cultural enhancement;
2. To determine the relationship between entitlements and food security through mapping the socio-economic indicators/determinants; and
3. To examine the prospect of fish industry in Norway House as a community oriented social enterprise to foster community economic development.

WHEREAS: This proposed research will benefit Norway House in determining:

1. how further processing of commercial fish can be carried out for added value;
2. how both commercial and domestic fish can be better used to locally improve nutrition and food security;
3. how under-utilized resources can be better used;
4. the livelihood implications of commercial and domestic fishing;
5. the scope of food security;
6. an evaluation of NH's Fishermen's Co-operative as a social enterprise; and
7. Recommendations for Chief and Council on future business decisions regarding the fishery;

WHEREAS: This proposed research is a valuable learning experience and opportunity for both the NH Fishermen's Co-operative and Ms. Islam.

WHEREAS: The Board of the NH Fishermen's Co-operative has approved the proposed research request;

THEREFORE BE IT RESOLVED: That NHCN Chief and Council approve the proposed research and authorize Durdana Islam to work with the NH Fisherman's Co-operative in fulfilling her PhD field research as per the objectives set out in the proposal submitted to NHCN on April 10, 2012 which can be refined at the request of the NH Fisherman's co-op.

FOUR (4)
Quorum _____

[redacted] (Councillor – Conseiller)
[redacted] (Councillor – Conseiller)
[redacted] (Councillor – Conseiller)
[redacted] (Councillor – Conseiller)
[redacted] (Councillor – Conseiller)

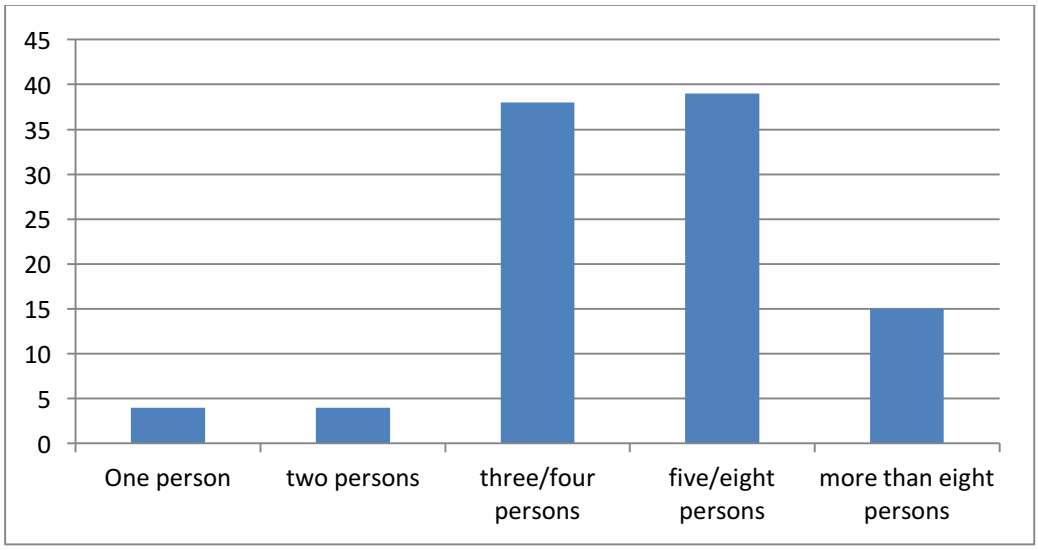
FOR DEPARTMENTAL USE ONLY – RÉSERVÉ AU MINISTERE

Expenditure – Dépenses	Authority (Indian Act Section / Autorité (Article de la Loi sur les Indiens))	Source of funds / Source des fonds: ☐ Capital ☐ Revenue / Revenu	Expenditure – Dépenses	Authority (Indian Act Section / Autorité (Article de la Loi sur les Indiens))	Source of funds / Source des fonds: ☐ Capital ☐ Revenue / Revenu
Recommending officer – Recommandé par: Signature _____ Date _____			Recommending officer – Recommandé par: Signature _____ Date _____		
Approving officer – Approuvé par: Signature _____ Date _____			Approving officer – Approuvé par: Signature _____ Date _____		

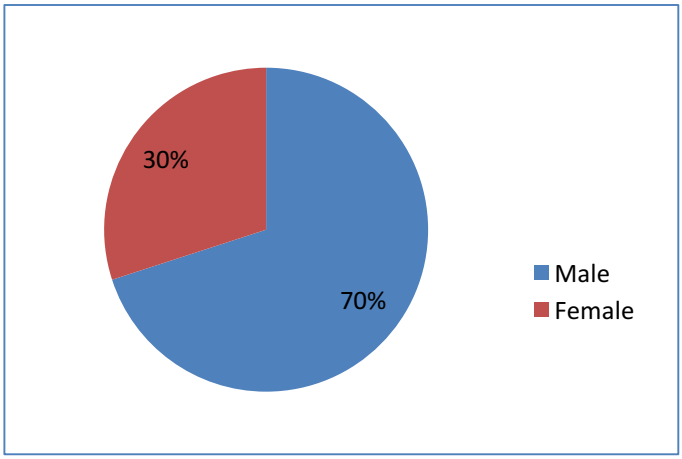
80-5 (12-89) 7530-21-036-8582 — Printed on recycled paper - Imprimé sur papier recyclé — Canada

APPENDIX C: SUBSISTENCE FISHERS' HOUSEHOLD QUESTIONNAIRE SURVEY AND SUMMARY OF RESEARCH FINDINGS (N=100)

1) How many people live in your household presently?
   1) One person
   2) Two persons
   3) Three/four persons
   4) Five/eight persons
   5) More than eight persons

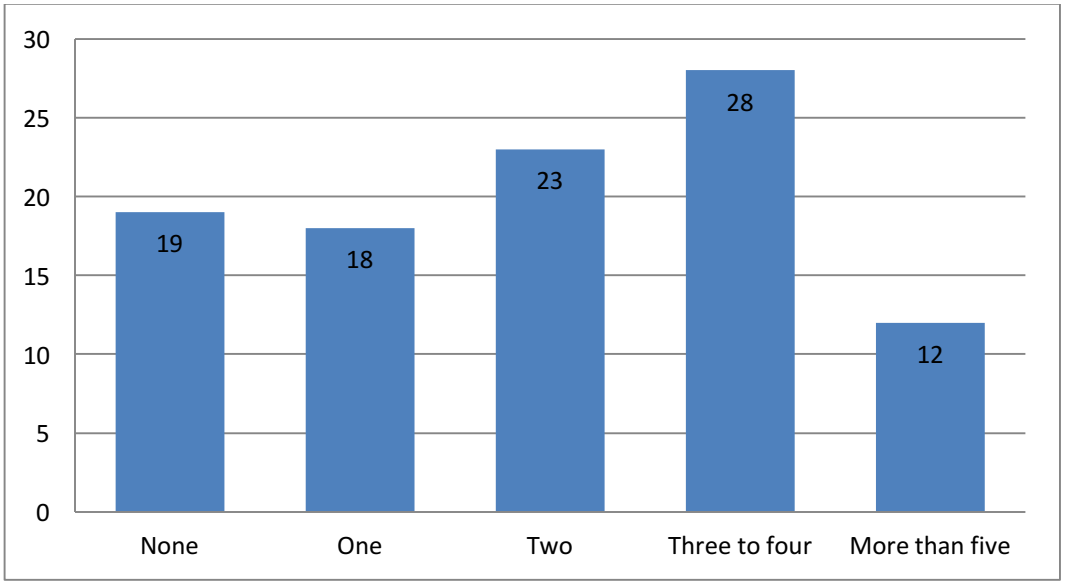


2) Is the household head male or female?



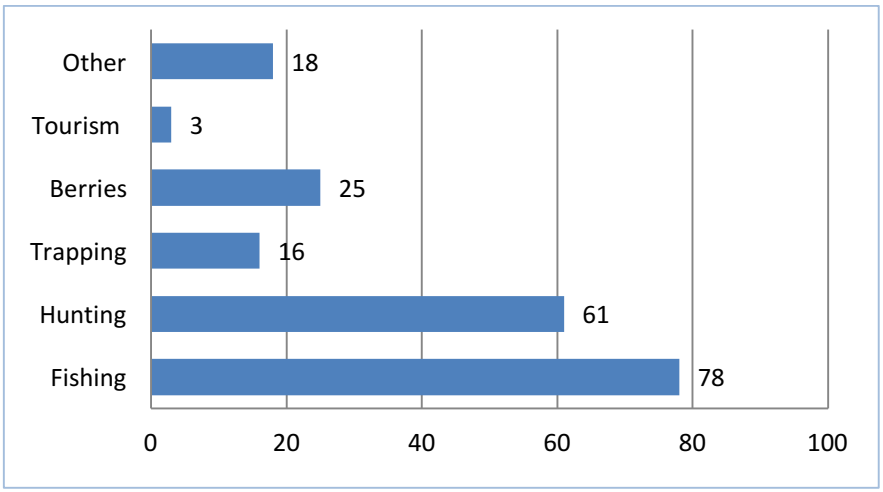
3) Total number of children in the household?

1) None
2) 1
3) 2
4) 3/4
5) More than 5



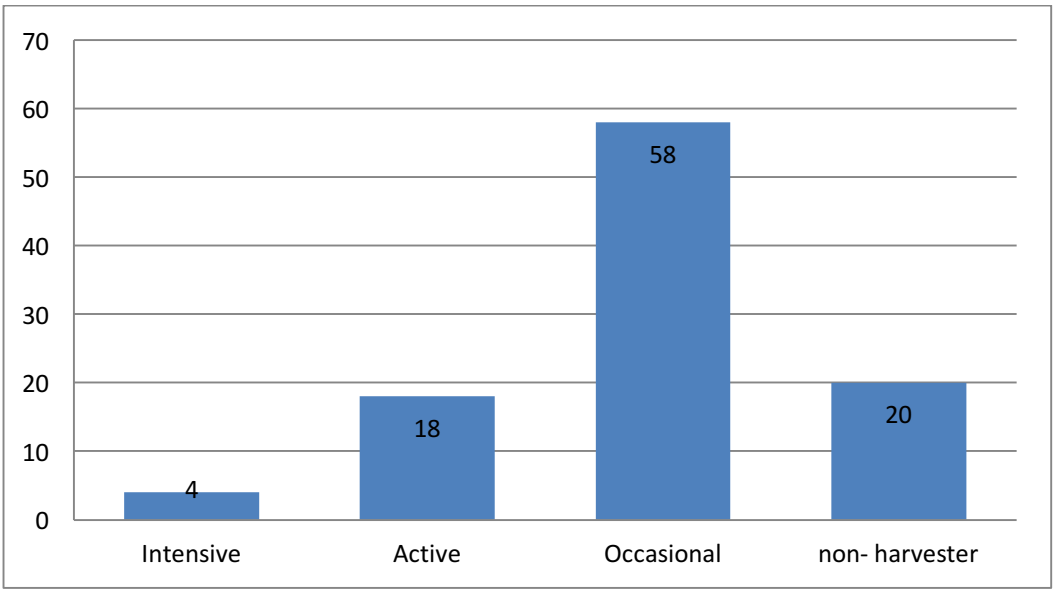
4) Please circle all the activities that produced food for household consumption in the past year

1. Fishing
2. Hunting
3. Trapping
4. Berries and other plant food and medicines
5. Tourism [eg. Bringing back meat or fish from fish camp]
6. Other



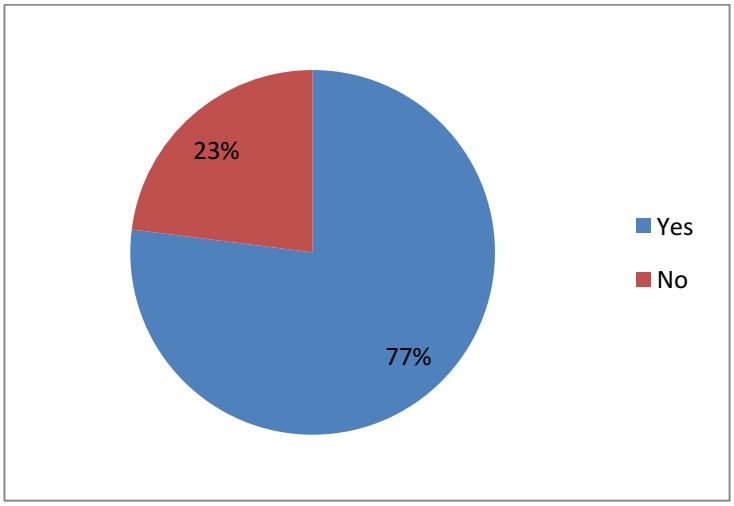
5) Are you or other members of the household harvested traditional foods in the past year (2012-2013)?

1= Intensive (considered by the community as bringing home a lot of traditional food)
2= Active (considered by the community as bringing home some but not a lot of traditional food)
3= Occasional (bringing traditional food only occasionally)
4=non-harvester



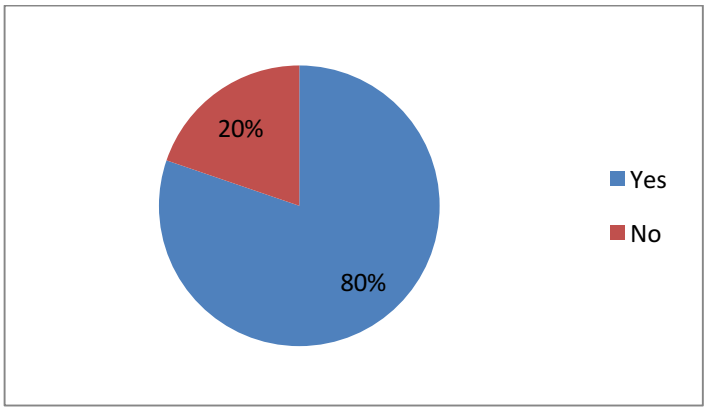
6) Did you do any domestic fishing (including angling) in the past year (2012-2013)?

1= Yes
2= No (Skip to Question 12)



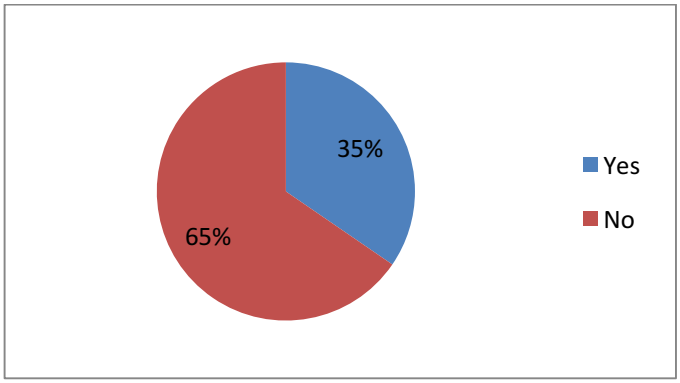
7) Did you do any summer/fall fishing (including angling) in the past year (2012-2013)?

1= Yes
2= No



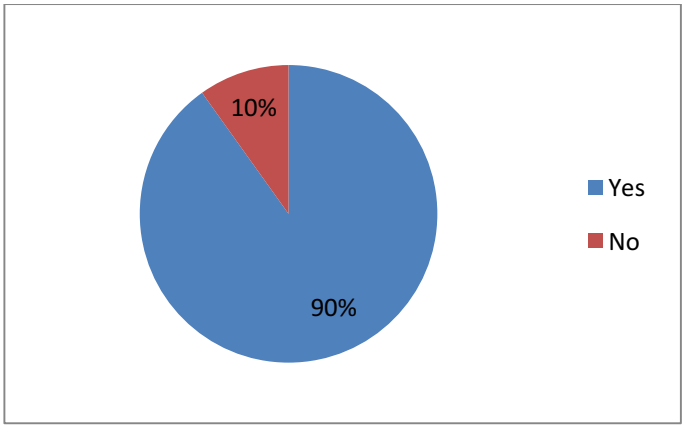
8) Did you do any winter fishing (including angling) in the past year (2012-2013)?

1= Yes
2= No



9) Did you do any spring fishing (including angling) in the past year (2012-2013)?

1= Yes
2= No



10) About how much of the following kinds of fish did you harvest during the following seasons (not including commercial catches)? Please use the following codes for the table that follows:

1= largest catch
2= Medium catch
3= occasional

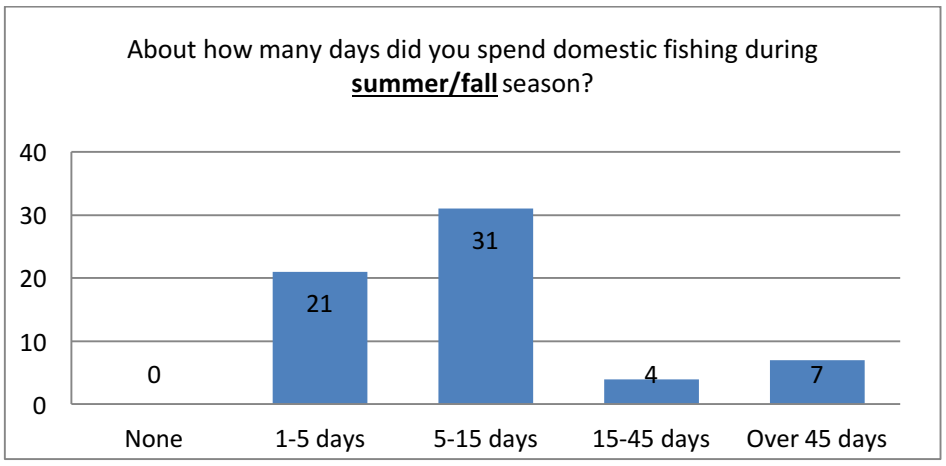
	Sum/Fall	Winter	Spring (total)
Whitefish			
Pickerel(Walleye)			
Sauger			
Perch			
White Bass			
Goldeye			
Northern Pike(Jackfish)			
Carp			
Mullet (White sucker)			
Tullibee			
Maria (burbot)			
Other fish(specify)			

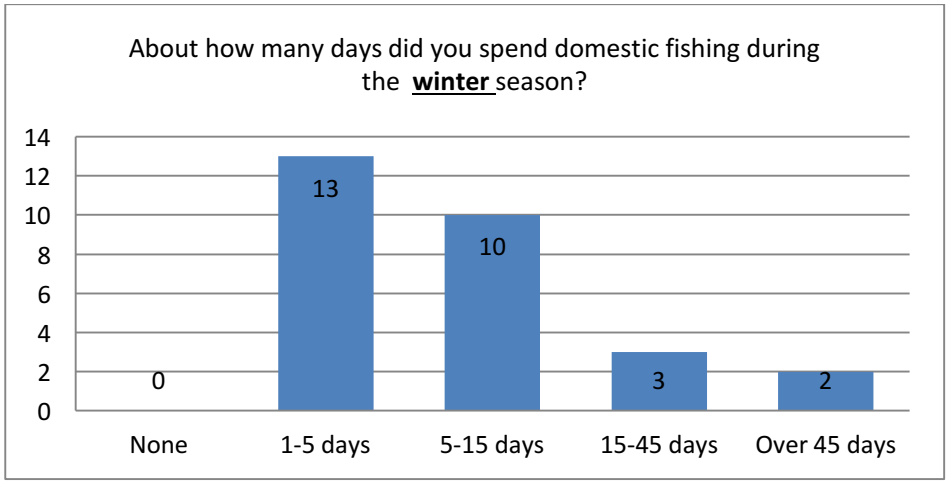
Fish harvest by Subsistence Fishers at Norway House Cree Nation in the year 2012-2013

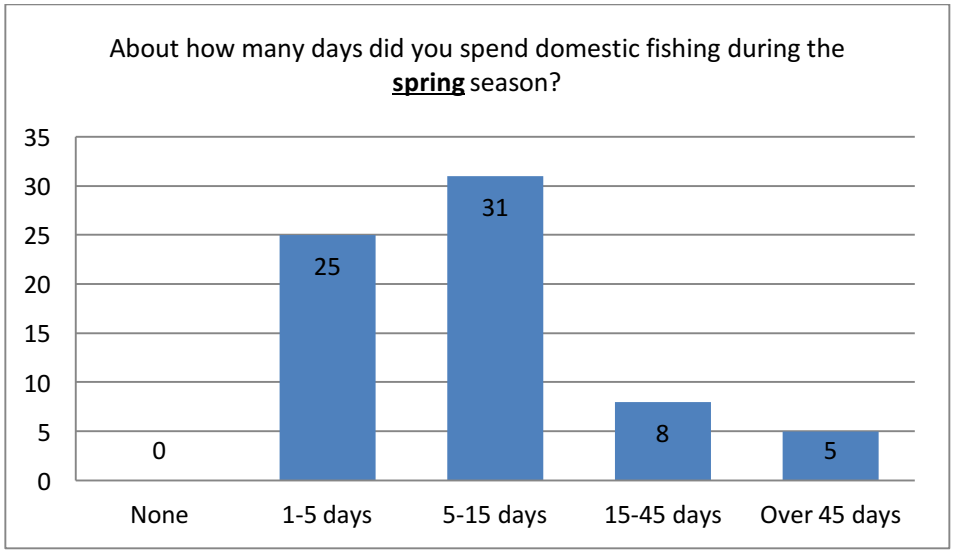
Seasons	Largest catch	Medium catch	Occasional catch
Summer/Fall (2012-2013)	Pickerel	Whitefish	Whitefish, Sauger, Northern Pike (Jack fish) and Mullet (White Sucker)
Winter(2012-2013)	Pickerel	White fish and Northern Pike (Jackfish)	Sauger, Northern pike, Mullet (White sucker) and Burbot
Spring2012-2013	Pickerel	Norhtern Pike (Jack fish),	White fish, Northern Pike (Jackfish)

11) About how many days did you spend domestic fishing for all species other than sturgeon during the following seasons? Please put a (√) in the appropriate box.

	None	1-5 days	5-15days	15-45 days	Over 45 days
Summer/fall					
Winter					
Spring					

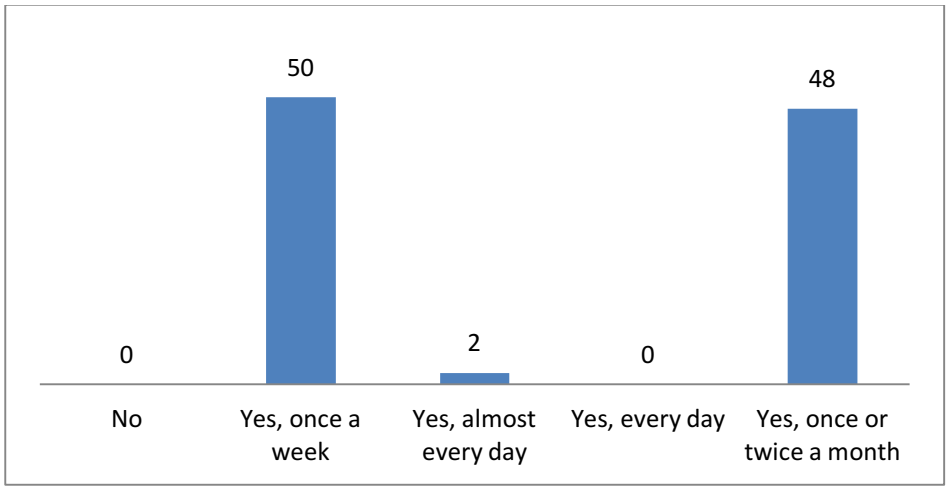

About how many days did you spend domestic fishing during summer/fall season?
40
30
20
10
0
0
21
31
4
7
None
1-5 days
5-15 days
15-45 days
Over 45 days


About how many days did you spend domestic fishing during the winter season?
14
12
10
8
6
4
2
0
0
13
10
3
2
None
1-5 days
5-15 days
15-45 days
Over 45 days


About how many days did you spend domestic fishing during the spring season?
35
30
25
20
15
10
5
0
0
25
31
8
5
None
1-5 days
5-15 days
15-45 days
Over 45 days

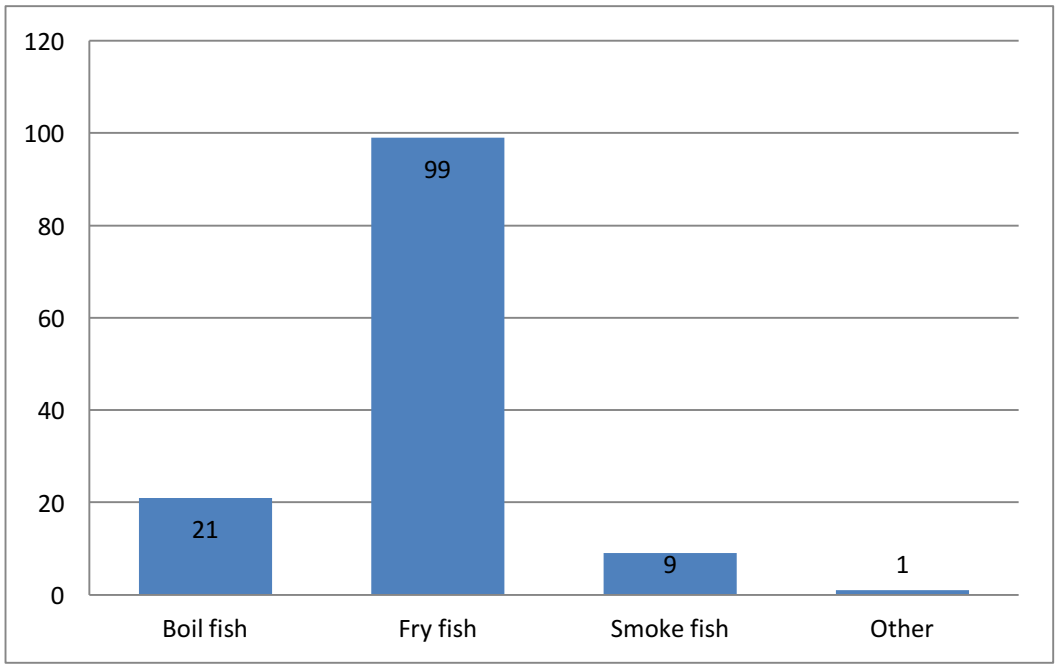
12) Does your family eat fish frequently?

0= No (skip next question)
1 =Yes, once a week
2 =Yes, almost every day
3 =Yes, every day



13) How do you cook your fish to eat? (You can choose more than one option)

1) Boil fish
2) Fry fish
3) Smoke fish
4) other_____



14) Please put a (√) mark here if kids in the family <u>don't</u> eat fish _____

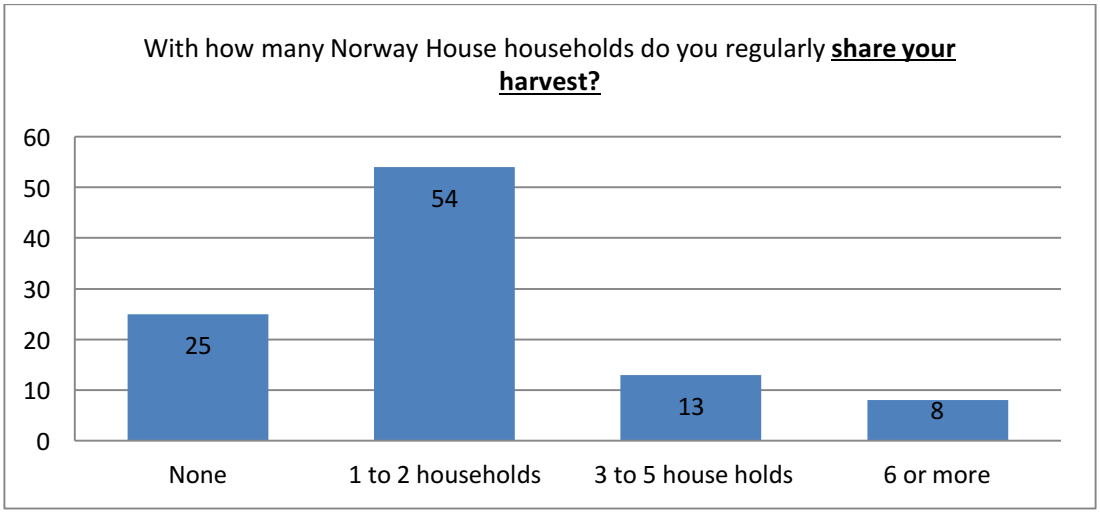
None of the participating households ticked this meaning in **100%** of the households' kids eat fish.

15) When there is no fish coming in, what do your family eat instead?

1 = someone shares fish with us
2= we use fish from our own freezer
3= we buy fish from the store [eg. Frozen whole, frozen packaged, or canned]
4= we buy other food from the store

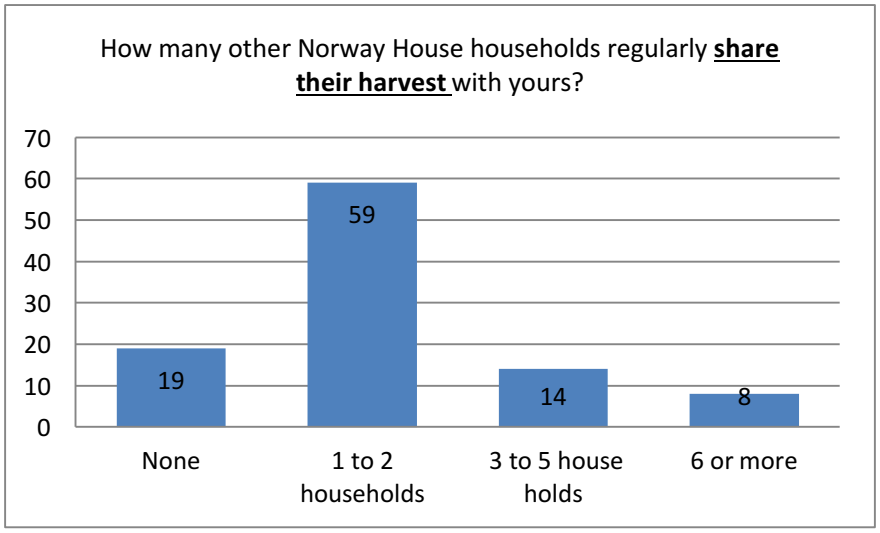
16) With how many Norway House households do you regularly share <u>your harvest</u> (fish and other wild foods) in past year (2012-2013)?

1) None
2) 1 to 2 households
3) 3 to 5 house holds
4) 6 or more



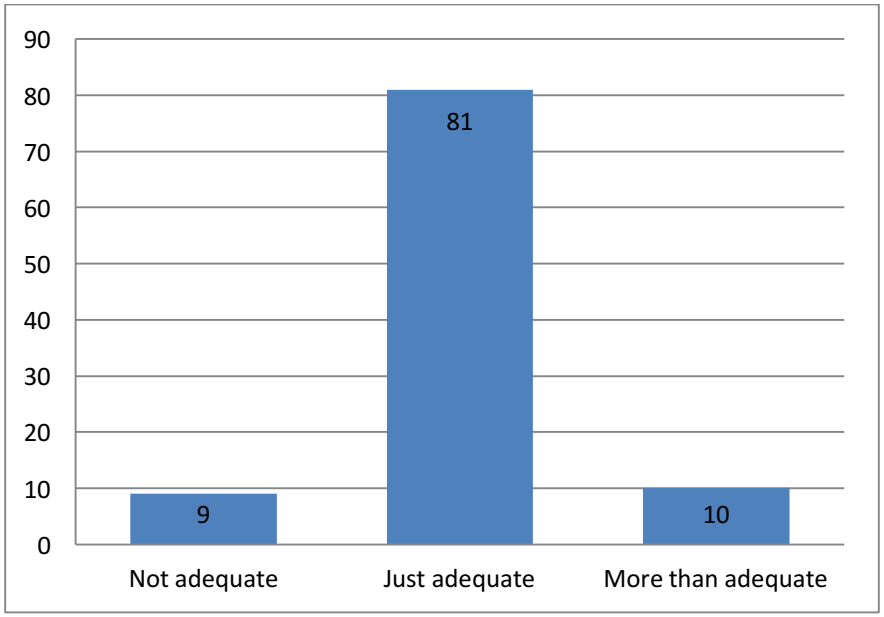
17) How many other Norway House households regularly share their harvest with yours?

1) None
2) 1 to 2 households
3) 3 to 5 households
4) 6 or more



18).Concerning your family's food consumption over the past one month which of the following is true? The family's food consumption was:

1 = Not adequate
2 = Just adequate
3= More than adequate



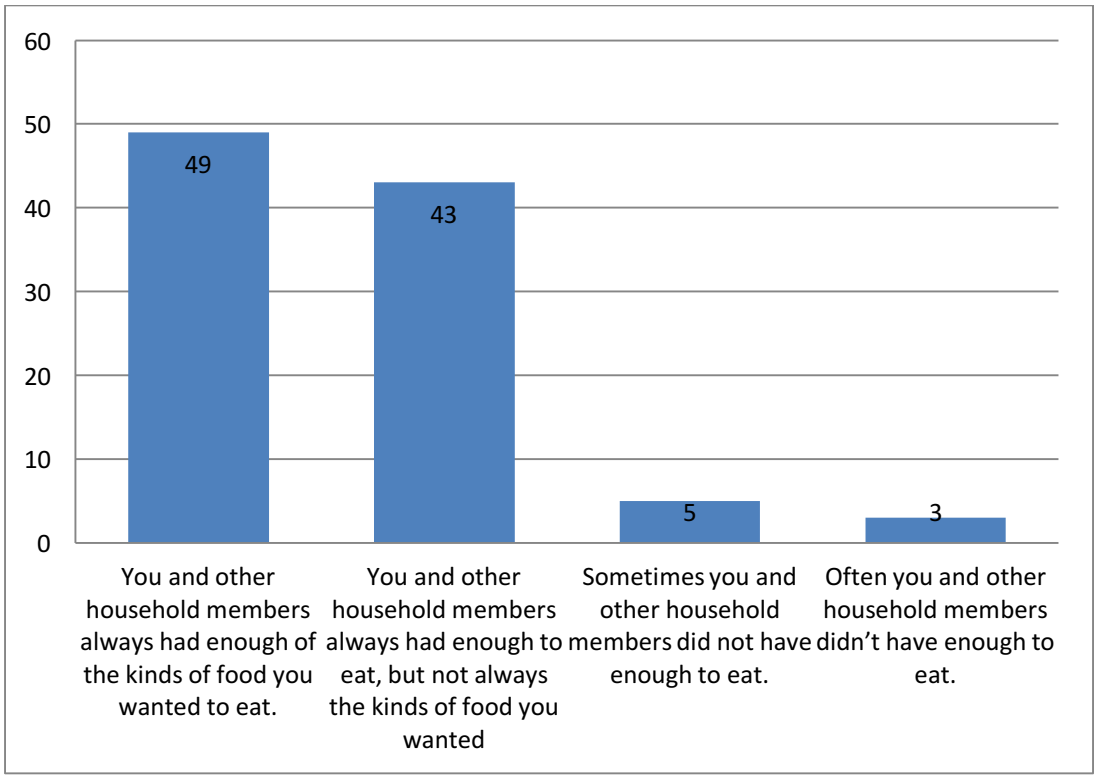
19). Which of the following statements best describes the food eaten in your household in the past 12 months, that is since [November] of last year?

1=You and other household members always had enough of the kinds of food you wanted to eat.

2= You and other household members always had enough to eat, but not always the kinds of food you wanted

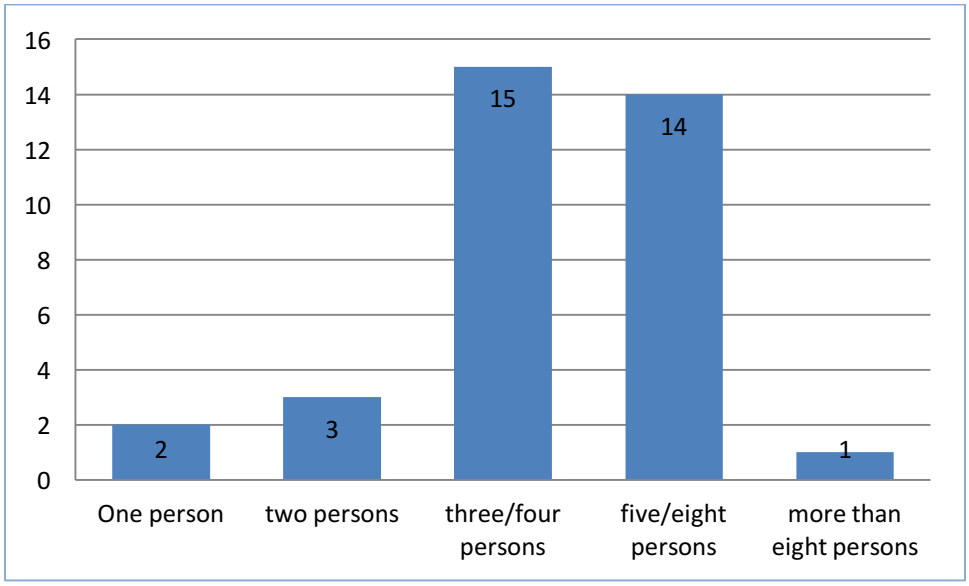
3=Sometimes you and other household members did not have enough to eat.

4=Often you and other household members didn't have enough to eat.

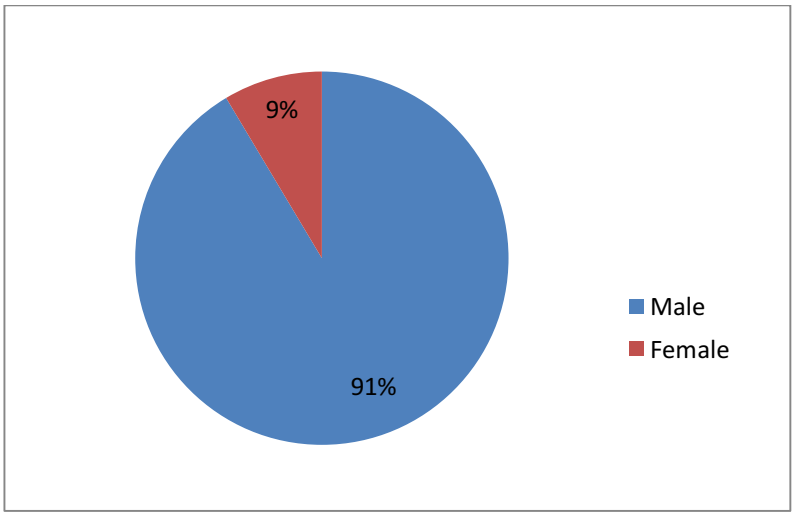


APPENDIX D: COMMERCIAL FISHERS' HOUSEHOLD QUESTIONNAIRE SURVEY AND SUMMARY OF RESEARCH FINDINGS (N=35).

1) How many people live in your household presently?
   1) One person
   2) Two persons
   3) Three/four persons
   4) Five/eight persons
   5) More than eight persons

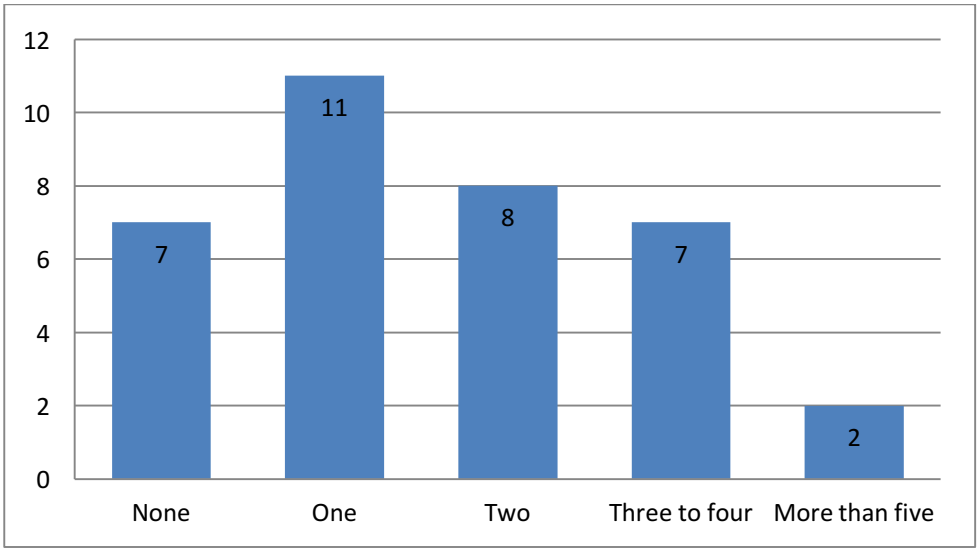


2) Is the household head male of female?



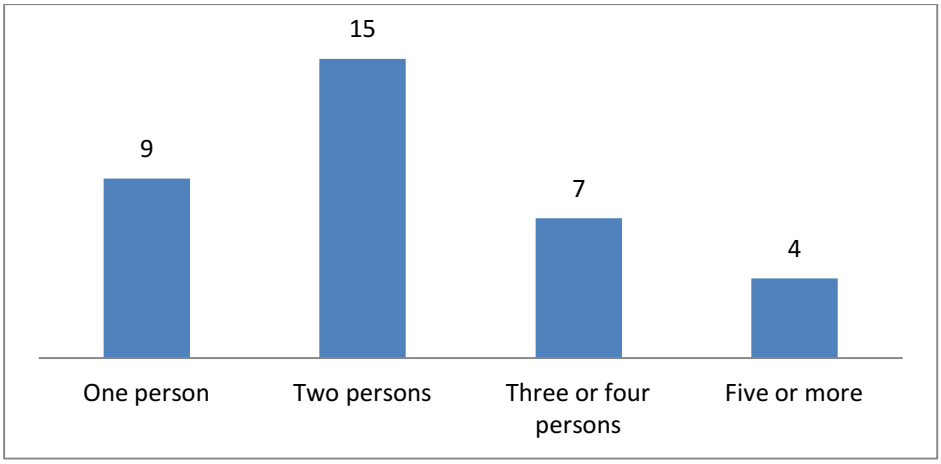
3) Total number of children in the household?

1) None
2) 1
3) 2
4) 3/4
5) More than 5



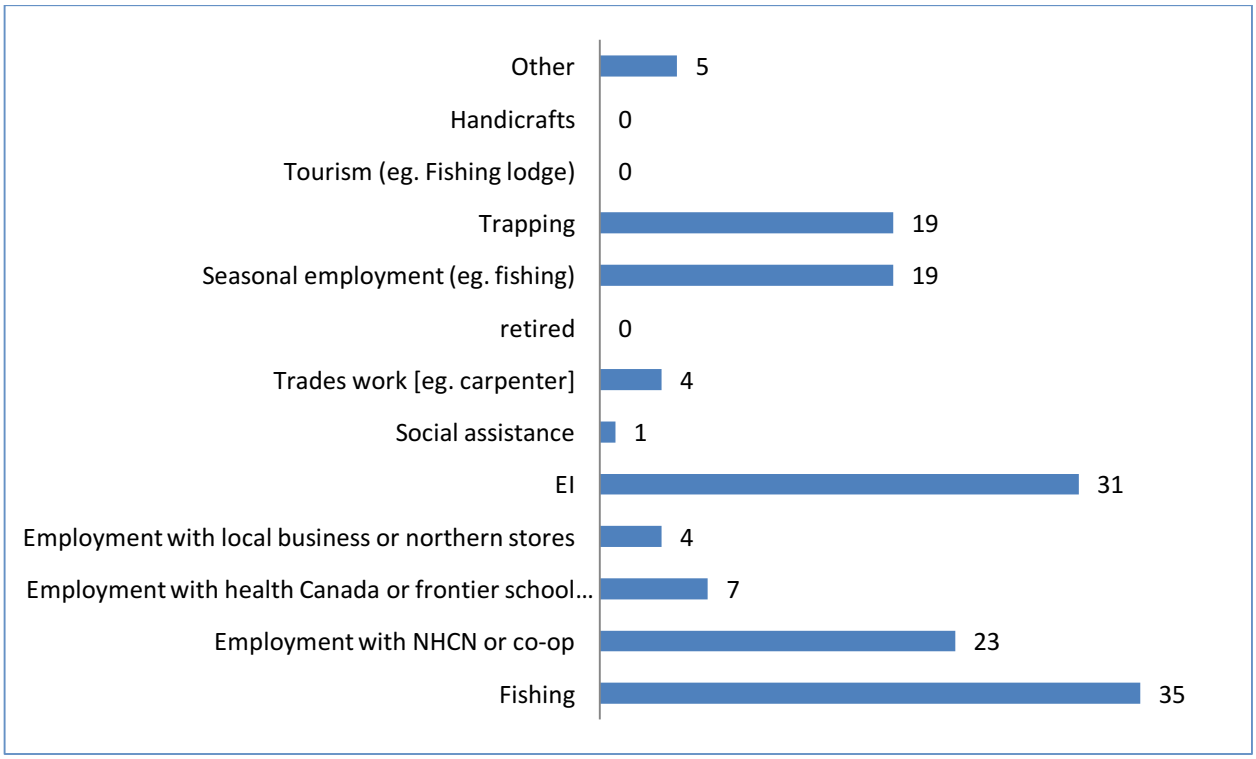
4) How many people in your household generated income this past year (2012-2013)?

1) One person
2) Two persons
3) Three or four persons
4) Five or more



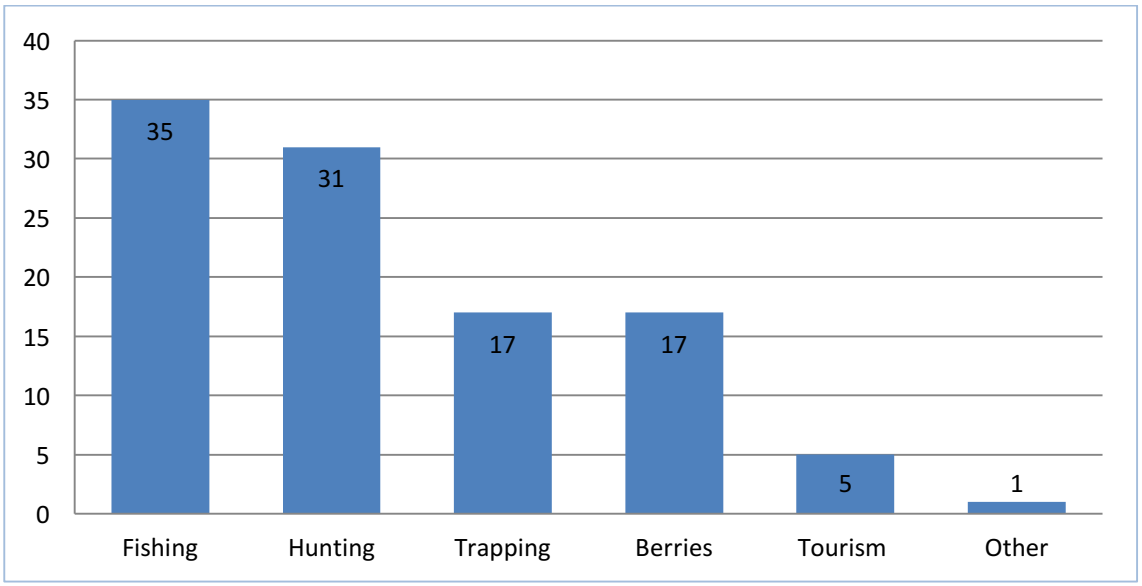
5) Please circle all the house activities that produced income in the past year

1. Fishing
2. Employment with NHCN or co-op
3. Employment with health Canada or frontier school division
4. Employment with local business or northern stores
5. EI
6. Social assistance
7. Trades work [eg. carpenter]
8. retired
9. Seasonal employment (eg. fishing)
10. Trapping
11. Tourism (eg. Fishing lodge)
12. Handicrafts
13. Other



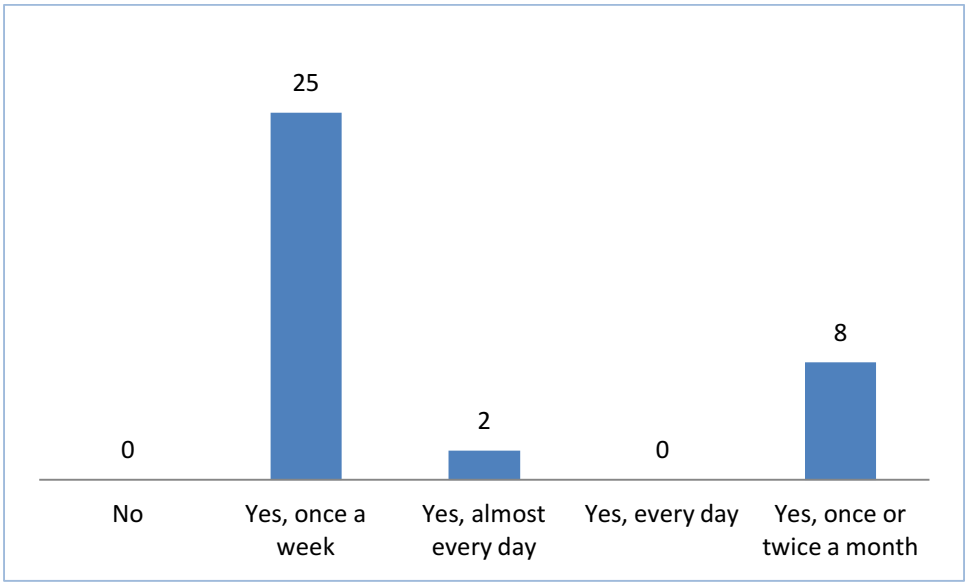
6) Please circle all the activities that produced food for household consumption in the past year

1. Fishing
2. Hunting
3. Trapping
4. Berries and other plant food and medicines
5. Tourism [eg. Bringing back meat or fish from fish camp]
6. Other



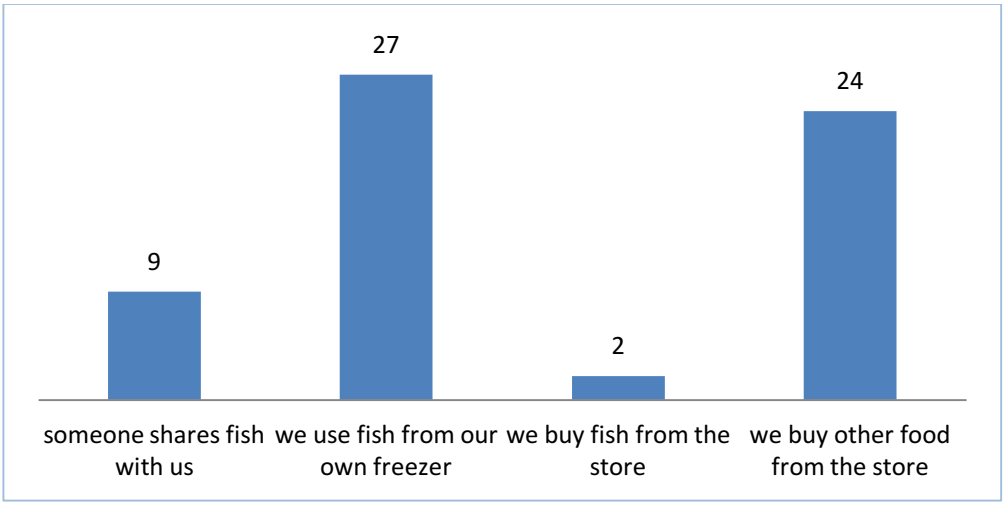
7) Does your family eat fish frequently?

0= No
1 =Yes, once a week
2 =Yes, almost every day
3 =Yes, every day
4= Yes, once a month



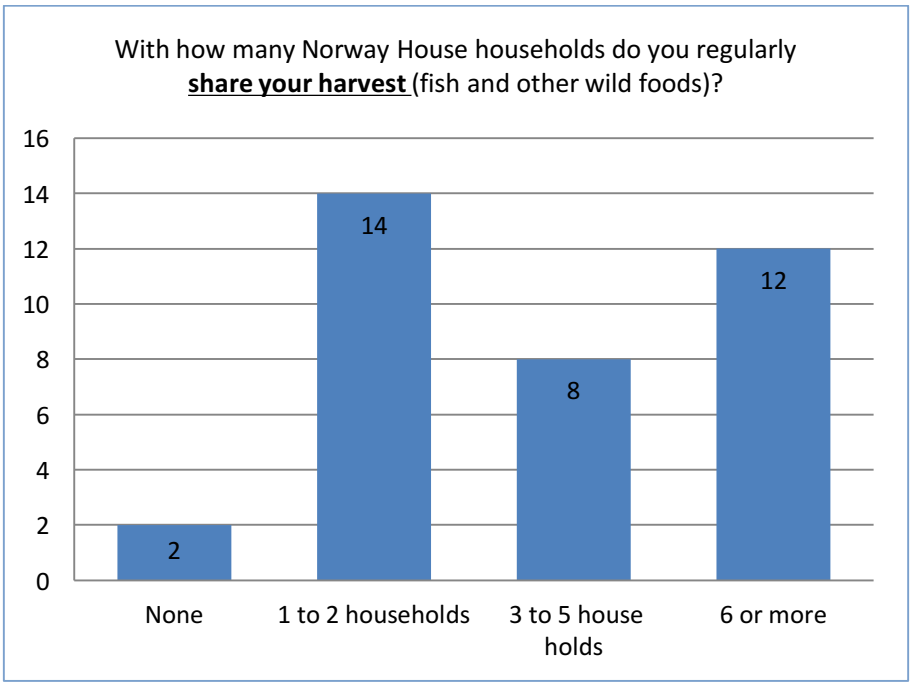
8) When you are not fishing commercially, what do you do for your family's fish consumption?

1 = someone shares fish with us
2= we use fish from our own freezer
3= we buy fish from the store [eg. Frozen whole, frozen packaged, or canned]
4= we buy other food from the store



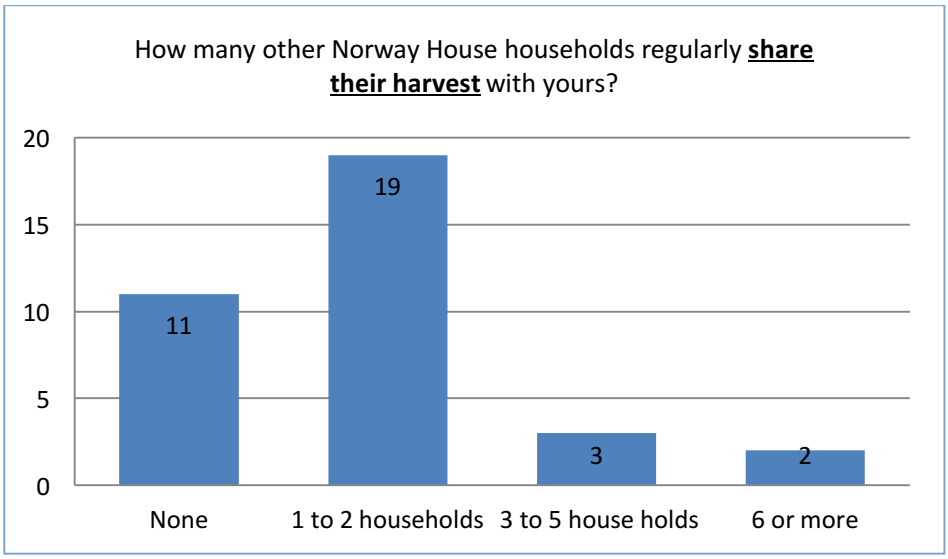
9) With how many Norway House households do you regularly share <u>your harvest</u> (fish and other wild foods)?

1) None
2) 1 to 2 households
3) 3 to 5 house holds
4) 6 or more



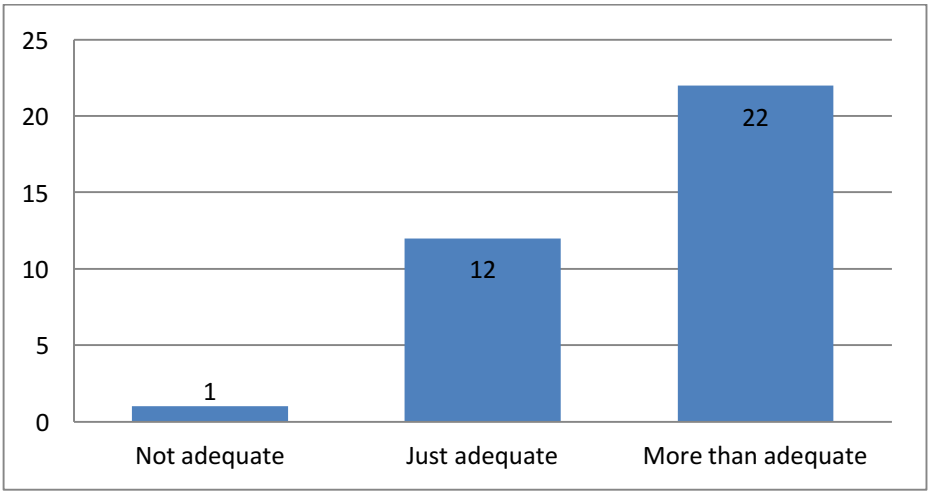
10) How many other Norway House households regularly share their harvest with yours?

1) None
2) 1 to 2 households
3) 3 to 5 households
4) 6 or more



11) Concerning your family's food consumption over the past one month which of the following is true? The family's food consumption was:

1 = Not adequate
2 = Just adequate
3= More than adequate



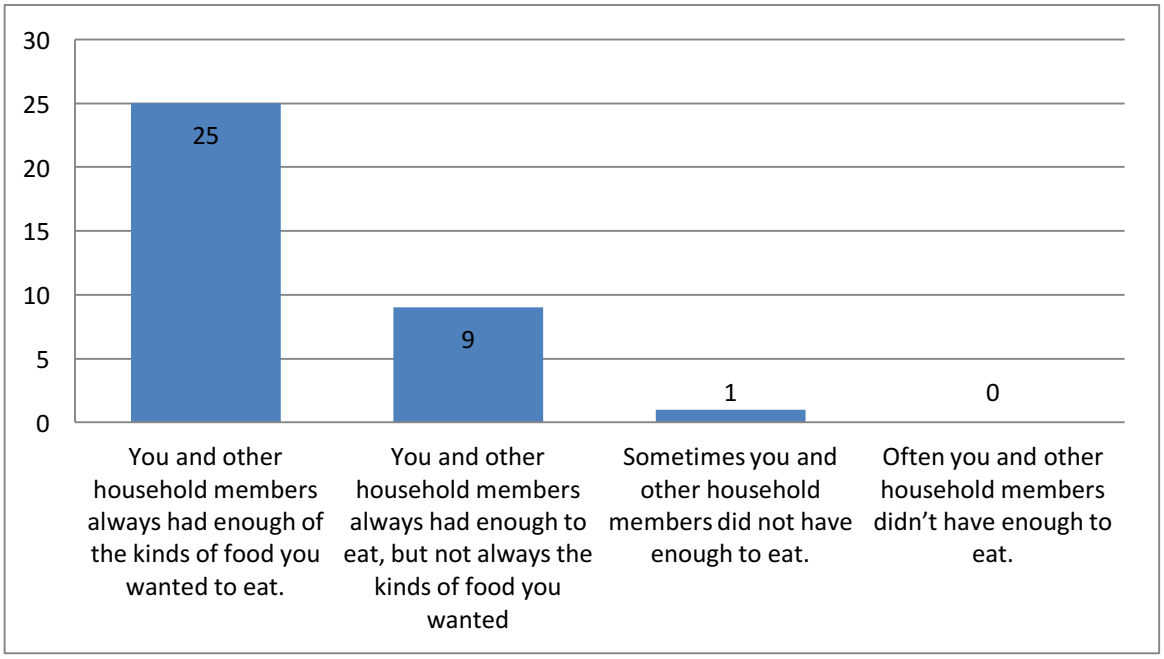
12) Which of the following statements best describes the food eaten in your household in the past 12 months, that is since [November] of last year?

1= You and other household members always had enough of the kinds of food you wanted to eat.

2= You and other household members always had enough to eat, but not always the kinds of food you wanted

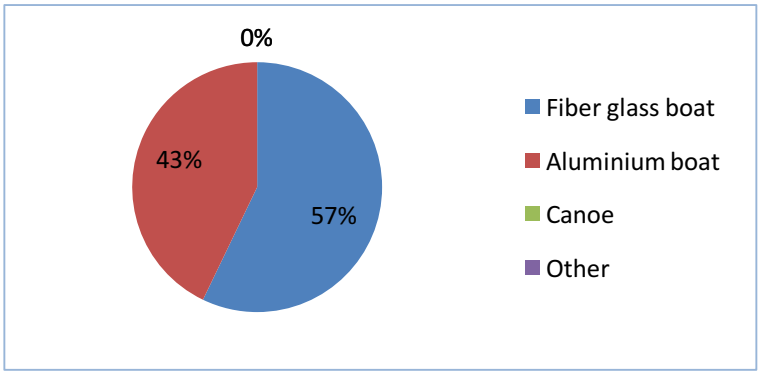
3= Sometimes you and other household members did not have enough to eat.

4= Often you and other household members didn't have enough to eat.



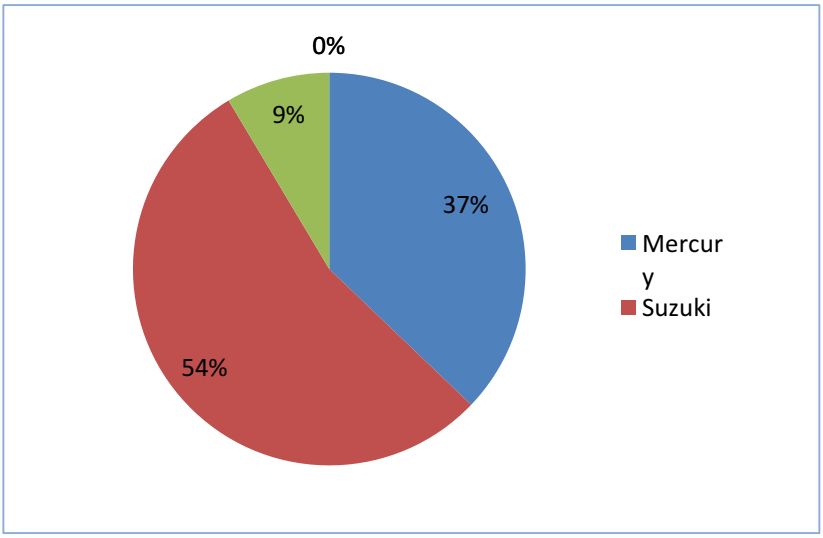
13) For commercial fishing purposes, what type of boat did you use last year?

1. Fiber glass boat_____ft
2. Aluminium boat_____ft
3. Canoe_____ft
4. Other



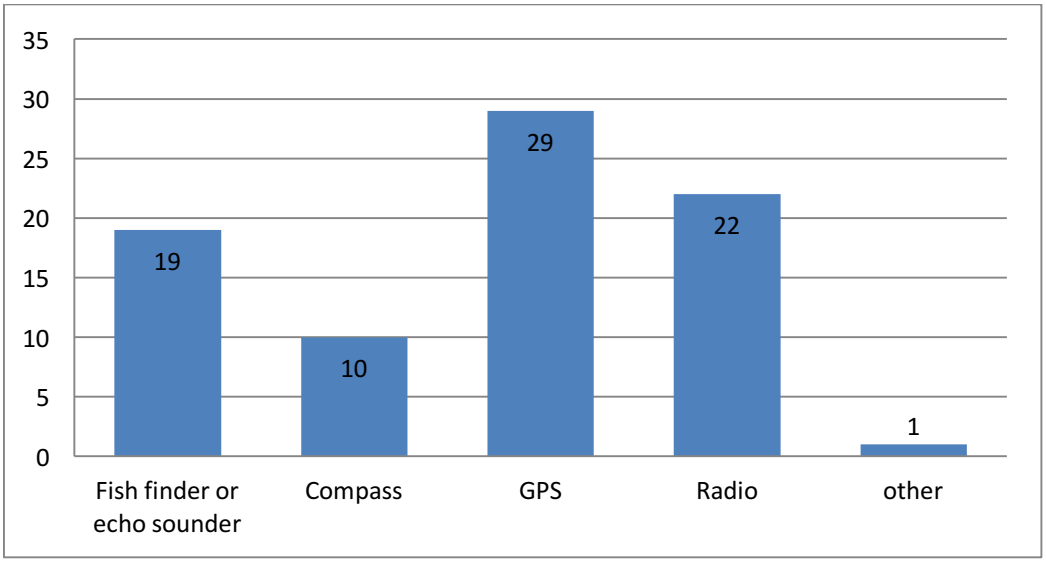
14) For commercial fishing purposes, what type of motor did you use last year?

1. Mercury _____HP
2. Suzuki _____HP
3. Yamaha _____HP
4. Johnson _____HP
5. Other _____ HP



15) If you have a motor boat, does the boat have?

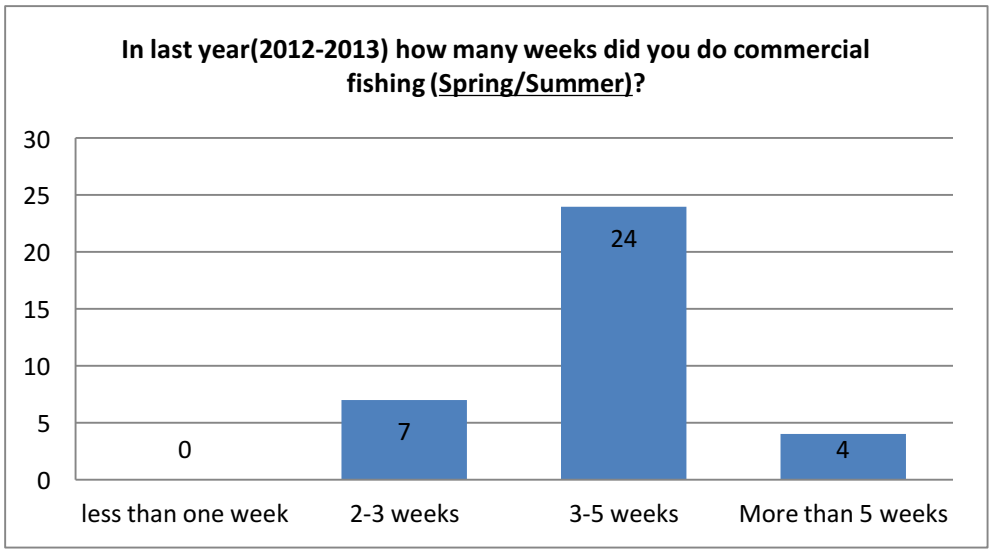
1. fish finder or echo sounder
2. compass
3. GPS
4. Radio
5. Other



16) In last year how many weeks did you do commercial fishing?

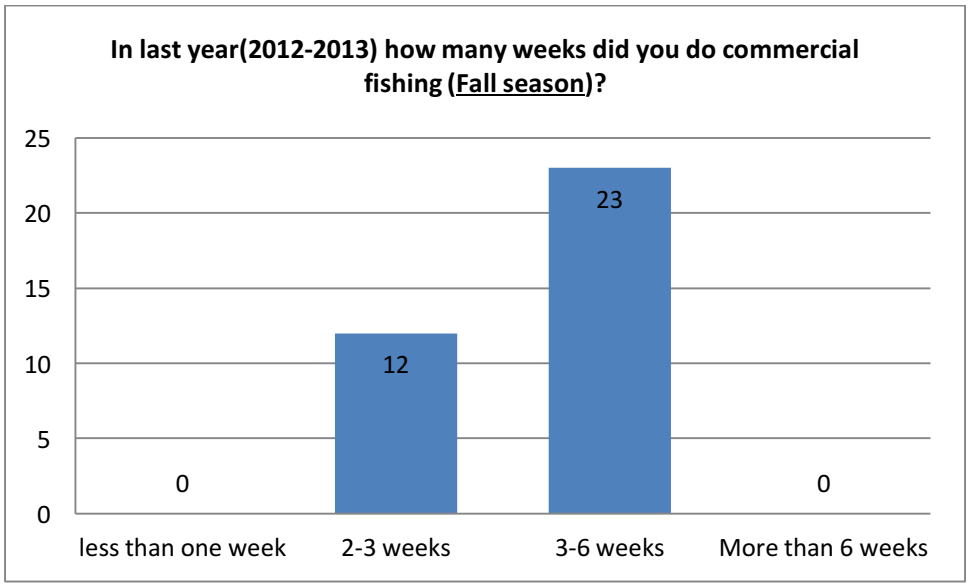
Spring/Summer season-

1. less than one week
2. 2-3 weeks
3. 3-5 weeks
4. More than 5 weeks



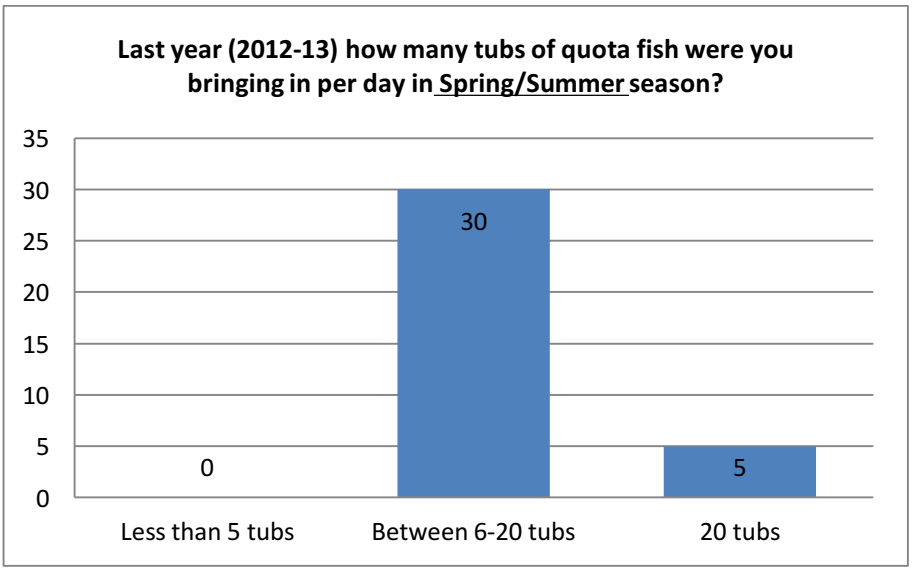
Fall season

1) less than one week
2) 2-3 weeks
3) 3-6 weeks
4) More than 6 weeks



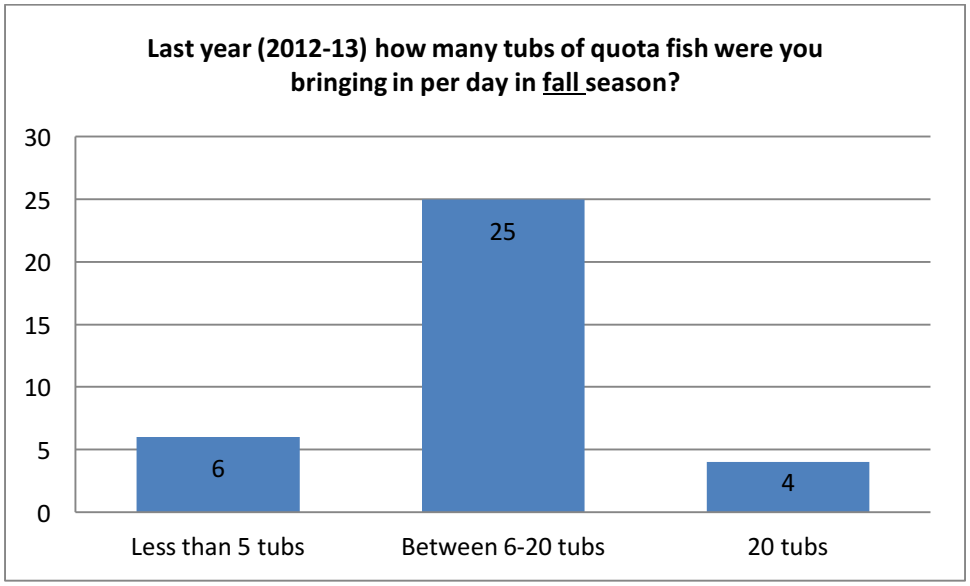
17) Last year how many tubs of Quota fish were you bringing in per day?
Spring/Summer:

1. Less than 5 tubs
2. Between 6-20 tubs
3. 20 tubs



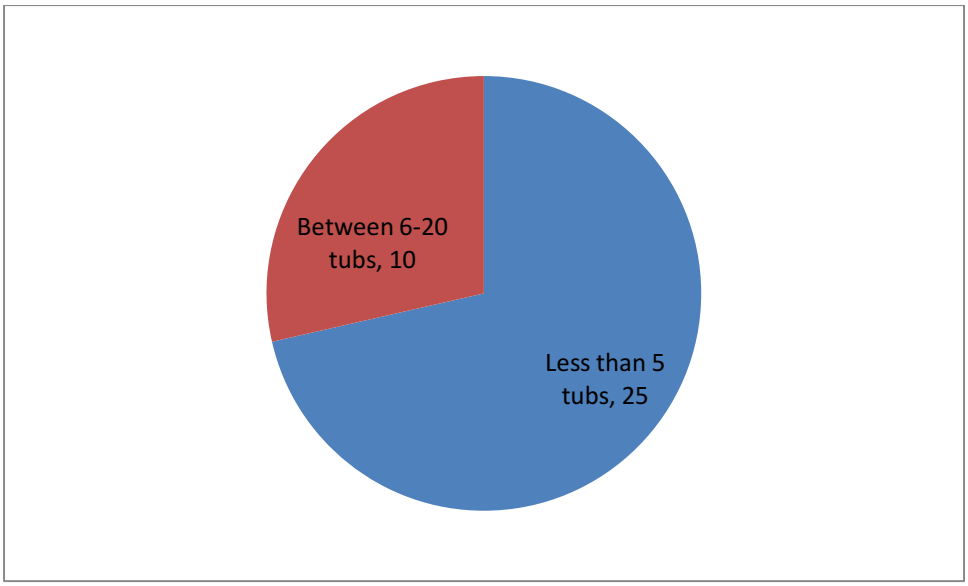
Fall:

1. Less than 5 tubs per day
2. Between 6-20 tubs
3. 20 tubs



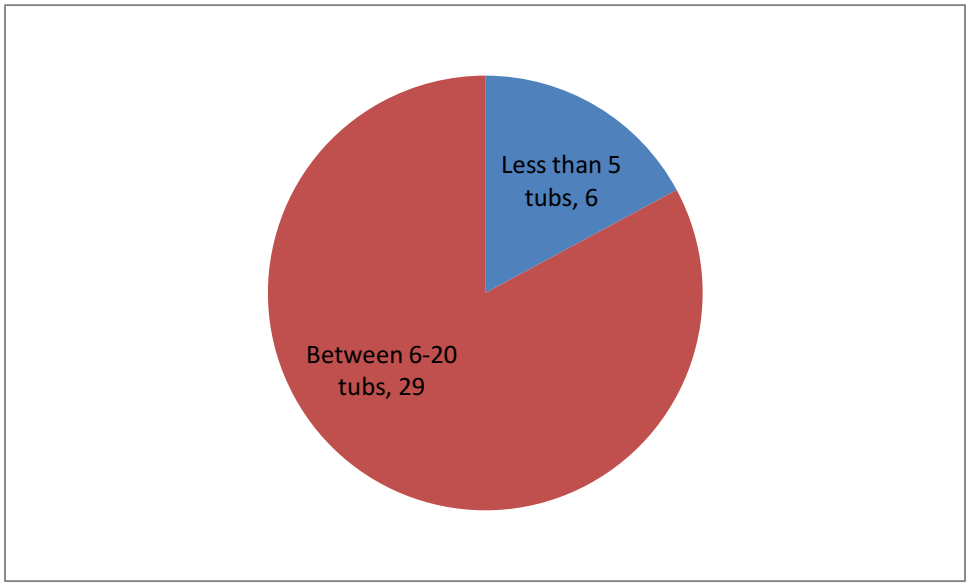
18) Last year how many tubs of non-quota fish were you bringing in per day?
Spring/Summer:

1. Less than 5 tubs
2. Between 6-20 tubs
3. 20 tubs
4. More than 20 tubs



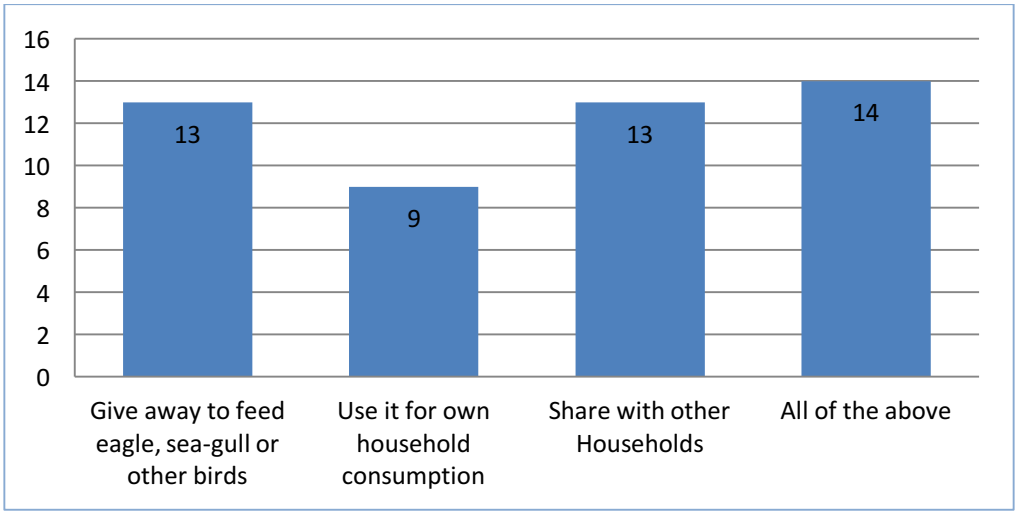
Fall:

1. Less than 5 tubs per day
2. Between 6-20 tubs
3. 20 tubs
4. More than 20 tubs



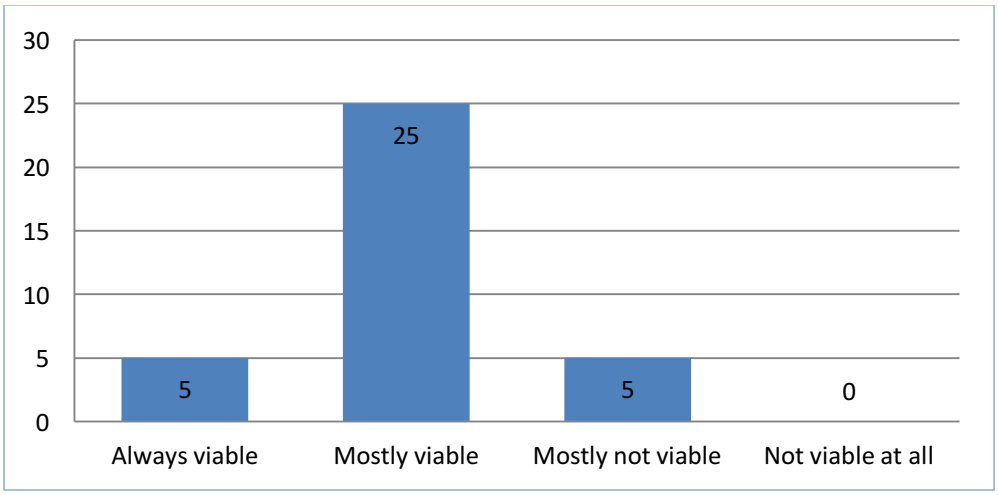
22) What do you do with the by-catch that you can't sell commercially?

1. Give away to feed eagle, sea-gull or other birds
2. Use it for own household consumption
3. Share with other Households
4. All of the above



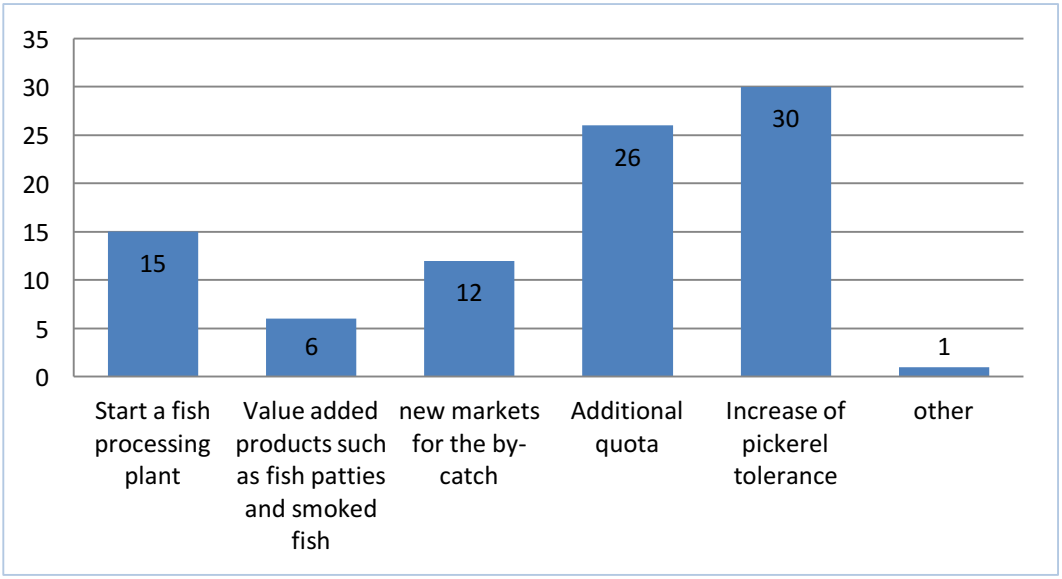
26) Is you commercial fishing livelihood economically viable?

1. Always viable
2. Mostly viable
3. Mostly not viable
4. Not viable at all



28) In your view, what are the priorities to improve commercial fishing at Norway House?

1. start a fish processing plant
2. value added products
3. new markets for the by-catch
4. Additional quota
5. Increase of pickerel tolerance
6. Other



29) Will you encourage your children to become commercial fisherman when they grow up?

1. Yes 2. No