SUSTAINABLE TUNA SUPPLY CHAIN TO MEET EUROPEAN MARKET DEMAND (A CASE STUDY IN BITUNG)

Maulisa Firbiani

940825240030

MSc Food Technology (Food Innovation and Management)

Wageningen University and Research

2018

MSc Thesis Report

Sustainable Tuna Supply Chain to Meet European Market Demand

(A Case Study in Bitung)

Maulisa Firbiani

940825240030

Date of submission: August 28, 2018

Thesis code: MST-80436

Supervisor: Prof. Jacques H. Trienekens

Co-reader : dr. Domenico Dentoni

Wageningen University and Research

Department of Social Sciences

Management Studies Chair Group

ABSTRACT

European market shows an increasing global demand related to tuna supply. There is a willingness from consumers to pay a premium price for sustainable tuna. Given by the high market demand and the efficacy as the world's largest tuna producer, Bitung has the ability to meet EU market demand. However, due to regulation reformations in 2104, the supply of tuna to export has been interrupted. Furthermore, this regulation has impacted on all parties involved in the supply chain.

This research aims to identify the roles of each stakeholders that influence the supply of sustainable tuna as an export commodity and provide recommendations to reform its supply chain system to meet European market demands in Bitung. The stakeholder in this study refers to fishers, suppliers, processors and exporters.

Comparative analysis was used to process the data that are collected through semi-structured interviews. The interviews among different supply chain parties were compared to understand current fish catching practices and the sustainable tuna supply chain in Bitung. The research found that there are eight variables that influence tuna supply to European market, which are skills, the need of adding number of boats, the understanding of the requirements, quality, education, market demand, contractual agreement, and incentives.

The most important findings of this study are that the fishers and suppliers are not aware of the importance of traceability and document control in sustainable fisheries practices. In contrary, as a stakeholder that has direct relation to the buyer it is hard for processors to satisfy buyer as the engagement of the supply chain actors remains low. Moreover, some of the government's requirements are cumbersome due to different traceability requirements from regional (government) and international document control. Although, the fishers' willingness to adapt to Fairtrade is high, support from the value chain actors is insufficient.

Several changes should be made by the supply chain parties to increase the number of sustainable tuna being exported. Effective cooperation and network building between the supply chain actors is important to improve the ability to collaborate on implementing the traceability system. With the development of good document control, more sustainable tuna can be documented to meet EU import market demand. Moreover, increasing pressure from the government, gaining cooperation and coordination between chain actors and non-chain actors is essential for the tuna supply chain to be successful.

Keyword: supply chain, demand, tuna, fishery, sustainable

ACKNOWLEDGEMENT

First of all, I would like to show my appreciation to Prof Jacques Trienekens who has supported me and guide me throughout my thesis. I thank you for the critical feedback and advice during this research. I would also thank dr. Domenico Dentoni to give a fruitful feedback for my thesis report. I also like to take a moment to thank all of the MDPI officers for supporting me during the data collection process in Bitung. My research would have been impossible without contribution from fishers, suppliers and officers.

Finally, I would like to express my gratitude to my family and friends who supported me through the last two years. An amazing opportunity which help me to grow as a person. I thank them for the supports, wishes and endless prayers. First and foremost, I would like to thank Ibu and Ayah for always believing in me throughout my study. Thank you for the trust and letting me choose my own path. I would not have made it this far without their blessings and prayers. I would like to thank all my close friends, my support system, for the strength, for the supports, for their presence. I wish all warmth and kindness of the world to always be with you, you do not know how much I am grateful. Lastly, thank you for the one who patiently encourage me through my insecurities, thank you for accepting me for being who I am.

Wageningen, August 28, 2018

Maulisa Firbiani

"Indeed, the help of Allah is near." (QS 2: 214)

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ASC	Aquaculture Stewardship Council
BRC	British Retail Consortium
CBI	The Centre for the Promotion of Imports from developing countries
DGCF-MMAF	Directorate General of Capture Fisheries of the MMAF
DKP	Dinas Kelautan dan Perikanan (Department of Marine and Fisheries)
EU	European Union
FAD	Fishing aggregating device
FAO	Food and Agriculture Organization
GAP	Good Agricultural Practice
HACCP	Hazard Analysis and Critical Control Points
IFS	International food standards
IUU	Illegal, unreported and unregulated
MDPI	Yayasan Masyarakat dan Perikanan Indonesia
MMAF	Ministry of Fisheries and Marine Affairs
MSC	Marine Stewardship Council
NGO	Non Gpvernmental Organization
SQF	Safe Quality Food Certification

1. INTRODUCTION

This section will introduce the inspiration for conducting this study. The problem statement regarding the sustainable tuna supply chain in Bitung will be introduced, explaining the current situation in the area. The objective of this study is formulated in the research objective section, followed by a list of research questions. The concluding part of this chapter is the research framework.

1.1 Problem Statement

Tuna is the most consumed fish species in the EU (EUMOFA, 2016). The amount of tuna consumption per capita in the EU was 2.6 kg in 2014 (EUMOFA, 2016). Furthermore, sashimi and sushi trends across the world in the past few years mean increasing demand for tuna (Miyake, Guillotreau, Sun & Ishimura, 2010).

Currently, the European market shows increasing demand for sustainable fish (WWF, 2017). According to CBI (2017), there is a willingness from consumers to pay a premium price for sustainable tuna. North and Western European retailers show a high demand for sustainable tuna products. The increase in demand is derived from the need to act on sustainable and ethical business behaviour at the retailer level and its supply chain (Chkanikova & Mont, 2011).

Tuna in the EU is principally imported from non-EU countries (CBI, 2017). In order to enter the European market, exporters need to comply with EU requirements and standards regarding the quality, traceability, trustworthy certificates regarding catches, health and hygiene, for quality assurance purposes (CBI, 2017). Consumers demand guarantees concerning food characteristics, calling for transparency and an effective response if a problem arises (Trienekens, Wognum, Beulens & Van Der Vorst, 2011).

As the world's largest tuna producer, Indonesia contributes approximately 16% of the world's tuna supply (USAID 2017; CEA 2015). Bitung is a city that is located in North Sulawesi Province, Indonesia. In 2014, Its main fishing port accounted for 54% of total fisheries products landed in Indonesia (SEAFDEC, 2017) and fishery products from Bitung were traded internationally to 34 different countries (USAID, 2017).

According to USAID (2017), tuna supply chain stakeholders in Bitung are made of numerous actors that play different roles throughout the supply chain. They are small and large-scale fishers, small and large-scale suppliers, processors or canneries, as well as exporters (USAID, 2017).

The increasing global demand related to tuna supply should be followed by sustainable fishery practices. Moreover, to prevent tuna resource depletion, it is crucial that sustainable development in is implemented in the tuna supply chain (United Nations, 2007). In 2014, regulation reformations concerning Indonesia's maritime policies and marine capture fisheries governance were issued by the Ministry of Marine and Fisheries Affairs (MMAF). The purpose of the regulation is to establish a moratorium on foreign vessels permits for fishing operations and moreover, to eradicate Illegal, Unreported and Unregulated (IUU) fishing in Indonesian fishing waters and combat overfishing.

Until 2014, fishing vessels in Bitung were dominated by nationalised foreign-made vessels and operated as joint ventures with local companies (Witular, 2016). After the regulations were issued in 2014, large-scale fishers (more than 30 GT) were unable to sail anymore. This situation is for the reason that vessels are not allowed to catch fish anymore. Consequently, the supply of raw materials to fish processing units has been interrupted. Furthermore, this regulation has impacted on all parties

involved in the supply chain. As the number of fish catching drops, processors are struggling to comply with the buyers' requests regarding quantity (continuity). Hence, the processors face a decrease in production of 59% (USAID, 2017).

The raw material shortage has benefited small-scale fisher and suppliers in Bitung. Nowadays, processors have begun to expand the sources of tuna from small-scale fishers to fulfil buyers' demands (Witular, 2016). Therefore, it has increased demand for small-scale fishers. As demand kept increasing, in 2015, small-scale fishers increased their catch volume to more than double (Mochtar, 2016).

Conversely, the number of catches from one fisher to another is not uniform. As a result, the supply fluctuates. Having a stable supply is important for fisheries industry in Bitung. The industry operates continuously with a certain quantity and quality standards that should meet Indonesia's and EU regulations. Adding to the problem, according to MMAF regulation, it is not mandatory for small-scale fishers to own catch documentation. However, catch documentation is required to export to the EU market.

Small-scale fishers in Bitung employ artisanal fishing methods. Yellowfin tuna in Bitung are caught by means of handline catching, which is recognised as sustainable (CBI, 2017). Given the high market demand and efficacy regarding sustainable tuna, Bitung has the ability to meet EU market demand.

1.2 Objectives

To identify the roles of each stakeholders that influence the supply of sustainable tuna as an export commodity and provide recommendations to reform its supply chain system to meet European market demands. The stakeholder in this study refers to fishers, suppliers, processors and exporters.

1.3 Research Questions

In order to achieve the research objective, the main research question and sub-questions for this study are constructed as follows.

1.3.1 Main Research Question

What are the roles of each stakeholders can be improved in relation to increase the supply of sustainable tuna as an export commodity in Bitung?

1.3.2 Sub-Questions

1. What are the current condition practices related to catching fish and the sustainable tuna supply chain in Bitung?
2. Do all the stakeholders know the export requirements for sustainable tuna to meet European market demand?
3. How willing are the supply chain actors to comply with the requirements of sustainable and traceable tuna?
4. What are possible solutions should be made by supply chain parties in order to comply with sustainable tuna requirements?

1.4 Key Concepts and Definitions

In order to gain an understanding of how terms and concepts are used during the research project, this section provides definitions of the fundamental terms and concepts.

Sustainable fisheries = ensures fish stocks can continue indefinitely and the fish population can remain productive and healthy, minimising the environmental impact so that other species and habitats within the ecosystem remain healthy, effective fisheries management and ensuring people who depend on fishing can maintain their livelihoods (MSC, 2018).

Supply chain = a network of (physical and decision making) activities connected by material, information and money flow that cross organisational boundaries (Chopra & Meindl, 2007).

Food (supply) chain = the entire supply process from agricultural production, harvest/slaughter, through primary production and/or manufacturing, to storage and distribution to retail sale or use in catering and consumer practices (Stringer & Hall, 2007).

Traceability = tracking fishery products via the entire supply chain from catch and landing through division and processing to final sale and consumption (Hosch & Blaha, 2017).

Value chain = model that describes a series of value-adding activities connecting a company's supply side (raw materials, inbound logistics and production processes) with its demand side (outbound logistics, marketing and sales) (Rayport & Sviokla, 1995).

1.5 Research Design

The primary purpose of this research is to determine the influence of supply chain stakeholders on the sustainable tuna supply chain. The research design serves as a plan that is decided by the researcher and is a way to introduce the decision on which study design will be used, how to collect the information from respondents, how to select respondents, how the collected information will be analyzed further and moreover, how to communicate the findings (Kumar, 2014). This study aims to provide recommendations to increase the supply of sustainable tuna. In order to achieve this aim, a literature study concerning related topics is conducted.

The design of this study is qualitative, explanatory, descriptive and contextual in nature. Its qualitative study provides the opportunity to reveal the nature of the sustainable tuna supply chain system of which little is currently known. The primary qualitative method selected in this research is a case study. Case studies help to understand some particular problem or situation comprehensively using multiple sources of evidence. Explanatory research helps to investigate the processes in a company (Yin, 2016). In explanatory research, data are examined both at a superficial and comprehensive level to explain the phenomena in the data. The descriptive study is carried out to describe situations and events which occur within the data in question. The contextual approach focuses on the phenomena under investigation to be studied regarding intrinsic and immediate contextual significance (Mouton, 1996). The empirical tools that are being used in this research are case studies and interviews.

1.6 Research Framework

The research framework represents how the research is conducted to achieve the objectives. It is organised into four distinctive sections.

1. Theoretical study

   The main objective of the theoretical study is to reveal information regarding factors that affect the sustainable tuna supply chain: current practice, the challenges and opportunities pertaining to sustainable tuna as an export commodity.
2. Empirical study

The empirical study is conducted in order to understand which factors affect the increasing number of sustainable tuna. This study is conducted via interviews with supply chain parties operating in the sustainable tuna supply chain.

3. Analysis
   The results from the empirical study will be collected and analysed to formulate relationships between the data and the theoretical study.
4. Conclusions
   Several recommendations will be provided to decrease the sustainable tuna shortage.

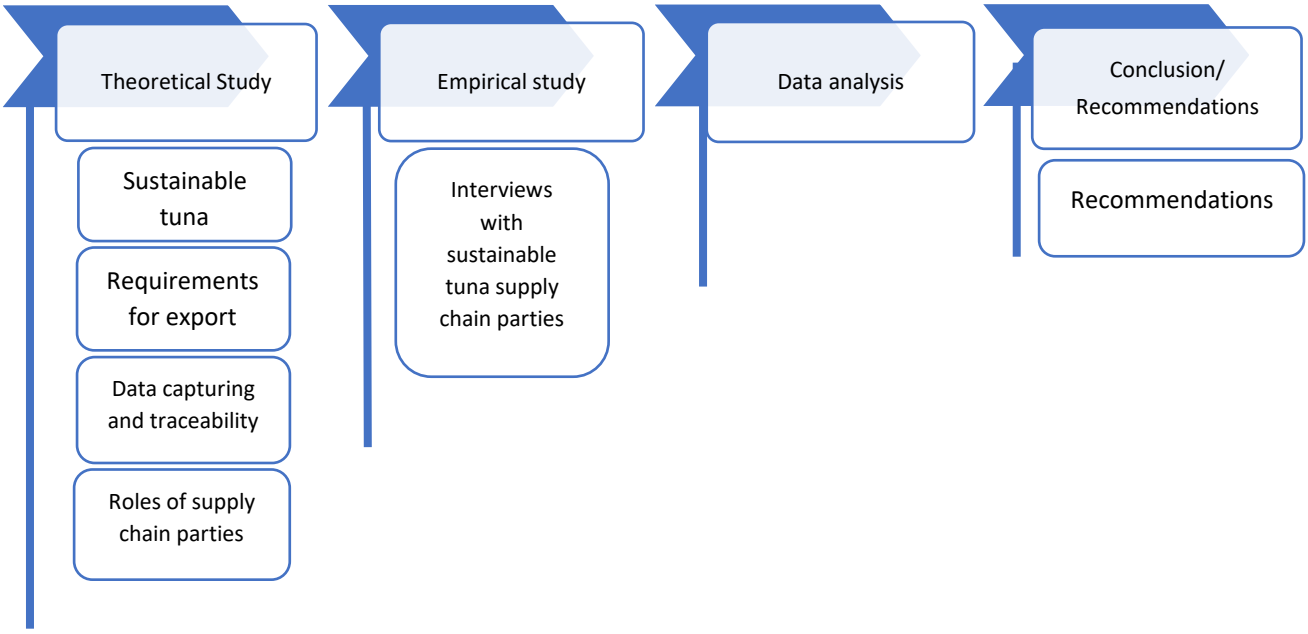


FIGURE 1 RESEARCH FRAMEWORK FOR THE STUDY ON THE SUSTAINABLE TUNA SUPPLY CHAIN (A CASE STUDY IN BITUNG)

2. LITERATURE REVIEW

In order to answer the research questions, a literature review covering the existing theoretical frameworks was conducted. This chapter further elaborates on the literature review. Current practices related to sustainable tuna are described in this chapter. Furthermore, preview studies regarding market demand for the sustainable tuna supply chain are described. The international requirements for sustainable tuna supply chain are also explained in depth in the following part. The role of each supply chain stakeholder will help to explore its contribution to a manageable sustainable tuna supply chain. This chapter closes by presenting a conceptual framework that will be used as a guide to answer the research questions during the studies.

2.1 Current practice of fishing on sustainable tuna in Bitung

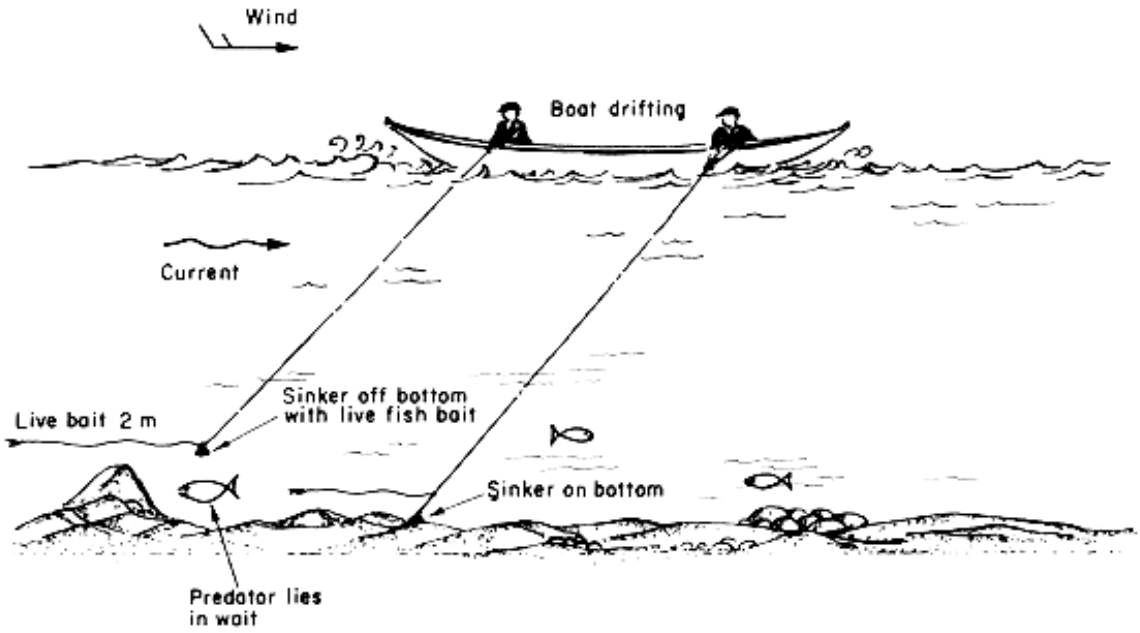
Bitung is one of the main fishing ports and processing centres in Indonesia. This industry provides more than 10,000 jobs in the area (Soeriaatmadja, 2016). Between 2011 and 2014, fish production in Bitung increased 599% from 15,933 to 111,316 tons in Bitung. Bitung contributes greatly to national fisheries production. The number of catches increased from 1.2% to 7.5% between 2011-2014.

Tuna is an essential commodity with regards to Bitung. Catches landed in the North Sulawesi Province are comprised of approximately 81% tuna species (USAID, 2017); specifically, 40% skipjack, 21% yellowfin and bigeye and 19% mackerel (USAID, 2017). Tuna processing in Bitung is separated into: (1) fresh or frozen tuna and (2) canned tuna. Fresh and frozen tuna are sold to high-value international markets such as Japan, the EU and the US. Meanwhile, canned tuna is targeted for at domestic and regional markets (USAID, 2017).

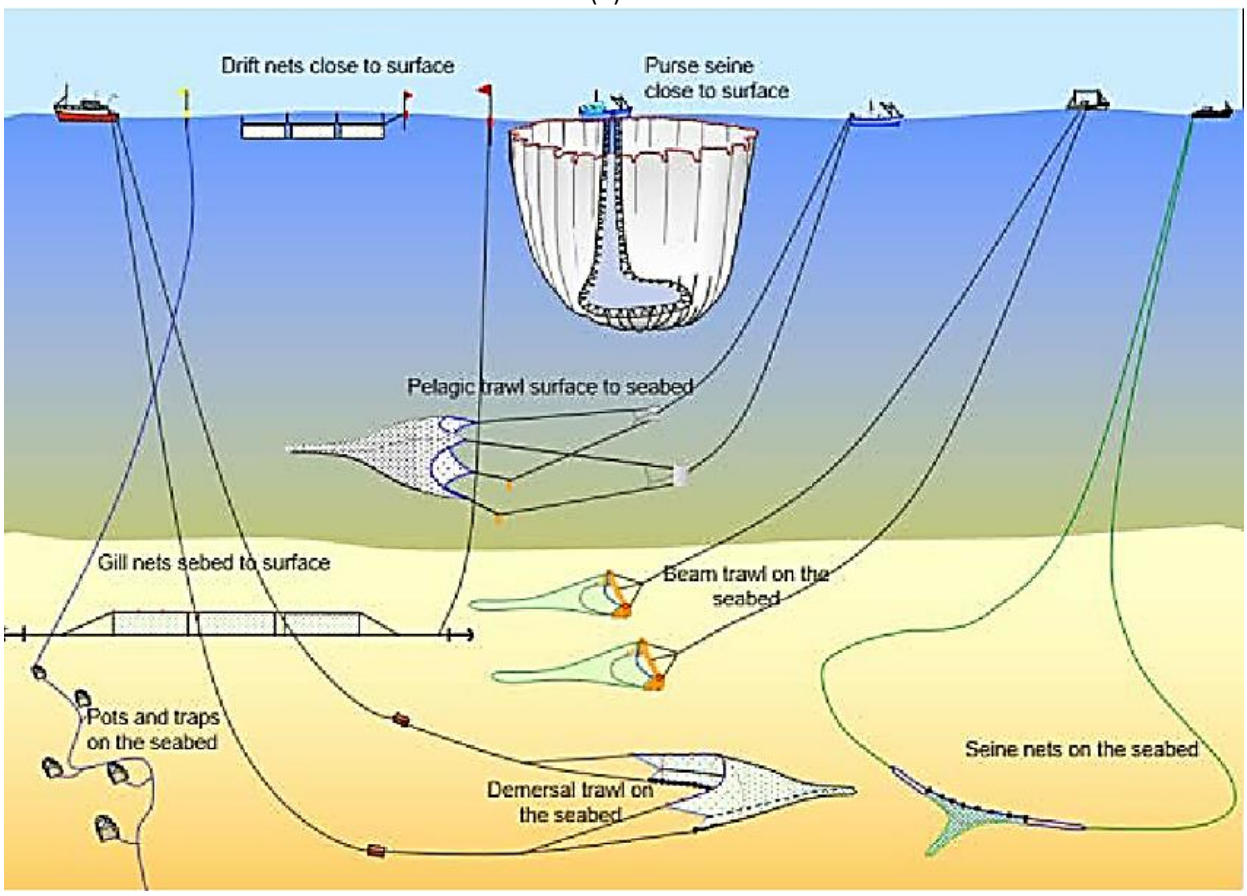
Between 2011 and 2015, tuna from Bitung was exported to 34 countries. The top five market destinations are Germany, UK, Thailand, the US and Switzerland. In 2015, the top five export markets represented 88% of the total export from Bitung. The UK is the single largest market (37%), followed by Germany (30%), the US (10%), Switzerland (7%) and Australia (4%) (USAID, 2017).

Several gear types are used to catch tuna in Bitung: (1) longline, (2) purse-seine, (3) pole-and-line, (4) hand line, (5) troll and (6) gillnet (Figure 2). In 2014, approximately 51% of tuna in Bitung was caught by means of pole-and-line, hand-line and long-line; while 31% of tuna was caught via purse seine (USAID, 2017).

Handline fishing is categorised as a small-scale fishing method. It is considered inexpensive, artisanal and simple. Not only economical, but also fuel efficient and an effective form of fishing (FAO, n.d.). Handline fishing in Bitung accounts for approximately 2% of Indonesia's tuna catch. It uses traditional techniques such as a rod and tackle, fishing arrows and harpoons, cast nets and small traditional fishing boats. Additionally, it is a skill learned by means of years of experience. The product is generally sold in North America (Fishery Progress, 2018).



(A)



(B)

FIGURE 2 (A) HANDLINE FROM DRIFTING CANOE AND (B) PURSE SEINE FISHING PRACTICE (SOURCES: FAO, (N.D.)AND GRIEVE, BRADY & POLET (2014))

The policy issued in 2014 has impacted on every fishery supply chain actor in Bitung. Two fisheries policies were implemented at this time:

- MMAF Regulation No. 56/2014 (MMAF, Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 56/PERMEN-KP/2014, 2014)
  Establishes a moratorium on foreign vessel permits for capture fisheries, foreign employment ban and foreign export vessel permit re-verification
  Aims to eradicate IUU fishing in Indonesian fishing waters
  Impact:
  1. Drop in fish catch numbers
  2. Dwindling supply for fish processing businesses
  3. Lower levels of exports (USAID, 2017)

- MMAF Regulation No. 2/2015 (MMAF, 2015)
  Bans trawlers and purse seine nets in Indonesian fisheries management areas
  Aims to protect the marine environment from damage and improve fish catches
  Impact: Fishers encounter difficulties in replacing fishing equipment (USAID, 2017)

As noted, the current government supports more sustainable, localised fisheries, the distribution of fisheries resources across many parties within a sector and an increase in value over volume (USAID, 2017).

Due to purse-seine restrictions, there was a drastic 62% decline from 2014 to 2015. The purse seine technique is used worldwide by the industrial and semi-industrial fleets of several countries (FAO, 2018). However, the catching performance of purse seine is not selective (concerning species and sizes of fish); therefore, there could be important by-catch of non-targeted species or tiny fish of target species (FAO, 2018).

It should be noted that after the fisheries policy was implemented, many fishing vessels (> 30 GT) were unable to operate. Consequently, landed volumes decreased 59% from 2014, which means that the processors are receiving fewer supplies. Furthermore, due to the lower production volume, approximately 10,000 workers have lost their jobs in the past year (Witular, 2016).

Currently, only 31% of tuna production from Bitung is exported (USAID, 2017); thus, the level of exports has dropped (USAID, 2017). Currently, there are 67 registered processor companies in Bitung, performing processes such as cutting fish into loins, smoking, freezing and packaging of tuna species (USAID, 2017).

Conversely, small-scale fishers have benefited from this condition. As the supply from large boats to the industry was interrupted, processors need to expand the sources of tuna from small-scale fishers (Witular, 2016). Therefore, small-scale fishers and suppliers that operate fishing practices have gained a valuable bargain position (USAID, 2017).

Roles of supply chain stakeholders in the sustainable tuna supply chain

The fisheries commodities supply chain can involve a large number of stakeholders between the fisher and the final consumer (De Silva, 2011). The fisheries supply chain from Indonesia to the international market constructed from long and complex supply chain (Duggan & Kochen, 2016).

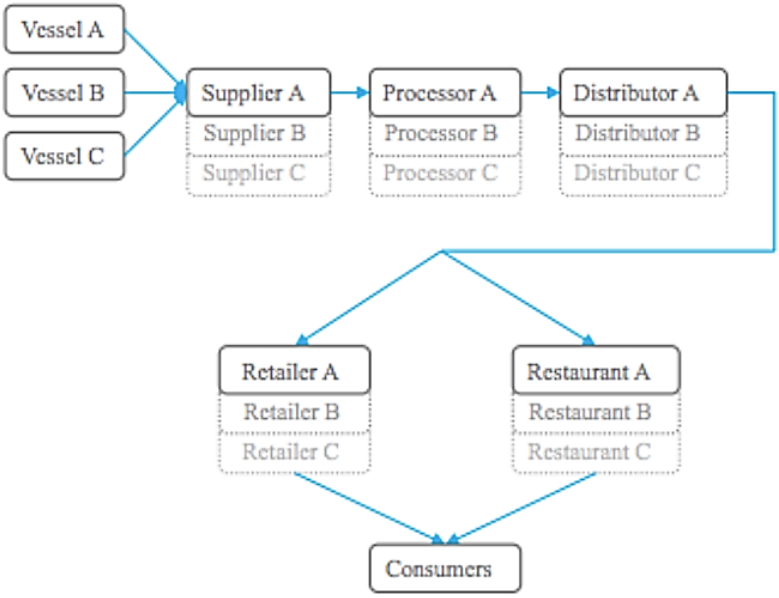


FIGURE 3 INDONESIA FISHERIES SUPPLY CHAIN (SOURCE: (DUGGAN & KOCHEN, 2016))

According to USAID (2017), Bitung tuna value chain parties in Bitung are comprised of numerous stakeholders, which have the following roles described below:

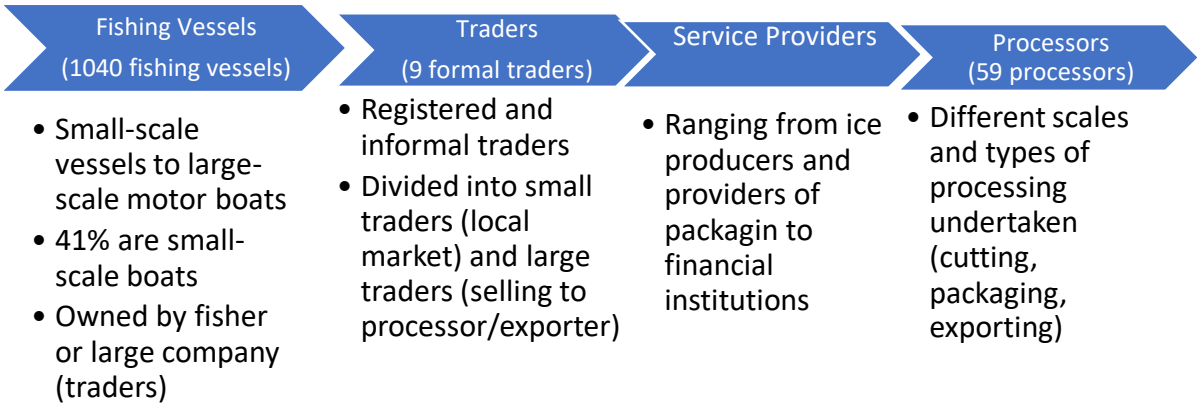


FIGURE 4 TUNA VALUE CHAIN ACTORS IN BITUNG (SOURCE: USAID, 2017)

- Fishing vessels

  The fishing vessels in Bitung vary from small-scale vessel to large-scale vessel. Most of the vessels are handline (46%), followed by purse seine (32%), pole-and-line (3%) and other (19%).

- Fisher

  According to DKP Bitung, there are approximately 6700 people engaged in fishing activities around the Bitung Fishing Port. The fisher in Bitung are divided into self-owned fishers and fisher who operate company boats.

- Traders/Middlemen/Supplier

  Suppliers in Bitung operate a logistics role, moving fish from the landing point to the processors. There is a shortage of information available and little visibility of the suppliers' role within the supply chain stakeholders.

  The recent decrease in fish supplies in Bitung has improved the suppliers' bargaining position. Since processors cannot maintain their minimum production capacities, they have expanded their supplier network beyond traditional channels.

- Processors
  Processors in Bitung perform activities such as cutting fish into loins, packaging, smoking and the freezing of tuna species (USAID, 2017).

Market demands for sustainable tuna and its impact on suppliers

Fishery products are the most traded food commodity. Approximately 40% of fisher's catches are sold on the international trade (Washington, 2008). Around 50% of international fisheries products originate in developing countries. Furthermore, 80% of these products end up in a developed country (Washington, 2008).

Due to economic improvements, the demand for high-value tuna in European countries has increased in recent years (CBI, 2017). Europe is the world's principal importer of fish and seafood, consuming in the region of 12 million tons a year (WWF, 2017). The demand for tuna, especially yellowfin, has also increased in recent years in parts of Northern and Western Europe.

Customers from the US, the EU and Australia show a preference for sustainable and traceable products. There is a willingness to pay a premium price for sustainable tuna in EU countries (CBI, 2017). The reasons for this are diverse and include:

- Corporate image and credibility
- Preservation of the brand name by offering eco-label brands
- Long-term economic savings
- Scientific alerts
- Environmentally conscious consumers
- Regulatory environment
- Opportunity to enter green markets
- Media support for sustainability
- Availability of environmental technologies
- Open business culture (Leadbitter & Benguerel, 2014)

In the Philippines, increasing demand for sustainable tuna is having a positive impact on the value chain actors (WWF, 2017). Additionally, EU demand for sustainable tuna has reshaped value chain actors' livelihoods in Lagonoy Golf and Mindoro sites in Philippines by way of triggering a fisheries improvement project to achieve MSC certification, a sustainable seafood scheme. The following examples are evidence of the success:

- Regarding ecological impacts, grade A tuna stocks increased, which in turn improved the sustainable fish stocks and generated fair competition.
- The small-scale fisher now has a better income which leads to improved livelihood. Gender equality and empowerment of people in the area also improved.
- High demand for sustainably caught tuna has encourage the governance systems to adapt, scale up financial support and provide avenues for replication for other local governments (WWF, 2017).

Consequently, the Philippines is now the biggest tuna supplier to the EU market with 82% of canned tuna exported to the EU (WWF, 2017).

Supply chain parties' involvement to ensure sustainable practices

According to Leadbitter & Benguerel (2014) four tools can be used by the commercial sector to ensure its sustainable practice. They bolster the formal regulations in some cases and fill in the gaps where regulations are either absent or not working appropriately. These tools can have an impact and provide solutions that governments cannot deliver:

1. Codes of practice and environmental management plans
   These are beneficial educational and guidance tools for all supply chain actors. Third party auditing can be used to provide feedback on progress but also provide reassurances to interested stakeholders that progress is being made
2. Retailer procurement policies
   One successful example is Walmart's commitment to sustainability in relation to the sourcing of all its seafood products. The aims are to develop and implement procurement policies, often in partnership with NGOs
3. Supply chain agreement.
   Committed participants in the supply chain are turning to private contracts in order to gain a commitment to sustainability from suppliers. The contract between the value chain enables companies to take legal action or terminate contracts if illegal activity is detected.
4. Supply chain certification
   Certification provides verification of claims to assure the systems are reliable. According to Roheim & Sutinen (2006), a chain of custody has a greater impact on preventing IUU fish from reaching the marketplace than the catch documentation schemes that currently exist.

The small-scale fisher and its livelihood

In Indonesia, classifications of fishers are differentiated by the gear size of fishing vessels. The small-scale fisher is someone who conducts fishing to meet the needs of everyday life, both of which are undertaken without a vessel or with a vessel of a maximum of ten gross tonnages (GT) (UU No. 7/ 2016) (Mochtar, Small Scale Fisheries in Indonesia, 2016). GT is the tonnage measurement of fishing vessels or size of the boat. Approximately, 90% of vessels in Indonesia's coastal areas are dominated by artisanal vessels, which are smaller than 5 GT (Sunoko & Huang, 2014). According to MMAF regulation, these small-scale vessels do not require to have a catch certificate. The small-scale fisher makes an important contribution to providing a livelihood for communities in remote areas. Small-scale tuna fisheries operations frequently occur in remote, small communities throughout Indonesia, meaning accessibility, education and socioeconomic conditions are inadequate (Duggan & Kochen, 2016).

According to a study that was conducted by USAID (2017), in general, the small-scale fishing vessel has two principal roles; specifically, captain and crew. The crews have several job descriptions such as:

1. Captain
2. Chief engineer
3. Assistant engineer
4. Chief mate
5. Crew

The significant difference between the captain and crew is the annual income, monthly expenditure and certain aspects related to material wealth. Due to his role and responsibilities, the captain has slightly more material wealth than the fisher. In this case, 100% of the captains that were interviewed owned a motorbike and a television and have electricity in their homes (USAID, 2017). Additionally, 80% of fishers earn their income through a profit-sharing system.

Most of the small-scale fishers in eastern Indonesia are exposed to a low level of education. Consequently, they are more focused on their short-term livelihood and financial income (Duggan & Kochen, 2016). According to USAID (2017), vessel captains are acknowledged to be slightly better educated than the crew. More than half of the participants finished high school.

The fishers annual average expense is Rp24,785.460 or €1510 (updated 24 January 2018, with currency 1 EUR = 16415 IDR), whilst the estimated average annual earning is Rp29,222,222 or €1779. There is a difference between expenses and incomes of captains and crew. The captain earns 58% more than his crew.

2.2 Export requirements to EU market

Particularly when it comes to access to the EU market, the Indonesian tuna industry has to comply with multiple legal requirements to meet EU standards. Furthermore, there are also additional requirements that should be met by the exporter (CBI, 2017). Therefore, some catch certificates need to be implemented for tuna to be exported to the EU. Various factors need to be fulfilled by the industry: inputs of raw material, management regulations to meet global requirements, regulations, human resources and safety standards (USAID, 2017).

In order to export to the EU, firstly the non-EU country (third country) must have an authorised establishment. The establishment should be listed on the list per sector and per country. There are four sections of the establishment; they are food; semen and embryo; animal by-product and veterinarian**.** Before a country is approved and starts exporting its product, food audits will be conducted by a competent authority, Directorate General for Health and Food Safety and the European Commission. After the EU approves an establishment, the non-EU country must have a residue monitoring plan by means of Council Directive 96/23/EC. (European Commission, 2018).

Indonesia's has been listed on the approved country. By obtaining the authorised establishment, it means Indonesia ensures that the fishery products exported meet the strict health requirements of the European Union (CBI, 2017).

Secondly, catch certificates that state the imported seafood is not caught illegally are required to enter the EU market. According to EU anti-IUU fishing legislation (EC (European Council) Regulation No. 1005/2008), without catch certificates, the imported seafood will be fined up to €70,000. The catch certificates must be issued by the country where the seafood caught. These catch certificates must be validated by the relevant competent authority from the origin country (USAID, 2017).

Thirdly, fishery products must be accompanied by proper health certificates. This health certificates confirm that the products met the standards for export to the EU. The most important rules and regulations include hygiene-related regulations (HACCP), traceability and labelling, contaminant and microbiology regulations (CBI, 2017). Under Directive No 1379/2013, in order to export to the EU countries, a product labels must be provided by exporters. The label must include this informations:

- List of ingredients (commercial and scientific name) and per cent of the weight
- Fishing gear used
- FAO area and sub-area of catch
- Net quantity
- Best before date
- Address of the manufacturer or seller established in the EU
- Place of origin
- Approval number of the processing facility
- Date of freezing (for frozen products) (European Commission, 2014).

The labelling provides information concerning product compositions and safety. This labelling strengthens traceability (De Silva, 2011). This labeling system provides consumers the opportunity to select seafood harvested with more sustainable methods from specific sources (CBI, 2017).

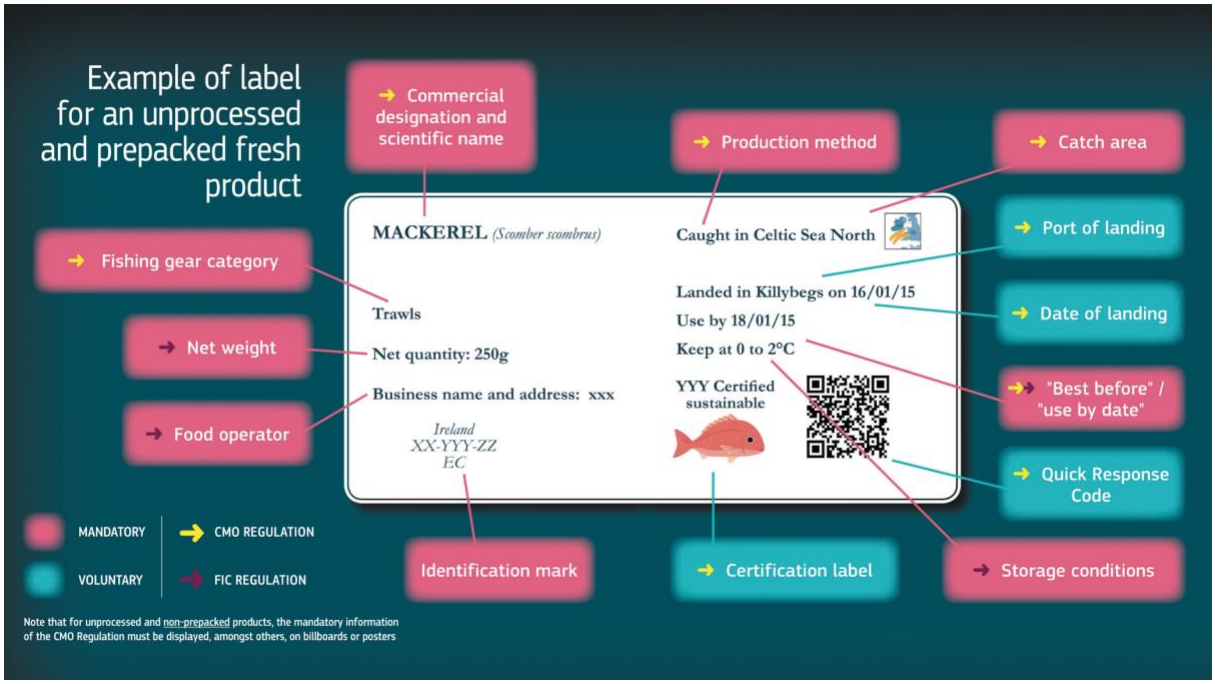


FIGURE 5 EU SEAFOOD PRODUCT LABEL
(SOURCE: (MARITIME AFFAIRS AND FISHERIES, 2015))

In addition to the label, exporter must take into account the seafood by-catch of the fishing practice. According to Council Regulation (EC) 1185/2003, it is prohibited to remove sharks fin on vessels (European Commission, 2015). Shark finning practice means cutting of a shark's fins and discarding the body at the sea. This practice is driven by the discrepancy in value between high-value shark fins and lower-value shark carcasses, especially from Asian market. Since sharks are highly vulnerable to overexploitation, due to the fact that they grow slowly, mature late, and have low rates of reproduction, many shark species are considered threatened (EU Oceana, 2011).

Additional requirements such as food safety standards and certifications can improve exporter chances to market the products in EU. These additional requirements are mainly concerning about food safety. Furthermore, ecolabelling such as MSC or Fairtrade can increase the market niche (CBI, 2017).

International standards and certifications as additional requirements

The most commonly requested food safety certification schemes for seafood products in the EU market are International Food Standard (IFS) and (or) British Retail Consortium (BRC) (see 2.7.1) Global GAP, and Safe Quality Food (SQF) (see 2.7.2) (CBI, 2017; FAO, 1996). In addition, most large-scale British retailers require BRC certification as a standard requirement for trading processed fish and seafood (FAO, 1996). Ecolabel certificates create a market niche in western and northern Europe countries (CBI, 2017).

According to Roheim & Sutinen (2006), eco-label certificate can serve three functions in the marketplace:

1. Provide independent evaluation and endorsement of a product
2. Tool for consumer protection

3. Achieving specific environmental policy goals

Certification bodies who issued the certificate own its environmental endorsement symbol or trademark and licences. There is certain fee and requirements that should be paid by the applicant to put the certificate symbol on the label. In order to put the certificates for certain period, the applicants should meet all requirements from the certification bodies.

Despite its benefit on providing a market niche, there are several gaps related obtaining eco-label requirements in both developed and developing countries. It is challenging for developing countries to comply with the requirements. The certification regularly requires fisheries management programmes of an institutional nature that are not available in many developing countries (Roheim & Sutinen, 2006).

British Retail Consortium (BRC)

BRC global standard are issued by the Association of UK retailers, manufacturers and food safety organisations (BRC, n.d.). This certification was driven by the need to meet the legislative requirements of the EU General Product Safety Directive and the United Kingdom Food Safety Act (FAO, 1996). Its quality management systems comply with the ISO 9001:00 standard.

The aim of this certification is related to what customer want from the retailer in terms of quality. It all began because of an increase in the number of retailer brands and dynamic change regarding non-price policies are strictly correlated to the transformation of the distribution sector as a whole (Arfini & Mancini, 2004).

This standard is well-established internationally. The format and content of this standard are designed to allow an assessment of the supplier's premises and operational systems and procedures by a competent third party, which standardised food safety criteria and monitoring procedures (Arfini & Mancini, 2004). The BRC standard reduces multiple audits by the technical retailer and third party technical representatives of food producers supplying the retailer with their products.

Safe Quality Food (SQF)

SQF certification is an independent certification that was developed in Australia in 1995. The purpose of this certificate is verifying the food safety of a food product that is exported to other countries, complies with international and domestic food safety regulations (FAO, 1996). Obtaining this certificate means that the supply chain actors have produced, processed, prepared and handled food according to the highest possible standards at each level of the chain (FAO, 1996).

The basis of SQF are the Hazard Analysis and Critical Control Points (HACCP) system and ISO 9000 series (Trienekens, 2004). SQF differentiates two norms; specifically, SQF 1000 which focuses on farmers and producers and additionally, SQF 2000 that focuses on food manufacturers and distributors. It has been implemented globally in more than 5000 companies in the Asia-Pacific region, Europe, the Near East, South America and the United States (FAO, 1996).

Fair Trade Certification

Fair Trade is a third-party certification that ensures the product is produced and sourced in an ethical, fair and environmentally sustainable manner (Fairtrade, 2018). Fairtrade was initiated by way of cooperation between alternative trade organisations and small-scale producers in the late 1980

(Naylor, 2013). Fair Trade focuses on land produced commodities, originally coffee and bananas, though it has expanded into cotton, fruits and farm produce.

Fairtrade gives a guarantee to the producer including a long-term relationship and minimum guaranteed price and other benefits such as a price premium (Nicholls & Opal, 2005). The price premium can be spent to improve the community's livelihood and to develop the efficiency of production systems and to implement environmental programmes (Duggan & Kochen, 2016).

Traceability system

Traceability is the ability to trace and follow food, feed and ingredients through all stages of production, processing and distribution (European Commission, n.d.). Traceability allows the consumer to determine information on the location of the product and to trace the history of that product (Trienekens, 2004).

There are three requirements with regard to chain traceability information systems. They are:

1. Identification of produce and products throughout the food chain. The identification distinguishes the item as a unique set of data. It provides items with a unique code (barcode, label, tags).
2. Tracking of items: determination of where a certain item is located in the supply chain. Tracking is proactive. It provides information about the location of a certain item at a given time.
3. Traceability of items throughout the food chain. Tracing is reactive. It aims to define the composition and treatment of an item after the item has been received during different stages of the supply chain. It is divided into two chains. Chain upstream (backward) aims to investigate the history of the item and chain. Chain downstream (forward) aims to determine the path through different stages in the supply chain (Trienekens, 2004).

The figure below illustrates the different directions of traceability in a food supply chain (van der Vorst, 2006).

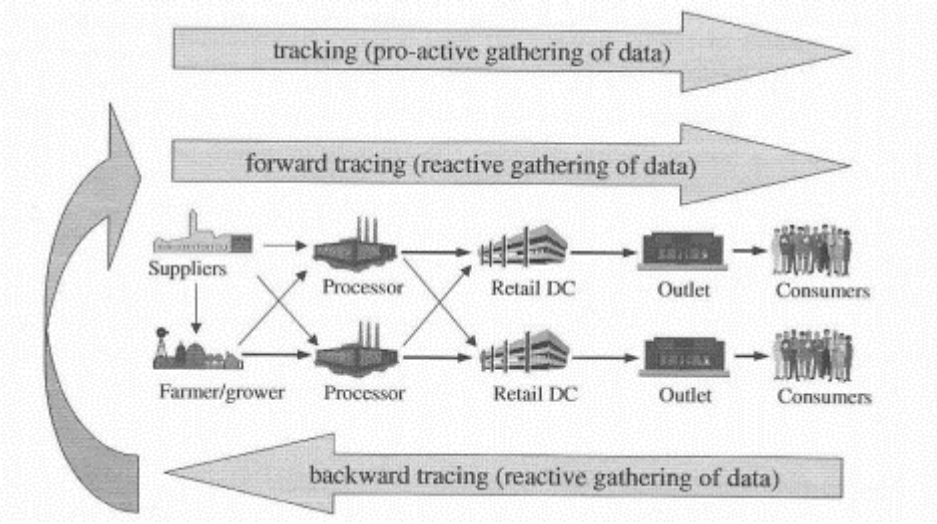


FIGURE 6 TRACKING AND TRACING
(SOURCE: (VAN DER VORST, 2006))

Olsen and Borit, in their book, mention several benefits can be accessed via traceable products:

- Ability to follow the movement of food through specified stage(s) of production, processing and distribution (CODEX, 2016)
- Ability to trace the history, application and location of that which is under consideration (ISO, 2011)
- Ability to access any or all information relating to that which is under consideration throughout its entire life cycle using recorded identification (Olsen & Borit, 2013)

Record keeping is a crucial aspect of traceability (Olsen & Borit, 2013). Furthermore, good recordkeeping offers opportunities to follow the product and the processes it undergoes and is essential in (re)gaining consumer's trust (Trienekens, 2004).

According to Trienekens, Wognum, Beulens & Van Der Vorst (2011) there are four factors that affect industry to adapt traceability: (1) consumers demand and legislation (2) ability to quickly recall product (3) improve information exchange (4) adding value by labeling.

2.3 Willingness towards adopting sustainable practices

The concept of sustainability has an indefinite meaning (Utne, 2008). According to United Nations (2007), a good indication of sustainable development in fisheries is a good proportion of fish stocks within safe biological limits. It means the percentage of fish that is caught within the area is within the level of maximum biological productivity. Thus, the biological limit is indicated by the state of exploitation of fisheries resources at global, regional and national levels. This indicator measures the level of sustainable production from capture fisheries and the results are seen as a formal stock assessment.

Fish stocks that are "overexploited", "depleted" and "recovering" are out of the maximum biological productivity. According to the MSC pre-assessment, the status of the yellowfin tuna stock in the Pacific area (including Bitung) was "moderately exploited" (WWF, 2011). These stocks are within the maximum biological productivity according to the formal stock assessment based on FAO procedure. According to United Nations (2007), it is still categorised as having a proportion of fish stocks within the safe biological limit.

According to Hall, Dennis, Lopez & Marshall (2009), there are five factors affecting the adoption of sustainable practices. They are:

- Environmental regulations
- Customer value
- Farmers' attitudes toward sustainability
- Age
- Operation size

In contrast, positive attitudes toward sustainability and the environment are not in line with adoption behaviours. The two most important factors that affected the adoption of sustainable practices were concerns about the implementation and risk perceived by growers.

Eco-labels are one of several factors to facilitate movement towards sustainable fisheries and marine ecosystems by allowing the consumer to pay a premium price (Uchida, Roheim, Wakamatsu & Anderson, 2013). However, the effectiveness of this criteria is dependent on economic incentives via the marketplace to affect reform of fisheries management and practices. The target market is tied

to understanding the awareness of environmental issues which demand such labels. Sustainable labels enhance consumers' ability to make those product choices regarding the issues they value (Uchida, Roheim, Wakamatsu & Anderson, 2013).

Eco-label could also be addressed as a sustainable marketing. Sustainability marketing can be defined as related to building and maintaining sustainable relationship with customers, the social environment and the natural environment (Belz & Schmidt-Riediger, 2010). When a company earns eco-label certificates, it will increase the market niche. Eco-label, as a part of sustainable marketing tries to deliver and increase customer value by attaching social and environmental value to food products (Belz & Schmidt-Riediger, 2010).

2.4 Conceptual Framework

Based on the previously discussed literature, the following conceptual framework is constructed (Figure 7). The conceptual framework states that the sustainable fisher's practice to meet market demand is constructed of three variables; specifically, requirement variables, willingness to collaborate and impact on market demand. Each variable contributes to a series of factors.

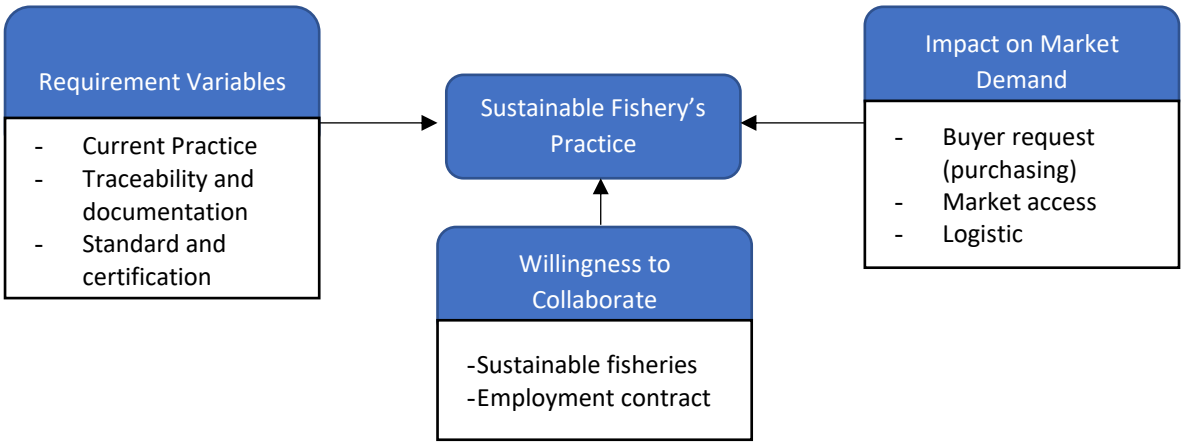


FIGURE 7 CONCEPTUAL FRAMEWORK OF SUSTAINABLE TUNA SUPPLY CHAIN IN BITUNG

Firstly, the requirement variables that are essential in order to export to the European market were studied. Current practice was observed to examine if the practices are already being applied in a sustainable manner. Furthermore, the European market has strict import regulations when it comes to documentation and traceability. Better document control regarding the supply chain actors can result in increasing export volumes. Secondly, the willingness of sustainable tuna supply chain actors to collaborate with sustainable livelihood were studied. Sustainable livelihood and employment contracts are factors that influence supply chain actors to adopt sustainable fisheries. Lastly, the impact on market demand was observed. This factor was constructed by way of market volume, market access and logistics. Those factors mentioned affect fisher's practices. The improvement in those factors can increase the supply of sustainable tuna as an export commodity in Bitung.

3. METHODOLOGY

In this chapter, the methodology that includes the reseach design which this study follows, will be explained in further detail. The second section, the case selection (sampling), will also be discussed. To conclude, an explanation of the study instrument and methods that are used in the data collection and analysis will be discussed.

3.1 Research Design

The research design that is used in this study is a case study design together with the qualitative approach. The case study design is chosen to provide in-depth information pertaining to current practices, requirements and changes, as well as the willingness and compliance to increase sustainable tuna supplies. This approach is more appropriate for exploring and understanding comprehensively (Kumar, 2011). Qualitative sampling is a method that is purposely selected for essential information in which specific situations, individuals, organisations or events can produce what other sampling methods are unable to (Maxwell, 1997).

3.2 Case selection (sampling)

The field work where this thesis set the scene is in Bitung, North Sulawesi, Indonesia. It is selected to be the field study in this thesis, for the reason that it is main fishing port and accounts for 54% of total fisheries products landed in Indonesia (SEAFDEC, 2017). Similarly, in 2012 and 2013, tuna production in North Sulawesi amounted to 22% of the estimated total catch of yellowfin tuna in Indonesia (DGCF-MMAF, 2013). Yellowfin tuna in Bitung are caught by way of handline fishing, which is acknowledged as sustainable in Europe. Additionally, according to the CBI (2017), from 2011-2015, yellowfin tuna was imported the most. Therefore, Bitung is a sensible location to conduct this study case.

FIGURE 8 STUDY AREA IN BITUNG, NORTH SULAWESI, INDONESIA (SOURCE: (SOERIAATMADJA, 2016))

The case selection began by undertaking the literature review and having a discussion with a sustainable fisheries NGO named Masyarakat dan Perikanan Indonesia (MDPI). This organisation (MDPI) has an office in the Bitung area and moreover, it has a close relationship with the sustainable tuna supply chain actors in Bitung port. Discussion with MDPI gave a more in-depth representation regarding the situation and current fisheries practice in Bitung.

Interviews were conducted with sustainable tuna supply chain actors, the fishers, suppliers and companies. The interviewees were selected by means of snowball sampling. This sampling method helps the researcher to ask a member in the group to identify other people. Hence, selected people become part of the sample (Kumar, 2011).

According to the European Commission (2017), there are two processing companies from Bitung that have been established to export the products to European Union countries.

TABLE 1 PROCESSED FISHERIES PRODUCTS EXPORTED TO THE EU FROM INDONESIA

No	Approval Number	Name	Activities
1	427.25.A/B	PT. Sari Tuna Makmur	Processing
2	562.25.A/B	PT. Nutrindo Fresfood Internasional	Processing

The companies identified above were selected to be interviewed. MDPI's field officer helped by identifying stakeholders involved in the supply chain. Furthermore, the MDPI teams provided an insight into other processing companies in Bitung that have the capability to export to the European market, with regards to Fairtrade certification ownership. According to Yin (2013), it is important to identify key informants and focus on those who are in a position to provide detailed information regarding the problem. Therefore, interviewing the manager or equivalent positions became the main priority.

Data were gathered via semi-structured interviews (in-depth interviews). The semi-structured interview provides a framework which permits the interviewer to establish specific topics to be examined, whilst it also allows the interviewee the freedom to deviate from the topic (Bryman, 2007). The interviews were conducted in the Indonesian language (Bahasa Indonesia), recorded and subsequently transcribed. The interviews took from 15 - 111 minutes to complete.

FIGURE 9 THE RESEARCHER CONDUCTING AN IN-DEPTH INTERVIEW WITH A CAPTAIN ONBOARD HIS SHIP (AUTHOR)

Interviews were conducted by means of face-to-face interviews, email and phone calls with relevant interviewees during the fieldwork. Additionally, by using open-ended questions, the semi-structured interview was divided into four sections: first, focusing on general information in relation to current practices, which lead to the next section concerning the requirement variables and each supply chain actors' willingness to collaborate with sustainable fisheries practices. The final section identified current market demand.

In conducting the interviews, an interview guideline was used (Appendix 1). It began in the MDPI office and was followed by an introduction to several interviewees at the port. The MDPI's strong relationship with those stakeholders is vital with regard to the data collection. The suppliers and fishers were selected via recommendations from MDPI staff. Prior to asking the interview questions, the researcher introduced herself using the same instructions, as stated in the guidelines. This introduction was directly followed by asking for permission to record the interview section by audio-recording. The interviews were conducted in places that were chosen by the interviewees. Mostly in the work place.

Overall, 24 interviews took place with sustainable tuna supply chain parties, as can be seen from Table 2.

TABLE 2 LIST OF INTERVIEWEES

No	Name of the respondent	Job	Duration of the interview	Date of interview
1	Lubis	Fisher (Captain)	30 minutes	8 February 2018
2	Heri	Fisher (Captain)	22 minutes	9 February 2018
3	Surahmat	Fisher (Kepala Kerja Kapal)	20 minutes	9 February 2018
4	Anderson	Fisher (Captain)	42 minutes	9 February 2018
5	Kapten X	Fisher (Captain)	17 minutes	19 February 2018
6	Juna	Fisher (Captain)	12 minutes	19 February 2018
7	Tata	Fisher (Captain)	9 minutes	19 February 2018
8	Yan	Fisher (Captain)	1 hour 51 minutes	19 February 2018
9	Bernard	Fisher (Crew)	11 minutes	20 February 2018
10	Lisa	Supplier	17 minutes	19 February 2018
11	Yan	Supplier	15 minutes	19 February 2018
13	Josua	Supplier	15 minutes	20 February 2018
14	A	Supplier	31 minutes	20 February 2018
15	Rudi	Supplier	11 minutes	21 February 2018
16	Ni Ketut	Supplier	14 minutes	21 February 2018
17	Bobby	Supplier	10 minutes	23 February 2018
18	A	Company (Manager PT. BOGI)	35 minutes	9 February 2018
19	KM	Company (Manager PT. Sari Tuna Makmur)	1 hour 43 minutes	21 February 2018
20	SM	Company (QA PT. Sari Tuna Makmur)	1 hour 39 minutes	22 February 2018
21	D	Company (QC PT. Anova)	23 minutes	23 February 2018
22	T	Company (Manager PT. Nutrindo)	20 minutes	16 March 2018
23	Anova NL	Importer	No answer	21 November 2017
24	Amacore NL	Importer	No answer	29 November 2017

3.3 Analytical Design

Comparative analysis was used to process the data that are collected through semi-structured interviews. The interviews among different supply chain parties were compared to understand current fish catching practices and the sustainable tuna supply chain in Bitung. The information from the literature review was also taken into account in the analysis. Finally, the changes undertaken by the stakeholders to increase the number of sustainable tuna for export can be adequately analysed. Regarding time constraints and the translation process, the data was transcribed and coded manually in this research.

The subsequent step involved generating the interview transcripts into the qualitative data analysis. Following on from (Creswell, 2009), this study used a simplified version of the qualitative data analysis steps, as seen in Figure 10.

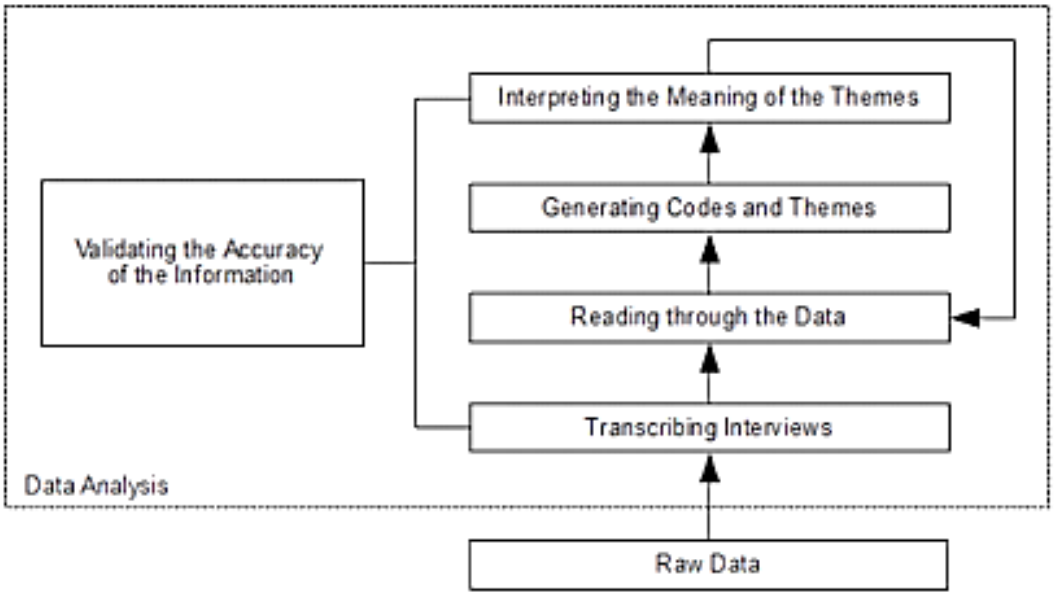


FIGURE 10 QUALITATIVE DATA ANALYSIS STEPS (SOURCE: (CRESWELL, 2009))

Based on Figure 10, this study applied the following data analysis steps; specifically:

1. Transcribing data collection into text format
2. Reading through the text format and noticing themes related to the data
3. Formulating codes, sub-codes and themes
4. Interpreting the meanings related to the themes (Creswell, 2009).

The coding framework was guided by the measurable factors which were derived from the literature. The main variables in the research were measured by multiple items, such as the fisher's practices, requirements, willingness to collaborate and market demand. After coding the information, the items were then grouped based on the sub-research questions. The researcher analysed the data based on the connection between the groups of codes.

In total, 33 questions were constructed and asked of the interviewee. These questions were divided into four types of questions. The classification of questions is shown in Table 3.

TABLE 3 CLASSIFICATION OF QUESTIONS

Question Type	Number of questions in total
General Information	11
Requirement variables and data collection	6
Willingness to collaborate	8
Market demand	8

The transcripts were separated into research themes and for comparison purposes among all the respondents. A coding system using category methods was developed prior to conducting the interviews, based on literature reviews, as such, a short list of tentative codes and categories based on the operationalisation of the research. Moreover, additional categories were inductively added to the material, based on further codes that emerged from the interview transcripts.

4. RESULTS

In this chapter, the results from the qualitative semi-structured interviews will be presented and discussed. The main objective of this section is to answer the research sub-questions. This chapter is separated into three sub chapters. Sub-chapter 4.1 will answer SRQ1 and SRQ2, sub-chapter 4.2 will answer SRQ3 and the final sub-chapter will answer SRQ4.

This chapter presents an explanation of the analysed data on the interviewees contribution to the series of factors that shape fishery's practice in Bitung. These factors are classified into requirement variables, willingness to collaborate and impact on market demand. Each chapter will start by presenting the data collection results from different supply chain stakeholders (fishers, suppliers and processors) and generates analysis which increases the number of sustainable tuna for export.

4.1 The Supply Chain Stakeholders' Organisation

Before discussing each variable that contributes to sustainable tuna supply, it is important to determine the supply chain stakeholders in Bitung. Figure 11 illustrates each stakeholders' activities and responsibilities on the supply chain.

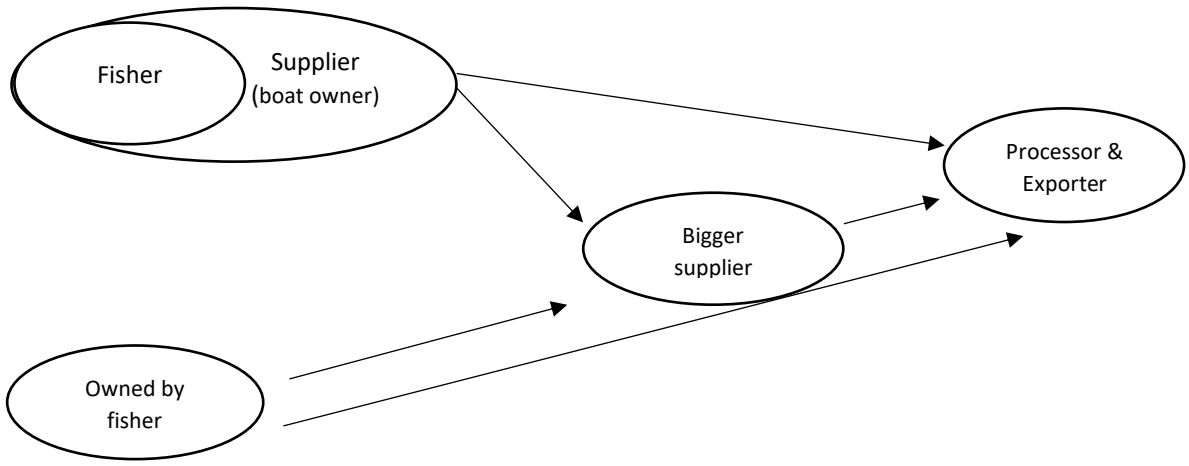


FIGURE 11 SUSTAINABLE TUNA SUPPLY CHAIN IN BITUNG

- **Fishers**

The tuna supply chain in Bitung begins with the fisher. Boat ownership is characterised by boats that are self-owned by fishers and boats that are owned by suppliers. The self-owned fishers sell their catches to a bigger supplier or processors. The second scenario is a fisher that operates a vessel owned by the supplier. The catches are delivered directly to supplier who is also the boat owner.

The small-scale boats (5-10 GT) are used as mother boats to catch fish. The number of crew in each boat varies from 3-7. These crews use handline bait with artisanal techniques, that are hereditary.

- **Suppliers**

As stated in the literature review, suppliers in Bitung work as traders and boat providers. Most of suppliers in Bitung owns one or several boats.

Suppliers in Bitung perform the following role:

1. Owners of the boats
2. Traders, who decide where to sell the fish
3. Provides operational money, ice blocks and fuel for sailing

As a trader, the supplier plays a vital role in choosing a partnership with the processor. Supplier has the power to decide where the catches are sold. The processor that has an enhanced informal relationship with the supplier has a better chance of being selected. When the fishers tie up at the dock, the suppliers are already waiting at the port to transport the catches.

FIGURE 12 SUPPLIER READY TO TRANSPORT THE FISH TO PROCESSOR

There are also local traders, however, this stakeholder is not included in the chain, as the focus of the study is supply chain stakeholders to the EU market. Typically, the fish that cannot be exported are sold directly to the local market via local traders.

- **Processors and Exporters**

Mostly, processors in Bitung are also exporter. Processors have a direct connection to international buyer from EU, US, or Japan. Processors decide which tuna sold to different market. Processors are responsible to ensure the products comply with the requirements regarding the documentation and quality for those buyers.

4.2 The factors related to supply chain

Based on the conceptual framework of this study, The current practice of each stakeholder in the supply chain regarding the requirement variables will be discussed in this chapter. The specific requirements of the EU with respect to import documentation and product specifications were also studied. To understand more about supply chain stakeholders' engagement, interviews were conducted with each supply chain actors.

FISHERS

- **Skills**

Due to the moratorium in 2014, there are fewer handline fishers these days. Prior to 2014, fishers in Bitung were dominated by foreigners, especially individuals from the Philippines**.** After the moratorium in 2014, the foreign fishers could not sail anymore in the Bitung area. This situation has a positive impact on small-scale fishers in Bitung. As noted in the observation, there are many handline vessels in Bitung's port that are not being operated due to the lack of human resources.

As a results, the number of handline crews dropped drastically. As a consequence, boats owners have less crew to catch tuna. According to the observation, there are a considerable amount of boats that do not operate anymore. Furthermore, A explained that there is the possibility that handline fishing would not have any successor and stated:

> "*The youth in Bitung do not see fisheries as a good career. They often see handline fishing as the last resort. Most of them want to work for the government or in other jobs. It would be nice if we have a successor. It is easier to learn how to be a handline fisher. But, this job is sometimes uncertain and not safe. They are afraid of the risks"* (A, interview, 20 February 2018).

> "*Nowadays, there are fewer catches because there is a shortage of crews. However, the price or fish landings has increased due to the lack of supply" (*Y, interview, 19 February 2018).

The fishers learn about fishing techniques and what bait they should use from an early age. There are several types of bait that can be used to catch yellowfin; specifically, fresh small fish, kite gear, rock, fake fish and many more. It is important to understand which bait should be used, since tuna is a migratory fish. Different seasons affect fishers' choice of bait.

"*As a fisher we should obtain many skills and strength. First how to choose different bait in different seasons. Sometimes tuna appear on the sea surface; sometimes they move to deep water. As a fisher we should know which bait to use, otherwise we cannot catch any fish…. Furthermore, we need strength. While catching tuna, we use all our body, our elbows and hands, all need to be trained*" (Lubis, interview, 8 February 2018).

The handline fishing method only targets specific fish; specifically, yellowfin tuna. However, the bait used in this method generates by-catch such as sharks and sea turtles.

FIGURE 13 FISHERS EXPLAIN THEIR FISHING TECHNIQUES

Furthermore, A also explained several attempts to encourage the youth to engage in handline fishing.

"*The thing is, we do not have sufficient human resources. We used to depend on fishers from the Philippines. It is hard to find skilful handline fishers. In the village here, it is hard to find a set of handline fishing gear. It is important to give training on catching fish" (*A, 20 February 2018)."

Currently, fishers face a situation where there is no successor. More fishers are urgently required in Bitung.

"… the fisher here did not choose it as a profession at first. When they were young, they wanted to be an employee. It is all in the mindset. Most of the time, the parents wanted them to be a government official. Becoming a fisher is an option when they had no other choice" (KM, interview, 21 February 2018).

- **Knowledge about requirements**

  According to the interviews, most of the fishers do not know export requirements to meet European market demand. Even, most of the fishers do not know the end consumers of their catches. Regarding the catch documentation, not all of the fishers own a catch certificate because it is not obliged by the government. Furthermore, fishers mention that in relation to obtaining a certificate, the bureaucracy is complicated and time consuming.

  According to the interviews, most fishers already know that they are prohibited from catching sharks. Despite its high value on the Asian market, fishers in Bitung only target yellowfin tuna. However, it is hard to control which fish eats the bait, whilst sharks and sea turtles occasionally, catch the bait too. Sharks play a crucial role in the ecosystem. Therefore, the EU has regulated an international action plan to ensure the conservation and management of sharks and their sustainable use at global level (European Commisssion, 2018).

- **Documentation**

  In general, based on findings fishers are not familiar with catch documentation and certification. Most of the fisher that were interviewed do not have logbooks. One of fisher who was interviewed did not know what a logbook is.

  > *"What is a logbook? … No, we never document our catches…. We do not know where the fish go after we hand them to the supplier" (*Tata, interview, 19 February 2018).

  According to the interviews, only one fisher acknowledged that he owns logbook

  > *"Yes, we do have a logbook. In 2015, we learned how to complete a logbook with help from our friends at MDPI. It is a simple logbook. We write the weight and length of the fish on the boat"* (Yan, interview, 19 February 2018).

  It should be noted that there is an involvement from NGO to give education for fishers to have a knowledge about recordkeeping and its importance. Based on interview, NGO gives an education to the fisher's organisation.

  According to findings, most of fishers already understand the terms of sustainable practice. However, none of fishers that interviewed know the requirements of sustainable certificate and standards.

- **Quality**

  The duration of the trips affects the quality of the fish. Each trip typically takes from 9-15 days. The fishers generally return home once the ice stocks and fuel supply are insufficient. In every trip, ice blocks are used to preserve the quality, as the longer the duration of the trip, the quality of the fish might degrade. The ice stock should be taken into account to preserve the quality of the fish, as the EU market only permit grade A quality. A good fish handling should be taken into account to maintain the post-harvest quality of the catch.

  The fisheries sector is dependent on the seasons which have a conspicuous effect. In terms of number of catches, in Bitung, more fish can be caught between July-September (south wind,

with large waves), whereas less fish are caught in March (north wind, fewer waves). According to the interviews, the south wind increases the number of catches.

The weight of the yellowfin tuna ranges from 40-100 kgs. It is worth noting that tuna size is dependent on the seasons.

> *"The size of the fish depends on the season. Sometimes we can catch tuna that weigh 100 kg. Usually we can catch it in December. It also depends on the bait. We usually use fresh bait, which also depends on the season"* (Lubis, interview, 8 February 2018).

- **Equipments**

Each small-scale boat commonly provided with several pekura (small boats) that can only be used by one person (Figure 13). Beside catching fish in the mother boat, fishers can catch fish by riding of the pekura. Furthermore, according to interview to Lubis, using the pekura to catch fish increases the number of catches. Moreover, have more pekura gives fishers have more opportunity to broaden the fishing location.

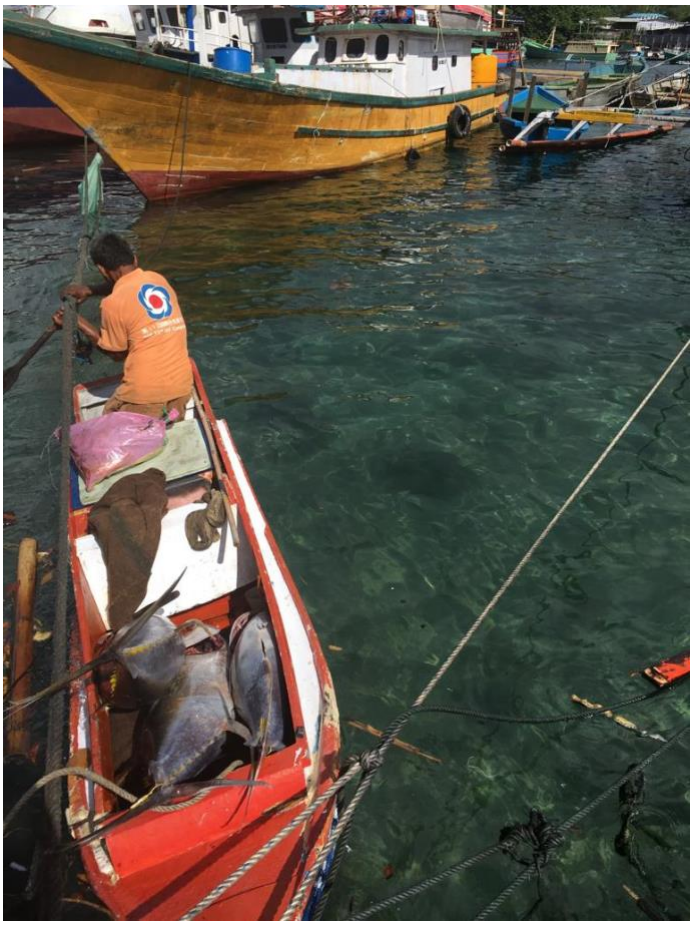


FIGURE 14 FISHER TRANSPORTS A CATCHES IN HIS PEKURA

SUPPLIERS

After the regulation was changed in 2014, the processors sought to expand supply from small-scale fishes. As boat owners, suppliers benefited from this situation, seeing as small-scale fishers are

habitually coordinated by one supplier. According to the interviews, each tuna supplier owns at least one boat. In fact, one of suppliers to the STM company owns 156 handline boats.

- **Skills**

  As per the interviews, numerous new yellowfin tuna suppliers emerged after the moratorium in 2014. There is no specific requirements regarding the crew skills.

  > *"There is no specific requirements to be the crew on my boat. As long as they want to be the crew, I welcome them."* (Lisa, interview, 19 February 2018).

  Lisa also mentioned it is important to note that all crew should have Indonesian citizenship. Therefore, it is quite hard to select a skillful fishers, since the number of human resources are limited.

- **Knowledge about Requirements**

  Like most of the fishers that interviewed, most suppliers do not aware where the fish will be sold. Therefore, the understanding of export requirements in suppliers are still low.

  > "*Well, I do not know where all of the fish sold to. It is all company's decision. I only sell the fish."* (Lisa, interview, 19 February 2018).

- **Documentation**

  Based on empirical work, the suppliers tend to have slightly better document control than fishers. Although no template exists concerning traceability among the suppliers. Most of the suppliers have a simple documentation book to log the number of catches and quality/grade of the fish they have caught.

  > *"I made this note as data for the fisher. I wrote their name, weight and the quality of the fish. Furthermore, I will give them incentives based on my logbook list"* (Ni Ketut, interview, 21 February 2018).

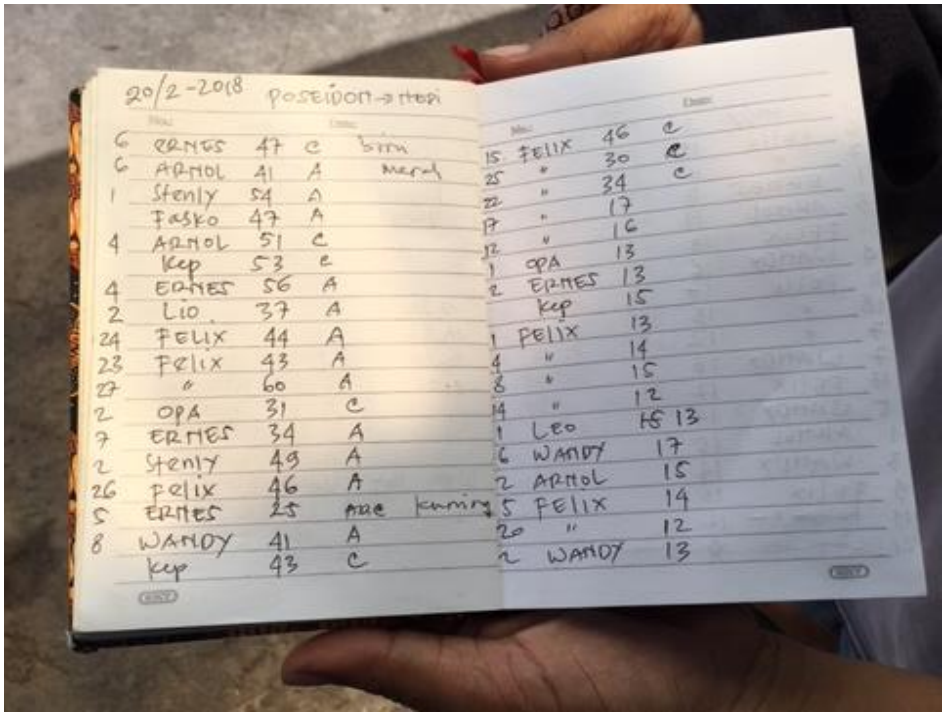


FIGURE 15 SUPPLIERS' LOGBOOK

However, this logbook does not have a sufficient information about vessels details and areas of operations.

In terms of catch documentation, several small-scale boats that owned by suppliers already obtained a catch certification. According to the interview, when all the requirements are satisfied it is not hard to obtain. Especially when it comes to only have a local crews.

> *"it is not hard to obtain catch documentation when all the crews have complete documents. We used to have crews from other countries, however due to the new legislations we are not allowed anymore to employ them."* (Lisa, interview, 19 February 2018).

However, not all boats are registered due to the tax they have to pay. Besides, it is not mandatory to own catch documentation for small-scale boats.

- **Quality**

It is important to mention that the seasons also affect fish quality. Other than ice stocks, the seasonal changes also affect the quality of catches. In a season with larger, more tempestuous waves, more turbulence occurs on the trips. When the waves are high, the post-harvest quality of the fish decreases. Moreover, disturbances on the ship deck agitate the fish in the store room, which changes the colour and quality of the fish. Therefore, it is quite hard to maintain fish quality during transportation.

> "*When the weather is poor the ships are disrupted more. It affects the quality of the fish….. Usually the company buy grade A fish Rp 62,000 per kg. If the grade is local they only buy it for Rp 23,000 per kg"* (Lisa, interview, 19 February 2018).

"*Of the 112 fishes we caught, we only had 4 that were grade A. It was due to the weather constraints. Shaking on the transportation affected the post-harvest fish quality. So, the fish handling was not perfect" (*Ni Ketut, interview, 21 February 2018)."

Consequently, less income was generated when the weather was bad.

PROCESSORS

- **Skills**

As stakeholders that have a direct relationship with the EU buyers, the processors were affected by the circumstances after the moratorium in 2014. Consequently, several processors closed their businesses and looked for other opportunities.

> *"We used to be a processing company. Nowadays, we only focus on being a supplier. Before, the moratorium there were 100 boats catching fish every day. These days, it is only 20 boats. Many boats have been abandoned because there are no crews left. The number of suppliers we worked with decreased to 50%" (*A, interview, 20 February 2018).

Processors now look for tuna from small-scale fishers that fish daily in remote areas. The focus has changed ever since the moratorium was established. Currently, the processors focus on maintaining supply. This industry needs a stable and a substantial tuna supply. In order to increase supplies, companies obtained fish from other regions such as the North Moluccas, Moluccas and Papua. Those fishers are handline small-scale fishers.

> *"The processors now rarely buy from fishers in Bitung. There are a lot of processors in Bitung. The price is competitive and we cannot compete with it. Therefore, we have expanded our suppliers geographically. We have suppliers from Papua: Jayapura, Sorong; the Moluccas: Sanana, Mangoli, Obi, Bacan, Ternate, Morotai; Sulawesi: Sangihe, Manado and Bitung. The largest supply comes from the Moluccas" (*A, interview, 9 February 2018).

Nowadays, processors primarily obtain their raw material from suppliers and small-scale fishers, for the reason that there are fewer skillful crews available to operate large-scale vessels. Moreover, some processors prefer to have a collecting boat to increase the number of catches.

> *"We do not have our own boat to catch yellowfin tuna. We buy from small-scale fishers or suppliers. Currently, we have twelve permanent suppliers. One of our suppliers owns 156 boats"* (KM, interview, 21 February 2018).

> "*We do not have our own handline boat. We used to catch tuna with purse-seine boats, but they are not operated anymore. Currently, we have 12 boats operating as collecting boats… We'd rather collect fish from remote islands, so our company boats wait at the port"* (T, phone interview, 16 March 2018).

- **Knowledge about requirements**

As part of the chain which has direct access to the EU buyers, the processors have a greater understanding of the requirements, in contrast to the remainder of the stakeholders. The document that should be sent to the buyer contains information included in the template as regards vessel details, area/s of operation, data collection, observers, transhipment, crew profile, gear, target species, by catch and IUU details. These details should be attached in every shipping to the buyer and placed on the labels (Figure 17).

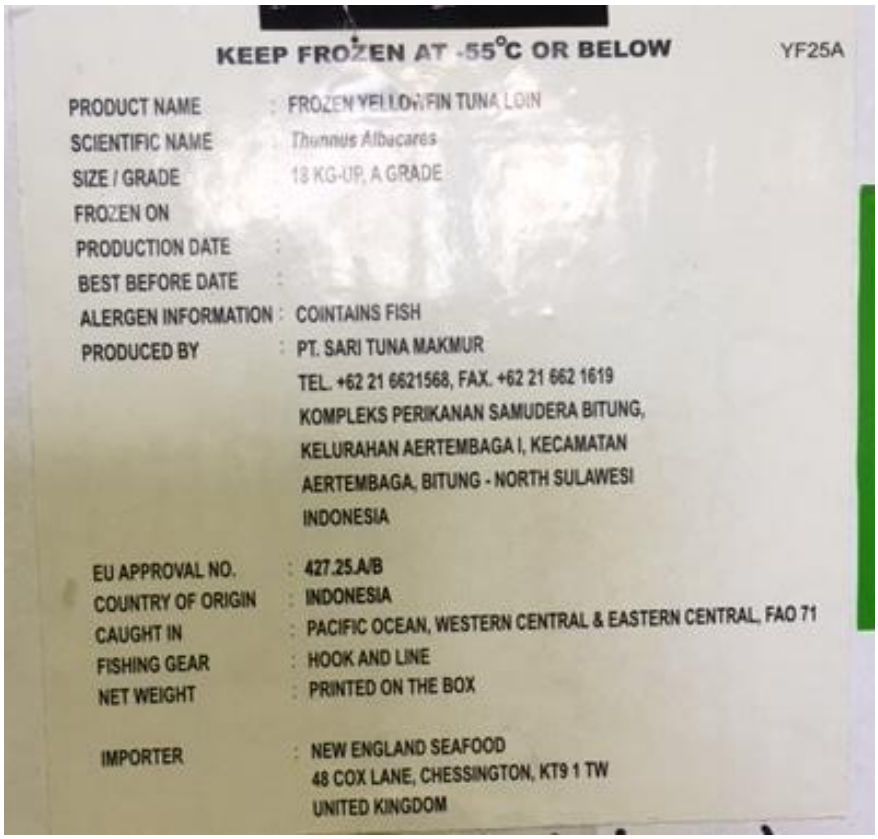


FIGURE 16 LABEL FOR EU MARKET

In general, imported fisheries products should comply with EU food safety regulations such as BRC or SQF. This is in accordance with CBI (2017) and FAO (1996), who asserted that the most commonly requested food safety certification schemes for seafood products in the EU market are International Food Standard (IFS) and (or) the British Retail Consortium (BRC), Global GAP and Safe Quality Food (SQF).

Generally, the EU buyers require information concerning vessel details, area/s of operation, data collection, observers, trans-shipment, crew profile, gear, target species, other species, sharks, marine mammals and IUU (see Appendix 2). These requirements correspond with common food safety regulations and certificates in the EU.

Moreover, processor think education regarding fish documentation and how to make a community group is crucial.

"*It is important to offer the fishers education about documentation. We get a lot of demand from buyers; however, we cannot fulfil it due to the strict requirements. It is easier if the government encourage the fishers to make a community group for the sake of information sharing" (*KM, interview, 21 February 2018).

- **Documentation**

Based on interview to processors, document control to meet the EU market is exceptionally strict. According to the interview with SM a quality assurance manager at a company called STM, EU document control is stricter than the markets in the US and Japan. STM has been exporting to the EU since 2008. The main buyers in the company come from the UK, followed by Germany, France and Austria. Nowadays, it has become more important to comply with food safety standards such as Safe Quality Food (SQF) and the British Retail Consortium (BRC) certification, as the buyers' request. Several exporters have already obtained Fairtrade certificates.

> *"It is very important for all the value chain at the fisher's level have document control to assure quality. Every 18 months the buyer visits Bitung to audit the documents and check compliance. Sometimes, the buyer does a DNA test to ensure there is no fraud"* (SM, interview, 22 February 2018).

The DNA test is conducted regularly as a part of the quality assurance checks. The international buyer verifies if the fish species that are sold are solely yellowfin tuna. Furthermore, SM explained that a few buyers discovered that some processors were actually mixing the product with other fish species, which is fraudulent. For example, when a company determines that the big eye tuna species exceeds safe biological limits, it is categorised as unsustainable. Therefore, a DNA test is required to ensure only yellowfin tuna are being sold.

The buyers only tolerate rejection below 3%. When, the product exceed the tolerate percentage, an audit usually conducted to production site.

> "*In order to ensure the quality of the fish, the buyer visits Bitung to undertake an audit…. As a processor we really depend on the fishers. The fishers require education. When they have good quality fish, we will also have good quality fish.… Moreover, post-harvest education is important. For example, education on how to kill the fish and types of gear modification that are needed to be more efficient to increase the number of fish that can be exported"* (SM, interview, 22 February 2018).

- **Quality**

After the supplier delivers the fish, the processor checks and grades the catches. The processor grades the tuna. In general, tuna grading in Bitung is classified into grades A, B, C and local. The processor does not accept the local grade; therefore, it would be sold to the local market. In general, the supplier transports the catches to the company where the grading is completed. If the company is located quiet far from the port, some processors occasionally check the quality of the fish directly at the port.

Due to the contract with the buyer, it is very important for processors to have a constant supply with grade A quality. SM, from the STM company, stated during the interview, that when the supply decreases there is always a way to negotiate with the buyer.

> "*The buyer demands that we send at least 1 container a month. In case we cannot fulfil it, we add an extra supply in another month"* (SM, interview, 22 February 2018).

Furthermore, SM mentioned the number of catches dependent on seasons. In some months the number of catches are higher than other months.

FIGURE 17 QUALITY CHECKING BY PROCESSOR AT THE PORT

There are easy processes and ones that require more effort. The process ranges from limited value addition such as a cutting and packaging to businesses that export high quality fresh products to the EU, US and Japan. Several types of cutting are usually requested; namely, loin, cube and ground meat and cube meat.

Occasionally, the buyer gives a recommendation to the fisher and give instructions on what kind of gear to use to ensure the quality. However, engagement remains low.

> "The *European buyer does audits regularly. When they find an out of spec product, they teach the fishers. They come, teach and show photos of a good quality product. They also give recommendations on how to kill the fish, to minimise post-harvest damage. However, the fishers are not used to the practices due to their cultural habit. As a result, not all of the fishers follows the suggestions" (*SM, interview, 22 February 2018).

"We often educate the suppliers how to maintain the quality of the fish and traceability. But, it is hard to educate fishers, as sometimes they do not want to listen" (A, interview, 9 February 2018).

- **Market demand**

As a result of the moratorium in 2014, it was extremely challenging for processors to meet market demand.

"The moratorium affected our business a lot. In the first two years of the moratorium, our sales decreased by 75-80% due to the lack of supply" (KM, interview, 21 February 2018).

"After the moratorium we needed two years to recover. Our exports decreased 30-50%" (T, phone interview, 16 March 2018).

In addition, demand from the European market keeps increasing, however the processors cannot meet expectation.

"Nowadays, the trend shows increasing demand. Last year the request was only four containers. This year, it has increased to 6-7 containers a year. One container holds 20 tons. Also, 60-70% of our buyers come from the EU, especially the UK and Germany. We also sell our product to France and Austria" (SM, interview, 22 February 2018).

It has been four years since the regulations were issued, although not much has changed in Bitung port. Examples of this argument show in the price generated by the suppliers and small-scale fishers in Bitung, which remains competitive.

4.3 Willingness to collaborate regarding sustainable fisheries practices

The willingness of the supply chain parties to collaborate was investigated. Moreover, the shareholders, the fishers, suppliers and processors were interviewed. These actors have different needs, depending on their relationship with the practices.

FISHERS

- **Contractual agreement**

Having a written contract between fishers and suppliers is not common practice in Bitung, as they tend to be unconcerned regarding such an issue.

"*We do not have contracts with fishers. We can stop their supplies anytime. When there is no compatibility between us, we stop the supply"* (A, 20 February 2018).

"*The relationship between the supplier and crews are informal. We already know to each other and our relationships are like a family"* (Lisa, interview, 19 February 2018).

Furthermore, it is important to mention that it is common to move from one company to another and come back to the supplier depending on the benefits that they have.

There is no big gap between the captain and the crew beside the bonuses from the boat owners.

> *"There is no such division of work while we're sailing. We all work together. As a captain, I can also use the pekura if I want to. However, the captain is still the leader and directs the boat where it should head to…. I get a special bonus from the boat owner, usually Rp 1000/kg (€0.80)"* (Lubis, interview, 8 February 2018).

- **Incentives**

The incentives that the fishers receive are based on profit sharing. First, 20% of the money that is earned will be paid out for operational cost. The remainder of the money is then divided equally between the owner of the ships and the crews. The captain of the ship receives bonuses from the ship owners (supplier).

> *"After each trip, the captains or head of machinery receive extra money. No, it is not from the profit sharing, but from my income. I give bonuses to them"* (Ni Ketut, interview, 21 February 2018).

It should be noted that the fishers are not provided with health insurance by the supplier nor the processor. The fishers have to apply through government organisations.

> "*We have insurance. It is from the government. We applied for it in 2017. It was free. But after that we should pay for it ourselves. It is not expensive and starts from Rp 50,000 (3 euro) per year. However, it does not cover our families"* (Yan, interview, 19 February 2018).

There are some fishers who already own Fairtrade certificates. The Fairtrade certificate provides the community with valuable incentives. Fishers that implement Fairtrade practices have a contract with the supplier. Additionally, as a requirement of Fairtrade, the fishers must have their own organisation.

> *"Fairtrade has standard. Fairtrade has various steps. NGOs like MDPI educate fishers on post-harvest education and maintaining fish quality. The fishers are really interested in this programme because of the price premium that it offers"* (A, interview, 9 February 2018).

The price premium given by Fairtrade is used to ensure an improved infrastructure in the community. For example, building a place of worship or buying fishing gear.

Fairtrade certification can only be issued by the community. Furthermore, in order to make a group, a minimum of ten people are required to meet at a specific time, which is challenging as people are so busy**.**

"*… in our group, we also have coaching and training provided by an NGO. Making a community is harder than making a cooperative, as a cooperative does not have any requirements. A fishers' community requires a lot of documents. Not only that, we are not used to organisation. It is hard to find a win win solution for all of us, so sometimes we argue with each other about having the same vision and mission. Today, we find it is beneficial to have the community, as we have more access to information and education that we need as fishers* (Yan, interview, 19 February 2018)."

SUPPLIERS

- **Contractual agreement**

Suppliers play a vital role in deciding where the fish would be sold. A written contract between suppliers and processors is not common, given that some of the suppliers move from one processor to another.

> *"We do not always sell to company X. We check the buying price before we sell it to one company. If the offer is low, we look for another company* (Lisa, interview, 19 February 2018)."

With regard to the suppliers selling their catches, the relationship between the supplier and processor is a significant factor in Bitung.

> "*We used to sell our catches to company C. Now we sell to company B … I've worked with the boss of company B before. Now, I always sell the catches to company B"* (Josua, interview, 20 February 2018).

- **Incentives**

Suppliers offer incentives to the fishers in two distinct schemes: (1) profit sharing (2) individual catches. Profit sharing has already been described in the previous paragraph.

> "*On our boat, we name our own catches. Our income is based on luck and our perseverance. The one who catches more fish, gets more money"* (Ni Ketut, interview, 21 February 2018).

FIGURE 18 UNLOADING THE FISH, DIFFERENT FISHERS HAVE DIFFERENT COLOURED RIBBONS

The suppliers also offer a few incentives such as food and children's education when required.

> *"Whenever the fishers cannot go sailing, I give the captain and crews the money for household spending. We give it only when the captain asks. Sometimes, I give Rp 200,000 - 500,000 (15-30 euro) for each person"* (Lisa, interview, 19 February 2018).

> "*Although we do not have contract with the fishers. Whenever they cannot go sailing due to bad weather or engine repairs, we give them compensation (money). We call it standby money. Sometimes we give money to buy rice or the kid's education"* (A, 20 February 2018).

Suppliers do not mention any willingness to engage to more sustainable fishery during interview.

PROCESSORS

- **Contractual agreement**

Processors usually do not have contract with fisher and suppliers. In STM company, before 2010 the company have a contract with fisher and supplier, but now it stopped.

"Last time we had contract with fisher and suppliers in 2010. There were a lot of misunderstandings. Fisher usually have lack of commitments. Sometimes they sell the catching to other company, even though we already had contract (KM, interview, 21 February 2018)*".*

According to processors informal relationship with supplier is a key to maintain supply from fisher and supplier.

"Our relationships with suppliers and fishers are all based on trade transaction. We build informal relationships with the suppliers and fisher. It is very effective. It makes them have a sense of belonging to the company and there is no dependency" (KM, interview, 21 February 2018).

Furthermore, in BOGI company. The informal relationship also includes education of the supply chain parties.

"Our company does not have contracts with suppliers. We gain their trust and build informal relationships. Our boss provides education and teaches them how to handle fish and how to become a good supplier" (A, interview, 9 February 2018).

At the same time, cooperation between the processor and the importer is written in the contract. The contract can still be negotiated, although it depends on the number of catches.

We have an annual contract with buyers from the *EU. This year, demand increased to 8-12 containers from 6-8 containers last year. In case we cannot provide 1 container in a month, we add extra supplies another month"* (SM, interview, 22 February 2018).

This contract also sets out requirements that should be fulfilled by the company in terms of quality and traceability.

- **Incentives**

From the processor's point of view, meeting the document requirements issued by the buyer is challenging.

"*Fulfilling international requirements is cumbersome. Because of this document registration, the fish that we bought legally becomes illegal, just because of incomplete documentation… Furthermore, the fishers do not seem to support us. It seems like the company is walking alone…. We have already provide education about catch documentation. However, the fisher's life is laid back and they do not have many rules. When we told them about this. They said, 'do you want to buy fish or documents? (*KM, interview, 21 February 2018).

After providing some education. The suppliers and small-scale fishers have demonstrated some improvement concerning document control.

"*There has been some change from the 6GT boats…. Nowadays they have their own logbook. But, it was hard to educate them. Our idea is that when suppliers or fisher*

*have complete document control we would like to pay more" (*KM, interview, 21 February 2018).

Even though processors understand sustainable certificate will give a better price for tuna product. The processors show low interest to fulfill the certificate's requirements.

Furthermore, traceability is incredibly important not only for fulfilling the buyer's demand but also for internal tracking. As A mentioned in his interview:

*"Traceability is important for internal audits. We want to reduce our loss. If we can trace where our product comes from, when there is a rejection from the buyer. We can reduce the cost by only cutting products that do not comply….. We have experience of rejection. At that moment we recalled all the fish that was sent. It would be easier if we have traceable documents" (*A, interview, 9 February 2018).

The buyers make a lot of requests for sustainable tuna. A company known as STM always adjusts the standard to what the buyers want. The company already has a connection with a supplier that has Fairtrade certificates

"The buyer requests a high standard. So far, we can fulfil the SQF standard. It is a common standard for entering the EU market…. Nowadays, the market is showing an interest in ecolabel certification. Buyers give a better price when we can comply with such a certificate. However, we have to make more of an effort" (SM, interview, 22 February 2018).

In conclusions, Table 4 gives summary of factors that influence the supply chain to meet European market demand.

TABLE 4 SUMMARY OF FACTORS THAT INFLUENCE THE SUPPLY CHAIN TO MEET EUROPEAN MARKET DEMAND

Problem Definition		Fishers	Suppliers	Processors
Current practice and requirements understanding	Skills	- There are less fishers than 2014 - Low engagement from youth	Number of human resources are limited	Less supply of fishes than 2014
	Adding number of boats	Impact on increase the number of catch	-	-
	The understanding of the requirements	The understanding of the requirements	Not understand the export requirements	Fully understand the export requirements
	Quality	Seasonal wave affects the quality and quantity of the fish	Post-harvest handling and seasons affect the quality of the fish	Post-harvest handling and seasons affect the number of exports
	Education	-	Education on post-harvest handling and skill to youth is important	Education on post-harvest handling and skill to youth is important
	Market demand	-	-	Increase market demand from EU buyer
The willingness to collaborate	Contractual agreement	No contract between fishers to suppliers	No contract between suppliers to fishers or processors	There is a contract to buyer
	Incentives	- Profit sharing with crews. Incentive from suppliers when there is no income. Shows willingness to have a premium price	Profit sharing with crews	There is incentive to suppliers and fishers that have better documentation

5. DISCUSSIONS, LIMITATION AND RECOMMENDATIONS

Generally, based on empirical data, each stakeholder has a role that influence the supply of sustainable tuna as an export commodity. During the semi-structure interview, there are several variables found to construct the roles of each stakeholders. These variables influence the supply of sustainable tuna as an export commodity. They are knowledge about requirements, skills, documentation, willingness to collaborate and education. When these factors were improved, the supply of sustainable tuna as an export commodity could be increased. The contribution of each variables to a series of factors can be seen on Figure 19.

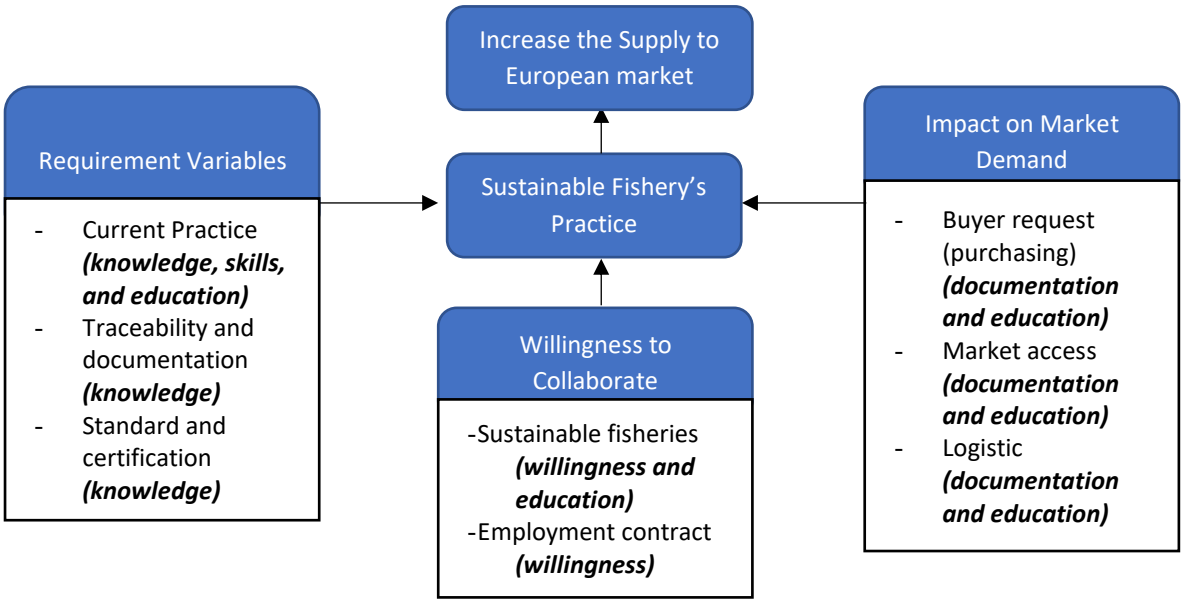


FIGURE 19 VARIABLES THAT AFFECTS THE SUSTAINABLE FISHERY'S PRACTICES, AS A FACTOR TO INCREASE THE SUPPLY TO EUROPEAN MARKET

5.1 Discussions

The present study focuses on what roles of each stakeholders that can be improved in relation to increase the supply of sustainable tuna as an export commodity in Bitung. This study started with the interview to explore what problem each stakeholder has that related to the supply of sustainable tuna to Europe. This section discusses the roles of each stakeholder that can be improved in relation to increase the supply of sustainable tuna as an export commodity in Bitung.

In this study, the problem found in each stakeholder's role are defined into eight problem definitions related to current practice, requirements understanding, and the willingness to collaborate. Those eight problems definitions are skills, the need of adding number of boats, the understanding of the requirements, quality, education, market demand, contractual agreement, and incentives.

5.1.1 Research Question 1: What are the current condition practices related to catching fish and the sustainable tuna supply chain in Bitung?

In general, based on observation on field and literature review, it was established that fisher's in Bitung are already adapted a sustainable manner; specifically, developing handline fishing which is categorised as sustainable (CBI, 2017). However, in order to be able to be exported to European market, several requirements must be completed. As a basic requirement, it needs a good

documentation from fishers, suppliers, processor and exporter to ensure the traceability of fishing practice.

Based on empirical work only few fishers have a logbook. Record keeping is a crucial aspect of traceability (Olsen & Borit, 2013). Furthermore, good recordkeeping offers opportunities to follow the product and the processes it undergoes and is essential in (re)gaining consumer's trust (Trienekens, 2004). As the documentations are not completed, not all fishes could be exported to European market and sold to local market.

5.1.2 Research Question 2: Do all the stakeholders know the export requirements for sustainable tuna to meet European market demand?

The main problem discovered in the field is that not all stakeholders understand the importance of document control and traceability. As the actor that has direct contact with the buyer, the processor is the stakeholder that understands the regulations the most.

The most important finding is fishers and suppliers do not see the documentation as an important requirement to export to European market. According to the finding, there are many small-scale fishers do not have catch certificate for the vessels, because it is not obligatory by Indonesian government.

From exporters point of view, requirements such as standards and certifications are important. They are used as a traceability tool to the European buyer. This statement is also supported by Leadbitter & Benguerel (2014), who stated that certification confirms claims to assure the system comprises integrity. BRC and SQF standards that are required by the buyers aim to (1) support retailer and consumer objectives at all stages of the supply chain; and, (2) improve production consistency throughout the supply chain (Trienekens, Wognum, Beulens & Van Der Vorst, 2011).

5.1.3 Research Question 3: How willing are the supply chain actors to comply with the requirements of sustainable and traceable tuna?

Based on interview, fishers show a willingness to comply with the requirements to export. One of the factors that influence the engagement from fishers is the premium price. In the literature review, it was determined that the two most important factors that affected the adoption of sustainable practices were concerns about the implementation, as well as the risk perceived by the stakeholders (Hall, Dennis, Lopez & Marshall, 2009). From the processors point of view, it discovered that there is a risk of losing the buyers when the sustainable practices and documentation cannot be fulfilled in the production.

5.1.4 Research Question 4: What are possible solutions should be made by supply chain parties in order to comply with sustainable tuna requirements?

It is important to collaborate with youth to address the limited number of human resources. Based on interview, fishers embrace their children to not work in fishery because of its safetiness and uncertainty. This statement is also supported the fact that in Uruguay, adult fishers prefer that their children did not work in the fishery mainly because it will no longer be a viable occupation due to resource decline, increased unpredictability of the fishing activity (Trimble & Johnson, 2013). One of the solutions that can be offered is giving an incentive to the youth to be motivated to engage with fishery (Trimble & Johnson, 2013).

Moreover, Tolentino-Zondervan et al. (2016), stated that the greater the degree of coordination regarding the value chain actors, the more effective it is in changing the behaviour of fishers in developing countries. The mechanisms must initiate investment in institutional means of support for fisheries to realise the benefits any incentive has to offer in order to stimulate changes to sustainable practices (Tolentino-Zondervan, et al., 2016).

According to empirical study there is a knowledge gap found between processor and other actors regarding the understanding of requirements to export. Some fishers even do not know what logbook is. This is supported by Duggan & Kochen (2016), who stated that most of small-scale fishers in eastern Indonesia are exposed to a low level of education, they are more focused on short-term livelihood and financial income. According to Trienekens, Wognum, Beulens & Van Der Vorst (2011) there are four factors that affect industry to adapt traceability: (1) consumers demand and legislation (2) ability to quickly recall product (3) improve information exchange (4) adding value by labeling. Therefore, this condition makes it hard to give a better understanding about the consumer demand and legislation and the importance of having a good documentation to fishers and suppliers.

It is believed that collaboration is required between the supply chain actors to improve working relationships. According to the interviews with the processors, the government's role on more effective regulation and enforcement procedures is a vital tool to increase supply chain actors' preparedness. Governmental legislation should be modified from compliance-orientated to stimulation of cooperation in the supply chain and networks (Wognum, Bremmers, Trienekens, Vorst & Bloemhof, 2011). It is extremely important to support all supply chain actors to obtain the necessary documentation for international market requirements. Furthermore, burdensome catch documentation procedures should be limited.

In order to increase the willingness to collaborate in the sustainable supply chain and its requirements for export, the processor mentioned several solutions such as education as regards document control and its importance. Education on sustainable practices and mindset is the first thing that needed to be achieved. When the fishers and suppliers are taught the importance of sustainability, they will become familiar with sustainable practice. As a trade-off, the EU market will be supplied as required.

According to Roheim & Sutinen (2006), eco-label certificate can serve three functions in the marketplace:

1. Provide independent evaluation and endorsement of a product
2. Tool for consumer protection
3. Achieving specific environmental policy goals

Certification bodies who issued the certificate own its environmental endorsement symbol or trademark and licences. There is certain fee and requirements that should be paid by the applicant to put the certificate symbol on the label. In order to put the certificates for certain period, the applicants should meet all requirements from the certification bodies.

5.2 Distinction and Limitations

This research provides informations to reform each roles of each stakeholders to meet European market demands. Thus, this knowledge can be used to advocate on tuna supply chain

management and to establish a better management for better sustainability practice in fisheries, especially for yellowfin tuna species.

This research has several limitations that are worth pointing out. Firstly, the time constraint and location of the interviews was a definite restriction for this study. Secondly, the study only focuses on the Bitung area; therefore, it cannot provide the current state of all yellowfin tuna processors in Indonesia. Furthermore, there is also a chance that the interview with stakeholders based on the network of NGO provide bias. Since the stakeholders that are interviewed already aware of sustainability requirements. Thirdly, another limitation is related to personal bias. As this study is primarily based on semi-structured interviews and probing people's ideas, there is the chance that, on occasions, the interview questions were not explained correctly or that the respondent was not fully able to understand some of the questions. To conclude, several of the interviews were also conducted over the phone. On consideration, an ideal situation for this study is the face-to-face approach, although this could lead to an incomplete answer.

5.3 Recommendations

Future research regarding the engagement of youth to the fishers practice would be interesting to conduct. From both the literature study and the empirical study, it was ascertained that traceability and documentation control are significant issues for sustainable tuna stakeholders to engage with and thus, meet the EU requirements. However, this problem can be overcome by having a better traceability system that can be easily implemented via the stakeholders. Further research would be essential for the stakeholders.

The role of the government is important in bridging the gap between small-scale fishers and processors in terms of documentation and education. Cooperation between supply chain stakeholders is crucial and there should be comprehensive governance among the sustainable tuna supply chain actors. Additionally, further research related to the role of the EU buyers would be interesting.

6. CONCLUSION

The main research question of this study is “What are feasible methods to increase the supply of sustainable tuna as an export commodity in Bitung?” This chapter will answer this question by looking at the factors that influence the fishers’ current practices.

As stated in the literature review, the three main factors that influence fisher practices were determined. They are requirement variables, willingness to collaborate and market demand. Semi-structured interviews were conducted to gather information about each supply chain actors’ behaviour concerning the sustainable tuna supply chain in Bitung.

It was established that the sustainable tuna supply chain in Bitung involved three main actors: the fishers, suppliers and processors, who are also the exporters. The EU market requires strict document control. Most handline fishers and suppliers are not aware of the importance of traceability and document control in sustainable fisheries practices. In contrary, as a stakeholder that has direct relation to the buyer it is hard for processors to satisfy buyer as the engagement of the supply chain actors remains low. Moreover, some of the government’s requirements are cumbersome due to different traceability requirements from regional (government) and international document control.

Although, the fishers’ willingness to adapt to Fairtrade is high, support from the value chain actors is insufficient. Education on how to create a community of fishers’ is inadequate. Therefore, not all fishers have the information and knowledge.

It is the opinion of this researcher that changes should be made by the supply chain parties to increase the number of sustainable tuna being exported. Effective cooperation and network building between the supply chain actors is important to improve the ability to collaborate on implementing the traceability system. With the development of good document control, more sustainable tuna can be documented to meet EU import market demand. Moreover, increasing pressure from the government, gaining cooperation and coordination between chain actors and non-chain actors is essential for the tuna supply chain to be successful.

REFERENCES

A. Lindgreen, R. P., & Trienekens, J. H. (2005). Relationships within sa supply chain. *Journal on Chain and Network Science 5 (10)*, 85-101.

Anon. (2000). The millenium poll on Corporate Social Responsibility. *The Prince of Wales Business Leaders Forum and The Conference Board.* Environics, Canada: Environics International Ltd.

Anon. (2007). Strategy for Market-Intervention Tools to Conserve Marine Fisheries. *Packard Foundation*.

Arfini, F., & Mancini, M. C. (2004). British Retail Consortium (BRC) Standard: a New Challenge for Firms Involved in the Food Chain. Analysis of Economic and Managerial Aspects. *Analysis of economic and managerial aspects. Parma, Italy: Dept. of Economic and Quantitative Studies, Inst. of Agrifood Economics, Parma Univ.* , 1-9.

Bailey, M., Bush, S., Oosterveer, P., & Larastiti, L. (2015). Fishers, Fair Trade and finding middle ground. *Fish Res*, 1-10.

Belz, F. M., & Schmidt-Riediger, B. (2010). Marketing strategies in the age of sustainable development: evidence from the food industry. *Business Strategy and the Environment volume 19, issue 7*, 401-416.

Boston, C. (2004). Using stakeholder views to develop strategies for the Dutch pork supply chain. *14th IAMA Conference*.

BRC. (n.d.). *Overview*. Retrieved from BRC Global Standards: https://www.brcglobalstandards.com/

Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of mixed methods research 1 (1)*, 8-22.

CBI. (2017). *Exporting frozen tuna to Europe*. Retrieved from CBI Ministry of Foreign Affairs: https://www.cbi.eu/market-information/fish-seafood/frozen-tuna-products/europe/

CEA. (2015). *Indonesia Fisheries: 2015 Review.* California: California Environmental Associates.

Chkanikova, O., & Mont, O. (2011). Overview of Sustainability Initiatives in European Food Retail Sector. *IIIEE Working Paper 2011: 1*.

Chopra, S., & Meindl, P. (2007). *Supply chain management. Strategy, planning, & operation.* Gabler.

CODEX. (2016). *Codex procedural manual*. Retrieved from http://www.fao.org/3/a-i5995e.pdf

Creswell, J. (2009). *Research Design: Qualitative, Quantitative and Mixed Method Approaches 3rd Ed.* California: SAGE Publications Inc.

De Silva, D. A. (2011). *Value chain of fish and fishery products: origin, functions, and application in developed and developing country markets.* Food and Agriculture Organization.

DGCF-MMAF. (2013). *Capture Fisheries Statistics of Indonesia 2012.* Jakarta: DGCF (Ed.) The Ministry of Marine Affairs and Fisheries of Republic Indonesia.

Duggan, D., & Kochen, M. (2016). Small in scale but big in potential: Opportunities and challenges for fisheries certification of Indonesian small-scale tuna fisheries. *Marine Policy, 67*, 30-39.

EC. (2008). Council regulations No 1005/2008. *J. Eur Union* , 1-32.

EU Oceana. (2011). *Shark finning and the EU*. Retrieved from http://eu.oceana.org

EUMOFA. (2016). *The EU Fish Market.* European Union: European Market Observatory for Fisheries and Aquaculture Products (EUMOFA).

European Commission. (2014). *A pocket guide to the EU's new fish and aquaculture consumer labels.* Luxembourg: Publications Office of the European Union.

European Commission. (2015, 4 15). *REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the operation of Council Regulation (EC) No 1185/2003* . Retrieved from https://eur-lex.europa.eu

European Commission. (2017). *Country Section - Indonesia Fishery Products*. Retrieved from European Commission: https://webgate.ec.europa.eu

European Commission. (2017, July 26). *EC Europa*. Retrieved from webgate.ec.europa.eu

European Commission. (2018). *Non- EU Countries Authorised Establishments*. Retrieved from European Commission: https://ec.europa.eu

European Commission. (n.d.). *Food Law General Requirements*. Retrieved from European Commission : https://ec.europa.eu

European Commisssion. (2018). *Sharks: the current situation*. Retrieved from https://ec.europa.eu

Fairtrade. (2018). *Aims of Fairtrade Standards*. Retrieved from https://www.fairtrade.net/

FAO. (1996, May 15). Retrieved from fao.org/docrep

FAO. (1996). Private standards and certification for food safety and quality in fisheries and aquaculture- Current practice and emerging issues. In FAO. FAO.

FAO. (2018). *Tuna Purse Seining*. Retrieved from Fisheries and Aquaculture Department: http://www.fao.org/fishery/fishtech/40/en

FAO. (n.d.). *Part 1 Handlining*. Retrieved from http://www.fao.org/docrep

Fatma, E. (2015). Development of sustainable tuna processing industry using system dynamics simulation. *Procedia Manufacturing 4*, 107-114.

Fishery Progress. (2018). *Eastern Indonesia Yellowfin Tuna - handline*. Retrieved from FisheryProgress.org: https://fisheryprogress.org/

Gioia, D. A., Corley, K., & Hamilton, A. L. (2013). *Seeking qualitative rigor in inductive research: Notes on the Gioia methodology.* Organizational Research Methods.

Grieve, C., Brady, D. C., & Polet, H. (2014). Review of habitat dependent impacts of mobile and static fishing gears that interact with the sea bed. *Marine Stewardship Council Science Series*, 1-72.

Haddock-Fraser, J. E., & Tourelle, M. (2010). Corporate motivations for environmental sustainable development: exploring the role of consumers in stakeholder engagement. *Business Strategy and the Environment*, 527-542.

Hall, T. J., Dennis, J. H., Lopez, R. G., & Marshall, M. I. (2009). Factors Affecting Growers' Willingness to Adopt Sustainable Floriculture Practices. *HortScience 44 (5)*, 1346-1351.

Hawaii-Seafood.org. (2015). *Handline Fishing*. Retrieved from Hawaii-Seafood.org: https://www.hawaii-seafood.org

Hosch, G., & Blaha, F. (2017). *Seafood traceability for fisheries compliance: Country-level support for catch documentation schemes.* Rome: FAO Fisheries and Aquaculture Technical Paper 619.

ISO. (2011). *Traceability of finfish products: specification on the information to be recorded in captured finfish distribution chains.* Geneva.

Kalfagianni, A. (2006). *Transparency in the food chain. Policies and politics.* Enschede, The Netherlands: PhD Thesis, University of Twente.

Khan, S. R., Ali, F., & Tanveer, A. (2005). *Compliance with International Standards in the Mairne Fisheries Sector: A Supply Chain Analysis from Pakistan.* Winnipeg, Canada: International Institute for Sustainable Development.

Kochen, M. (2014). Traceability: Is the Effort Worth the Benefit? in Towards ecosystem based management of fisheries: what role can economics play? *Seventeenth Biennial Conference of the International Institute of Fisheries Economics and Trade.* Brisbane, Australia.

Kumar, R. (2011). *Research Methodology. A step-by-step guide for beginners (Third ed).* London: SAGE Publications Ltd.

Kumar, R. (2014). *Research methodology: A step-by-step guide for beginners.* Los Angeles: SAGE.

Kusnadi. (2002). Konflik sosial nelayan, kemiskinan dan perebutan sumberdaya perikanan. *LKIS*, Yogyakarta.

Leadbitter, D., & Benguerel, R. (2014). Sustainable Tuna - Can the Marketplace Improve Fishery Management? *Business Strategy and Environment 23*, 417-432.

Liu, P. (2009). Private standards in international trade: issues and opportunities. *WTO's Workshop on Environment Related Private Standards Certification and Labeling Requirements*, 1-22.

MARITIME AFFAIRS AND FISHERIES. (2015). *More transparency for consumers as new rules on seafood labelling come into force*. Retrieved from European Commission: ec.europa.eu

Maxwell, J. (1997). *Designing a qualitative study.* USA: SAGE Publications.

Miyake, M., Guillotreau, P., Sun, C.-H., & Ishimura, G. (2010). Recent developments in the tuna industry. Stocks, fisheries, management, processing, trade, and markets. *FAO Fisheries and Aquaculture Technical Paper No. 543*, 125.

MMAF. (2014, November 3). *Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 56/PERMEN-KP/2014*. Retrieved from http://jdih.kkp.go.id

MMAF. (2015, January 8). *Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 2/PERMEN-KP/2015*. Retrieved from jdih.kkp.go.id

Mochtar, Z. (2016). Shortage in fish supply for industry not national-level problem. (R. A. Witular, Interviewer)

Mochtar, Z. (2016). Small Scale Fisheries in Indonesia. *The 2nd International Symposium on Fisheries Crime 2016.* Yogyakarta.

Monteiro, D. S., & Anders, S. (2009). Third-party certification, food standards and quality assurance in supply chains. *Journal on Chain and Network Science 9 (2)*, 83-88.

Mouton, J. (1996). *Understanding social research.* Pretoria: Van Schaik.

MSC. (2018). *Marine Stewardship Council*. Retrieved from https://20.msc.org//what-we-are-doing/our-approach

Naylor, L. (2013). “Some are more fair than others”: fair trade certification, development, and north-south subjects. *Agriculture and Human Values 31*, 273.

Nicholls, A., & Opal, C. (2005). *Fair-trade: market-driven ethical consumption.* London: SAGE.

Nijhoff-Savvaki, R., Trienekens, J., & Omta, O. (2008). Netchain Innovation for Sustainable Pork Supply Chains in an EU Context. *IAMO Forum 2008*, (p. 20).

Norwegian Fishing Vessel Owners' Association. (2006). *Fiskebatrederness Forbund*. Retrieved from fiskebatreder.no

Olsen, P., & Borit, M. (2013). How to define traceability. *Trends in Food Science and Technology 29 (2)*, 142-150.

Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *J. Econ. Perspect 9 (4)*, 97-118.

Rayport, J., & Sviokla, J. (1995). Exploiting the virtual value chain. *Harvard business review 73(6)*, 75.

Roheim, C. A., & Sutinen, J. G. (2006). *Trade and marketplace measures to promote sustainable fishing practices.* Geneva: International Centre for Trade and Sustainable Development (ICTSD).

SEAFDEC. (2017). *Learning Site: Bitung Indonesia*. Retrieved from https://www.seafdec-oceanspartnership.org/learning-sites-indonesia/

Shelton, P. A. (2009). Eco-certification of sustainably managed fisheries - redundancy or synergy. *Fisheries Research 100*, 185-190.

Soeriaatmadja, W. (2016). *Indonesia's fishery sector loses bite*. Retrieved from The Straits Times: https://www.straitstimes.com/

Stringer, M. F., & Hall, M. N. (2007). A generic model of the integrated food supply chain to aid the investigation of food safety breakdowns. *Food Control, 18(7)*, 755-765.

Sunoko, R., & Huang, H. W. (2014). Indonesia tuna fisheries development and future strategy. *Marine Policy, 43*, 174-183.

The World Bank. (2016). *Tuna Fisheries.* World Bank.

Tolentino-Zondervan, F., Berentsen, P., Bush, S., Idemne, J., Babaran, R., & Lansink, A. O. (2016). Comparison of Private Incentive Mechanisms for Improving Sustainability of Filipino Tuna Fisheries. *World Development Vol. 83*, 264-279.

Trienekens, J. H. (2004). Quality and safety in food supply chains. In T. Camps, P. Diederen, G. Hofstede, & B. Vos, *The Emerging World of Chains and Network* (pp. 253-267). 's-Gravenhage: Reed Business.

Trienekens, J. H., & Van Der Vorst, J. G. (2006). Traceability in food supply chains. *Safety in Agri-Food chains*, 439-470.

Trienekens, J. H., Wognum, P. M., Beulens, A. J., & Van Der Vorst, J. (2011). Transparency in complex dynamic food supply chains. *Advanced Engineering Informatics 26*, 55-65.

Trimble, M., & Johnson, D. (2013). Artisanal fishing as an undesirable way of life? The implications for governance of fishers' wellbeing aspirations in coastal Uruguay and southeastern Brazil. *Marine Policy 37*, 37-44.

Uchida, H., Roheim, C. A., Wakamatsu, H., & Anderson, C. M. (2013). Do Japanese consumers care about sustainable fisheries? Evidence from an auction of ecolabelled seafood. *Australian Journal of Agricultural and Resource Economics 58*, 263-280.

United Nations. (2007). *Indicators of Sustainable Development: Guidelines and Methodologies.* New York: United Nations.

USAID. (2017). *Value Chain Assessment Bitung, Indonesia.* Jakarta: United States Agency for International Development/Regional Development Mission for Asia (USAID/RDMA).

Utne, I. B. (2008). Are the smallest fishing vessels the most sustainable? - trade-off analysis of sustainability attributes. *Marine Policy 32*, 465-474.

van der Vorst, J. G. (2006). Product traceability in food-supply chains. *Accred Qual Assur 11*, 33.

Washington, S. (2008). *Ecolabels and Marine Capture Fisheries: Current Practice and Emerging Issues.* Rome: The GLOBEFISH Research Programme.

Witular, R. A. (2016, October 4). *Collateral damage in war against poachers*. Retrieved from The Jakarta Post: http://www.thejakartapost.com

Wognum, P. M., Bremmers, H., Trienekens, J. H., Vorst, J. G., & Bloemhof, J. M. (2011). Systems for sustainability and transparency of food supply chains - Current status and challenges. *Advanced Engineering Informatics 25*, 65-76.

WWF. (2011). *Action Plan Indonesian Tuna Fisheries. Better management practices for moving toward sustainable and responsible fisheries.* Indonesia: Indonesian Ministry of Marine Affairs and Fisheries and WWF.

WWF. (2017). *Sustainable Tuna for Europe.* Wien: WWF.

Yin, R. K. (2016). *Qualitative Research from Start to Finish.* New York - London: The Guilford Press.

Yuniarta, S., van Zwieten, P. A., Groeneveld, R., Wisudo, S. H., & van Ierland, E. (2017). Uncertainty in catch and effort data of small-and medium-scale tuna fisheries in Indonesia: Sources, operational causes and magnitude. *Fisheries Research 193*, 173-183.

Ziggers, G. W., & Trienekens, J. (1999). Quality assurance in food and agribusiness supply chains: Developing successful partnership. *Int. J. Production Economics 60-61*, 271-279.

Appendix 1 - Interview guidelines

Interview Guidelines

Sustainable Tuna Supply Chain to Meet European Market Demand (A case study in Bitung)

Name of the respondent :

Job :

A. The introduction of the interview of the research background and objective from the interviewer
B. Ask the permission to record
C. List of questions:

Themes	Questions
1. General Information	1.1 What is your responsibility on the fishing practice? 1.2 Do you understand the terms of sustainability? 1.3 When did you implement sustainable fishing? 1.4 What is your main reason to convert to sustainable fishing? 1.5 What kind of vessel do you use? 1.6 What kind of 1.7 How far do you usually catch the fish? 1.8 How much tuna that could be produced daily? 1.9 What kind of tuna that is caught on the sea? 1.10 How many number of employees in the vessel? 1.11 Where are your market target region?
2. Requirement variables and data collection	2.1 Do you think the fishery stock is increasing/ decreasing/ stay the same? 2.2 Do you know about current fishing regulation and requirements? 2.3 Are you doing data collection activities? 2.4 What does the definition of high quality sustainable tuna? 2.5 What are the challenges to provide the high-quality product that meet the consumers' demand? 2.6 How do you measure the quality of product that meet the consumers' requirements?
3. Willingness to collaborate	3.1 How many actors that are involved in the sustainable tuna supply chain? 3.2 What kind of collaboration that develops between fisher and other actors? (e.g. collector, processor, buyer, end customer) 3.3 How do you maintain the trust and commitment of other actors?

	3.4 Have you experienced non-commitment of other actors? (regarding logistic and document control of the product) 3.5 What obstacles that each actor finds to meet EU market demand? 3.6 Which factor influences supply chain parties to do sustainable fisheries? 3.7 How is the willingness of each actor to collaborate? 3.8 What could be improved?
4. Market Demand	4.1 How many sustainable tuna have been sold in a month? 4.2 How many tuna that is demanded by consumers? 4.3 How many tuna that can be provided to fulfil the demand? 4.4 How much does the supplier have to pay to purchase sustainable tuna? 4.5 How important sustainable aspect to consumer in comparison with regular tuna? 4.6 What is the standard that is demanded by consumer? 4.7 Do the consumers always ask for certain certification attributes? (fair trade or MSC) 4.8 What are challenges for fisher to meet the demand of consumer?

Appendix 2 – EU buyer requirements

[You must list every vessel that will be used to supply New England Seafood on this form, and please answer all the questions for each vessel listed.]

VESSEL RECORD FOR NESI SUPPLIER NAME:		NAME AND POSITION OF PERSON COMPLETING THIS LIST:		SPECIES THAT YOU SUPPLY TO NESI:	*Thunnus albacares Yellowfin Tuna*	DATE LIST COMPLETED:	*January 04, 2016*

	Vessel details													
Question	Name of vessel	Vessel registration number	Name of registering authority	Start date of vessel registration	Date of vessel registration expiry	Fishing licence number	Start date of fishing licence	Date of fishing licence expiry	Vessel International Radio Call Sign (ICRS)	Does the vessel have a Unique Vessel Identifier (UVI) number?	What is the UVI number?	Vessel owner name/ co-name	Flag of vessel	Has the vessel flag, name or registration no. changed in the past 5 years?
Instructions and guidance on information required	*[Enter name of vessel]*	*[Enter vessel registration number]*	*[For example: ALDFG]*	*[Enter start date of vessel registration]*	*[Enter date that vessel registration expires]*	*[Enter fishing licence number]*	*[Enter start date of fishing licence]*	*[Enter date that fishing licence expires]*	*[Enter the vessel's ICRS, often called vessel 'call sign']*	*[Select 'Y' (yes) or 'N' (no). Examples of UVI include Lloyds or International Maritime Organisation (IMO) number]*	*[Only fill in if the answer to the previous question was 'Y']*	*[Enter name]*	*[Enter country]*	*[Select 'Y' or 'N']*

					Area/s of operation						
Give details of all changes that occurred and why	Type/ description / length of boat	Approx. vessel hold capacity	Is the vessel registered on the International Seafood Sustainability Foundation (ISSF) Pro-Active Vessel Register (PVR)?	In which RFMOs is the vessel licenced to fish?	RFMO licence numbers	Where does the vessel operate?	Name(s) of EEZ(s)	FAO areas where you will fish to supply NESI	Landing site(s)		
[Only fill in if the answer to the previous question was 'Y']	*[For example: Aku boat for pole and line fishing, 20m]*	*[Use tonnes]*	*[Details about the PVR can be found here: http://iss-foundation.org/pvr/ Select 'Y' or 'N']*	*[List all as appropriate]*	*[List every licence number here. For example: IOTC licence no: xxxxx; WCPFC no: xxxx]*	*[Choose either 'EEZ', 'International waters' or 'EEZ AND international waters']*	*[Only fill in if fishing occurs in EEZ(s)]*	*[List ALL FAO areas where fishing activity could take place]*	*[List all sites where this vessel may land fish for NESI]*		

Data collection											
Is there a VMS (Vessel Monitoring System) on board?	Is the VMS system in 24 hour use?	Where is the VMS land base station?	Does the coastal state have VMS systems?	Are logbooks completed?	Are the logbooks paper or electronic?	What information must the vessel report to flag state?	What do vessels report to coastal state?	Are there coastal state patrols?	Who does the patrolling?	How are landings monitored?	How are fishing authorisations verified?
[Select either 'Y'- Flag State;' 'Y'-Coastal;' 'Y'- Flag state AND coastal' 'Y'- other' or 'N']	*[Only fill in if there is a VMS on board Select 'Y' or 'N']*	*[Only fill in if there is a VMS on board Insert location, country]*	*[Select 'Y' or 'N']*	*[Select either 'Y'- Mandatory;' 'Y'- Voluntary;' 'Y'- Mandatory AND Voluntary' or 'N']*	*[Only fill in if logbooks are completed Select 'Paper;' 'Electronic' or 'Both']*	*[For example: catch volume by species, location of catches, length of set]*	*[For example: catch quantity, catch period and catch area]*	*[Select 'Y' or 'N']*	*[Only fill in if the answer to the previous question was 'Y'. For example: By the navy or fishery agency]*	*[For example: catch logbook sent to flag state]*	*[For example: port inspections]*

Observers						Trans-shipment					
Is the vessel legally required to take observers?	Does the vessel take observers?	If the vessel takes observers, are observers paid independently?	If the vessel takes observers, are the observers accredited/ trained?	Date that the last time an observer was on board the vessel	Average no. of days vessel is at sea per year	Is the fish trans-shipped?	Where is the fish trans-shipped?	Are records completed at every transfer of fish?	Please provide details of the regulation(s) followed, and an example copy of the transfer paperwork (as an attachment)	Are there observers employed at trans-shipments?	Which vessel are observers on?
[Select 'Y' or 'N']	*[Select 'Y' or 'N']*	*[Only fill in if the vessel takes observers. Select 'Y' or 'N']*	*[Only fill in if the vessel takes observers. Select 'Y' or 'N']*	*[Day/month/ year]*	*[Days]*	*[At any stage, from the catching vessel to another vessel (collector or other vessel)? Select 'Y' or 'N']*	*[Only fill in if trans-shipping takes place. Select either 'In port;' 'At sea' or 'In port and at sea']*	*[Only fill in if trans-shipping takes place. Select 'Y' or 'N']*	*[Only fill in if trans-shipping takes place]*	*[Only fill in if trans-shipping takes place. Please give details]*	*[Only fill in if trans-shipping takes place and it occurs at sea. Choose either 'Receiving vessel;' 'Offloading vessel;' 'Receiving AND offloading vessel']*

Crew profile											
How many crew (maximum) are on any trip?	How many crew, including skipper, are nationals?	How many crew, including skipper, are non-nationals?	What are the nationalities of the crew?	Are all crew members trained and up to date in the mandatory health and safety training?	Are all crew paid at least the national legal minimum wage?	Are workers being paid on equal terms to other crew?	Has an agency or any third party been used to employ any of your crew?	If you have used an agency, how many crew members were recruited through the agency?	Are any crew paid by an agency or third party?	Have you checked the passports of all your crew?	For any non-national crew members, have you checked that each worker possesses current permission to work in the country?
[Choose the maximum possible]	*[National to the flag state]*	*[Non-national to the flag state]*	*[Include the number of each nationality. For example: 3 Spanish, 2 Filipino, 2 Indian]*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Only fill in if the answer to the previous question was 'Y']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Detail the check you made]*

Crew profile										
Have you checked the passports of all your crew?	For any non-national crew members, have you checked that each worker possesses current permission to work in the country?	Do you hold the details of all crew members' addresses on record and checked that they are not a shared address?	Are all workers' wages paid into a personal bank account in their own names?	Are all crew members free to leave upon giving proper notice?	How many days at sea is the maximum that any crew member is required to be on board?	Are all crew members free to join trade association/ trade union if they wish?	Is there a company human resources policy on ethics in place, covering crew welfare on vessels?	Is there a company policy on training of crew and frequency of training?	Is there a company policy on vessel maintenance & safety?	Is there safety equipment on board the vessel which is accessible at all times to all crew?
[Select 'Y' or 'N']	*[Detail the check you made]*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N']*	*[This includes all crew members having access to their own personal inflatable device, sufficient numbers of lifeboat to hold all crew members. Select 'Y' or 'N']*

Gear			Target species				Other species						
What fishing method do you use?	What type of hook do you use, J or circle?	Average length of fishing trip	What species is being supplied to NESI?	What is the approx % catch of the total for the species being supplied?	What other species are you targeting?	What is the approx % catch of the total for the other species that are being targetted?	Other than the target species, what other species are caught by the vessel?	What is the approx % catch of the total for the other species that are caught by the vessel?	What bait is used?	What is the flag state of the vessels catching bait?	How is the bait fish caught?	What FAO area(s) is the bait fish caught?	Is the bait fish subject to a management system?
[For example, 'Handline' or 'Pole and Line']	*[Select 'J' or 'Circle']*	*[Number of days]*	*[List each of the species, include common and Latin name]*	*[List % values separately for each species, include a % estimate of total catch by volume]*	*[List all of the species, include common and Latin name]*	*[List % values separately for each species, include a % estimate of total catch by volume]*	*[This must include all species, including non-target, discarded species, birds and marine mammals. Include common*	*[List % values separately for each species, include a % estimate of total catch by volume]*	*[List all species. Include common and Latin name]*	*[Enter country]*	*[List gear type and fishing method]*	*[List ALL FAO areas where fishing activity could take place]*	*[Select 'Y' or 'N']*

Sharks			Marine mammals		IUU		
Does the vessel carry wire tracers on board?	Are sharks landed whole with the fin attached?	Is any shark finning done on this boat?	Does this vessel engage in native, subsistence harvest of whales, seals, sea lions or other marine mammal?	Does this vessel engage in commercial harvest of whales, seals, sea lions or other marine mammal?	Has this vessel ever been included on any register of IUU vessels (suspected or confirmed IUU)?	Is the vessel listed on any of the following RFMO IUU vessels registers: WCPFC/ IATTC/ ICCAT/ IOTC/ CCAMLR/ CCSBT?	Any further information or questions
[Select 'Y' or 'N']	*[Select 'Y' or 'N']*	*[Select 'Y' or 'N'] by shark finning we mean the removal and retention of fins, and discarding of the body before the vessel lands its catch]*	*[If yes please describe which species and where]*	*[If yes please describe which species and where]*	*[If yes please provide details]*	*[Select 'Y' or 'N']*	*[Please feel free to call or e-mail at any time]*