

# SOCIO-ECONOMIC IMPLICATIONS OF INCREASING DEMAND FOR SUSTAINABLE SEAFOOD:

## POLE-AND-LINE'S ASSOCIATED BAIT FISHERIES IN INDONESIA

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## **Abstract**

There is an increasing demand for sustainable seafood products, including pole-and-line caught tuna. Expansion of pole-and-line activities however appears to be hampered by limited bait availability. While the pole-and-line's advantages of creating social and ecological benefits have been widely researched, limited information exists on the effect bait fisheries have on local bait supplying communities. In order to understand the socio-economic implications under increased pole-and-line production, this thesis uses the sustainable livelihood framework to map the conditions of beach seining fisheries in the North-Sulawesi, Indonesia. Based on the local conditions a SWOT analysis is made to identify the strengths and weaknesses of the beach seining communities, and the opportunities and threats they face regarding an increasing demand for pole-and-line tuna. The SWOT analysis combined with livelihood strategies revealed a skewed situation of communities only having one livelihood strategy that suits the challenges resulting from an increased market demand. This makes the communities highly vulnerable and hampers their ability to counter the threats, like exclusion from certification processes and closure of the bait fishery, which would eventually lead to a further reduced capacity to safeguard the future of their livelihood. An opportunity would be creating social structures through organisation and participation, but communities appear to lack capabilities to do so. This leaves beach seining communities deprived in terms of social inferiority, isolated in relation to the institutional processes and excluded from benefit sharing mechanisms. The results of this study raise questions on how global environmental sustainability standards are influencing local socio-economic conditions and whether striving for sustainable seafood products actually contributes to overall sustainability. Without proper institutions in place that allow for organisation and participation of beach seining fishermen, it is unlikely that the local impact of an increased market demand on the socio-economic conditions and the adaptive capacity of beach seining communities will be beneficial.

Keywords: socio-economic conditions, bait fishery, Indonesia, sustainable livelihoods, pole-and-line tuna, community, SWOT, sustainable livelihood framework, adaptive strategy

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## Abbreviations and acronyms

AP2HI	Asosiasi Perikanan Pole and Line dan Handline Indonesia
CPUE	Catch per unit effort
CA	Capability Approach
DFID	Department for International Development
EAF	Ecosystem Approach to Fisheries
EEZ	Exclusive Economic Zone
EIO	Eastern Indian Ocean
ES	Environmental Sustainability
EU	European Union
FAD	Fish aggregation device
FAO	Food and Agriculture Organization
FIP	Fishery Improvement Project
FMA	Fishery Management Area
IOTC	Indian Ocean Tuna Commission
IPNLF	International Pole and Line Foundation
ISSF	International Seafood Sustainability Foundation
MSC	Marine Stewardship Council
NGO	Non-Governmental Organisation
PIPs	Policy, Institutions and Processes
SFP	Sustainable Fisheries Partnership
SL	Sustainable Livelihoods
SMS	Samudra Mandiri Sentosa
SPC	Secretariat of the Pacific Community
SS	Social Sustainability
SSM	Sustainable Seafood Movement
SWA	Social Wellbeing Approach
SWOT	Strength, Weaknesses, Opportunities and Treats
UN	United Nations
UNDP	United Nations Development Program
WCPFC	Western Central Pacific Fishery Committee
WCPO	Western and Central Pacific Ocean
WUR	Wageningen University and Research centre
WWF	World Wildlife Fund



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## 1. Introduction

Tuna was once considered to be a low-value substitute for fish like salmon and sardines (WWF, 2014). Nowadays, it has become popular fish for consumption and is one of the most commercially valuable fish species in the world. Increased consumption has led to a total catch increase from 300,000 metric tons in the 1940s to over 4 million metric tons in the last few years (ISSF, 2009). Accounting for almost 60 percent of the global tuna catch (WCPFC, 2013), the Western and Central Pacific Ocean (WCPO) houses one of the largest tuna fisheries in the world. Most economies of Western and Central Pacific nations depend on the tuna industry for national income, as the sea makes up for the majority of total area for many nations (Barclay and Cartwright, 2006; Bailey, 1988). Identification of the socio-economic advantages and challenges of tuna fisheries and consequent activities are therefore of national interest to many, but vary between different regions and fishing methods.

The most commercially important tuna species are: yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), albacore tuna (*T. alalunga*), skipjack tuna (*Katsuwonus pelamis*) and bluefin tuna species (*T. spp.*). There are historically three principal methods of catching tuna: purse seine, longline and pole-and-line (Rawlinson et al., 1992). Purse seine vessels catch primarily skipjack and yellowfin tuna, targeting either free-swimming tuna schools or schools that are attracted to floating objects. These fish aggregating devices (FADs) can be man-made specifically for this purpose, or be natural objects, e.g. dead animals or drift wood. Longline tuna fisheries target tuna species that inhabit deeper waters, like albacore, bigeye and yellowfin tuna (ISSF, 2014a). The pole-and-line fishery catches predominantly skipjack and yellowfin tuna (ISSF, 2009; ISSF, 2014b). Until the 1960's, the world's tuna fleet comprised mostly of pole-and-line vessels. Nowadays, pole-and-line fishing accounts for roughly 10% of the global tuna production (ISSF, 2009; ISSF, 2014b). Japan, the Maldives and Indonesia constitute almost three quarter of the total pole-and-line tuna catch (IPNLF, 2012). Their main markets are Europe, the United States and Japan (Stone et al., 2009).

Pole-and-line vessels use live baitfish to attract the tuna, which get caught with a hooked line attached to a pole (ISSF, 2009). This fishing method thus comprises two linked fisheries: tuna fisheries and bait fisheries. The way the bait fish gets caught depends on the oceanic region, and varies from using simple stick-held dip nets to purse seine/ shrimp nets or lift nets. The bait is kept alive in anchored pens, to help the baitfish adapt to captivity as they need to stay alive on the pole-and-line vessel until needed (IPNLF, 2012). The most effective baitfish are small pelagic fish with a

size ranging between 4 - 12 cm that survive in captivity and remain near the surface when thrown in the water (IPNLF, 2012). The predominant species of baitfish are from the families *Engraulidae* (anchovies), *Clupidae* (herring, sprat and sardines) and *Caesoinidae* (fusiliers) (IPNLF, 2012). The amount of tuna caught is much greater than the amount of bait fish used. The estimate for the global tuna-baitfish ratio is 25.3 (IPNLF, 2012); For every unit of bait, 25.3 units of tuna are caught. The global requirement of baitfish for the pole-and-line industry is estimated to range from 19,000 to 48,000 tons per year which helped land approximately 242,958 tons of tuna in 2012 (IPNLF, 2012; WCPFC, 2013). Pole-and-line fishing is considered one of the most sustainable ways of catching tuna and has been praised for its positive impact on the ecological environment and its positive social impact (Stone et al., 2009; Gillet, 2011 b). The desirable ecological aspects of the fishery are low environmental impact and low level of by-catch (Stone et al., 2009; Gillet, 2011a). Social benefits are derived from the creation of local livelihoods as pole-and-line fisheries are labor intensive, providing both upstream and downstream benefits together with other associated employment opportunities (Stone et al., 2009).

The growing concern on widespread degradation of fisheries and marine environments, marine life and habitats together with a lack of or failing government action, has led to the emergence of the so-called sustainable seafood movement (SSM). The SSM<sup>1</sup> consists environmental organisations trying to conserve fisheries and marine environments by using market based approaches (Konefal, 2013; Roheim, 2009). The movement aims to restructure the food sector by creating market incentives for sustainable fisheries and aquaculture products (Konefal, 2013). To do this, the SSM uses a variety of strategies that are either supply driven like ecolabeling seafood products, or demand driven like boycotts, seafood guides, consumer education and collaboration with retailers and restaurants. Most of their attention nowadays is focussed on collaborating with retailers and the food service industry to make sourcing commitments to sustainable seafood products, who have become main drivers for increasing demand of sustainable seafood (Seaman, 2014; Stone et al., 2009). Considering the positive sustainability aspects of the pole-and-line fishery, the SSM has targeted their attention to pole-and-line tuna products. In practice this has meant MSC certification of Maldivian pole-and-line caught yellowfin and skipjack tuna in 2012, MSC assessments of other pole-and-line fisheries and Greenpeace pushing UK retailers to only sell pole-and-line tuna products (MSC, 2015; Hamilton et al., 2011; ISSF, 2006). Resulting from the actions of the SSM, the demand for pole-and-line tuna is

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<sup>1</sup> Konefal (2013) makes a distinction between the marine conservation movement and the SSM. He argues that the SSM is part of the marine conservation movement, but moves more autonomously as the SSM uses market-based approaches while more radical conservation organisations are not willing to use such methods.

expected to increase rapidly in Western countries with estimates of a 140, 200 and 400 percent increase by 2020 for Europe, the US and, Australia and New Zealand respectively (Seaman, 2014). Nevertheless, the global production of pole-and-line fisheries have remained fairly constant over the past decades, while their global market share has decreased (ISSF, 2009). In order to meet this growing market demand, pole-and-line productivity would have to increase on a global scale. Indonesia is one of the biggest exporters of canned pole-and-line tuna to the West, and it is expected that their market will respond to this increased demand.

## 1.1 Indonesian tuna market

Indonesia is the world's largest archipelago, comprising over 17,500 islands which span over a length of 5000 km (Williams, 2009; UNDP). The five main islands are (1) Sumatra, (2) Java, (3) Kalimantan, (4) Sulawesi and (5) Papua (UNDP), see Figure 1. The Indonesian Exclusive Economic Zone (EEZ) covers an area of 2,462,028 km<sup>2</sup>. The EEZs are located in the Western Central Pacific Ocean in the east and the Eastern Indian Ocean in the west. The ecosystems in the Indonesian waters are highly diverse, which has led to high productivity and biodiversity (Williams, 2009).

Indonesia is the biggest tuna landing nation in the world, contributing to almost 16 percent of the

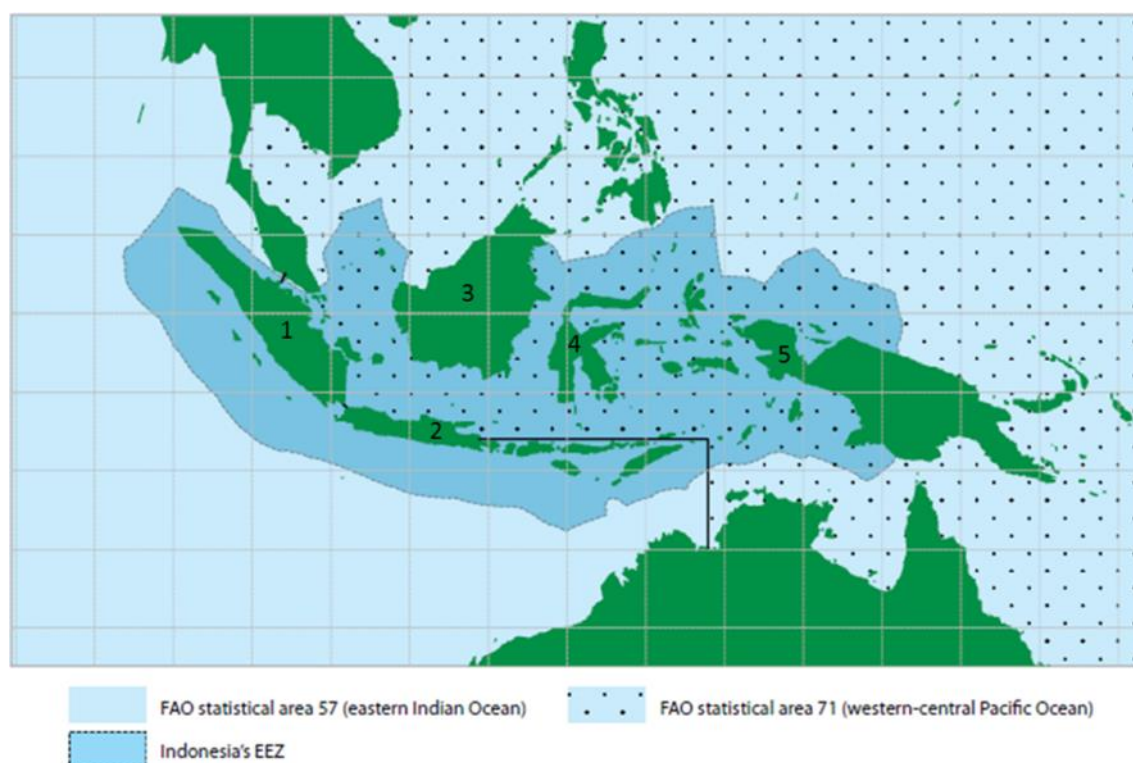


Figure 1. The Indonesian archipelago, showing the approximate 200-mile EEZ boundaries (darker blue). The dotted blue area is covered by the Western Central Pacific Fishery Commission Convention Area (FAO area 71). The blue area without dots is included in the Indian Ocean Tuna Commission Convention Area (FAO Area 57). Source: Williams, 2009.

total tuna production in 2012, followed by the Philippines (8,4%), Japan (8,1%) and Taiwan (6,4%) (FAO FIGIS, 2014). At least ten tuna species are caught in Indonesian waters (SFP, 2009). The composition of catches consist 60 percent skipjack, approximately 27 percent yellowfin tuna, 11 percent of bigeye tuna, 2 percent of albacore and < 1 percent of Southern bluefin tuna in 2012 (FAO FIGIS, 2014). The WCPO contributes around 80 percent of the Indonesian commercial tuna production, comprising 534,459 tons in 2012 (FAO FIGIS, 2014). The industrial tuna fisheries in the EEZ are mainly purse seine and pole-and-line, with vessels greater than 15 GT (SFP, 2009). The Eastern Indian Ocean (EIO) contributes for the other 20 percent, which was 131,918 tons in 2012; Most of the industrial tuna fishing operations in the EIO use longliners, with vessel usually below 200 tons (SFP, 2009). After it is landed in Indonesia, tuna is processed into fresh chilled tuna, frozen tuna and canned tuna (Figure 2). Fresh chilled and frozen tuna is primarily made from yellowfin, bluefin or bigeye. Canned tuna is made from yellowfin, albacore, skipjack and bigeye tuna. It is relatively common in the tuna industry to undertake all the processing stages up to tuna loining near the landing areas (SFP, 2010).

Tuna has been the second largest fishery export product in Indonesia, contributing around 15 percent of the total export value in 2011 (SFP, 2014). This export generated an approximate income of USD 498.6 million in 2010 (SFP, 2014), which has been an increase with respect to 2010 (Van Duin et. al., 2012). The main markets for Indonesian tuna are Japan, the US and the European Union. Japan and the US have been an important markets for fresh and frozen tuna products. Indonesia contributed 28 percent of the total fresh and frozen tuna import to Japan in 2007, which are used for sashimi; For the US, Indonesia contributed 36 percent of the total frozen tuna import (SPF, 2009). The US and the EU are an important market destination for Indonesian canned tuna products. In 2007 they purchased over 50 percent of the total Indonesian canned tuna export, which amounts to 25.3 tons of canned tuna (SFP, 2009). Besides export, a lot tuna and seafood is consumed or sold to the domestic market; around 75 to 85 percent of the national fish products (Indonesia Investment, 2014; WUR, 2013). The domestic consumption of seafood was estimated to be around 38 kilogram per person per year in 2014 (Indonesia Investment, 2014).

Indonesian tuna fisheries are managed at the regional level through the Western Central Pacific Fishery Commission (WCPFC) and the Indian Ocean Tuna Commission (IOTC). At a national level, Indonesia has divided its EEZ through the Ministerial Regulation in eleven fishery management areas (FMAs) in January, 2009 (Williams, 2009). Fishery management takes place on different governmental levels and districts, depending on location, type, size of the fishing operations and size of the vessels.

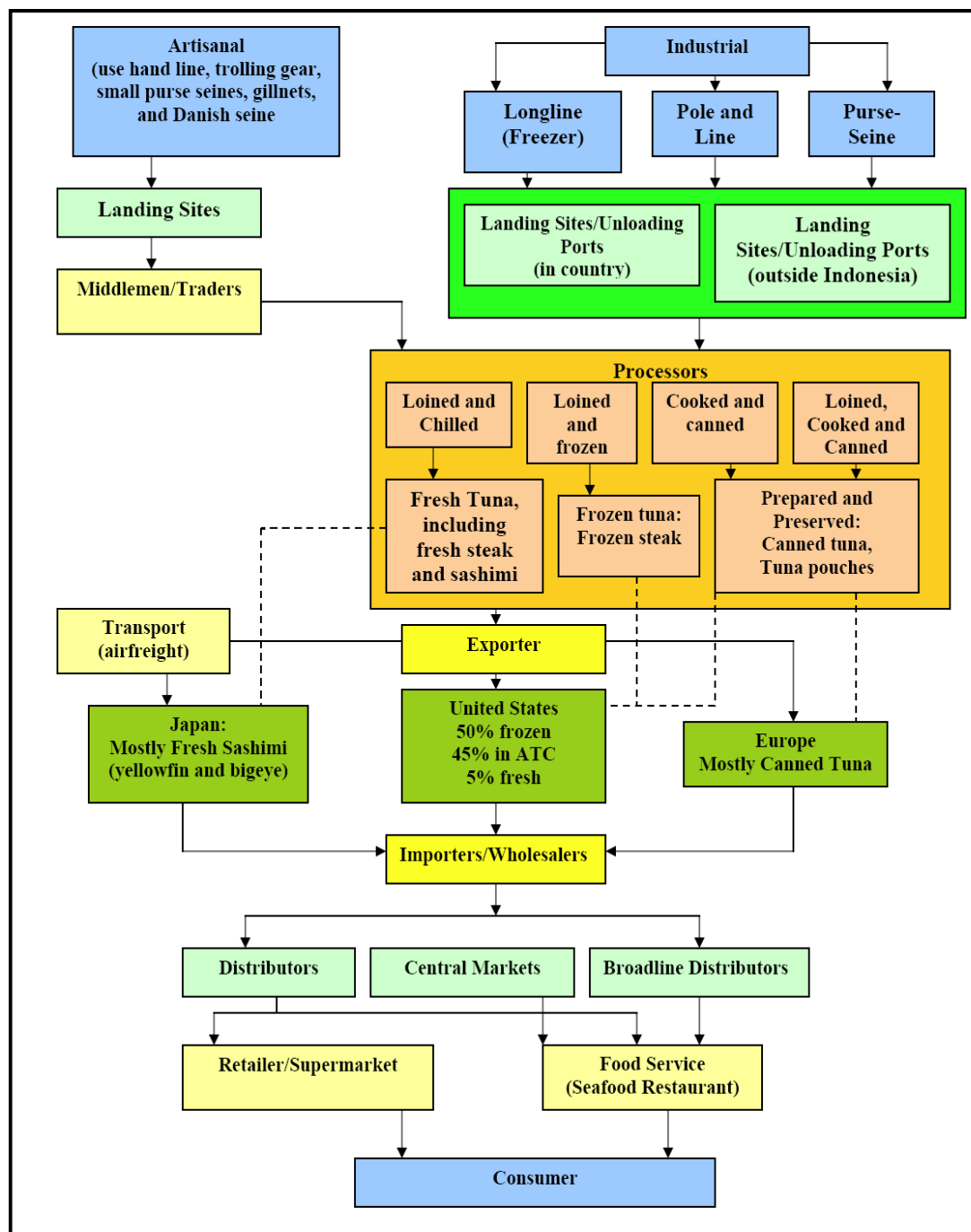


Figure 2. A global overview of the tuna supply chain in Indonesia. Source: SPC (2010).

### 1.1.1 Pole-and-line fisheries

Indonesian pole-and-line fisheries were developed by state led enterprises in Sorong, Bitung and Ambon in the 1970s (SFP, 2009). Pole-and-line vessels vary in size ranging from 10 GT to up to 30 GT. Smaller vessels use sails, supported by small engines (SFP, 2009). Pole-and-line fisheries mainly operate in the WCPO. The IPNLF (2012) estimated that there were around 232 pole-and-line vessels operating in Indonesia in 2007. This seems to comply with a more recent study performed by Gillet

(2014), who visited three sites in Indonesia and found around 161 – 181 vessels. However, not all of these vessels were active. Indonesia's pole-and-line fisheries contribute to 14 percent of the global pole-and-line tuna catch (IPNLF, 2012), amounting to 66,00 tons in 2007 (Miyake et al., 2010). However, there are very large ranges in the estimates of tuna catches (Gillet 2011b). Pole-and-line tuna is mainly used for canning, and is mostly used for domestic consumption (IPNLF, 2012; Gillet 2011b). The Indonesian pole-and-line fishery is one of the largest in the developing world, but due to adverse economic factors and technological advances vessels have been switching to yellowfin handline fishing and purse seine (Gillet, 2011b; SPC, 2010). This had led to decreasing pole-and-line productivity.

In 2012 the Indonesian pole-and-line fishery started with a MSC pre-assessment, which led to the establishment of a fishery improvement project (FIP) in 2013 that covers pole-and-line fisheries that catch yellowfin and skipjack tuna in the Indian and Pacific Ocean, as well as territorial waters (IPNLF, 2014d). A FIP offers a step-wise approach towards more sustainable fishery practices, for fisheries that do not meet the Marine Stewardship Council (MSC) certification criteria, such as environmental and traceability standards (IPNLF, 2014). Fishermen and fisheries engaged in a FIP get rewarded with market access, on the condition that they improve the sustainability of their practices. The main aims of the Indonesian pole-and-line FIP are: ensuring that tuna catches do not exceed sustainable levels, promoting ecosystem approach to fisheries management and strengthening governance systems in the Indonesia tuna fishery (Poseidon ARM Ltd, 2013). The ultimate goal for Indonesian pole-and-line tuna fisheries is to acquire MSC certification, just as the Maldivian pole-and-line fishery.

### **1.1.2 Bait fisheries**

In Indonesia the baitfish for the pole-and-line fishery is supplied by a separate artisanal fishery. These artisanal bait fisheries operate on a small scale and exist throughout the archipelago. The predominant bait species in the WCPO is anchovy (IPNLF, 2012). One of the ways to catch bait fish is by using lift nets (bagans) that deploy fixed or mobile platforms to catch and hold bait (IPNLF, 2012). In his recent study Gillet (2014) found around 180 bagans operational. Another way to catch bait is by beach seining (soma dompar), where a net is set around a lampboat near the beach. The bait fish are caught at night, using the lights from the lampboat to attract the fish.

After capture the fish are kept in anchored bait receivers, until they are sold to pole-and-line vessels. The bait is transferred with either a scoop net into a bucket or the bucket itself is used as a scoop. Rough handling of the bait fish, such as dry scooping or scooping with a bucket, leads high baitfish mortality which can be up to 20 to 30 percent (Gillet, 2014). Besides serving as bait for the pole-and-line industry, these fish are also a source of food. Fresh, canned and dried anchovy is consumed

domestically in Indonesia (Bailey et al., 2008). This has led to the concern on potential social impacts derived from bait fishing for the pole-and-line industry, like food-bait competition (Gillet, 2014), but sufficient evidence on this is lacking. However, most concerns on the bait fishing activities are ecological of nature and involve the diminishing catch per unit of effort (CPUE) over the past years, possible interaction with other reef fisheries, depletion of common stock, use of juvenile fish and by-catch (Gillet, 2014; IPNLF, 2012)

Despite these concerns there is no bait fishery management currently implemented in Indonesia (Gillet, 2014). This is likely due to difficulties such as baiting areas falling under the jurisdiction of several districts. Making these government entities aware of the need for a management plan, the benefits of it, together with having them cooperate with each other, would be a huge task (Gillet, 2014). Thereby Indonesia has little background in fishery management plans, not until last year's appointment of Ibu Susi Pudjiastuti as the new minister of Maritime Affairs and Fisheries.

## **1.2 Problem statement**

While Indonesian pole-and-line fisheries are in decline, the Western demand for pole-and-line tuna products under influence of the SSM is expected to increase considerably in the coming years. Meeting the increased demand for pole-and-line tuna products is at the moment hampered by limited pole-and-line activity. The availability of bait appears to be the main resource factor that limits pole-and-line expansion, given that the target species, skipjack, remains relatively healthy (Gillet, 2011b; Seaman, 2014). Bait fisheries have therefore received quite a lot of attention from an ecological perspective, in order to alleviate this restraint. In addition, research has also focused on finding alternative bait supplies, e.g. through milkfish culture, in order to reduce the resource dependency on baitfish. Both perspectives are focussed on increasing pole-and-line productivity, in order to secure the demand for sustainable seafood.

While the pole-and-line fishery is considered to be ecologically sustainable and provide social benefits, there has been limited research on the linked artisanal bait fisheries. Research mainly focusses on ecological aspects of the bait fishery, neglecting socio-economic aspects. It is therefore unclear how an increased demand in baitfish to be used for the pole-and-line industry will effect local socio-economic conditions. A possible effect that gets mentioned occasionally, is that there might be competition between baitfish and local food provision in the communities (Gillet, 2014; ISSF, 2009); Gillet (2014) even observes in his survey that baitfish consumption has increased in the last decades. If increasing pole-and-line activity results in competition for food availability, then this increased international demand for sustainable seafood may negatively impact the socio-economic conditions



at the community level. People in baiting communities might get deprived of food, by i) not being able to afford baitfish anymore due to price-competition between the pole-and-line vessels and the local market, or by ii) simply having an inadequate amount of baitfish to distribute. Thereby, satisfying market demand could easily lead to inequitable distribution of benefits, resulting in skewed relations within the communities as only some people might be benefitting, or some more than others. A similar scenario could evoke when the Western world is able to secure their demand for 'sustainable' tuna, leaving local communities bear the consequences.

Nonetheless, the growing Western demand could also result in having a beneficial impact on baiting communities. Increased pole-and-line activities could lead to more employment opportunities in fishing communities, thus positively influencing livelihoods and welfare. This way, the growing demand would contribute to ensuring improved livelihoods for local communities through generating employment options, whilst simultaneously meeting Western demands. If this is the case, then the increased demand for sustainable seafood could potentially create win-win situations throughout the value-chain.

Since it is unknown how the increased demand of pole-and-line products will affect the baiting communities, any actions on increasing pole-and-line productivity should be taken with careful consideration. Promotion of pole-and-line practices, or replacement of wild caught baitfish with cultured baitfish could hold serious implications for the adaptive capacity of these communities. Furthermore, these bait supplying communities are positioned upstream at the pole-and-line value chain, by supplying input material for the pole-and-line fishery. Any negative implications would undermine the sustainability values the pole-and-line branch and SSM aim to represent and could have serious consequences throughout pole-and-line value chain and market. Gaining a better understanding of the effects increased pole-and-line productivity on the socio-economic conditions of bait supplying communities is therefore crucially important. By assessing the local conditions of baiting communities and gaining a better understanding on how an international force like increased demand for sustainable seafood affects them, an attempt can be made to identify the socio-economic effects and key issues these communities are faced with under increasing market demand.

### **1.3 Research aim and questions**

This research aims to assess the local impact of an increased international demand for pole-and-line tuna on socio-economic conditions, by identifying the adaptive capacity of bait supplying communities in the vicinity of Bitung, North Sulawesi, Indonesia. The main research question of this paper is therefore:

*What socio-economic conditions do bait supplying communities in Indonesia face in the context of increasing demands for pole-and-line tuna?*

To answer the main research question, the socio-economic conditions of bait fisheries of local communities in the vicinity of Bitung, North Sulawesi are assessed. In order to determine the socio-economic conditions, the following sub-research questions were made:

Sub-research question 1: *What are the local conditions of the communities?*

Sub-research question 2: *In what way does the increased demand for sustainable seafood manifest itself in Indonesia with respect to these local communities?*

Sub-research question 3: *What are the current overall strengths and weaknesses of these local communities, and what opportunities and threats do they face regarding an increasing demand for pole-and-line tuna?*

## **1.4 Methods**

In order to answer the questions stated above, an approximate three month field study was performed November 2014 – February 2015 in and around the city of Bitung, situated in the North Sulawesi Province, Indonesia. Bitung harbours several fishing companies that own pole-and-line vessels, which operate for both domestic and export markets. The approximate number of active pole-and-line vessels in Bitung is between 40 – 60 vessels (Leadbitter, 2012). This location was chosen for its high level of pole-and-line and baiting activity in and around the area.

Pole-and-line fishermen were approached to help identify suitable baiting communities for the study. These fishermen were connected to the local canning company PT Samudra Mandiri Sentosa (SMS), which provided necessary information and assistance for finding baiting communities. PT SMS is a member of Asosiasi Perikanan Pole and Line dan Handline (AP2HI), a NGO that helps to promote pole-and-line and handline fisheries and align them with the international market. They were asked to identify communities that provide most of the bait to the pole-and-line operations in Bitung. However, it soon became clear that the bait was acquired by pole-and-line vessels through two types of fishing techniques, lift net (bagan) fishing and beach seining (soma dompar). Based on the pole-

and-line fishermen's information, information from a local PhD student<sup>2</sup> and taking the set objectives into account, it was decided to direct the focus on only beach seining fishermen. The main reason for this decision was that beach seining fishermen operated from a community basis, whilst bagan fishermen operated alone or in pairs for days or weeks on bagans that tended to be privately owned or by a particular company. The bagan fishermen thus did not seem to have a direct link to a particular community, while community conditions form an essential part of this study.



**Figure 3. Geographical location of the visited baiting communities. Kasawari 1. and 2. refer to the different beaches where the bait fishers operate. Kasawari 1. refers to Kasawari beach; Kasawari 2. refers to Kambahu beach.**

Based on the information provided by the pole-and-line fishermen, five communities were selected for further research. These communities were: Binuang, Kasawari, Pintu Kota Kecil, Mawali and Tandurusa (Figure 3).

Data were collected through qualitative interviews, focus group discussions and literature research. Qualitative interviews were chosen as they let the researcher guide conversations through asking questions (Warren, 2002). Emphasis lied on listening to the respondents answers and trying find meaning in their answers. Qualitative interviewing does not make participants passive conduits of information; as is often the case for survey interviews, since the answers are limited to a predetermined set of possible options. By giving them the option to interpret the question and answer in their own way, participants were viewed as 'meaning makers' (Warren, 2002). The purpose of qualitative interviewing was therefore to deduce interpretations from respondents answers.

An attempt was made to get an equal amount of male and female respondents for the community interviews. Men and women often play different roles in fisheries; Men usually perform the fishing activity itself, while the women play a supporting roles as e.g. preparing bait, processing the catch and/or selling the fish. The aim was to gain more insights and get multiple perspectives on what

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<sup>2</sup> Widhya Nugroho Satrioajie, PhD student on fisheries situated in Bitung.

happens at the community level and what the bait fishery provides to their livelihood by paying attention to the different gender roles. Within these communities 40 personal interviews with men and women connected to the bait fishery were conducted. Also, two focus group discussions for a group consisting solely men and solely women were held per community (Table 1). Visiting these communities gave the opportunity to assess the impact of bait fishing practices on the social and economic conditions. To cross-check the community respondents answers a few pole-and-line fishermen were also interviewed at the harbour.

**Table 1. Overview of interviews held per community.**

Community	Nr. male respondents personal interviews	Nr. female respondents personal interviews	Nr. males FGD	Nr. females FGG	Total nr. interviewees per community
Binuang	4	4	4	4	16
Kasawari	4	4	4	4	16
Pintu Kota Kecil	4	4	4 - 5 <sup>3</sup>	4	16 - 17
Mawali	4	4	4	4	16
Tandurusa	4	4	4	5	17
<i>Total nr. interviewees per group</i>	<i>20</i>	<i>20</i>	<i>20 - 21</i>	<i>21</i>	<i><b>81 - 82</b></i>

In order to identify how an increasing market demand might impact baitfishing communities, other relevant parties were interviewed. They could provide information on external events happening at different scales that might not be recognized by the community respondents, but could still impact community conditions. In total six external party interviews were conducted (Table 2).

**Table 2. List of external parties interviewed.**

Type	Name associated organization/company/etc:	Name respondent:
Canning company	Samudra Mandiri Sentosa	Abrizal Ang
Canning company	PT Sinar Purefoods	Ivonne Peleh
Processing company	PT Sari Usaha Mandiri	Boy (last name unknown)
Processing company	PT Sari Cakalang	Roberto Meremis
Fishery scientist	IPNLF	Dr. Tony Lewis
Sustainable seafood party	Masyarakat dan Perikani Indonesia	Momo Kochen

<sup>3</sup> The FGD started out with 4 respondents, but during the discussion another respondent joined in.

The interview questions were tailored to the different types of interviewees, which were people from the community and external parties. The questionnaires can be found in appendix 1. The questions were as such that they would provide:

- Insights in community conditions and functionings, with a focus on bait fishing impact on and contributions to their livelihood (communities).
- General observations on pole-and-line fishery (community and external parties)
- Identification of relevant processes, economic, ecological and social (community and external parties)

Bahasa Indonesia was the spoken language in the communities, which made an interpreter essential. For the total of three month field research, three interpreters were hired. The first two weeks of personal community interviews were conducted with one interpreter, but as she couldn't stay longer than two weeks, another interpreter was found for the remaining weeks for personal community interviews and focus group discussions. To keep the focus group discussion organized, an additional interpreter was required, who could lead the conversation whilst the other interpreter could translate the discussion. However, due to the limited available time, some focus group discussions were only done with one interpreter. The external party interviews were conducted in English, except for PT Usaha Mandiri which was interviewed incidentally while interviewing pole-and-line fishermen in the harbour.

Additional data on the institutional settings of Indonesian fishery management and other relevant institutions on both national and regional scale were assessed through literature review and news items. Literature review disclosed important external forces that remained unmentioned, and supplied complementary information on issues raised by interviewees. News items provided updates on the developments of the new policies that were put in place under the new fishery moratorium, which is described later on.

The interview data were analysed by using the sustainable livelihoods (SL) framework as a tool to identify the socio-economic conditions of the baiting communities around the area of Bitung. The SL framework helped with analysing and structuring the data by focussing on the five domains of the SL framework in order to assess local conditions. Based on this information it was possible to get an impression of their current socio-economic situation and be able to place this in the context of the growing demand for pole-and-line tuna. In order to identify future issues and threats regarding this increased market demand, a SWOT analysis was made. The acronym SWOT stands for Strengths,

Weaknesses, Opportunities and Threats. The SWOT analysis is a tool used to categorize the environmental factors influencing an organization or business (Pickton and Wright, 1998). Stacey (1993) describes the SWOT analysis as “a list of an organization's strengths and weaknesses as indicated by an analysis of its resources and capabilities, plus a list of the threats and opportunities that an analysis of its environment identifies.” (p.52). The tool is highly commended due to its simplicity and focusing attention on key issues, which are then used for strategic planning. Though, when a SWOT analysis is adopted too simplistically it can lead to damaging consequences, like strategic errors; This can be overcome by more detailed analysis, highlighting significance and using complementary frameworks (Pickton and Wright, 1998). Even though it is often used in a business or marketing setting, it has also been applied in other fields of research and contexts. The SWOT analysis provided the insights in the communities current strengths and weaknesses which were based on the different assets of the sustainable livelihood framework and its relation to the external forces. The opportunities and threats concern the advantages and challenges these communities are facing now and in the future in the light of the growing demand for pole-and-line tuna.

### **1.5 Funding**

This research was generously funded by the International Pole and Line Foundation (IPNFL). The IPNFL is a non-profit organisation based in London, UK. They are an international charity, working worldwide across science, policy and the seafood sector, in order to engage the market in and to develop pole-and-line fisheries (IPNFL, 2014ab). They use market influences to develop and demonstrate the value of pole-and-line caught tuna to the coastal fisheries, and to the people and the oceans they connected (IPNFL, 2014b). The organisation's mission is “to develop socially and environmentally responsible pole and line fisheries (to develop supply) and demonstrate their value for coastal communities (to drive demand)” (IPNFL, 2014c). Interested in the outcomes of this research, the IPNFL made a EUR 6175,- budget available to perform and cover the research costs.

### **1.6 Thesis outline**

The outline of this thesis is as follows: The first chapter has sketched the situation and questions that have led to this research, and the method of data collection and processing. The second chapter describes the analytical framework used to answer the research question. This chapter explains the theoretical model and fundamental concepts of SL used to assess community conditions. The third chapter describes the community conditions, by reporting on the commonalities and differences in livelihood assets. The fourth chapter characterizes the external forces that impact community conditions, by outlining the main forces derived from the increased demand for sustainable seafood and other secondary forces these communities are dealing with. The fifth chapter provides a SWOT analysis for North Sulawesi region, based on the earlier assessed communities conditions in

combination with the external forces, and a description of the livelihood strategies the communities have adopted. Thereby, a link is made on how internal conditions and strategies of these communities are matching up to the external trends. The fifth chapter evaluates the local impact of these external forces on socio-economic conditions and the adaptive capacity of these communities. In addition, it discusses the limitations of the theoretical framework encountered in this study and provides alternative frameworks also suited to analyse community conditions. The final chapter concludes this study by answering to the main research question and offering recommendations for further research.

## **2. Theoretical framework of sustainable livelihoods**

The theoretical concept of sustainable livelihood (SL) is used as the analytical basis for assessing and evaluating the beach seining communities' conditions and the impact of increased market demand. Increasing attention has been given to livelihoods in both research and policy. This increase follows from a wide recognition that certain rural or urban households rely on a single income generating activity; being especially the case for poor households in developing countries (Rakodi, 2002). The theoretical concept of sustainable livelihoods (SL) originates from the Brundtland Commission on Environment and Development in 1987. The idea behind this concept was to link socio-economic and environmental concerns to create a coherent structure which would be relevant for policy making (Krantz, 2001). The concept expanded in 1992 under the United Nations Conference on Environment and Development, becoming "an integrating factor that allows policies to address development, sustainable resource management, and poverty eradication simultaneously" (UNPD, 1997 in Krantz, 2001, p.6). Sustainable livelihoods has become a central concept to the debate of rural development, poverty reduction and environmental management (Scoones, 1998). SL goes beyond the conventional definitions and approaches to reduce poverty, by integrating vital aspects such as vulnerability and social exclusion (Krantz, 2001). The identification of processes that hamper people's ability to survive greatly benefits efforts to improve livelihood conditions.

Over the recent years many definitions have emerged on what constitutes a sustainable livelihood. Krantz (2001, p.1) provides the following definition of SL by quoting Scoones, who as part of the Institute for Development Studies (IDS) gave the definition of SL: "A livelihood comprises the capabilities, assets (including both material and social resources and activities) required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base." Carney (1998) follows with a very similar definition, as she considers a livelihood to be sustainable "when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets now and in the future, while not undermining the natural resource base" (p.4). A livelihood can be analysed on different hierarchical levels, but the most commonly used livelihood level is the household level (Chambers and Conway, 1992).

### **2.1 Theoretical model**

The theoretical framework of sustainable livelihood derives its value from capturing key components and their relationships which can be used for identifying potential issues and appropriate points of intervention (Rakodi, 2002). The theoretical model of the framework serves as a tool to define the scope and to provide a basis for analysis, through enabling identification of main factors affecting the



livelihoods and the relationships between them (Carney, 1998). Such information supports the livelihoods of people by helping them understand and manage the complexities that they are faced with. Thereby, this information could also serve as a reference for other efforts trying to support livelihoods in different contexts (Rakodi, 2002).

There are many graphical presentations of the SL model that try to capture the main components of a livelihood and its relationships. For this research the graphical representation of Allison and Horemans (2006) is used (Figure 4), who adopted their framework from the UK Department for International Development (DFID). This graphical representation derives its strength from capturing the dynamic and complex interrelationships between the different components, without affecting comprehensibility of the figure. The framework consists of five components, each of which are discussed below.

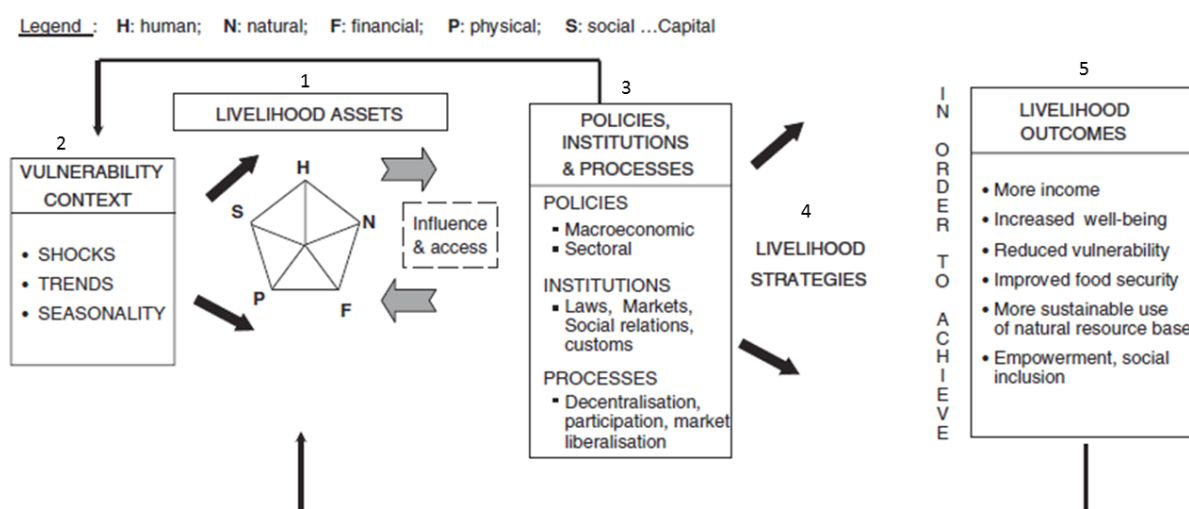


Figure 4. Theoretical model of sustainable livelihoods, adopted from Allison and Horemans (2006).

## 1. Livelihood assets

Livelihood assets are based at the centre of the framework. Fundamental to the livelihood approach is thinking in terms of strengths or assets, thereby focussing on what poor people have rather than what they do not have (Moser, 1998; Rakodi, 2002). Assets constitute the properties or commodities a particular livelihood either owns, controls, claims or that can be accessed by the household by some other means and can be material or immaterial. The livelihood assets can be grouped in five categories; also shown in figure 4. These are: physical, financial, natural, human and social assets (Allison and Horemans, 2006; Serrat, 2008).

- The *physical capital* constitutes tangible assets; e.g. a house, a car, and on a higher hierarchical level access to infrastructure such as roads, schools, health clinics etc..
- The *financial capital* comprises the financial resources of a household; e.g. a household savings, their credits, debits, insurance.
- The *natural capital* consists of the claims a household can make natural resources; e.g. land, water, open access fish stocks, leased or accessed by licence land or sea, owned land, cultivated crops.
- The *human capital* refers to people abilities and capabilities, both the quantity and quality of labour resources that are available to a household. This capital is important as it enables to engage in income-earning activities (Rakodi, 2002; Carney, 1998); e.g. having good health, ability to perform labour, the level of education, knowledge and skills. The lack of having human capital affects a household's ability to secure a livelihood (Rakodi, 2002).
- The *social capital* focusses on the different kind of relationship networks. It entails rules, norms, obligations, reciprocity and trust embedded in these relationship networks, enabling a household members to meet their objectives (Narayan, 1997). Grafton (2005) states "Unlike reproducible, human or natural capital, social capital can only exist at a group or community level. Social capital is also unique in that it resembles what may be called a local and impure public good." (p.133). Social resources a household is involved in; e.g. family relations, implicit or explicit membership of associations and/or organisations either part of a community or political network.

## 2. Vulnerability context

Capital assets are subjected to external forces; these external forces are referred to as the vulnerability context. These forces characterized as not being under a community's control, as they cannot be influenced through community actions. They consist of trends, shocks and seasonality, on which households have no control. Trends include e.g. rising food prices, economic depression, market demand and rise of unemployment. Shocks include storm damage, job dismissal, illness and a sudden death of household member. Seasonality implies that external forces are recurring on a seasonal basis e.g. rain seasons, drought, hurricane seasons. For some forces it is clear that they are not affected or controlled by community actions, like seasonality. For others, it more difficult to appoint them as 'uncontrollable', as

they are linked to livelihood activities and assets. Understanding people's (in)ability to survive under these external conditions can assist in strengthening people's adaptive strategies.

### **3. Policy, institutions and processes (PIPs)**

Access to assets and activities are also enabled or hindered by policies and institutional context of a livelihood. PIPs are found in the centre of Allison and Horemans (2006) frame. They state that "It is policy and institutions that determine access to assets, set the vulnerability context and determine people's livelihood options, reactions and strategies (...)" (p. 764). This makes the PIPs essential factors to understand people's livelihood. It provides information on how livelihoods are affected by market forces through managerial and institutional processes, and helps to explain adaptive strategies. Institutions that influence livelihoods can have both a public or private nature. The processes influence how organisations and individuals interact with each other on a formal and informal basis and include e.g. policies, laws and social norms (Rakodi, 2002).

### **4. Livelihood strategies**

The livelihood strategies are the activities a household is able to undertake in order to achieve their livelihood goals. The ability to choose for a particular strategy is based on a household's assets and how these are affected by the vulnerability context and the PIPs. The choice for a particular strategy is dependent on whether it meets the needs of a household. Due to various external influences needs are ever changing and choosing a strategy comprises a dynamic process (IDS, 2014). The livelihoods approach recognizes the seasonal and cyclical complexities of livelihood strategies.

### **5. Livelihood outcomes**

The livelihood outcomes are the result of the chosen livelihood strategies. If the outcome is positive, their livelihood is sustainable and can maintain and/or improve their standard of living. If the outcome is unsustainable, their standard of living and adaptive capacity decreases.

## 2.2 Fundamental concepts

Chamber and Conway (1992) and Rakodi (2002) identified the concepts of *capability*, *equity*, *ecological* and *social sustainability*, *poverty* and *deprivation* being central to the notion of SL<sup>4</sup>. These concepts can be found in the different components of the theoretical model of SL. Due to the dynamic nature of the SL model, the concepts form both a means (in terms of livelihood conditions) as well as an end (in terms of livelihood outcomes) and tend to be interlinked to each other. While the SL model does not offer a definition for the concepts, it does provide a framework in which livelihood conditions and outcomes can be conceptualized and evaluated using these notions. This section therefore, tries to provide a definition for the concepts which will be used later on to evaluate the local impact of international market demand on socio-economic conditions. Since these concepts are backed by a substantial body of literature, an attempt is made to provide a brief synopsis of the most important aspects for each concept.

### **Capability**

The term capability was introduced by Sen (Sen, 1980; 1985; 1999), providing an alternative for the dominant economic frameworks to address poverty, inequality and development. The foundations of the concept came from critiques on traditional welfare economics, that generalized wellbeing to be only dependent on fortune and utility (Crocker, 1992). An important notion of capability according to Sen (1993) is functioning, which represents parts of the state of a person. Functionings entail the various things a person is able to do or be in life. Functionings are based on commodities, but the relationship is not linear; one can't have functionings without commodities, but having commodities does not necessarily result in having functionings. Functionings can be either elementary and straightforward, e.g. being well-nourished or healthy, or complex, e.g. achieving self-respect integration in social structures (Sen, 1993). A person's capability refers to the set of combinations of functions a person is able to achieve, and from which a person can choose a collection (Sen, 1993). Some functionings are more valued than others, depending on the individual person. The quality of a person's life can be assessed on whether that person is capable to achieve their valued functionings. Ballet et al. (2003) extended the notion of capability to cover not only individuals, but also societies. The different capability structures express the extent to which an individual or society is able to adapt to certain constraints. A change in this structure might reduce the resilience of individuals or society by making them more vulnerable. Thereby, Ballet et al. (2003) makes a distinction between the vulnerability of an individual or society and the fragility of their capability. The vulnerability of an

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<sup>4</sup> Subjected to unintended and implicit favouritism, the chosen concepts should by no means be interpreted as the only fundamental concepts for sustainable livelihoods; e.g. Rakodi (2002) also mentions 'wellbeing' as an important concept, yet as this is linked to a whole other framework it would be too extensive for this research to describe as well. Wellbeing is therefore addressed through intermediary concepts such as capability and poverty.

individual or society is determined by the entire set of functionings and capabilities. Combining these functionings and capabilities improves resistance to risks. The fragility of a capability refers to the characteristics of a particular capability, and whether this capability is in itself resilient.

### **Equity**

The concept of equity contains a lot of ambiguities and difficulties, which according to Pazner and Schmeidler (1974) makes it impossible to define. The equity theory has been widely discussed in economic literature. An appropriate criterion for equity seems to be fairness (Pazner and Schmeidler, 1974). Varian (1973) illustrates the issue of equity and fairness with an example (Textbox 1.) Let's explain this example with fewer economic terms: Two people get a fixed amount of goods divided between them. If person j gets what person i wants, person i will envy person j. This makes this specific division of goods unequitable. If a particular division of goods does not make one of the two people envious of each other, then we can say that the division is equitable. If both persons are

#### **Textbox 1. Example of equity by Varian (1973)**

"Consider the problem of dividing a fixed amount of goods among a fixed number of agents. If, in a given allocation, agent i prefers the bundle of agent j to his own, we will say i envies j. If there are no envious agents at allocation x, we will say x is equitable. If x is both pareto efficient and equitable, we will say x is fair." (Varian, 1973 p. 63)

getting exactly what they want, and neither are worse off or jealous of each other, then this division is called fair; according to Varian (1973). The difficulty with this example however, is that the words of 'equitable' and 'fair' seem to have different meanings. This is not always the case with other definitions, where the terms are used interchangeably. Other authors that state that

distribution of goods is fair (equitable) if an individual in society does not prefer the goods that are allocated to somebody else over the goods that are given to him (Dubins and Spanier, 1961; Foley, 1976; Sen, 1970). Based on both views, equity thus seems to depend on a person's own notions of distributive justice. This is also raised by Varian (1976), who believes that a person's notion of equity depends on symmetry. Other people's situation should be just as good or bad as their own. But the measure of symmetry is internal, depending on taste and values of the person involved (Varian, 1976); this makes the concept highly subjective. Thereby, based on this notion of symmetry, equity can also be seen as a relational concept; What is fair and equitable depends on comparison with something else. The policy term of equity refers to the distribution of welfare goods and life chances on the basis of fairness. Equitable distributions means that all citizens should have an equal opportunity to both survive and fulfil their potentials (Murphy, 2012). According to Chambers and Conway (1992) the notion of equity can also be used in much broader terms than just allocation of goods or income; Equity in terms of sustainable livelihoods can imply the equal distribution of assets,

capabilities, opportunities, but could also imply ending discrimination against women, minorities and/or the weak.

### ***Ecological and social sustainability***

The notion of sustainability has many meanings and interpretations (Lele, 1991), with different definitions for economic, ecological and social sustainability. In the context of sustainable livelihoods however, there is a strong focus on ecological and social sustainability, so for this study these two components are also prioritized.

*Ecological sustainability* (ES) refers to the maintenance of the natural environment. The natural environment consists of natural assets that together provide a life support system. Goodland (1995) states that ecological sustainability therefore means to sustain life-support systems without end. The life-support system of the surrounding environment can be divided in material sources and sink capacities. Material sources refer to food provision, clean air, energy etc., which can either be renewable or non-renewable. The sink capacities concern the ability of an ecosystem to assimilate outputs such as waste and pollution (Goodman, 1995). These sources and capacities are also known as environmental goods and services. A crucial aspect of this definition of ES is that it obeys biophysical laws, making it also a natural science concept (Goodman, 1995). This makes the definition applicable in a wide range of areas and contexts. Ecological sustainability is needed to secure social sustainability; As social sustainability is, among other things, dependent on ES for natural resources. When the aim is to reduce poverty, it should be taken into account that the finite amount of resources puts a strain on human progress and development. According to Goodland (1995) poverty reduction should therefore come from qualitative development, redistribution and sharing of assets, population stability, and community association rather than from throughput growth. It is important to note that ecological sustainability is a man-made concept and has a anthropocentric approach. The reason why ES is aspired, is mainly to uphold the needs of human life. David and Leach (1991) separate ES in the light of livelihoods in two levels, the local and global level. The local level focusses on the impact on the local natural resource base. The impact can be both positive or negative, influencing future livelihood activities. The global level concentrates on the net positive or negative contribution to long-term ecological sustainability of livelihoods across the globe. Chamber and Conway (1992) also add preservation of intangible assets to ES, instead of just preserving tangible assets. They would consider a livelihood environmentally unsustainable when it has a net negative effect on claims and access needed by other people. This can be related back to the concepts of capability and equity, as ecological unsustainability could influence a person's capability and endorse inequality.

The *social dimension of sustainability* often receives less attention than environmental or economic sustainability (Cuthill, 2009; Vavik and Keitsch, 2010). Just as is equity, social sustainability (SS) is a contested concept. The definition of 'social' has not been determined, and seems to depend on underlying frameworks (Lehtonen, 2004). This makes it difficult to provide an accepted definition. The social dimension appears to consist of both objective and subjective conditions, together with a combination of material and immaterial aspects. According to Lehtonen (2004) the social dimension is reflexive, as perceptions of objective social conditions influence the behaviour of individuals and social collectives; thus impacting the objective conditions and its immaterial. Empacher (2002) continues this line of thought by arguing that concrete material circumstances lie at the heart of social sustainability; social phenomena are immaterial and subjective making them difficult to grasp. Another aspect of the social dimension of sustainability, is that it is dynamic and changes over time (Dempsey et al., 2011); timescales could range from decades to years and even to days due to the subjective and immaterial nature of social experiences. The social dimension of sustainability is embedded in both the environmental and economic dimensions (Lehtonen, 2004). This makes SS both dependent and independent, making it difficult to identify purely social issues.

The notion of social cohesion is thought to be central to the concept of SS (Goodland, 2002; Chan and Lee, 2008; Cuthill, 2009; Dempsey et al., 2011). Social cohesion is an ill-defined concept. Dempsey et al. (2011) link social cohesion to the notion of 'sustainability of communities' and outline five interrelated dimensions: (i) social networks in the community, (ii) participation in collective groups and networks in the community, (iii) community stability, (iv) sense of place, and (v) safety and security. According to Murphey (2012) social cohesion in policy terms is therefore focussed on establishing opportunities that promote coexistence and/or to stop civic strife. Lehtonen (2004) provides two other concepts linked to the social dimension of sustainability: capability and social capital. The capability approach puts emphasis on the improvement of social conditions. According to Lehtonen (2004, p. 203) Ballet et al.'s (2003) social sustainability "guarantees for both present and future generations an improvement of the capabilities of well-being (social, economic or environmental) for all, through the aspiration of equity on the one hand— as intra-generational distribution of these capabilities— and their transmission across generations on the other hand". 'Social capital' generally refers to networks of social relations with both horizontal or vertical associations. In the context of livelihoods, Chambers and Conway (1992) define social sustainability as "the ability to maintain and improve livelihoods while maintaining or enhancing the local and global assets and capabilities on which livelihoods depend." (p.5).

## **Poverty**

The concept of poverty can be directly or indirectly defined and both contribute to lack of essential material wellbeing. This is also brought forward by Watts (1968), whose economic definition of poverty is "a property of the individual's situation, rather than a characteristic of the individual or of his pattern of behaviour" (p. 321). This definition focusses on the measurement of command over resources, and does not attach welfare levels to resources as these are subjected to a person's taste (Goedhart et al., 1977). Poverty research tends to focus on two research questions: who are the poor, and what is an overall indicator of the characteristic of the poor (Bourguignon and Chakravarty, 2003)? The poor are usually identified by setting a minimum amount of income that is adequate for or adapted to a certain country or setting, the poverty line; if income falls below this set amount, a person is considered poor. This is usually referred to as 'extreme poverty'. Poverty lines are dependent on country's gross domestic product (GDP) per capita, and can therefore be seen as a relative measurement (i.e., what is considered poverty in country A may differ from poverty in country B).

Beside extreme there is also 'absolute poverty'. Absolute poverty defined by the UN is a condition that is characterized by severe deprivation of basic human needs, e.g. food, drinking water, health, education etc.. This type of poverty depends not only on income but also on access to services (UN, 1995); Being at this deposition for a long period of time threatens life and causes harm. The UN definition of absolute poverty touches upon the idea that poverty is not only dependent on the level of income and material aspects, therefor hinting at the multi-dimensionality of the concept. Poverty can therefore also be defined as lack of opportunities and choices that are essential to human life. This is substantiated by Bourguignon and Chakravarty (2003), who argue that poverty and wellbeing depend on both monetary and non-monetary variables. The authors argue that income alone as an poverty indicator is inadequate, and rather that a genuine measure of poverty depends income as well as non-income indicators which identify aspects of welfare that cannot be captured by income alone (Bourguignon and Chakravarty, 2003). Sen (1985) substantiates this idea by stating that poverty should be seen in terms of capabilities, rather than commodities. A person would then be considered poor when he is not capable perform the functionings he deems valuable.

## **Deprivation**

Very closely linked to poverty is the concept of deprivation; in literature they are sometimes used interchangeably. Deprivation is a conceptual device that deals with poverty and disadvantage. Central to the concept is the inability to have or do something (Perez-Mayo, 2003); According to Woodward (1996) deprivation is a normative construct, created through discourse and debate



usually originating from policy issues. Deprived and poor people are often seen as uniform groups based on objective and monolithic criteria, as this is easier for welfare policy to quantify deprivation. However, Woodland and Chambers identify consequences that come with this approach. Just as poverty, deprivation is multidimensional and subjective, making it difficult to quantify (Woodward, 1996; Chambers, 1995); According to Haan (1998) Townsend (1973) has been a protagonist on this new concept of 'relative deprivation'. He claims that Townsend criticised the use of basic needs, minimum consumption and absolute deprivation. A poverty or deprivation line cannot be set as an absolute and independent minimum, but should depend on a countries living conditions. A monolithic or absolute approach to deprivation tends to focus only on material conditions, which means that a range of experimental and subjective conditions may be excluded (Woodward, 1996). Following this line of thought, Woodward points at the problem of inclusion and exclusion of social groups; who decides who's in or out, based on what criteria? She states "'Deprivation' may be experienced in a variety of ways by a variety of people'" (p. 58). By having a set list of criteria, other people may be excluded as their problem is unique, while it does contribute to deprivation. Thereby, some groups dismiss the notion of deprivation. They don't like to be identified as deprived as they might find the term and the criteria belittling. Chambers (1995) adds to this that deprived people don't always consider themselves as deprived, considering they might value a whole different set of criteria. Policy measures to alleviate deprivation might therefor not coincide with what is experienced as needed.

Chambers (1995) has tried to identify multiple dimensions of deprivation that poor people may experience. Disadvantages and deprivation can take many forms. He notes that any list of dimensions is personal and transitional. The three dimensions he found central to the concept of deprivation are: (i) poverty, (ii) social inferiority and (iii) isolation. Poverty here refers to lack of physical necessities, but can include more than just being income poor; just as described in the section above. Social inferiority ascribes to being genetically inferior or lower in terms of class, which could be based on race, gender, ethnic group, profession, etc.. Isolation focusses on being peripheral and cut off, either geographical or social. Chambers (1995) continues to name five other dimensions, but only three will be discussed here as they might be relevant for the fishing communities: (iv) physical weakness, (v) vulnerability and (vi) seasonality. Physical strength is a major resource for people that are reliant on their body strength to be able to work. Physical weakness, sickness or disability are therefore seen as bad, for the individuals themselves but also for the effect it has on others. Vulnerability refers to exposure and defencelessness against particular shocks and processes. Vulnerability has two sides, the external side of exposure to shocks and the internal side of not being able to cope with those shocks, their defencelessness. The impact of shocks can take many forms, like being physically

weaker, socially dependent etc.. Last is seasonality, which ascribes the seasonal dimensions of deprivation, depending on weather and other external conditions.

### **2.3 Applications in fishery research**

The sustainable livelihoods approach has been prominent in development programmes aimed at reducing poverty and vulnerability in small-scale fishing communities (Allison and Horemans, 2006). The importance of maintaining these small-scale fisheries has become of increasing importance, as it becomes more recognized that a lot of people are dependent on fishing or fishing related practices for securing their income and livelihood (Allison and Ellis, 2001; FAO, 2011). This being especially the case in developing countries, where small scale fisheries are usually seen as a last resort and employ the poorest of the poor (Allison and Ellis, 2001). The sustainable livelihoods framework brings fuller understanding of fishing communities adaptive strategies for policy implementations in small-scale fisheries management (Allison and Ellis, 2001).

In this research the SL framework is used for analysing the local impact of increased international market demand on socio-economic conditions of beach seining communities in Indonesia. The livelihoods are investigated at a community level. The SL model is used as a tool to determine community conditions by using the asset pentagon of the livelihood assets. The vulnerability context and the PIPs components of the SL model are used to investigate how an external trend like the increased demand for sustainable seafood sets the institutional context that impact these local communities, together with highlighting other external influences they are dealing with. Then, in order to understand the complexities these communities are faced with, a SWOT analysis is made that identifies strengths and weaknesses of current community conditions, and opportunities and threats in light of increasing market demand. Together with the current livelihood strategies these communities have adopted, a link is made on how internal conditions and strategies of these communities are matching up to the external trends. In the end, the local impact of these external forces and the adaptive capacity of these communities are evaluated by using the SL concepts by combining the identified SWOT with their current livelihood strategies.

### **3. Community description**

In this chapter the socio-economic conditions of beach seining communities in the vicinity near Bitung are assessed. Not much research has been done on the pole-and-line associated bait fisheries, while many questions and hypotheses have arisen surrounding their conditions; Especially in the light of sustainability and livelihoods. This chapter aims to assess the conditions of one type of these baiting communities. The acknowledgement of having separate types of bait fisheries is already important, as bait fisheries tend to be seen as one entity. Bait fish, however, can be caught by several techniques. In Indonesia the most common techniques are lift nets (bagans) and beach seining (soma dompar). As explained before, the focus of this research is on the beach seining communities.

The first section provides general information on the organisation of baitfishing activity. It offers a detailed description of how the fishing activity is organized, as well as a general supply chain/flow diagram of the baitfish. These insights on the basic functionings of the bait fishery add to the common understanding of bait fishery practices and their general functioning. The second section is focussed on assessing local conditions, by reporting the community assets. This section describes the livelihood assets they have in common, differences found and notable differences between communities.

#### **3.1 General information**

There are many bait fishing communities active in the area surrounding Bitung. For this research the five communities Binuang, Kasawari, Pintu Kota Kecil, Tandurusa and Mawali were visited. Two of the communities were located on the mainland of Sulawesi, and three of the communities were located at the nearby island of Lembah. The bait collection grounds for these small-scale bait fisheries were located just outside their bays, out in the Lembah Strait.

The industrial port and fishing harbour are located at the Sulawesi mainland and in the Lembah strait. A lot of shipment takes place, making the Lembah Strait a busy channel for ferries, container boats and other large vessels. Nearby the Mawali community on Lembah, a new harbour/docks was built. The exact purpose of these docks/harbour remain unclear, but observation showed that ships were landing material onshore. Whether these ships were providing material for building the new harbour or were already part of the functioning of this new harbour is uncertain.

Located at the shore of the Sulawesi mainland connected to the Lembah Strait, but also just outside the straight just southwest along the Sulawesi mainland, were the processing and canning

companies. Some of these companies had their own docks for fishing vessels to land their fish directly at the factory.

### 3.1.1 Fishing activity

Baitfish can be caught in a variety of ways. The communities caught bait fish using beach seines. This type of fishing gear is not very selective and a number of non-target species are also caught using this method; e.g. squid, puffer fish and other reef species (Figure 5). Usually the non-target species that could not serve as bait were used for domestic consumption, if possible. Fish not suited for consumption were discarded. The fishing activities usually started three days after full moon, and went on for the next fourteen days<sup>5</sup>. Fishing commenced in the late afternoon and ended sometime at night or early morning, depending on the season. At the community of Tandurusa a baitfishing operation was attended. The activities that took place are described in Textbox 2.

The activities described in Textbox 2 complied with the overall accounts of baitfishing activities other fishermen told in the visited communities. Instead of transporting the bait into a bucket, other communities sometimes put the baitfish in floating pens to keep them alive for the pole-and-line fishermen to pick up the following morning. Most pole-and-line vessels that would pick up the bait in the communities were associated with different processing and canning companies in Bitung.



Figure 5. Species caught with beach seine bait fishing. Left picture: anchovy (ikan putih). Right picture: bycatch.

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<sup>5</sup> Mentioned in Mawali.

### Baitfishing in Tandurusa

Around 4 p.m. one of the bait fishermen had left the village with a lampboat to the bay near Kasawari to find baitfish. Bait fish had been scarce for the last couple of days near Tandurusa. At 8 p.m. at night the boat was slowly returning in dark to the village with his lamps lit. The boat moved slowly to keep the fish that were attracted to light nearby. When boat was close enough, a team of eight people, consisting of men and women, set out in another boat. This boat set the net around the lampboat, so that the lampboat was completely surrounded by the net. A group of people had gathered at the place where the net setting boat had left and were holding on to one end of the net. The people that had set the net were holding on to the other end of the net. Then, the net dragging started by pulling the net to the shore. Both men and women were dragging; Around sixteen draggers were working in total. At some point, the bait fisherman in the lampboat started to put coloured sacks over the lamps. This was to ensure that the light would not reach the bottom, as this would scatter the light and thus the fish. As the net was dragged closer to shore, the lampboat turned off his lights and glided over the net to get out of the purse that was formed. The two groups of draggers moved slowly together while pulling the net, and when the net was almost fully pulled ashore, the fish were scooped out of the remaining purse the net had formed in the water (Figure 6). The fish were transported to a bucket. The catch that night was not much, only half a bucket. The fish were therefore distributed as food among the people that had been involved in the fishing activity. Half an hour later, another boat was approaching.



Figure 6. Collecting the catch. Left picture: the dragger women are scooping the caught fish out of the net. Right picture: the catch

There were informal bonds between the communities and companies, which entailed that a particular company taking bait from a particular community. These connections were established either through someone in the community having a relation to that company and thus playing the role of an informant from and to the company, or a company delegate visited the community to form the informal agreement.

In order to let the pole-and-line fishermen know that a community had bait to sell, people from the community generally called them after the fishing had taken place. Sometimes the company that owned pole-and-line fishing boats called the community asking for specific amount of baitfish, but the pole-and-line boats would always take what the community had even though it did not meet the companies' demand. It might be for this reason that the communities never indicated they felt an increasing demand for baitfish. When the respondents were asked if they felt that the demand for baitfish had been increasing, they tended to say no. This is not strange if one considers that the bait fishermen were usually taking the initiative by calling the company or the pole-and-line boats. Thereby, the pole-and-line fishermen could only buy the bait that was actually caught, thus having limited influences on bait availability. They could indicate that they wanted more, but the bait fishermen only caught what they could which depended on the season. The fact that pole-and-line boats could literally 'always' be called hints at a constant demand for baitfish, but wasn't seen as such by bait fishermen.

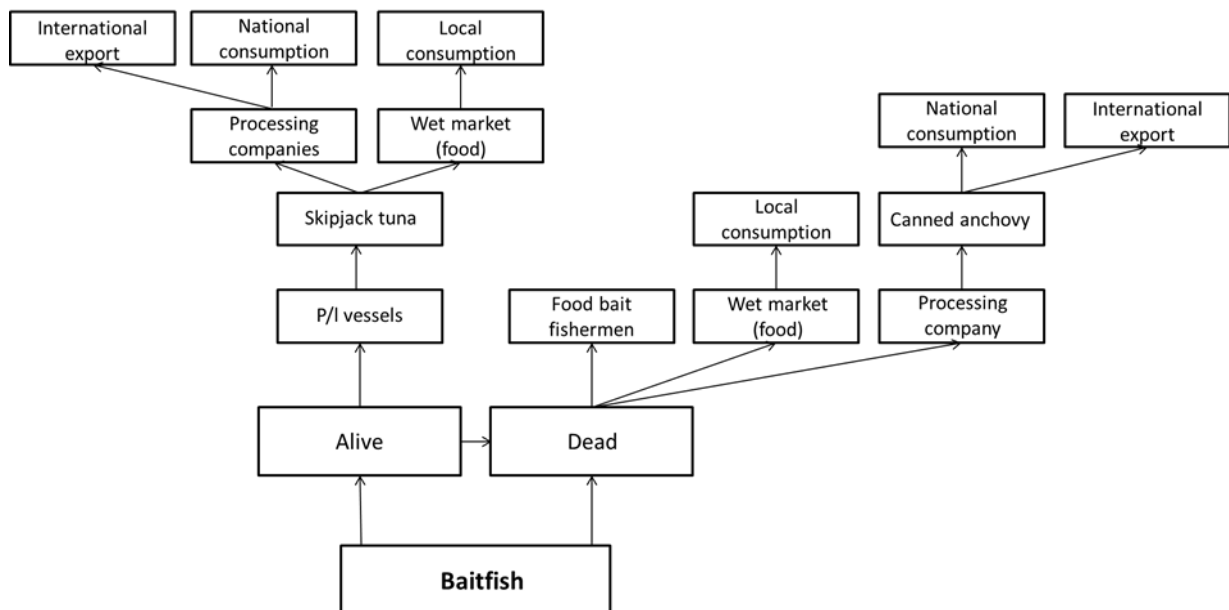
### **3.1.2 Options for bait usage**

After the bait was caught there are several options for the bait usage. A schematic overview of the different pathways is presented below in Figure 7. The most important determinant for the different usages is whether the bait fish is alive or dead. In the case that the bait is alive, it can be sold to the pole-and-line vessels that use the bait for chumming to catch skipjack tuna. Skipjack can either end up at the wet (food) market making the fish accessible for local consumption, or be processed. Processed skipjack products will end up in local and national stores or are exported internationally e.g. to Europe, Korea and Japan.

The usages of dead baitfish take a different path. There are several reasons why the bait could have died. Sometimes this is by choice, communities want to sell their baitfish to the wet market as they might get a higher price for the fish than from the pole-and-line vessels; For the wet market it is not necessary to keep the bait alive. The willingness of the communities to sell the bait either to the wet market or the pole-and-line vessels depended on the price. However, as the mentioned prices for the wet market and pole-and-line vessels were fluctuating significantly between fishermen, communities

and seasons etc., it is difficult to say something about what actual prices were. The determinants that influenced whether bait was sold to the wet market or pole-and-line vessels were fuel costs and distance between the community and the wet market. If the distance between the community and the market too great and the fuel cost too high, than it would have been more profitable to sell their bait to pole-and-line vessels even if they offered a lower price than the market; the pole-and-line vessels would come pick up the bait, so no transportation costs were incurred.

Unintentionally however, baitfish could also have died; during catching, waiting for the pole-and-line vessel, or when it ultimately couldn't be sold to pole-and-line vessels due to bait surplus. The latter happens very rarely and only in the high season. At that point there is a saturation of bait, thus a surplus of bait supply. The most common step for bait fishermen was to use the dead bait directly as food. At all the communities it was mentioned that they always took plate of fish for their own families, beside selling it either to a pole-and-line vessel, the wet market or a processing company. This was especially the case in the high season, when there was a lot of fish caught. During this time the catches were also shared among neighbours. When there was not enough fish for both selling it as bait and using it as food, there tended to be two main strategies: either sell all the bait and use the income to buy other fish/food or don't sell the bait and only use it for food. The first strategy was usually chosen when it was more profitable to sell the fish and buy new food. Otherwise, they kept their fish. This might explain why the respondents indicated that they didn't feel any competition between using the fish as bait or as food. They were always able to take a plate, and otherwise to sell the fish and use the money to buy other food, which was generally fish.



**Figure 7. Schematic overview of the baitfish supply chain. Note that processing companies also entail canning companies; canning as a way of processing.**



Although not experienced as a competition for or deprivation of fish by the respondents, they are limited in their choice of fish. If, through market forces, it is more profitable to sell a certain species of fish and buy another species, they might end up never eating this profitable species. A similar situation is sketched by one of the external interviewees from Masyarakat dan Perikanan Indonesia. She talks about having met pole-and-line fisherman that have never tasted tuna, as it is always exported. Especially with the rising prices and demand for pole-and-line tuna, cheap protein sources are diverted from locals. In the situation she sketched this was in the form of tuna, but it seems also a possible scenario for baitfish. Thereby, other locals that are not directly involved in the fishery, might also find difficulties gaining access to these baitfish as the fish tends to be sold at high prices especially in the low season. In the high season the baitfish seems to be more accessible, as the baitfish are also shared among non-fishermen neighbours.

If locals have enough baitfish for themselves to eat and to sell, they can sell the dead bait to the wet market or to a processing company that will process the bait; in this case canning anchovies was mentioned. At the wet fish market in the fish port, in Bitung called the TPI or Perikani, the bait is sold locally and will end up as a food source for the people within and near Bitung (Figure 8). The processed anchovy will end up in local and national stores or are exported.

### 3.2 Community assets

This section aims to assess the socio-economic conditions of the visited communities, by using the assets from the SL model (Figure 9). This is done by describing the five assets found in the different visited communities. The importance of determining the livelihood assets of these communities comes from the central notion of the livelihood approach, namely 'thinking in terms of



Figure 8. Baitfish sold at the wet market in Bitung. The price of the shown buckets of bait was at that time 500.000 IDR.



strengths or assets'. The identification of the communities' strengths, through ownership of or access to particular assets, provides a better understanding on a community's vitality; it provides insights on which kind of threats they are likely prone to, due to e.g. the nature of the threat or the underdevelopment of a certain capital, and which opportunities can be explored.

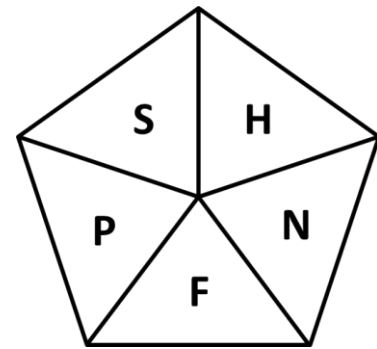


Figure 9. The asset pentagon as found in the SL model

The focus of this section is on describing assets that are derived from or linked to the bait fishery, the bait fishermen and the women involved in these communities. This way, the importance of the bait fishery to the respondents' livelihoods is understood. Another reason for this focus is due to the fact only men and women involved in the bait fishery were interviewed, making it difficult to distinguish contributions the community's capital assets of other occupations; None of the communities consisted of 100 percent of bait fishermen and women.

An important notion to consider is that the sustainable livelihood framework describes dynamic processes, as each of the five different components of the framework (livelihood assets, PIPs, strategies etc.) are interlinked and influencing each other. This makes placing the dynamic SL framework on static information derived from the communities difficult, especially in the case of assets as they are both a means as well as an end of different livelihood strategies. This is in line with Chambers and Conway (1992), who state: ““(...) any attempt to reduce measurement to a single scale or indicator risks doing violence to precisely the complexity and diversity which many rural livelihoods manifest (...)” (p.18). Therefore, one should keep in mind that the assets described below for each communities do not stand on their own, and are already results of influences by either the vulnerability context, the policies, institutions and processes (PIPs), and the livelihood strategies; since the communities are already living by a certain strategy. In a sense, the assets are also livelihood outcomes.

### 3.2.1 Common assets

The total livelihood assets, which enables households and communities to live their lives in a particular manner or strategy, are constituted by the five capital assets. These assets are based at the centre of sustainable livelihood framework and are grouped in five categories: physical, financial, natural, human and social (Allison and Horemans, 2006; Serrat, 2008). A short recap of what is included in these assets: The *physical assets* refer to tangible assets such as houses, cars etc.. *Financial assets* entail the financial resources of a household or community. *Natural assets* are formed by the claim a household or community can make on a natural resources base. *Human assets*

refers to the people's abilities and capabilities, in terms of labour resources, both quantity and quality, that are available to the community or household. *Social assets* comprise the different kinds of relationship networks; Entailing rules, norms, obligations, reciprocity and trust embedded in these relationship networks, which enables household members to meet their objectives (Narayan, 1997).

As the respondents in the different communities were all bait fishermen using the beach seine method, they therefore have a lot of assets in common essential to beach seine bait fishing. Thus, instead of describing each community separately, this section describes the similarities found between the different communities. Each livelihood asset is discussed separately. Communities that share a lot a similarities are likely to be affected by the same external trends in a similar way and to a similar extent. For this reason, it is important to identify the commonalities of the visited communities, as this information will help later on with assessing the impact of the increasing market demand. These similarities will also form the baseline later on when the notable differences of communities are demonstrated graphically with 'asset pentagons' in section 3.4.

#### *Physical assets.*

The physical asset that is needed to be able to secure bait fish is owning fishing boats. Lamp boats and boats used for net setting were commodities accessible for each community, though ownership differed. During fishing the lamp boats got equipped with a generator that produced electricity for the lamps, or kerosene lamps. Thereby there was access for all the communities to either elementary, secondary and high school as there were school located in and near Bitung and on the island of Lembeh. Whether to count housing as a physical asset is uncertain, as it was not a topic that was explicitly discussed during the interviews. However, based on visual observation and the fact that respondents never hinted at particular problem of lacking or wanting to own a house. Another asset that is needed for the baiting activity is physical infrastructure for transportation of baitfish. However this is dependent on the geographical location of the community.

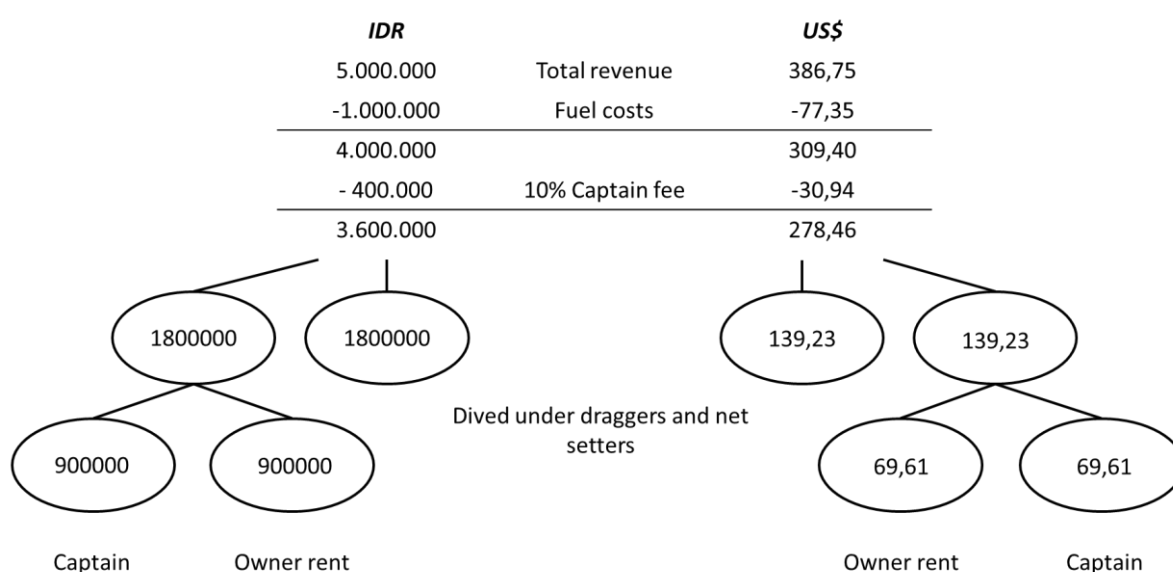
#### *Financial assets.*

The most important financial asset for these communities are the revenues gained from baitfishing, for both men and women. The general opinion was that for them the bait fishery was the most profitable job they could employ based on their personal skills. There was general agreement that the price of a bucket of bait depended on the season, with high prices per bucket in the low season due to bait scarcity and low prices in the high season due to the bait surplus. Although the division of revenues was dependent on the boat owner, it might be fruitful to show one of the examples that was mentioned. Figure 10 shows an example of financial distribution that was mentioned in Binuang.

The other examples mentioned were quite similar, where only one step e.g. like the 10 percent for the captain was removed from the model. In essence, most of the revenues ended up with the boat captain or owner. The women draggers only received a relatively small share of the total earnings. This didn't seem to bother them as generally the female respondents indicated that being a dragger was the most profitable job for them. Thereby, there didn't appear to be a differentiation on basis of gender, as all draggers male or female were allocated the same amount. However, whether this is really the case is unknown and is a topic for further research as it might provide insights on the social status of women in the beach seine bait fishery. The eventual financial gains tended to be invested into other capital assets, such as building houses, stores and sending their kids to school. Investing their money into savings was mentioned by some of the respondents, all of these were kept at home. There was no mentioning of lending out money, but it was mentioned that in difficult times every now and then money was lent from friends and neighbours in some of the communities.

#### *Natural assets.*

The main natural capital for these communities consisted of free and easy access to baiting grounds. Their catches depended on the season and composed a variety of species, with anchovy (ikan putih) as the target bait species. Other species that were caught are scad (malalugis), bigeye scad (tude), and sardines (tembang/tandipan). The amount of catch differed on a daily and seasonal basis, however there was a general conviction that the baitfish stock had been decreasing over the years. Some of the respondents answered that in the earlier days, baitfish was caught all year round, that there was no seasonality. The reason of this decline was attributed to a variety of reasons, most common were competition with small purse seiners and nature just being nature; i.e. natural



**Figure 10. Example revenue distribution gained from a bait fishing trip, mentioned by one of the boat owners in Binuang community. Other examples had a similar distribution structure but missed e.g. the 10% captain fee.**

fluctuations.

#### *Human assets.*

The human assets of the communities were the men and women involved in the bait fishery. The women were in all the communities involved for the same reason: lack of people (men) to do the dragging. In that sense, women play a vital role in the fishery, as without them there would be nobody to drag the net. However, there is no specific gender role for the women as they could be easily replaced by men, having the advantage of physical strength. The people involved in the fishery were relatively low educated people, generally the highest degree being high school graduates and the lowest being elementary school dropouts. The wish for their children was to be better educated than themselves. In general all the children are able or have been able to go to school. The fishing business according to the parents should be a part-time job for their children, as they could get better jobs with their education. Children that drop out of school were likely to end up in the fishery. Even though it was not asked explicitly, most of the community respondents were religious. In the case of the Binuang community, a clear division was visible in the village which was later explained to be due to religious reasons; one side of the village is Christian the other side is Muslim. However, when asked, the religion was not causing any friction within the community and opposite faiths were found to live on either sides and food is sent to each other during religious holidays. It did not seem to affect the bait fishery in any way.

#### *Social assets.*

In all the communities strong social bonds existed between and towards all types of fishermen. Everybody had a right to fish, even though it was causing competition. A common remark mentioned by the respondents was: 'fishing is teamwork'. These strong social bonds between fishermen might entice them to form groups or associations in times of adversity, offering heavy resistance if necessary. An example of this was provided by the Kasawari community: Some years ago the government intended to build a factory near the community. As the fishermen did not agree with this development, they would break down the houses that were built for the future employers. They would take away all the stones and use them to build their own houses. In the end, the factory was never build. Beside social bonds between fishermen, there were also bonds with neighbours. When the season and the catches were good, fish was shared among neighbours who might not be involved in the fishery themselves. Between the visited bait communities was also communication. Fishermen or women either met at the market or at sea, and shared fish related information with each other. The social status of fishermen within the communities was generally good. Especially in communities where a large share of the inhabitants were involved in fishing, the fishermen had a

good status. There were some mentions of people that were looking down on them, because of their profession and therefore e.g. would not take them seriously. But this rarely seemed the case, and everybody appeared to be content with their job.

### **3.2.2 Difference in assets**

As the previous section explained the importance of similarities between the baiting communities, this section of the chapter focusses on differences found between the communities. While the similarities may comprise the basis of the livelihood assets and is thus important, a similar case can be made for the importance of the differences between the communities. If one wants to understand the dynamic of the region as a whole, labelling the beach seine bait fishery as one entity and only by the general capital assets might not be the best approach. By identifying the differences in assets insights are given on how similar forces could lead to different outcomes at the community level. This sort of information is valuable for understanding and predicting the future of the beach seine bait fisheries as impacts of external forces may differ in each community; also holding indirect implications for potential management interventions and support, which might need to be adjusted to the specific conditions of a community in order to have the desired impact.

Beside sharing many commonalities the bait fishery's livelihood assets also differed between communities. To make comparing between the communities easier five tables were made, presenting the different aspects of a particular asset and how these differed between the visited communities (Table 3 to 8). For each asset an explanation and its implication is described in the last row of each table. The most striking differences are in bold.

**Table 3. Differences in physical assets between communities**

		Community				
Capital asset		Binuang	Kasawari	Pintu Kota Kecil	Mawali	Tandurusa
<b>Physical</b>						
1.	Geographical location	Lembeh – far from Bitung harbour	Sulawesi – far from Bitung harbour	Lembeh – moderate distance from Bitung	Lembeh – near Bitung harbour	Sulawesi – near Bitung harbour
2.	Estimated nr. and ownership boats	20 boats - fishermen themselves	3 boats – owned by middle man 2 boats – owned by PJK 3 - 22 boats – owned by community	8 – 12 lampboats – owned by community 1 of the lampboats provided by government	1 boat owned by PJK 4 – 6 lampboats – owned by community	4 boats – owned by community
3.	Ownership community land <sup>6</sup>	Owned by community	Land owned by government	Owned by community	Owned by community	Owned by community
4.	Electricity	No	unknown – but likely present <sup>7</sup>	No	No	Yes
Explanation and implication of the differences		<p>1. The geographical location can have a significant effect on the capital assets of the communities. Communities located on the island of Lembeh are more isolated and cut-off from goods and services that are found on the Sulawesi mainland. Even though the island is located closely to the Sulawesi coast, the physical natural barrier might pose as an obstacle.</p> <p>2. The estimated number of lamp boats that were found at each community and the ownership of these boats.</p> <p>3. Ownership of the land the community lives on and uses. Not having ownership of the land on which you have built your livelihood can have serious implications if the land gets designated to fulfil another function, where a livelihood could be completely destroyed when the households need to relocate to another area.</p> <p>4. The availability of/access to the electricity network. Electricity is often seen as a common commodity, especially in an era where everything has become more digitalized. Having access to the electricity network thus indicates a certain level of welfare. The people that do not have access to the electricity network, had generators to light their houses at night.</p>				

<sup>6</sup> The respondents of the Kasawari community mentioned that the land they live on is owned by the government. As none of the other community mentioned something like that, it is assumed that the land they live on is owned by them.

<sup>7</sup> Not explicitly mentioned, but as the community was based on the Sulawesi mainland it is likely that they had electricity. The communities on Lembeh island did not have any electricity, because of their location.

**Table 4. Differences in financial assets between communities**

		Community				
Capital asset		Binuang	Kasawari	Pintu Kota Kecil	Mawali	Tandurusa
Financial						
1.	Market: p/l vessels-companies OR wet market	p/l vessels-companies	p/l vessels-companies	Predominantly to p/l vessels-companies	Both wet market and p/l vessels-companies	Predominantly wet market. Sometimes using an agent to distribute fish among companies but agent charges 10% fee
2.	Companies sold to	PJK, KEONG and SARI CAKALANG	PJK, KEONG and SARI CAKALANG, SARI USAHA	Predominantly to PJK. Also mentioned KEONG and SARI CAKALANG	PJK, SARI CAKALANG, PT DEHO	MELODY ASRI, SARI CAKALANG,
3.	Payment	Monthly	Unknown	Straight away	Straight away	Straight away
4.	Savings	Has savings derived from bait fishing	Some have savings derived from bait fishing 3 of the women mention to not have any savings	Some have savings derived from bait fishing 2 people mention not to have any savings	Has savings derived from bait fishing	Has savings derived from bait fishing
5.	Loans and rent	No mention of it	Loans 1 boat from PJK and 3 boats from middle man pay rent to middleman no rent paid to PJK, obligation to sell bait to PJK Sometimes loans fuel, pay back when there are fish thus money	Loan 1 boat from government  No rent paid to government but commitment to stay fisherman	Loans 1 boat from PJK  No mentioning of rent, but obligation to sell bait to PJK	No mention of it
Explanation and implication of the differences		<ol style="list-style-type: none"> <li>1. Markets the respondents sold their bait to. Having a variety of options of markets to supply the bait to provides communities the ability to choose between markets to their economic advantage.</li> <li>2. Processing companies respondents sold their bait to. Again, providing an ability to choose to their economic advantage.</li> <li>3. Frequency of payments. Some respondents mentioned that they were paid either monthly or daily. This means that a community have credits with a company, and only receive their credits on a monthly basis. This could have an influence on a livelihood.</li> <li>4. Respondents having savings. Having or not having of savings/financial back up system can affect the livelihoods in times of financial adversity and influence their resilience and vulnerability to seasonality.</li> <li>5. Respondents having loans or rent to pay. The obligation to pay back loans or rent diminishes the financial capital.</li> </ol>				

**Table 5. Differences in natural assets between communities**

		Community				
Capital asset		Binuang	Kasawari	Pintu Kota Kecil	Mawali	Tandurusa
Natural						
1.	Relative amount of baiting spots <sup>8</sup>	High	Moderate	Low	Low	Low
2.	Availability of nearby agricultural land	Yes – one person owns farmland	Yes – multiple people mostly rent farmland, but no money is paid for rent	Yes – multiple people either own or rent farmland	Yes – multiple people own farmland	Yes – two people own farmland
Explanation and implication of the differences		<p>1. Relative amount of baiting spots, categories: high, medium, low. The categories are assignment to each community based on their response and location. Having access to multiple baiting spots makes communities more robust, as some baiting spots may provide more fish than others from time to time, plus gives them ability to choose between baiting spots in order to catch the most fish.</p> <p>2. Availability of nearby farmland and their ownership. In times when bait catches are low, it is important to know whether respondents have another natural source to secure both income as food.</p>				

<sup>8</sup> The number of baiting spots accessible for a community was not asked, but the respondents answers of Mawali and Pintu Kota implied that their baiting ground options were limited. The respondents from the Mawali community said that they only had one baiting spot. The baiting spots of the Kasawari community where at the same location as popular diving spots, causing competition and diminishing their natural capital. Based on the geographical location of the community, whether or not they were near the port or near open sea, the other relative amount of baiting spots was estimated.



**Table 6. Differences in human assets between communities**

		Community				
Capital asset		Binuang	Kasawari	Pintu Kota Kecil	Mawali	Tandurusa
Human						
1.	Estimated nr. of inhabitants	300 (500 including children)	1000	164 <sup>9</sup> (320 including children)	3000	6000
2.	Estimated nr. of people involved in the fishery	100% of men 50 – 100 % women	8 bait fishermen working under middleman  5 – 7 independent bait fishermen  12 – 20 draggers (5 – 11 female)	8 -9 bait fishermen  130 - 150 draggers (50 – 60 women)	5 – 20 bait fishermen  > 50 involved in fishery (60% female draggers 40-50 female draggers)	6 – 20 bait fishermen  25 – 150 draggers (14 – 40 female)
3.	Job opportunities	Few	Moderate	Few	Plenty	Plenty
Explanation and implication of the differences		<ol style="list-style-type: none"> <li>1. Estimated number of inhabitant that lived in the community. Larger communities might be more resilient than smaller. It also makes it possible estimate the relative amount of fishermen in a community.</li> <li>2. Estimated number or percentage of people in the community that were involved in the bait fishery. Based on the estimated number of bait fishermen/draggers in relation to the total number of inhabitants, something can be said about the relative share or importance the bait fishery has for the community.</li> <li>3. Job opportunities for respondents, few – moderate – plenty. Based on variety of jobs mentioned for both men and women and the relative distance to Bitung. The further away from Bitung, the less jobs opportunities.</li> </ol>				

<sup>9</sup> Pintu Kota Kecil was divided into two groups for administration purposes. This number represents only the number of people for one of the groups.

**Table 7. Differences in social assets between communities**

		Community				
Capital asset		Binuang	Kasawari	Pintu Kota Kecil	Mawali	Tandurusa
Social						
1.	Fishermen association present	No	Yes – only for the fishermen that work under the middleman	No	No	No
2.	Mentioning of having informal contract with processing companies	Yes – with PJK	Yes - with PJK	Yes – with PJK	No	No
Explanation and implication of the differences		<ol style="list-style-type: none"> <li>1. Fishermen association present, yes or no. Fishermen association can help fishermen in times of adversity, especially on an individual basis.</li> <li>2. Informal contracts with processing companies, yes or no. Informal contract could limit a community's ability to diversify their markets and gaining the best prices for their bait. On the other hand, it might offer security for their bait to be sold, without e.g. having to pay for fuel cost.</li> </ol>				

### 3.2.3 Visualizing differences

Based on the differences presented in the tables 3-8 this section focuses on the notable differences that were found. Differences between communities give an indication of the strengths and weaknesses these communities possess in assets. Nevertheless, describing negative assets, e.g. only having access to a polluted bay, would undermine the notion of assets as strengths as a polluted bay would be a weakness. Yet, these negative assets could prove crucial in understanding the reality these fishermen are facing. To overcome this issue of only being able to view assets as strengths, asset pentagons are made that represent the relative share of the five different livelihood assets (Figure 11). The pentagon illustrates the relative share of each capital

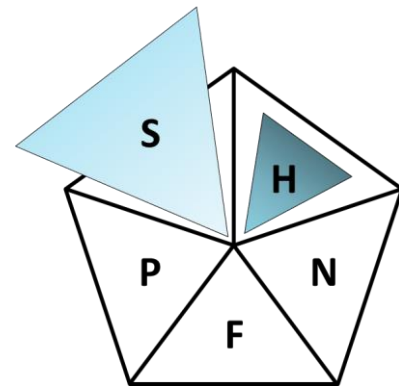


Figure 11. Representation of the relative share of the total livelihood assets. The pentagon illustrates an example of how over- and underrepresented capitals will be illustrated. An overrepresented capital is illustrated light blue and larger (S). An underrepresented capital is illustrated dark blue and smaller (H).

asset to communities' total livelihood assets. Basic assets found in all communities form the baseline. When one of the assets is particularly overrepresented in one of the communities, e.g. a much larger number of fishing grounds than the other communities, the share of natural asset is illustrated larger than the natural asset of the other communities. When one of the assets is particularly underrepresented or negative in one of the communities, then the asset's share will be illustrated smaller than the same asset of the other communities. When an asset is neither over- or underrepresented then the shape will remain the same. This simplified view across the communities capital assets makes it easy, among other things, to identify where a particular community strength and weaknesses in baitfishing assets lie. Note that over- or underrepresentation is not an actual strength or weakness of the community, as the assets are not seen in context with external forces.

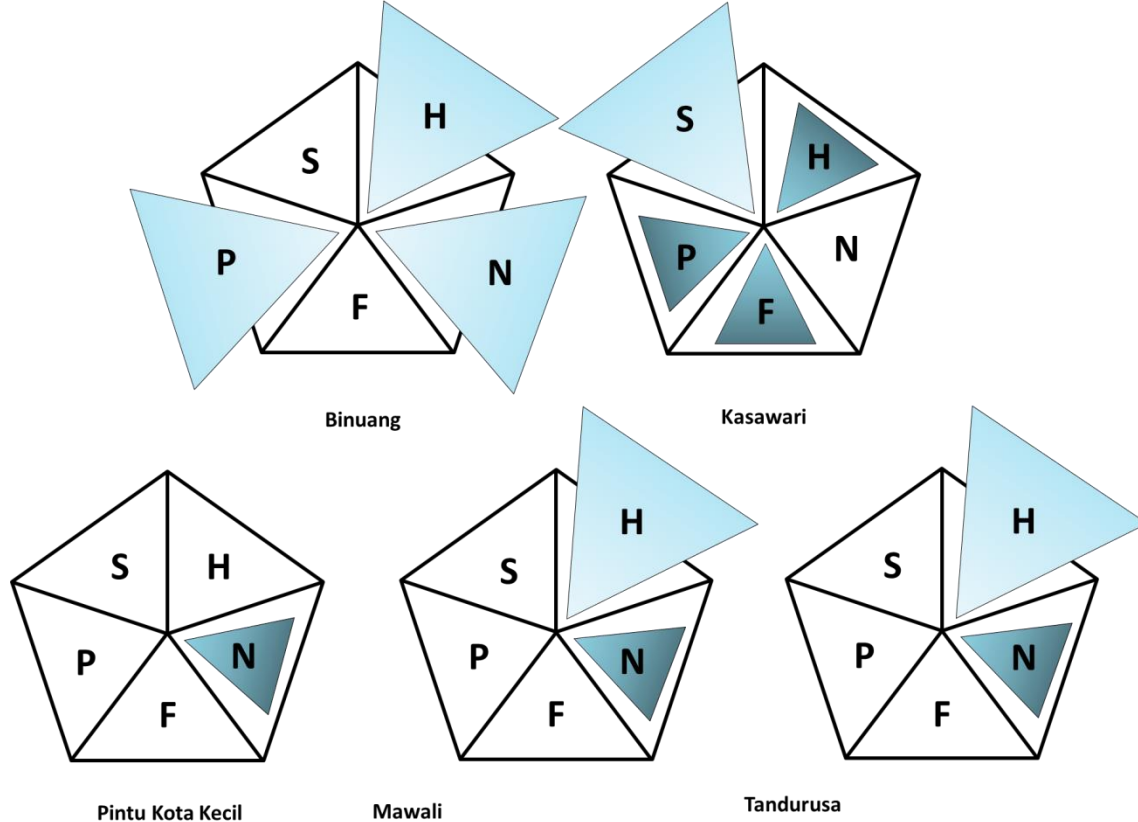
For each community an asset pentagon is made illustrating the relative share of each of the five assets in the community. The over- or underrepresentation of a particular capital is based on the information presented in tables above. As all the tables display different types of information, numerical, percentage, classes etc., it is difficult to sum all the information for a community together to gain an outcome. There are several ways to overcome this, e.g. giving values to each aspect with 1 being positive, 0 neutral and -1 as negative. It would have been possible to assign values to the different aspects of the community capitals, and to let some aspects have more weight than others. But due to the limited time in the field it is unknown which of the aspects have more influence on a community asset as a whole. Thereby, the focus of this research are on the assets derived from baitfishing, but there are other assets owned by these communities that do not have a direct link to the fishery, like the availability and ownership of farmland. One could choose to focus on aspects only

important to the fishery, but not taking other aspects into account could be a mistake. These non-fishery aspects might be interlinked to other assets and crucial to a community livelihood strategy. However, due to the complexity and diversity of the aspects of the assets it is impossible to make an exact representation of the situation of these communities. To provide a result, an attempt is made to shape these community pentagons by looking at trends, and having a 'more or less' approach. Chambers and Conway (1992) express a similar attitude. Instead of knowing 'how much' it is often enough to know 'more or less' or trends. They say that an "evaluative concept which conflates several criteria is usable once assessments of orders of magnitude, of relative values and of trends are accepted as useful and usable for decision-making"(p18). These pentagons are an example of such an 'evaluative concept' as it tries to combine several criteria or aspects that make these communities differ from each other. Based on the relative value of these aspects in relation to the other communities and the basic assets, a 'more or less' idea is given where the strengths and weaknesses lie for these communities in terms of assets.

Figure 12 shows how these pentagons would look like for the visited communities. A short explanation is given, discussing why an asset is over- or underrepresented for a particular community. In the case that an asset doesn't seem to be remarkably different from the other community, the share will be visualized as being normal and will not be further discussed. However, it is important to keep in mind that while three communities show an overrepresentation of human assets compared to the other communities, there is a general lack of human assets in the fishery. The pentagons show the difference in other human asset aspects.

#### *Binuang.*

Binuang has the most overrepresented capitals. The human capital overrepresentation is derived from the fact that all the men in the village are fishermen, and up to 50 to 100 percent of the women are involved in the fishery. As for the other communities' relative share of fishermen to the total community is much less, this capital appear to be extra strong for Binuang. The physical capital strength is derived from the fact that the community owns the most lamp boats and their geographical location. One might think, given the high number of people involved in the fishery and the number of boats, the relative amount of number of people per boat is small. But boats are an expensive asset, and all the boats are owned by the community. Thereby, the fishing activity itself employs a lot of people. It is possible to man lamp boats with three people. The geographical location of the community can also be seen as an advantage, by being far away from Bitung harbour they experience less negative impacts from the harbour, e.g. light pollution, waste from processing companies etc.. The natural strength comes from the relative amount of baiting spots. This is also



**Figure 12. The community asset pentagons. The pentagon shapes illustrate the relative over- or underrepresentation of the five capital assets for each community.**

linked to geographical location, as Binuang is nearest to open sea and has is less hampered by the activities of the harbour.

#### *Kasawari.*

Kasawari is the community that holds the most underrepresented assets. The most important, for this community and overall, is the fact that the community land is owned by the government, diminishing their physical asset. This makes their future uncertain as the government can take back the land at any time for any purpose. Next to that, a lot of the boats are loaned from either the middle man or a company, which makes this community to have the smallest physical asset of all the communities. Linked to this is their financial asset; Boats not owned are subjected to rent, paid to the middle man or company either in monetary terms or goods/services. Thereby, the bait they do catch can only be sold to pole-and-line vessels, their only market option, as the community is located far from Bitung and therefore the wet market. Another important notion is that the majority of women respondents said not to have any savings. Bait fishing is characterized by being very seasonal, resulting that the community can't catch bait for months on end. Having savings is crucial to overcome these months without any financial income from the fishery. The human asset is underrepresented as half of all the bait fishermen work under a middle man, making the fishermen less free to undertake their own strategies. The social asset is overrepresented in only this community, as the fishermen who work under a middle man have a fishery association. This association saves up money which is used to help out fishermen that are in financial needs. This

includes building or repairing houses, buying a boat etc. Thereby, the community members have a history of standing up against government plans to develop the area, hinting at strong social bonds in times prospective hardship.

*Mawali, Pintu Kota Kecil and Tandurusa.*

These three communities are very similar to each other in terms of strengths and weaknesses in assets. All of them have small natural assets, as they indicated that they don't have a lot of baiting spots and/or that their baiting spots are threatened by external influences. Their location is also near to Bitung, thus making their baiting spots subjected to negative impacts such light pollution, waste, etc.. As for Tandurusa and Mawali, the human asset is overrepresented as they have a lot of job opportunities beside bait fishing, which is directly linked to the geographical location. These communities are nearest to Bitung, where they have more opportunities find other jobs.

## **4. External impacts**

In order to answer the question of how an increased demand for sustainable seafood affects local conditions of baiting communities, this section investigates how an international trend like the increased market demand influences the institutional context that impact baiting communities, together with other external influences they are dealing with. This is done by using the external forces concept of the SL model. Within the model external forces are either placed under the vulnerability context or under policies, institutions and processes (PIPs). To recap, the vulnerability context refers to processes on which livelihoods have no control. The PIPs form the institutional context the communities are living in, and can be influenced by the communities themselves. PIPs enable or hamper community access to assets or activities, and influence or produce trends in the vulnerability context.

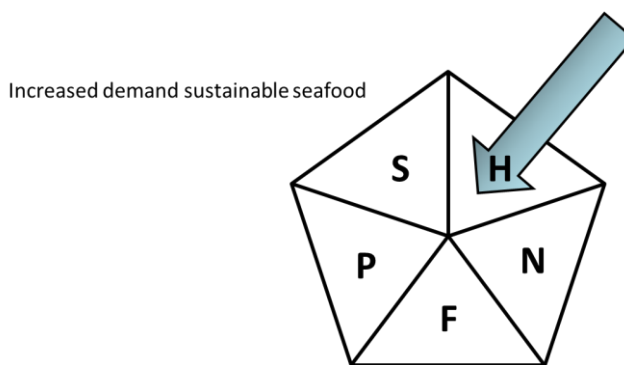
Instead of following the categories provided by the SL model, a distinction is made between main and secondary forces. First the main forces and their influence on baiting communities are discussed. Main forces represent external processes that are directly or indirectly linked to increased demand of sustainable seafood. The focus lies on describing processes that set or have the potential to set the institutional context that impacts these local bait fishermen, and are therefore part of PIPs. Secondary forces are external processes not linked to increased demand sustainable seafood, but still have an impact on local livelihoods. These forces are taken into account as they can alleviate or worsen community conditions caused by increased market demand, and can be part of either the vulnerability context or PIPs. With each external force, an asset pentagon is given to illustrate the primary livelihood asset(s) affected. Based on this information, in combination with the livelihood assets, an attempt can be made to identify the strength and the weaknesses of these communities, and the opportunities and threats they face with respect to the main forces.

### **4.1 Main forces**

#### *FIP / MSC certification (PIP)*

The demand for sustainable seafood products is growing and currently shaping the seafood market (Sampson et al., 2015). Paired with this development is the growing demand for traceable and quality assured products, ensuring that they come from a sustainable source (MSC, 2014). A credible certification scheme, such as MSC, needs detailed environmental and traceability standards, before a fishery can be certified and receive a price premium on their product (Samson et al., 2015; IPNLF, 2014d). To gain access to the Western markets and meet sustainability demands the Indonesian pole-and-line fishery has engaged in a fishery improvement project (FIP). The Indonesian FIP action plan's goal is to ensure that catches do not exceed sustainable levels, promote ecosystem approach

to fisheries management and strengthen governance systems in the Indonesia tuna fishery (Poseidon ARM Ltd, 2013). Bait fisheries are included under the goal of implementing an ecosystem approach. In order to reach MSC certification all products that are used as bait are also part of the assessment, thus the bait fish stocks also require assessment (Poseidon ARM Ltd, 2013)(Figure 13). However, FIPs often



**Figure 13. The livelihood asset primarily affected by ecolabeling the beach seining communities.**

operate without having transparent and independent assessment of sustainability improvements, making their effectiveness questionable (Samson et al., 2015).

Gillet (2014) researched the requirements for bait fisheries management from MSC, but failed to get a definite understanding. Gillet's personal communication with two former MSC employees indicates that MSC certification of the pole-and-line fishery is possible without having an effective management plan in place. Either none is required, such is the case for a certified Canadian fishery that use squid from China as bait. For this particular Chinese squid fishery there are no MSC requirements. The other case illustrated by Gillet (2014) is that there should be some evidence that the bait fishery is managed. To follow this up Gillet looked at MSC certified pole-and-line fisheries from Japan, America and the Maldives, and found that no treatment or just a demonstration of bait fisheries being managed appeared to be sufficient for these particular pole-and-line fisheries. This would mean that the Indonesian pole-and-line fisheries could get certified without having effective bait fish management in place. Thereby, there are views that, irrespective of MSC requirements, the Indonesian system is likely unable to support massive upgrading of monitoring and research which are proposed in the recent FIP (Gillet, 2014).

MSC certification of the Indonesian pole-and-line fishery without having a proper management plan for the associated bait fisheries would affect the communities natural asset. If the certification were to lead to higher fishing pressures it could diminish the CPUE of baitfish and depletion of the common stock. In addition, the beach seine fishery had a lot of bycatch, which emphasizes its interaction with other reef fish species and capture of immature juvenile fish. Without an effective management system in place, not only the bait fish stock as well as other reef fish stocks could be subjected to unsustainable fishing practices. However, should a proper management plan be implemented then the human asset of the communities would be affected as bait fishermen might



have to follow regulations and monitoring programs, and might have to be educated through workshops.

*Fishery moratorium and national tuna action plan (PIP)*

On October 27<sup>th</sup>, 2014 a new minister of Marine Affairs and Fisheries, Ibu Susi Pudjiastuti, assumed office. Before her instalment Indonesia had little background in marine resource management, with regulations mostly focussed on physical requirements for fishing boats. Following the government's recent call to boost anti-poaching efforts in the country, the new minister vowed to restrict illegal, unregulated and unreported (IUU) fishing in Indonesian waters (Abdussalam, 2014). Her ministry makes an effort to make the fishing activities in Indonesian waters sustainable, and aims to increase the quality standard of Indonesian fisheries in the global market as well as strengthen economic growth in the ecosystem-based fishery sector (WWF Indonesia, 2015).

On the 4<sup>th</sup> of November 2014 Pudjiastuti installed a six month moratorium that implemented or aims to implement the following policies. The policies in bold are particularly important for the beach seining communities as they would restrict community access to their natural resource.

- Only vessels that constructed in Indonesia are allowed to fish
- Halt on renewal and issuing licenses to fishing vessels over 30 GT, applies only for foreign made boats
- Ban transshipment at sea; the definition of transshipment is still under debate
- Ban on employing foreign crew; already active before the minister took office
- **Ban on using unsustainable fishing gear, e.g. trawl and small-diameter purse seine nets**
- Disallow foreign investments in fishing operations; including foreign ownership of fishing vessels or companies and foreign built boats.
- Introducing a 'fishermen card'; cash management scheme using a debit-ready card which allows for fair distribution of subsidized diesel to small scale fishermen.
- Eliminating fuel subsidy for large fishing trawlers over 30 GT
- **No fishing in the 0-4 mile zone; still under consideration**
- Restriction on lobster and crab fishing; only lobsters > 8 cm long, crabs > 15 cm wide and flower crabs > 10 cm long and not carrying eggs can be caught
- Prohibition of Hong Kong buyers to buy cultured fish like grouper<sup>10</sup>

(Salim, 2014; Tempo.Co, 2014; Abdussalam, 2014; Ningsih, 2015)

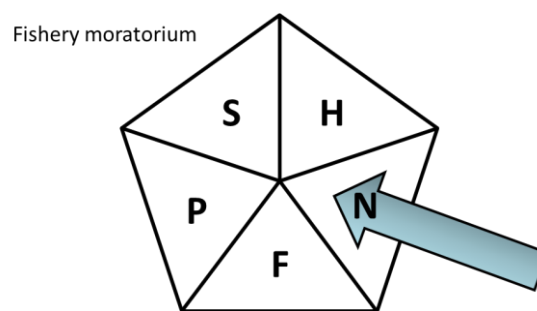
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<sup>10</sup> Personal communication Abrizal Ang

The existing anti-illegal fishing task force was reinforced and the Maritime Security Board was put in charge to enforce these rules to fight illegal fishing (Salim, 2015). Pudjiastuti has received a lot of criticism by many industry players, as they were not informed by the government of the new plans. The moratorium is expected to end on April 30<sup>th</sup> 2015, but the actual direction the government is heading with her policies remains unknown. Recent headlines do indicate that the ban issuing on renewal and new licenses will be extended to 31<sup>st</sup> of October 2015 (Salim, 2015 a), as well as limited use of Danish seine net (cantrang) until September 2015 (Salim, 2015 b).

With her instalment, Pudjiastuti also introduced a national plan of action for tuna, skipjack and neritic tuna management plan of Indonesia (NPOA, 2014). The objective of this plan is to ensure sustainable use of tuna resources, sufficient supply to domestic tuna processing industries and to increase competitiveness of the Indonesian global tuna market (NPOA, 2014). This plan is adopted throughout Indonesia FMA's. It is expected that with the adoption of this plan, future developments in tuna fisheries and industry can be sustainable. It is a technical report and calls for more studies on tuna fisheries and management. The action plan does not include bait fishery management, and bait fisheries are hardly, if not mentioned; There are some calls for studies on risk-based management regarding tuna fisheries mentioning 'alive feed' (NPOA, 2014). What these studies would entail, is unknown.

The installation of Pudjiastuti and her moratorium has been the topic of discussion by many external parties, as the new regulations had just come into force during the fieldwork period and were causing a lot of upheaval. A lot of fishing vessels were not going out from Bitung port. This resulted in canning companies not receiving sufficient raw material for their production process and were operating at a reduced production capacity. However, none of the moratorium policies or the national tuna action plan were mentioned by the community respondents, while the impact of the prior would be extensive. The moratorium is aimed ensure ecological sustainable fishing practices, which would have a positive effect on the baitfish stock; thus the natural asset. Nevertheless, the baitfish are a common pool resource and not owned but only accessed by the community. The ban on using unsustainable fishing gear and the 0-4 mile zone ban would terminate the access of all communities to their natural asset (Figure 14). This would be detrimental for the communities that have



**Figure 14. The livelihood asset primarily affected by the fishery moratorium in the beach seining communities.**

few other job opportunities and have a lot of the community inhabitants involved in the fishery.

## 4.2 Secondary forces

### *Decreasing baitfish stocks (VC)*

Although the fieldwork did not include an ecological survey nor stock assessment, there was a general belief expressed by the respondents that the bait stock had been decreasing over the years that was not due to seasonal fluctuations (Figure 15). Gillet's (2014) recent baitfish report also states that the CPUE of baitfish has reduced, which could indicate decrease of the bait stock and subsequently the communities natural asset. The respondents attributed decrease to several factors:

i) competition with purse seiner boats, ii) God/nature and iii) pollution.

- i) Some purse seiner boats target the same sized fish as the beach seining communities, mostly herring, scad and sardines, but also anchovies; these purse seiner boats are small vessels holding up no more than 15 GT, called pajeko's. They tend to fish near Bitung, sometimes coinciding with bait fishing areas causing competition with the communities. Their catch is sold to the wet market. This is also mentioned by Gillet (2014) and he adds the effect of near offshore FADs. A number of respondents brought forward an interesting notion, namely that the seasonality of bait catches was only a recent development. Baitfish used to be present all year round.
- ii) Some of the respondents thought that the decreasing stock was caused by natural fluctuations or a higher power. In both cases, the community respondents were convinced that the situation would play out by itself, having faith in God/nature that the baitfish would never be entirely gone.
- iii) Different types of pollution were mentioned that were affecting the bait stock. The most frequently mentioned was waste from nearby canning companies. When asked what kind of waste was harming the fish stock, the respondents generally referred to fish blood and intestines of cleaned fish that was dumped in the sea. According to them, this decreased the fish abundance as well as scaring fish away. The communities located closer to Bitung also mentioned light pollution from the nearby harbour, boats and resorts which would attract/distract baitfish. Although it might not directly influence the bait stock numbers, light pollution can affect fish behaviour like reproduction and

Decreasing baitfish stocks

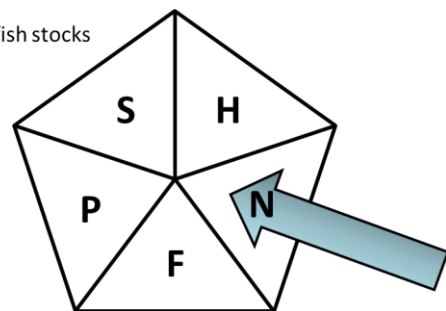
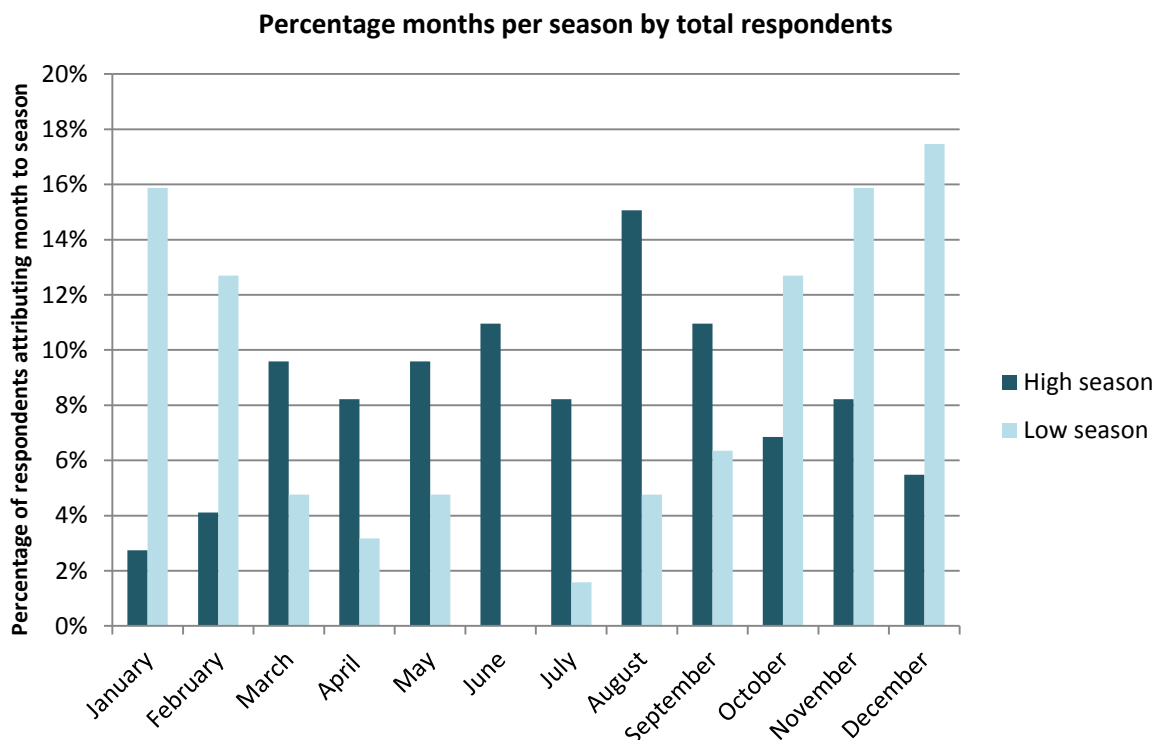


Figure 15. The livelihood asset primarily affected by decreasing baitfish stocks in the beach seining communities.

migration (Boeuf and Le Bail, 1999). Thereby, artificial lighting can confuse migratory fish which leads to excessive energy loss and reduced migratory success (Hölker et al., 2010). Another important source of pollution mentioned by several respondents was oil spills (or more accurately, leakage) at sea. These spills happen when larger ships change their oil.

### *Seasonality (VC)*

Seasonality is an important force in the beach seine bait fishery. All the community respondents mentioned that strong winds and currents, rain, tides and big waves disables them from fishing. If they do manage to go out, the winds and currents prevent aggregation of the bait or scatter the fish during the dragging process. The good season for the fishermen and draggers are then when the weather is calm. When asked in which months this occurred, a variety of months were provided, making it difficult to draw conclusions on good and bad seasons. Graph 1 shows the percentage of respondents attributing a particular month to either high or low season. The graph illustrates that the overall high season occurred around August. The low season is more clearly visible, and occurs from approx. October to February. However, it is uncertain whether the mentioned 'good/high season' referred just to weather, bait catches or both. When asked what made a low/bad season bad was because of the waves, rain and tides. However, the bait fish appear to be seasonable as well, with catch rates fluctuating between 0 buckets going up to 100 – 300 buckets / 3 nets a day. It seems



**Graph 1. Overview seasonality of baitfish. Percentage of the total respondents mentioning the months they attribute to high or low season.**

likely that the mentioned good and bad season were based on a combination both factors, weather and catches. The population dynamics of anchovy has been a

characterized by large scale fluctuation. Research has aimed to understand these fluctuations, but no definite answers have been found so far. Theory holds that the dynamics are due to density dependent and density independent factors (Lindgren et al., 2013).

Recent modelling by Lindegren et al. (2013) of the

Eastern Pacific California Current Ecosystem show that in their case the dynamics could be explained by “interacting density-dependent processes (i.e., through species-specific life-history traits) and climate forcing” (p. 13672). Whether this is also applicable to coastal region of Indonesia remains unknown as no such research has been done. Lindgren et al. (2013) research does tell us that the seasonality of anchovy is very complex, making it difficult to grasp. Fishing effort is optimized to the extent that amount bait catches corresponded to the number of active bait fishermen . Seasonality therefore affects both the natural as the human asset of the community livelihood, as during bad seasons people leave the community to work elsewhere (Figure 16).

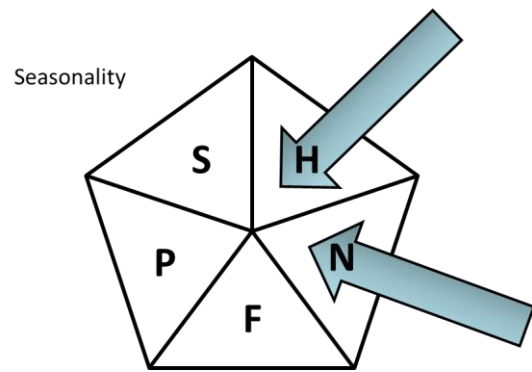


Figure 16. The livelihood asset primarily affected by seasonality in the beach seining communities.

#### *Coastal development (PIPs)*

During the time of the fieldwork a lot of coastal areas were being developed nearby the port and area around Bitung (Figure 17). The most important coastal developments for the communities were the developments that were impacting or reducing access to baiting grounds (Figure 18). A port appeared to be being built on Lembbeh island, next to the Mawali community. According to the Mawali respondents this development would take away their only baiting spot, forcing them to find other baiting areas further away or to give up fishing entirely.



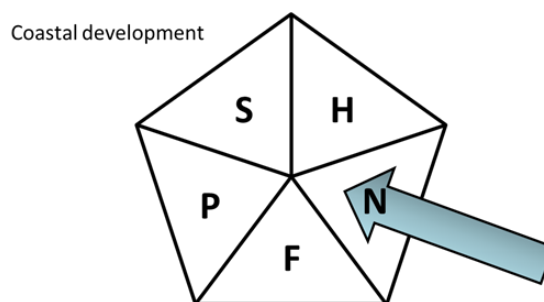
Figure 17. Coastal development. The picture above shows diving tours that operate in the area. The bottom picture show the development of docks on Lembbeh island, near the Mawali community.

The government recognized the impact and promised to hire people from the Mawali community to work in the future port. The respondents were hesitant as their low education levels made them only suitable for undesirable jobs such as carrier men. On the north side of Bitung, close to the community of Tandurasa, there were mentions of building additional docks. This would also take away some of their baiting spots. The port activities and its possible expansion are having negative impact on

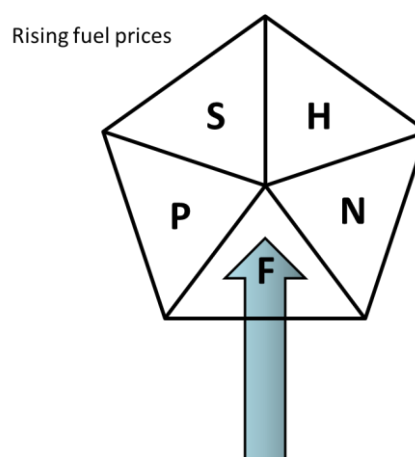
the baiting communities. The Lembbeh Strait is a busy channel for ferries, container boats and other large vessels, using bright lights at night to scatter the bait fish. Thereby, the lights from resorts and the city were also distracting the baitfish. The community of Kasawari experienced negative impacts from local tourism resorts, that would offer dive tours near Kasawari beach. Some of these dive tours would include night dives, which tend to be at the same spot where the community was fishing. The night divers with their torches would distract and scare the fish away. The community had made several attempts to speak with the dive boat captains, to come to an solution but their pleas were dismissed. There had also been rumours that there were talks about turning Kasawari into a tourism area.

#### *Rising fuel prices (PIPs)*

A common complaint of the respondents was directed on the increased fuel prices, making fishing an expensive venture (Figure 19). On January 1<sup>st</sup> 2014, the Indonesian president Pak Joko Widodo stopped with subsidizing gasoline and reduced the subsidy on diesel (Chen, 2015). This resulted in a price increase of US\$ 0,19 per litre of fuel, making it a third more expensive (Watts, 2014). Before fishing vessels could use subsidized fuel, but they now have to buy fuel at the industrial price, adding extra costs to fishing operations; including beach seine bait fishing. Bait fishermen use gasoline to fuel the generators needed for the lamps, as well for eventual boats with motors. The current fuel prices are around 10.000 to 12.000 IDR per litre, and a fishing operation uses 5 up to 10 litres of fuel. This results US\$ 3,86 – US\$ 9,27 in per fishing operation, excluding any



**Figure 18. The livelihood asset primarily affected by coastal development in the beach seining communities.**



**Figure 19. The livelihood asset primarily affected by the rising fuel prices in the beach seining communities.**

transportation cost to the wet market. One of the community uses traditional lamps (Figure 18) fuelled with kerosene, which cost 12.000 up to 15.000 a litre and is difficult to get. Per trip they need around 10 litres of kerosene to fuel 4 – 6 lamps, adding US\$9,27 – US\$11,58 to their costs.

## 5. Community analysis

This chapter aims to combine the information provided in chapter 3 and 4 in order to identify the overall strength and weaknesses of these communities, and the opportunities and threats related to increasing market demand. The communities' strengths and weaknesses are mainly based upon their access to and availability of livelihood assets. A similar approach has been used by Njifonjou et al. (2006), where livelihood assets were used as strengths in a SWOT analysis for the assessment of community concerns. The opportunities and threats are derived from the influence of the main forces in combination with the secondary forces.

The second part of this chapter discusses the link of the identified SWOTs with the communities livelihood strategies. First, the livelihood strategies of the baiting communities are described. The livelihood strategies entail activities these communities undertake to achieve their livelihood goal or deal with adverse situations. The ability to choose and the actual choice for a particular strategy are based on the communities assets and how these are affected by the vulnerability context and the PIPs. In order to assess how the livelihood strategies match up with the SWOTs, the livelihood strategies are combined with the SWOTs to investigate how the communities strategies enable communities deal with the identified opportunities and threats.

### 5.1 SWOT

To recap, the acronym SWOT stands for Strengths, Weaknesses, Opportunities and Threats. The SWOT analysis brings together the different aspects of the SL model, namely the livelihood assets and the external forces, from which the strengths, weaknesses, opportunities and threats for the community will be derived. This section describes the central elements of the SWOT analysis. An attempt is made for the region, but as differences existed between communities, the SWOTs can vary among the communities. Table 8 shows the strengths, weaknesses, opportunities and threats identified for the region.

#### Strengths

##### *Income*

An important strength of the respondents was their strong financial asset, given that they were (generally) low educated people. Being low-educated made them only suitable for low income jobs as carrier at the port, ojek driver, housemaid etc. A bait fisherman was said to be the most profitable occupation for them to have, generating relatively more income than other low-educated jobs. Personal communication with one of the interpreters revealed that the best job at a canning factory made around 2.000.000 IDR/ \$150 USD a month. The bait fishermen were able to earn this amount



Table 8. SWOT analysis for the North Sulawesi region

Strengths	Weaknesses	Opportunities	Threats
Income	Inconstant and unreliable income	Organisation and participation	Exclusion
Inclusion of women	Illiteracy		Depletion of bait stock
Social bond	Lack of organisation		Closure of the beach seine fishery
	No baitfish management		

of money per fishing trip, if the circumstances were favourable. The belief that small-scale fisheries only employed the poorest of the poor was therefore not applicable for these communities. They used their income to invest in their livelihood assets to improve their current and future livelihood, by investing money gained from fishing in: sending their children to school, built houses and shops, and buying boats.

#### *Inclusion of women*

For the women, the bait fishery offers them a profession and a social structure to engage in. Even though women are only involved because the fishery lacks enough men to drag, it gave them an important role in the fishery. Besides being a dragger, there were limited job opportunities for women especially in the more isolated communities. The bait fishery offered women their own source of income, which they spent on their family or savings. Most of the women respondents were draggers because their husband was active in bait fishing and for generating income. Yet some of the female respondents stated that income was not the reason why she started dragging, but for social purposes as her friends were also draggers.

#### *Social bond*

There were strong social bonds between the fishermen. Even though there were talks about competition with small purse seiners and with other fishermen, the overall sentiment of the bait fishermen was that everyone was allowed to fish. There were no hard feelings towards other fishermen, that were catching or earning more for their fish. Fishing was considered a team work. This social bond might be based on similar experiences fishermen have to go, are going and have gone through. Being a fishermen is a demanding job, physically strenuous and not as consistent in returns as other jobs might be no matter the work put in. The fishermen experience this on a daily basis and it is likely that they respect people that are going through similar experiences. These sentiments were found between bait fishermen and fishermen engaged in other types of fisheries.

## **Weaknesses**

### *Inconstant and unreliable income*

The income of the communities were inconstant and unreliable. This was due to variability in catches and prices. The bait catch fluctuated from approximately 0 – 200 buckets throughout the year, with communities mentioning not catching any fish and thus no income for three consecutive months. The price for baitfish was also highly variable. Next to local supply and demand and season, the price variation was likely to be caused by the following factors: fuel price, price for skipjack and the price for anchovy at the wet market. It is a complex system as these prices are also influenced by global forces, and based on international supply and demand. The wet market might be less vulnerable to such forces as not all fish might be used for export. In the case of anchovy however, if the international price for skipjack were to go up, the price for anchovy would follow. Pole-and-line vessels would have more money available to spend on bait fish, thus increasing the price. For the wet market to keep up, they'd also have to increase the market price. This could cause serious issues for the poorer households in the communities wanting to buy anchovy, as the price is driven up by forces beyond their control. The fluctuation in prices in combination with seasonality of anchovy deprives baiting communities from a stable source of income and financial security. This is especially challenging for the respondents who stated that they had no savings, as bait fishing requires fuel thus operating costs. If the price variations were unfavourable, then some of the respondents might not be able to go out fishing or have to take on loans. The price fluctuation even exists within the community, as some households are getting higher prices for their bait fish; Especially in the high season when more people are active in baitfishing.

### *Illiteracy*

The communities were not aware of global and national forces that could have a large impact on the fishery and community, only local forces were being recognized. The larger forces appeared to be out of their scope of attention. For the global increase for sustainable seafood, this lack of awareness was not posing a problem in the short term as the communities are currently not experiencing any pressure on meeting demands and there appear to no direct effects. Over a period of time, it is possible that this will change. New developments such as alternative bait sources through aquaculture or improved catch methods to optimize catches could be introduced in the future, and could pose competition for these fishing communities. Alternative bait sources may reduce the price competition between the wet market and the pole-and-line vessels by removing the dependency of the pole-and-line industry on bait catches, ultimately reducing the bait fishermen's income. A more pressing development is the new moratorium on fishery policy. Which direction the government will

take after the moratorium has ended and what kind of policies will be put into force are still uncertain. However, the complete lack of recognition of this force by the visited communities highlights their illiteracy on forces beyond the local level. Whether this gap of knowledge really exists is speculative; the respondents might not have mentioned it due to the fact the field work started during the time the new moratorium had just been put in to place and not have been informed on the latest developments. However, if this is not the case then the situation is distressing as the proposed legislations in the moratorium could completely shut down the beach bait fishery. As policies can be put into force overnight, it is essential that the beach seine communities have a well-adjusted strategies on dealing with the complete elimination of (or one of) their financial resources. Especially for the community inhabitants whose livelihood strategy is to take up no other activity beside bait fishing, or communities that have few job opportunities and a lot of people invested in the bait fishery will be stricken hard by such a development. The respondents with side-jobs might be able to deal with it better in the short term. Still, for most of the respondents being a bait fishermen or dragger was the most profitable job they could pursue and this legislation will lead to reduced financial gains and a total shutdown of the bait fishery.

#### *Lack of organisation*

Despite the social bond between the fishermen, they appeared to lack organisation. The respondents did not seem to know the exact amount of bait fishermen, draggers and boats within their own community, based on the variety of numbers given by different respondents. Except for the Kasawari community that had a fishermen association for those working under the middle man, there were no organisational structures found for fisheries in the other communities. Organized groups tend to have a stronger social capital, which might have beneficial outcomes on the beach seining practices by working more efficiently, equal distribution of revenue, deliver structured opposition if necessary and qualify for potential subsidies.

#### *No baitfish management*

Both literature and respondents indicate that there is no management for the bait fish stock. As baitfish are a central asset to the bait fishermen's livelihood and the source material for the pole-and-line fishery, having no monitoring or management in place makes the communities vulnerable. Without proper monitoring at least, it is unsure whether the bait stocks are healthy and being exploited sustainably. The target species is moderately resistant to fishing pressure, but the respondents and Gillet (2014) baitfish report indicate that the CPUE of baitfish has been declining in the area of Bitung. The communities appear to keep some sort of documentation of their catches, as

some communities are only paid per month. However, it hasn't been mentioned that this data is used for monitoring or management purposes.

## **Opportunities**

### *Organisation and participation*

An opportunity for these fishermen and women is organising a social structure, like a fishery association. Organisation of bait fishermen at the inter- and intra-community level increases their social asset by internalizing collective goal orientation and shared trust, which creates value by facilitating successful collective action (Leana and Van Buren, 1999). Bait fishermen are likely to derive benefits and values through collective action which could improve their resilience against threats. Through organisation bait fishermen are more competent defend themselves from unwanted processes increased market demand could bring and more likely to be noticed by other parties that are involved in processes relevant to their livelihood. As a collective, bait fishermen are able to set fixed bait prices within and between the communities.

Furthermore, as a social group they are capable to increase their participative power in managerial processes. They might be able to be involved with and to deal with (expected) bait management and monitoring plans that are might be needed for the certification process. It would also be easier to remain updated on external developments through an organization representative that could *laisse* with government and market actors. Likewise, they could offer collective resistance to unwanted management that affects the community or the beach seine fishery as a whole.

## **Threats**

### *Exclusion*

Arising from illiteracy on external processes is the threat of exclusion from processes and new developments that could positively or negatively affect these communities. The question rises whether they will be able to adapt to and keep up with the demands of these new developments, and whether they would be better prepared if they would have known beforehand or if they were part of the processes. Gillet (2014) thinks "it is doubtful whether the Indonesian system can support such a massive upgrading of monitoring/research" (p. 62). Although his notion concerns set FIP objectives for bait management, it gives the impression that being informed will make no difference; the Indonesian system is incapable of massive upgrading and monitoring. Nevertheless, beach seining communities could potentially improve the effectiveness monitoring systems if they were included in such processes.

Yet, beach seining communities are at risk of being excluded from the FIP, as either none or only some evidence of management is required for MSC certification of the pole-and-line fishery. In addition, FIP management measures are regulated through a top-down force. To illustrate:

“It is anticipated that the International Pole-and-Line Foundation (IPNLF), will facilitate the development of the FIP Action Plan, supported by Asosiasi Perikanan Pole-and-Line Dan Handline Indonesia (AP2HI) Indonesia. **However, the overarching management issues fall to the Ministry of Marine Affairs and Fisheries (MMAF),** in association with defined management actions approved by Western and Central Pacific Fisheries Commission (WCPFC) and Indian Ocean Tuna Commission (IOTC). **The associated fisheries management tasks fall to both MMAF at national level, and the Provincial Government and District Fisheries offices of Dinas Kelautan dan Perikanan (DKP).**” (Poseidon Arms. 2013, pp. 4 and 5)<sup>11</sup>.

Though developed by market-based NGOs, the management tasks fall under government control making it a top-down system. International forces, like the sustainable seafood movement, are driving these global forces back to local community levels through institutional settings. NGOs like IPNLF and AP2HI could play a role to counter top-down control of the government by increasing influence of the small-scale fishing communities in the FIP action plan. Yet none of the visited communities were approached or mentioned being approached during this study.

Another part of this threat, or rather a missed opportunity, is that the communities may also not be aware of or excluded from processes or policies that are beneficial. The interview with MDPI revealed that there are already some governmental support projects to relieve small-scale fishermen by providing e.g. financial aid. Small-scale fishermen only needed to be registered. None of respondents mentioned the existence of such a project; Whether this is due to the type of questioning or originate from illiteracy is unknown. However, if the latter option were to be true, then these communities might be also missing out on beneficial projects and processes.

#### *Continued decline of bait stock*

Without sustainable management it is possible that current practices would lead to future decline and depletion of the bait fish stock. As mentioned before, baitfish are a central asset to the bait fishermen’s livelihood and a source material for the pole-and-line fishery. Respondents and Gillet (2014) baitfish report indicate that the CPUE has been declining, which could mean declining baitfish stocks. Whether the this is due to just beach seining practices or combined with other types fishing activity in area is unknown and remains un-researched. It is likely that a combination of fishing

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<sup>11</sup> Bold parts are to highlight the important notions of this quote, they are not illustrated as such in the original document.

activity and environmental forcing are leading to this decline. Without proper management in place it is likely that the bait stock the decline will continue.

#### *Closure of the beach seine fishery*

The new fishery moratorium holds a large threat for the beach seining bait fishery. Originating from addressing IUU fishing and sustainable exploitation of Indonesian fish stocks, the newly proposed fishery policies have the potential to close the local beach seine fisheries. Two policies are of importance: the ban of unsustainable fishing gear and the ban of fishing operations in the 0-4 mile zone. As the moratorium is only a very recent development it is unsure how the new fishery policies will play out and whether they will ever be fully installed. However, if installed there would likely be issues with monitoring compliance with moratorium regulations. The moratorium is expected to have impact on the bait fisheries if not directly then indirectly through the Indonesian pole-and-line value chain; e.g. by stimulation of pole-and-line activity or forcing the pole-and-line industry to only use cultured baitfish.

## **5.2 Livelihood strategies**

This section describes the livelihood strategies identified during fieldwork and how they match with the identified SWOTs. It is unclear whether the communities' actions are part of a thought-out strategy or a reactive and unplanned activity (Dorward et al., 2003). The latter seems more likely for these communities, as the respondents never mentioned a clear link between their way of living and the processes that are going on in the region. Table 9 provides an overview of the adaptive strategies found and a brief description of what they entail. The strategies were sometimes used in combination with each other and are not mutually exclusive. The different strategies are not linked to a particular community, but were rather an individual strategy of the respondent. Nevertheless, some strategies were found more often in the same community as they faced similar difficulties.

**Table 9. Livelihood strategies found in the visited communities.**

Livelihood strategy	Brief description
Trust in God/ no other activities	Mostly used in relation to seasonality and decreasing baitfish stock. Respondents answered that nothing could be done about adverse trends and were just part of nature or Gods will. They trusted God to make it right, or just let nature run its course. Usually in the times when the bait season was low, these people would live on their savings or loans and wait for things to come around.
Baitfishing with a side-job	Having a side-job besides being a bait fishermen/women. The location of the community determined the number of job opportunities; closer to Bitung were more jobs. These people's main job was being a bait fishermen. In the times when there was no bait could be caught they would take up other professions, e.g. ojek driver, farmer, construction worker. They preferred their job as bait fishermen
Baitfishing as a side-job	Having baitfishing a side job. Only go baitfishing when there is a lot of baitfish to be caught. None of the respondents had adopted this strategy; it was mentioned that during the high season the number of bait fishermen and draggers increased and were causing competition in prices for bait.
Reporting	To deal with any adverse effects coming from pollution or coastal development, a number of respondent had turned to either to the government, police or resorts to address negative effects they experienced. The respondents took actions trying to improve their situation. In all the cases however, their voices were not heard and nothing had changed. This made them hesitant to try it again, as they thought it would be likely that it would fail.
Diversifying gear	To deal with the seasonality of the bait fishery a number of respondents had additional boats next to the lampboat. These boats tended to be a different type of fishing boat, such as a traditional handline boat or transportation boat. There were also talks of switching to other boats to get baitfish such as pajeko's, so that fishermen could go further out to sea. The pajeko's could also be used to drag the seine nets. A couple of the communities mentioned that they had fish farms, but these were not owned by the bait fishermen themselves. Other people that were not involved in the bait fishery owned fish farms and were farming ikan mubara. There had been previous attempts made by the government programs to start up fish farms in several communities, but the respondents did not like the government control. When asked if milkfish farming would be a good an idea as bait alternative the opinions were divided. A lot of the respondents had just heard about milkfish, but did not know that they could be farmed.

When linking the SWOTs with the livelihood strategies, it appears that the strategies are designed for processes happening at local levels that operationalizes their strengths and deals with their weaknesses. The strength and weaknesses originating from the secondary forces have an direct impact on the fishing activity and livelihood, so positive and negative consequences are felt directly in terms of catches and income. The adaptive strategies deal with these forces by finding alternative sources of income when baitfish are lacking, through side-jobs and diversifying gear. The strategy of finding alternative sources of income could prove useful if bait stocks were to deplete or the fishery banned, but does not safeguard the future of the baitfishing livelihoods.

The communities show an apparent lack of livelihood strategies to operationalize their opportunities and counter the threats, which are derived from the main forces. Illiteracy and its consequent threats of exclusion on these institutional forces keep beach seining communities unaware of situation they are potentially facing. These forces manifest themselves slower and on a larger scale, keeping communities unaware of their existence as there is currently not a direct impact. Only the strategy of 'reporting' to local governments or other parties could prove useful, as it shows that the communities have some notion of the larger forces at play and responsible bodies to report to. Whether they would use this strategy to deal with adverse effects from an increased demand for sustainable seafood, and whether the strategy would be successful is however unlikely.



## 6. Discussion

This study has aimed to investigate the socio-economic conditions bait supplying communities face in the context of increasing demand for pole-and-line tuna, using beach seining communities of North Sulawesi, Indonesia as a case study. Figure 21 provides a graphical overview of the different steps taken in this study. The livelihood assets are at the centre of the model and were described in Chapter 3. The assets specifically focussed on identification of properties the communities had or had access to. Beside the necessary assets for baitfishing, all communities were found to have strong social bonds between fishermen, but a general lack of human resources. The differences between communities were expressed by having reduced or overrepresented assets in relation to the other communities, which were predominantly the natural and human asset. Most of the differences originated from the geographical location of the communities. The external forces impacting livelihood assets were divided into main and secondary forces which were described in Chapter 4. The combination of these forces with the livelihood assets led to the observed and described strengths and weaknesses of the communities and the opportunities and threats they face regarding increased market demand (Chapter 5). Combining the SWOT with the communities' current livelihood strategies revealed a skewed situation of communities' adaptive capacity. It turned out only one livelihood strategy suits with identified opportunities and threats resulting from an

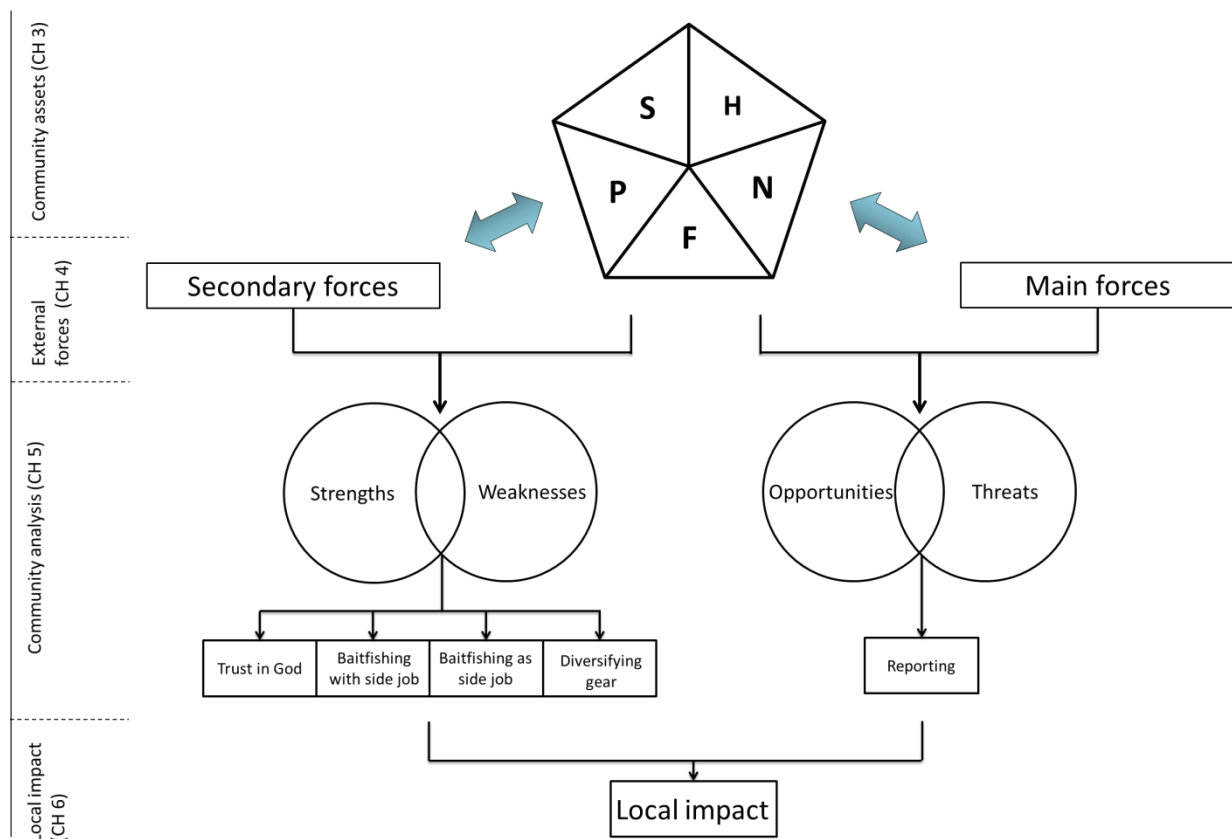


Figure 20. Graphical presentation of the different steps taken in this study to analyse the impact of

increased market demand for pole-and-line tuna.

Before concluding on the future implications for the fishery, this chapter evaluates the local impact of increased market demand on socio-economic conditions by using the SL concept. Thereby, the limitations of using the SL framework and concepts are assessed, together with the limitations of the study. Alternative frameworks are suggested to overcome the limitations.

## **6.1 Local impact**

Forces related to the international trend of increased demand for sustainable seafood are being institutionalized in national policy through the FIP, the fishery moratorium and the national tuna action plan. Rationalized through the SWOT and livelihood strategies, the sustainable livelihood concepts are used to evaluate the local impact of these developments on socio-economic conditions and the adaptive capacity of these communities. The SL concepts were: capability, equity, sustainability, poverty and deprivation.

The communities appear to lack capabilities to recognize and counter the developments described above. Their current livelihood strategies do not relate to and are not sufficiently resilient to cope with the implications originating from the main forces. Absence of these capabilities makes communities vulnerable and reduces resilience as they are not capable to respond to unwanted processes. While the current lack of capabilities is not a result from an increased demand for sustainable seafood, the prevailing developments could potentially aggravate local situations by reducing the communities adaptive capacity. Through exclusion from processes like the FIP, communities are not given the opportunity to maintain and improve their assets and capabilities on which their livelihood depends. In addition, the moratorium reduce the number of functionings the communities are able to achieve, as they are no longer allowed to fish. This in turn diminishes the quality of the life of community respondents as they are not able to perform the actions they might deem valuable. This is especially distressing for the more isolated communities like Binuang, where all inhabitants are involved in fishery, baitfish being their central livelihood asset and being a fisherman the main social status. Due to limited job opportunities in the area and low education level the adaptive capacity of this community is already low. Closure of the bait fishery would reduce it further. The same goes for the other communities. Even though there are more job options to engage in for the communities closely situated to Bitung, baitfishing remains the most profitable profession compared to other available jobs due to their general low education level. The impact on the socio-economic conditions of the moratorium would therefore be extensive, as it would derive

the communities of their most profitable income and social status as a fisherman. The continuation of the beach seining fishery would then solely depend on faulty monitoring of compliance with moratorium legislations.

The opportunity for the communities lies with organisation and participation, which would strengthen social conditions and increase their capabilities. The Kasawari community provided a one-time example of community bonding to stop the building of a processing company. Yet this example implies reactive, short-term organisation and it is unlikely that all communities have the capabilities to react in a similar manner or to make long-lasting social structures needed to cope with the institutional developments. Community welfare NGO's could play an important role by bringing the necessary capabilities to organize bait fishermen and set up local institutions. This could include increasing community awareness and enabling participation in processes that influence the future of their livelihood; ideally by providing communities opportunities to participate themselves or by representing their interests. Through organisation and participation, thus strengthening their social structure, communities would have the capability and opportunity to preserve or even enhance their economic conditions and adaptive capacity. In the case of the FIP, this would entail active participation of community members in drafting FIP action plan for the bait fisheries, making them part of the benefit sharing mechanism which could ultimately improve living conditions.

The current developments also raise questions on equity and distributive justice in terms of power distribution and participative power. The Indonesian government approaches bait fishery management with top-down measures with the FIP, moratorium and national tuna plan. The FIP monitoring and management plans are constructed with market-based NGOs and the actual implantation is done by governmental bodies, currently excluding local beach seining communities who actually depend on bait fishing for their livelihood. This evokes questions on the distribution of benefits. International market players hold most of the power by setting the standards and influence the demand for sustainable seafood. The Indonesian government and industry players conform to these standards and demands to maintain their export and trade; especially in Indonesia whose main export product is seafood. They are helped by market-based NGO's that link them to the Western markets. However, these international sustainability standards will also have to be met at local levels. The question is whether the benefits and costs of meeting this demand are equally distributed throughout the value chain. As beach seining communities appeared not to be involved FIP and baitfishing does not need to be sustainable for MSC certification, it is doubtful that these baitfishing communities will receive benefits even though they are linked to the sustainable and possibly certified pole-and-line fishery. The bait fishing communities are then likely to end up with costs, such as no bait management plan and/or competition with aquacultured bait. The declining CPUE current

underlines the importance for a management plan. Without such a plan the bait stock is likely to continue to decline, which would have most effects on communities with strong natural and human assets in the fishery. The competition between baitfish as food or bait appeared to be beneficial as beach seine fishermen sold their fish to the most profitable buyer, maximizing their income. Nevertheless, people not involved in the fishery end up paying higher prices for anchovy. Introduction of aquacultured bait could reduce the dependency on wild-caught baitfish thus alleviating price competition between the pole-and-line industry and the wet market, hence reducing the bait fishermen's financial asset.

The increased demand for sustainable seafood originates from increased awareness on unsustainable management of fishery resources. Recognized by the minister of Fisheries and Maritime Affairs, the fishery moratorium was implemented to increase the sustainability of the Indonesian fisheries and therewith simultaneously meet international demands of the seafood market. The development of increasing the sustainability of the Indonesian fisheries in itself is promising. The FIP for the pole-and-line fishery is part of this development and promotes ecosystem based approach to fisheries management. For the bait fishery this would mean an improvement of their ecological situation through monitoring and management activities of the bait stock to ensure sustainable fishing practices, and thus securing ecological sustainability of the beach seining livelihoods. This would safeguard communities socio-economic conditions through conserving the main natural resource on which their social status and financial ventures are derived. Nonetheless, this is only the case if the FIP requires to have an effective bait management plan in place. Without an effective management plan, ecological sustainability of the bait fishery is doubtful and could consequently undermine socio-economic conditions of the local fishermen.

Social sustainability is not high on the agenda of the fishery moratorium, FIP and tuna action plan. Although claiming to promote ecosystem based management, the planned activities are solely focussed on the ecological side of the fishery and ecosystem sustainability; e.g. community livelihoods are not mentioned in the FIP action plan (Poseidon ARMS, 2013). Social networks within the community and community participation in collective groups and networks are central to achieve social sustainability. As long as the FIP and national tuna action plan do not recognize this nor provide settings in which this can be achieved, current developments do not protect the social sustainability of these communities.

Relating the community situations to poverty, beach seining communities appear to have poor capabilities and limited opportunities. The SWOT demonstrated a majority of weaknesses and threats which hints at poverty in terms of capabilities, making the communities vulnerable to these 'new'

developments as they lack the adaptive capacity to counter negative effects. This makes the communities highly vulnerable to impacts of an increased market demand, which could lead to material poverty of the communities that are highly dependent on bait fishing if the bait fishery were to shut down or the bait stock continues to decline. Lack of awareness and participation from the communities to the top-down control from the market and national government, gives the impression of deprivation in terms of social inferiority and isolation in relation to institutional forces. This can be substantiated by two notions. First, the communities' knowledge gap on the developments related to increased market demand. Second, the lack of communication from top-down forces to the community levels. Both are worrying as it indicates a lack of information flow, which are leaving the communities socially inferior in terms of knowledge and isolated in terms of processes that are fundamental to their livelihood as a bait fishing community.

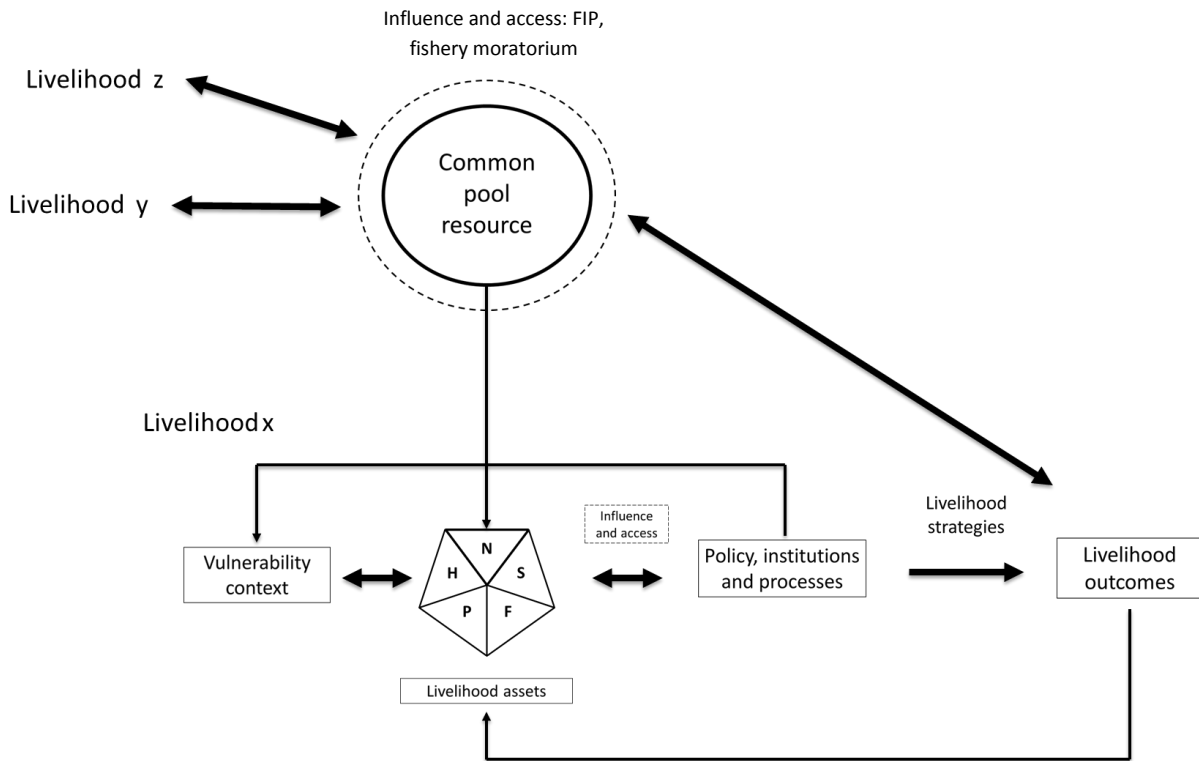
## **6.2 Limitations of the study**

This section critically reflects the limitations of the framework and the used methods, and how it might have impacted the outcomes of the study.

### **6.2.1 Theoretical framework**

This study has come across several limiting aspect of the SL framework for assessing and understanding community conditions. Although visually the SL model is simplistic enough, the underlying complexity and causal relationships makes it difficult to assess and assign community conditions properly as "SLs have many dimensions and multiple causalities. They take different forms for different people in different environments" (Chambers and Conway, 1992 p. 18). Placing the static data in a dynamic framework, by integrating multiple dimensions and causalities in a structured way, has been challenging. While challenging is not necessary limiting, it does question whether the SL sufficiently operational; The data was only able to provide a static 'snapshot' of community livelihoods, showing only a glimpse of its complex changes.

The framework also proved limiting in its scope, by not taking the common pool nature of the natural asset into account. As there were no exclusive rights to fishing grounds, the communities' livelihoods were affected by other 'livelihoods' depending on the ocean as a resource as well as international forces influencing the access to the resource through national institutions. In this line of thought, Figure 21 is an attempt to expand the SL model of Allison and Horemans (2006), by linking the natural asset of the target livelihood x to the common pool resource, which is also affected by activities of livelihood y and z. In this study the common pool resource is influenced by and limited in



**Figure 21. The SL model by Allison and Horemans (2006) extended to incorporate the common pool nature of the natural asset.**

access due to the FIP and moratorium, being part of the international force for increased demand for sustainable seafood.

Beside not incorporating the common pool nature of the natural asset, the framework was also inadequate for identifying power and power relations. The framework offers a structural perspective on processes that influence livelihoods, but does not incorporate the extent and force of these implications and on which domains. In this study the policies and institutions predominantly influenced the community livelihood and determined the future implications. In order to bring this power relation forward additional analyses had to be done, e.g. by integrating a SWOT analysis and conceptualizing the developments and implications through the SL concepts.

Lastly, the framework failed to grasp the more organic and social ways in which livelihoods are being shaped and reshaped. Given the results, a stronger focus is needed on understanding the social aspects and structures in place within the communities. Both Magis (2010) and Dempsey et al (2011) highlight the importance of social structures for community resilience and sustainability. The social side is disclosed through the human and social asset of the SL framework, but does not capture these social structures that are shaping the livelihoods. Thereby, the human and social asset only allocate

features to e.g. a person education level, but reveals nothing of a persons' wellbeing, aspiration and values.

### **6.2.2 Methodology and validation**

There were several factors that limited this research. These factors were a linguistic and cultural barrier, infrastructural difficulties and seasonality. Most of the interviews and focus group discussions were conducted with the help of an interpreter, making the data of this research subjected to the translation skills of the interpreter. Two of the interpreters did not have a background in fishery science, which made additional explaining necessary as well as rechecking translated data. Sometimes it happened that there seemed to be a miscommunication, where either the interpreter did not seem to understand the questions to be asked or the answer given, or either myself did not understand the translated answer. This means that I might have missed out on certain information or connection during the interviews and focus group discussions. Thereby, originating from a Western country, there was a cultural barrier that might have inhibited me to fully grasp and understand the perspective of my interviewees. Their lives and livelihoods differed significantly from my own, and I was often seen as a point of attraction. This did made people willing to participate as they were curious to know what I was doing, but at the same time people were also scared to sit down for one-on-one interviews. Thereby, people feared I was working for the government making them reluctant to be interviewed. But this was overcome by stating that I was not from the government and just a student doing her final research project.

As for infrastructural difficulties, some communities were too far away to visit or not accessible. These communities were located on the small islands above north Sulawesi. The visited communities were communities easily accessible by either car or boat, making the data biased. Other communities that were mentioned to be on Lembah were too difficult to access due to the weather conditions and strong winds, which made boat trips to those communities impossible.

Lastly, an important issue is seasonality, which relates to the ability to catch pole-and-tuna and bait fish, which is dependent on the season. In North Sulawesi there are two seasons, the dry and the rainy season. The wet season starts in December and lasts until March. During the rainy season a lot less pole-and-line activity is taken place. The season for bait fish seemed to fluctuate a lot, with some respondents stating that December was the high season for bait, whilst others called it the worst season. In January and February it was low season for bait, so there were not a lot of catches. Most of the respondent might have answered questions based on current fishing conditions, e.g. prices, catches etc., so the answers do not represent general data.

The factors mentioned above have influenced the research process, making it difficult to validate the research outcomes for the whole region or beach seining bait fisheries in general. Thereby, there was a lot of variation in answers within and between communities, making it difficult to provide a general assessment of the socio-economic conditions. It is important to keep in mind that the generated data is based on in-situ information and, even if some aspects can be extended to a larger scale, a lot of data is also community specific thus impacting the external validity. As for internal validity, conclusions and recommendations are based on the data that is obtained through qualitative personal interviews and focus group discussions. The internal validity is thus subjected to the type of questions asked, the interpretation of the question by the interpreter and interviewee, the translation process and how those factors have influenced the outcomes.

### **6.3 Alternative theoretical frameworks**

Beside the SL framework, there are alternative frameworks suitable to meet the research goals. This section brings forward a selection of other frameworks that might overcome the encountered limitations of the SL approach. Per framework a brief outline is given on the conceptual basis and its rationale considering the research goal.

#### *Ecosystem Approach to Fisheries (EAF)*

The EAF might prove useful as it operates at a higher level than households or community, namely the ecosystem level. Its founding principles and conceptual goals emerge from the foundations of sustainable development, aiming at both human and ecosystem wellbeing by recognizing the entire range of interactions happening in an ecosystem (Garcia et al., 2003). In this study, this could have been useful as it would give a better impression of the current bait stock status and potential implications of (not) having a management plan in place. With that knowledge it would be clear what type of measures would have to be adopted to make the plan effective, whether the baiting communities had capabilities to do so and if not what capabilities needed to be introduced to the communities. In addition, the framework would incorporate both community and ecosystem wellbeing, thus providing a scope that will include the livelihoods of other communities drawing from the pool resource. An EAF “strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.” (FAO, 2003 p. 14). As fruitful as this framework sounds, there are several issues foreseeable. First of all, an ecosystem and its interactions does not always have clear boundaries making it difficult to define the scope. The FAO’s ‘ecologically meaningful’ is pretty vague. Secondly, the SL has already proven to be



complex for assessing a livelihood in itself. The EAF would have to assess all livelihoods and the social and ecological relationships within and between these livelihoods, which would be extremely complex. Trying to reduce the complexity however could lead to the undesirable development of generalizing communities objectives, and through this possible reducing human wellbeing. Lastly, the services and needs of the different actors/livelihoods might be conflicting, creating a deadlock which could create an unbalanced situation where some wellbeing's are being valued more over others.

#### *The social wellbeing and capability approach (CA)*

The social wellbeing and capability approach might able to identify the organic and social ways that shape community livelihoods. SWA is a multi-dimensional approach for understanding and measuring social process and developments (Britton and Coulthard, 2012). Wellbeing being defined as "a state of being with others, which arises where human needs are met, where one can act meaningfully to pursue one's goals, and where one can enjoy a satisfactory quality of life" (McGregor et al., 2008 in Coulthard et al, 2011), which is closely linked to the concepts of human needs, freedom/autonomy and quality of life (Coulthard et al., 2011). As the SWA could the potential of providing a people-centred, holistic analysis of what matters to people in terms of quality of life, pursuits and achievements (Britton and Coulthard, 2012), which in this study could have shed light on the communities aspirations and values. In terms of fisheries policy and governance for baitfish management, this approach could have revealed the capabilities these community inhabitants needed and wanted. This information is important as it would enable NGO's and government to improve community conditions and public support for these developments. And this might, consequently, lead to better implementation of an eventual bait management plan. The difficulties of the SWA however, arise from fully grasping a person's quality of life which tends to be subjective and woolly of nature. This could have even been more difficult due the language barrier. Thereby, the quality of life as well as a person's values and needs are not static entities but change over time, making it challenging to assess.

Closely related to SWA is the capability approach, introduced by Amartya Sen in the 1980, which could also provide better understanding on community wellbeing and what they are able to do in terms of capabilities and functionings. The CA sees human life as a set of 'functionings' and evaluates the quality of life of person by having the ability to achieve functionings he deems valuable (Clark, 2005; Sen, 1985). While this approach does not focus on social structures, it provide a more objective way to assess community wellbeing than the SWA, as it capable of evaluating a group's wellbeing by looking at different aspects such as poverty and inequality (Robeyns, 2005). Even though capabilities were already included in this study, capabilities were only used to speculate on the community

inhabitants quality of life. With a direct focus on the available functionings of the community inhabitants together with investigation of the functionings these communities deem valuable, the impact of increased market demand on the quality of life could be assessed rather than speculated upon. In that sense, this framework could help with designing and evaluating policies for the bait fishermen, which would be useful to NGO's that want to strengthen community sustainability and resilience. However, as the CA might be satisfactory in identifying aspects such as poverty and inequality, it will not reveal anything about key drivers of these aspects which does happen in the SL framework. And as mentioned earlier, it fails to take into account social structures and interdependencies, which are also forces structuring and shaping livelihoods and community wellbeing.

## **7. Conclusions**

The aim of this study has been to assess the local impact of an increased international demand for pole-and-line tuna on socio-economic conditions, by identifying the adaptive capacity of bait supplying communities. This study analysed livelihood conditions of five beach seining communities in the vicinity of Bitung, North Sulawesi between December 2014 – Februari 2015.

Forces related to the international trend of increased demand for sustainable seafood are being institutionalized in national policy through the FIP, the fishery moratorium and the national tuna action plan. Local baitfishing communities are at risk of either being excluded from the certification process or forced to cooperate through top-down government control. Exclusion originates from either non-participation in creating a bait management plan or exclusion of the bait fishery entirely in the MSC certification process. The latter implies that the Indonesian pole-and-line fishery can get MSC certified without having an effective bait management plan in place. The fishery moratorium has the potential to cut-off communities access to their natural resource. This development would shut down all bait fishing activity in the region. The national tuna action plan only focusses on ensuring the sustainability of tuna fisheries and excludes bait fisheries and bait management.

Given the current developments this study revealed that the adaptive capacity of these communities is low, making them highly vulnerable to impacts of international market demand for sustainable seafood. Combining the SWOT with the communities' current adaptive strategies revealed a skewed situation of communities' only having one livelihood strategy that suits with identified threats coming from an increased market demand. The lack of adaptive capacity hampers these communities counter threats, which would eventually lead to a further reduced capacity to safeguard the future of their livelihood. Impacts of threats such as exclusion, closure of the fishery and baitfish depletion are sheer, providing no or little alternatives for the bait fishermen. An opportunity would be creating social structures through organisation and participation, given the strong social bonds that exist between the fishermen. Yet it appears that the communities lack the capabilities to realize this. The communities are at risk of being deprived in terms of social inferiority and isolation in relation to the institutional processes, through a lack of information flow from and to community level. Thereby, without participation it is unlikely that the benefits and costs of meeting demand are equally distributed throughout the value chain.

This study raises questions on how global environmental sustainability standards are influencing local socio-economic conditions and whether striving for sustainable seafood products actually contributes to overall sustainability, as these results show that environmental sustainability

standards do not guarantee socio-economic sustainability of local livelihoods. Only with proper institutions in place, that provide settings where communities are able to organize themselves and participate in processes essential to their livelihood, the increased market demand could bring capabilities and functionings that were not accessible before. NGO's play an important role here, as they could provide necessary capabilities and structures for beach seining communities to be part of these processes. By working closely together with an NGO that hold social sustainability in high esteem, it might be possible to improve the communities participative influence and consequently their adaptive capacity. Without social organisation of beach seining fishermen, it seems unlikely the local impact of an increased market demand on the socio-economic conditions and the adaptive capacity of beach seining communities will be beneficial.

### **Recommendations for further research**

To improve the findings of this study further research is recommended. Most pressing would be monitoring the current institutional developments in Indonesia and exploring ways how NGO's could play a role in making the beach seining communities more resilient, by providing social structure and creating knowledge flows. The focus of such a research should be on understanding and measuring social process and developments, and how NGO's could bring new capabilities and functionings that would comply with the needs and wants of the communities.

In addition, more socio-economic research on the Indonesian beach seining fisheries at other locations in Indonesia would improve the understanding of Indonesian beach seine bait fisheries. If consisting findings are found at other locations, it would increase the validity of this study outcomes. As bagans are also providing baitfish to the pole-and-line tuna industry in Indonesia, it would be important to also focus (socio-economic) research on this fishery and identify potential implications of increased production. This might also provide answers to how the sustainability of beach seine bait fishing practices compares to bagan bait fishing, and which type of fishery should be preferred for the pole-and-line fishery in the perspective of sustainability.

To understand the bait-food competition, more insights should be gained on baitfish/anchovy distribution dynamics. This could be done by assessing the supply chain from catch to processing factory, either the wet market or pole-and-line vessels; determining the share of baitfish distributed to the different markets, understanding price variations baitfish together with its influence on the competition between anchovy as bait or food.

Lastly, this study has made clear that a critical analysis is needed on how global forces like the sustainable seafood movement are affecting local community levels, and whether the local communities are benefitting from these processes regarding sustainability. This study combined with other case studies can be used as reference material to make assumptions and draw conclusions on the social sustainability aspects of the sustainable seafood movement and its local impact on communities in developing countries.

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## Appendix

### Personal interview questionnaire (community - males)

**Name:**

**Age:**

**Location:**

**Date:**

**“What are the local socio-economic conditions of the communities, and which aspects can be derived from bait fishing?”**

- 1.** How are you involved in the bait fishery? How long have you been involved?

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- 2.** How many men are involved in the bait fishery?

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- 3.** Do you like your job?

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- 4.** What is the price for baitfish? (Per kg, per bucket) What does the price depend on? What determines the price? How much do you fish per day? And how does the company know if there is a fish?

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- 5.** What do you do when you can't go fishing? Or if there is no fish in the ocean? Do you have any side job?

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- 6.** Can you tell me a little bit about the ownership of the boat? How many liters of fuel do you use for one time operation? What are the fuel cost?

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- 7.** What do you think are the advantages or benefits of this bait fishery? Do you expect more income from the bait fishery in the future? Are there any options for occupation? What about the profit, does other occupation offer more less the same profit or not?

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8. Can you tell me a little bit about education level of you and your kids? And what do you want your kids to be?

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**“What external forces impact the baiting practices of these local communities?”**

1. How do you fish? (Technically. Make a drawing, if necessary) Is there any contact with other bait fisher communities?

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2. What difficulties do you or have you experienced with fishing? Do you think that these difficulties can be overcome? If yes or no, why?

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3. Do you believe demand will increase in the future? If yes, then what will happen? What do you think will happen when the demand for baitfish increases? (Ex. Number of bait fisher might be increased, then would they be a competitor for you?)

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4. What difficulties do you foresee in the future?

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## Personal interview questionnaire (community - females)

**Name:**

**Age:**

**Location:**

**Date:**

**“What are the local socio-economic conditions of the communities, and which aspects can be derived from bait fishing?”**

1. How are you involved in the bait fishery community? How long have you been involved?

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2. How many female are involved in the bait fishery?

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3. Do you like your job?

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4. What is the price for the baitfish? (Per kg, per bucket) What does the price depend on? What determines the price? How much do you fish per day? And how does the company know if there is a fish?

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5. What do you do when you can't go fishing? Or if there is no fish in the ocean? Do you have any side job?

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6. Do you use the bait fish as food? Do you believe that there is a competition between selling the fish as bait or as food?

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7. What do you think will happen if the demand for baitfish increases? What if the demand is not increasing? Does that will influence you (your socio-economic life)?

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8. What do you think are the advantages or benefits of this bait fishery? Do you expect more income from the bait fishery in the future? Are there any options for occupation? What about the profit, does other occupation offer more less the same profit or not?

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9. Can you tell me a little bit about education level of you and your kids? And what do you want your kids to be?

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**“What external forces impact the baiting practices of these local communities?”**

1. What difficulties do you or have you experienced with fishing? Do you think that these difficulties can be overcome? If yes or no, why? Is there any contact with other bait fisher communities?

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2. What difficulties do you foresee in the future?

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## Focus group discussion questionnaire (males)

**Names:**

**Ages:**

**Location:**

**Date:**

1. Which bait species are caught? What is the weight per bucket?

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2. What factor limits you/the community **the most** in catching bait?

*(port development, decrease nr of fish/not enough fish, not enough boats/fishermen/ draggers, competition big fishing boats)*

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3. What could help you improve/increase bait catches? *(more boats, more fishermen, more fishing spots, etc.)*

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4. Is being a fisherman considered as a good job to have? Do you want your children to be a fisherman or involved in the fishery? Why (not)?

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5. Who will take over the fishery in the community when you become too old to be a fisherman?

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6. How do you think this fishery will look like in twenty years? *(will it be still here, will it be gone, will there be fewer/more fishermen, etc.)* Why?

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## Focus group discussion questionnaire (females)

**Names:**

**Ages:**

**Location:**

**Date:**

1. How important are women draggers in the fishery? (*What happens if there were no women involved?/ would it make any difference?*)

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2. What will you eat if you cannot eat baitfish (anchovies)? Is there any situation that you are not able to use baitfish as food?

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3. You and the other people involved in the fishery always take a plate or bucket of fish for food. What about the other people in the community who are not involved in the fishery. How do they get fish? (*What is the market price for bait fish? Can they afford to buy baitfish as food?*)

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4. Is being a fisherman considered as a good job to have? Do you want your children to be a fisherman or involved in the fishery? Why (not)?

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5. How do you think this fishery will look like in twenty years? (*will it be still here, will it be gone, will there be fewer/more fishermen, etc.*) Why?

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6. Have you heard about fish farming? Do you think it would be a nice job to have?

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## External party interview questionnaire

**Company name (if applicable):**

**Name:**

**Profession:**

**Date:**

1. How are you/is this company involved in the pole-and-tuna industry/Indonesian fishery?

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2. What do you think drives demand for pole and-line tuna? Is this likely to change in the future?

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3. How will and increased demand for pole-and-line tuna affect the pole-and-line and bait fishery?

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4. What difficulties do you or have you experienced/observed in the pole-and-line and bait fishery?

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5. What (other) difficulties do you foresee in the future? What opportunities do you foresee in the future?

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6. Which institutions are involved in the pole-and-line industry? How do they influence pole-and-line practices?

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7. What policies are involved in the pole-and-line industry? How do they influence pole-and-line practices?

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8. What processes influence the pole-and-line industry? How do they influence pole-and-line practices?

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## Extra (potential) questionnaire processing companies

1. What is a good season for baitfish? And skipjack?

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2. What do you think limits baitfishers to catch enough bait?

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3. How do you deal with bait scarcity? (Take extra measures, increase price etc?)

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4. Is there a preference for bait from bagans or from beach seining communities? If yes, which and why?

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5. Who determines the price that is paid for bait, the company or the boat captain?

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## Questionnaire pole-and-line fishermen

**Name:**

**Age:**

**Location:**

**Date:**

1. What are good season to get baitfish? Which months?

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2. What limits you catching (enough) skipjack?

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3. What do you think limits baitfishers (beach seine and bagans) to catch (enough) bait?

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4. How do you deal with bait scarcity – what do you do if there is not enough bait?

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5. How does the company you work for respond to bait scarcity – what do they do?

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6. Where do you buy your baitfish? From bagans or beach seining communities? Which do you prefer and why?

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7. Does the company or the captain determine the price for which they want to buy bait?

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