

SECTOR REPORT

Marine Fishery in East Java



ICCO

Jalan Tukad Batanghari IX/8, Panjer, Denpasar

Phone: +62 361 8955801

E-mail: south-east-asia@icco-cooperation.org

Developed with Technical Assistance from



swisscontact

Under AusAID's Introducing Market Development Indonesia (IMDI)

Table of Contents

1. Executive Summary	2
2. Background.....	4
3. Sector Profile	5
3.1 International Context.....	5
3.2 National Context	6
3.3 East Java.....	9
4 Sector Dynamics.....	10
4.1 Market Map.....	10
4.2 Core Value Chain	12
4.3 Supporting Functions/ Services.....	15
4.4 Supporting Rules and Regulations (Enabling Environment).....	16
5 Analysis.....	17
5.1 Problems and Underlying Causes.....	17
5.2 Services, Enabling Environment and Weaknesses Analysis	19
6 Strategy	20
6.1 Market Potential.....	20
6.2 Vision of Change	21
6.3 Interventions	21

Annex: Intervention Logic Analysis (ILA) Table

1. Executive Summary

Global fisheries production continues to increase dramatically. Although marine fishery is declining it remains the largest sector globally and there is a significant demand in the ASEAN region which is projected to experience the largest increase in consumption outside China. Indonesia accounts for 35% of the fish production in Southeast Asia and has high potential for expanding Mariculture. Fish consumption is increasing and Indonesia is exceeding sustainable levels of fish production, promoting the Government to address the issue through the designation of nine different Fisheries Management Zones. Demand for Indonesian exports is growing, particularly serving the Chinese market and the tuna market to Japan. Also the domestic market is also growing for pelagic fish.

East Java is the largest fish producing area in Indonesia, where the target districts of Situbondo Government schemes though more bespoke products could be developed. Fisher groups working as collective enterprises are a common practice locally and local micro-processing industries have been set up. Skills development services are offered by *District Marine Affairs and Fishery Office* (DKP). Enforcement of fishing laws is undertaken through an existing PPP arrangement. *Asosiasi Tuna Long-line Indonesia* (ATLI) is working well in providing support, information, and representation to the sector in East Java.

The **key problems in the fisheries sector in East Java** include: that traders do not receive required quantity of fish (Kerapu); supplies of fresh fish to the local market are of poor quality; generally there are delays in payments of fish deliveries which impacts small-traders and fisher folk disproportionately; and there are a lack of post harvest facilities available locally. In this the **key services identified which can be strengthened to impact positively upon the local market system** include technology, food safety and quality assurance (QA) services; cold chain facilities/ services; financial services; and, post harvest facilities/ services.

A vision of change is outlined for the sector and service levels. The vision for the sector is to **increase marine fishery production of quality fish by increasing the contribution of coastal fishing to overall production**. At the service level there are a number of areas which it is envisaged that improvements can be made. These include: (1) technology services being provided by the exporter; (2) the formation of collective enterprises by the associations; (3) an increase in proper investment financing is provided through credit unions; (4) improved processing services; and, (5) improved services to traders/ fishers on accessing higher value markets. There is an **opportunity for small-holders to meet rising demand for fish in Situbondo whilst avoiding over-fishing through engaging in cage-culture fish farming**. This can **unlock nearly AUD 8M of additional value through tapping existing and potential areas for fish production**.

The report recommends five inter-related interventions to achieve the vision of change. These comprise:

1. **Develop cage farming in Situbondo.**
2. **Develop innovative financial products for fish cage farming.**

3. Establish private sector ice production facilities.
4. Establish an aggregation system.
5. Establish branding for Situbondo and Trenggalek fish.

DROPPED

2. Background

AusAID has been a key player in supporting development activities in Indonesia. The Australia Indonesia Partnership for Decentralization-Rural (AIPD-Rural) aims to increase rural incomes in 5 provinces of Eastern Indonesia. Under this framework it has tendered a new project. The goal of Australia Indonesia Partnership for Promoting Rural Income through Support for Markets in Agriculture (AIP-PRISMA) is to contribute to a 30%, or more, increase in net incomes for 1,000,000 poor rural female and male farmers, 300,000 of which will be reached by June 2017.

To enable a quicker start for the new project by identifying potential partners, building up their capacity to take on the role of market facilitators AIP-Rural commissioned Swisscontact – the Swiss Foundation for Technical Cooperation – to implement a small project called IMDI (Introducing Market Development in Indonesia) from October 2012 till 31 March 2014. The fisheries sector was selected because the sector is one of the main income source of farmers in Indonesia.

This Sector Report on the fisheries sector in East Java has been produced by ICCO Indonesia through IMDI. The document is not intended as a comprehensive sector report; rather it is to provide a logic and rationale for market-based interventions which can support the fisheries sector to the benefit of small-holder producers. The report is result of a learning process by which NGOs were mentored by Swisscontact to develop their capacity for engaging in wider market-oriented programming in specific agricultural sectors. Certain interventions identified in this report will be commissioned for implementation under the IMDI initiative.

3. Sector Profile

The sector profile provides information on the current status and potential of the target sector. This has been derived mainly from relevant secondary data and literature relevant to the target sector.

3.1 International Context

3.1.1 Global fisheries production continues to increase dramatically.

Global fish production has increased by over seven times in the last 60 years (from 19.3M MT in 1950 to 163M MT in 2009). Increasing demand from a growing world population and changing consumption preferences such as the increasing popularity of fish as a healthy source of protein is responsible for this trend. The actual production of fish may be higher than the figure suggested, as by catch (collateral damage caused by large-scale fishing practices) is estimated to comprise 30M MT or 25% of global fish landings. These are often discarded or excluded from fish landings.¹

3.1.2 Marine fishery is declining globally though remains the largest sector.

The global trend of marine fisheries follows an increasing trend. Production has

increased by over 400% from 16.7M MT in 1950 to a production peak of 87.7M MT in 1996. In recent years due to over fishing, marine fish production has gradually declined to 79.5M MT (2009) a drop of around 9.4%.² While marine fishery was still the largest contributor to world fish production, its contribution shrunk from 86% to 49% for the same 60 year period. Marine and inland aquaculture is expected to overtake marine fishery production in the next few years.³

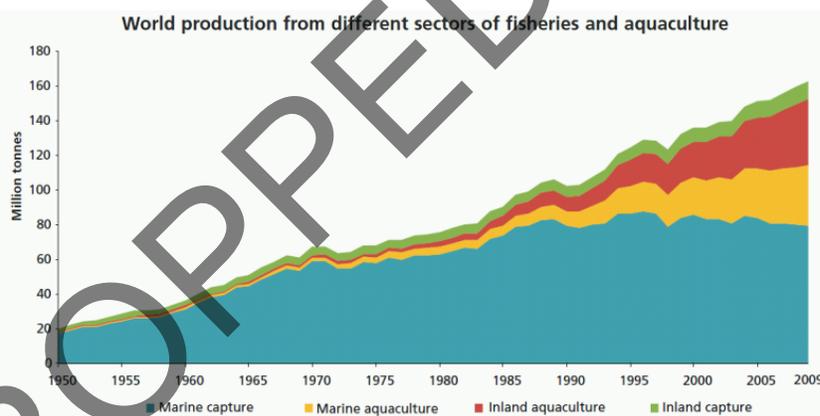


Figure 1: World production from different sectors of fisheries and aquaculture

3.1.3 There is a significant demand for fish in ASEAN and the region is projected to experience the largest increase in consumption outside China.

Demand in ASEAN countries has increased faster than global trends. Fish consumption in Asia accounts for two-thirds of total consumption with 85.4M MT (20.7 kg per capita), of which 42.8M MT was consumed outside China (15.4 kg per capita)⁴. The ASEAN region with population of

¹FAO, World Review of Fisheries, 2012; Cudmore, W. PhD., Marine Fisheries – Causes for Decline and Impacts, Northwest Center for Sustainable Resources, 2009

²Review Of The State Of World Marine Fishery Resources. Fisheries And Aquaculture Technical Paper. FAO. 2011

³World Review of Fisheries.FAO. 2012

⁴FAO (2012), World Review of Fisheries and Aquaculture, <http://www.fao.org/docrep/016/i2727e/i2727e01.pdf>

586M (2008 figure) accounts for around 16% of the world total fisheries production.⁵ Per capita fish consumption in ASEAN region is expected to expand over the next decade, growing at the rate of 1.5% annually and expected to reach 42.6 kg by 2022.⁶ Fish consumption in ASEAN (outside China) is projected to reach 27M MT by 2030, from around 19M MT in 2010.⁷

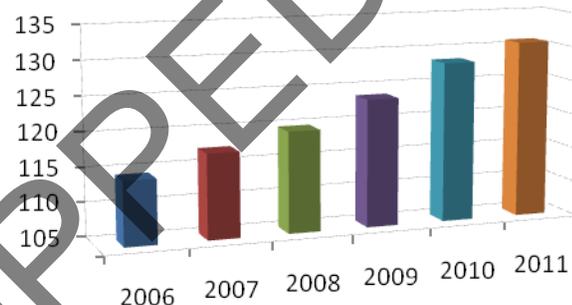
3.2 National Context

3.2.1 Indonesia accounts for 35% of the fish production in Southeast Asia.

Indonesia is the largest archipelagic country in the world and the biggest producer of fish in Southeast Asia. In 2010 Indonesia contributed some 10.8M MT or 35% of the region's fish production.⁸ It is considered a major tuna producer, along with Japan, Taiwan, China, Spain and Korea. The fishery sector makes up 19.2% of the country's GDP, and provides employment and livelihood to more than 3.5M people.

Some 60% of Indonesians live at or near the coastline, and two-thirds of Indonesian cities are located within coastal zones. Coastal areas are characterized by overdevelopment and exploitation, and these have put a tremendous pressure on the country's marine resources.

Figure 2: Consumption of world fisheries (2006-11 in M MT)



3.2.2 Fish consumption is increasing and Indonesia is exceeding sustainable levels of fish production.

With a population of 240 million, total fish consumption at present is estimated to be 7.7M MT. Consumption of fish is being encouraged by the government and shifting consumer preferences and a growing population has increased per capita fish consumption by 6% per year, to an average of 30.4 kg (2011). Marine fisheries account for 52% of total fish production in the country. The Maximum Sustainable Yield (MSY) of the entire marine fishery resources in the country is pegged at 6.4M T per year, of which the Total Allowable Catch (TAC) is 5.2M MT per year (80% of the MSY). Pressure is being put on these limits as marine fishery production in 2009 had already reached 5.1M MT (98% of the TAC). With an average growth rate of 2.1% in marine catch production, the TAC may already have been exceeded by 2010 and MSY level will be breached within 7 years.

3.2.3 The Government of Indonesia is seeking to address the over-fishing issue through the designation of nine different Fisheries Management Zones.

In 2011 the Government of Indonesia designated 9 different Fisheries Management Zones (see Figure 3. below). The zones lead to conditions on fish catch for over-fished areas. Zones 1 and

⁵ Dr. Chumnarn Pongsri, Proceedings of the ASEAN-SEAFDEC conference on sustainable fisheries for food security towards 2020: Fish for the people 2020: Adaptation to changing environment, Bangkok 2011

⁶ OECD-FAO (2013), Agricultural Outlook 2013-2022 Highlights, www.oecd.org/publishing/corrigenda

⁷ Projection for Fish Supply, Demand and Prices: Preliminary Results, Madan M Dey, Siwa Msangi, Kehar Singh and Miroslav Batka, Arkansas Aquaculture, 2012

⁸ *Fishery Industry at a Glance*, Agribusiness Update. BKPM, 2011.

3 are considered over fished, where current volume of marine fishery production has already exceeded the potential production set for each specific fishing zone. Situbondo is located in Fishing Zone Number 3 (Laut Jawa). Fish production can still be increased in Zone 3, but it has

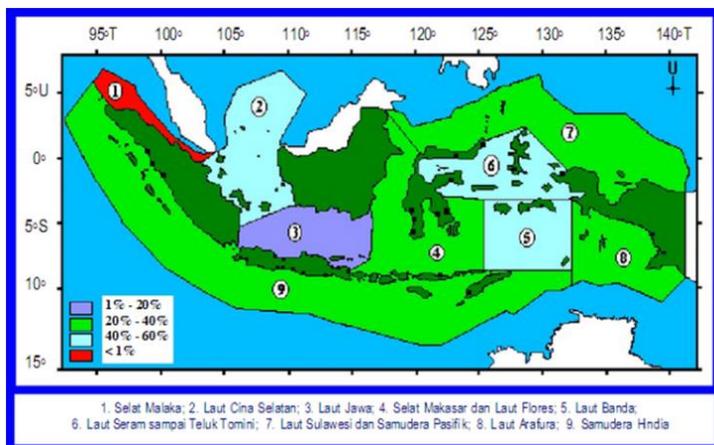


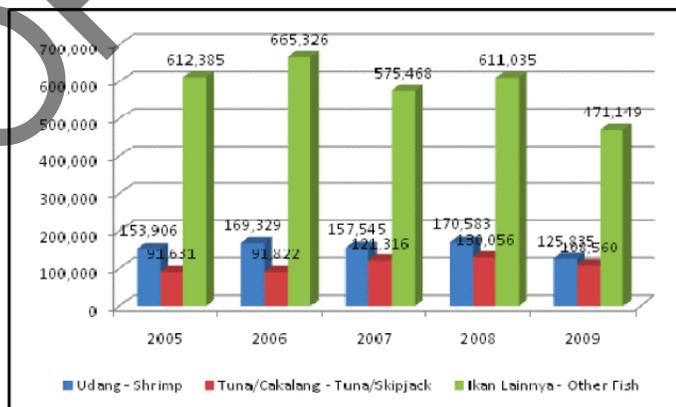
Figure 3: Designated Fisheries Management Zones in Indonesia

to come from marine culture. Marine fish production in the light green and light blue areas can still be increased as current production is still below the identified potential production. Trenggalek is located in Zone 9 (Samudera Hindia).

3.2.4 Indonesia has high potential for expanding Marine culture.

Indonesian climate lends itself to marine culture production all year round and the country has tremendous potential to be a bigger seafood player, given the country's extensive coastline and abundant marine resources.⁹Indonesia has more than 2M Ha of potential area for marine culture providing a potential production of approximately 46.7M MT/year. However, current production is just 0.5M MT/year.¹⁰The Government of Indonesia, Ministry of Fisheries, has indicated that across Indonesia the potential area for marine culture is 4.58M ha but up to 2011 only 169.292 ha or around 3.69% had been utilized.¹¹ Grouper or Kerapu is among the many fishes that can be produced via marine culture in Indonesia, with a potential marine culture area of 461.600 ha.¹² In addition to this, there is significant potential for pelagic production with utilization of pelagic in the Indonesian seas estimated to be at 63% for large pelagic fish and 49% for small pelagic fish¹³. Demand for marine fish remains strong, with Tuna and Shrimp as the main species exported. The major shrimp export destinations is China with 100M MT, and the United States with 600,000 MT. Japan is the major destination for exporting tuna from Indonesia, with imports of tuna worth USD 375M of which USD 101.25M is fresh tuna,

Figure 4: Fish export by volume Indonesia (2005-09) (MT)



Source : Ministry of Fisheries & Marine Affair (2009)

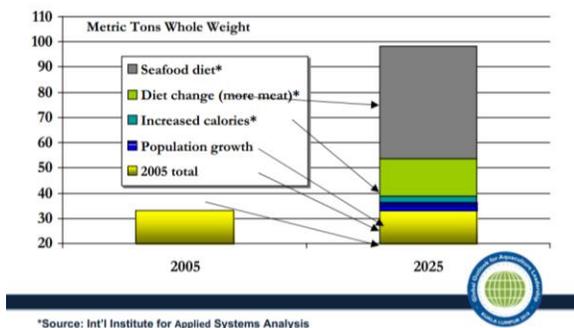
⁹ A value Chain Assessment of Aquaculture Sector in Indonesia, USAID 2007, http://pdf.usaid.gov/pdf_docs/PNADL490.pdf
¹⁰ Dahuri, Dr. Rokhmin. Sustainable Development of Indonesian Marine and Fisheries Resources. Ministry of Marine Affairs and Fisheries. 2004
¹¹ Source: Suarakarya.com. Accessed: May 31, 2013
¹² Dahuri, Dr. Rokhmin. Sustainable Development of Indonesian Marine and Fisheries Resources. Ministry of Marine Affairs and Fisheries. 2004
¹³ Dahuri, Dr. Rokhmin. Sustainable Development of Indonesian Marine and Fisheries Resources. Ministry of Marine Affairs and Fisheries. 2004

USD 108.75M frozen, USD 165M¹⁴ canned. Indonesia's largest export volume from period 2005 to 2009 for commodity shrimp and tuna / skipjack occurred in 2008. The volume of shrimp exports in 2008 reached over 170,000 MT, while for tuna / skipjack, it reached over 130,000 MT.

3.2.5 The export market for Kerapu is growing, particularly serving the Chinese market.

Kerapu is sold live, displayed in aquariums or fish tanks in Chinese restaurants in Hong Kong and in Indonesia. Indonesia, Malaysia, Philippines, Taiwan Thailand, and Vietnam are among the countries exporting live Kerapu. Kerapu fish production for export has been increasing in

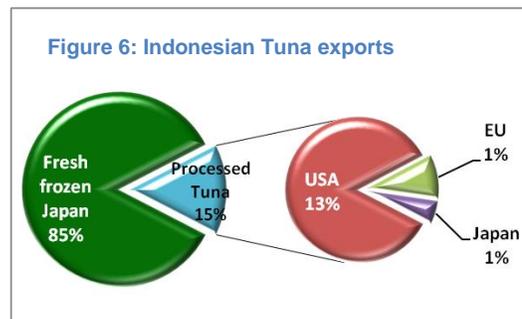
Figure 5: Projected seafood demand in China



recent years, reaching over 100,00MT annually since 2004¹⁵ to fulfil demands in Asian countries markets, especially Singapore, China, and Hong Kong. The total live marine fish market in Hong Kong is 11,000 MT per year, Kerapu market is around 50%, which already includes domestic culture/capture and imports; valued at USD 50 million.¹⁶ This demand is likely to rise over the coming years, with demand for seafood from Hong Kong and mainland China already worth around 1 billion USD each year and expected to more than triple by 2025.¹⁷

3.2.6 The majority of Indonesian tuna is exported fresh frozen to Japan.

Approximately 85% of tuna from Indonesia is being exported fresh frozen to Japan, with an average of 50-60 MT being air-lifted daily. The price of landed tuna in the *Tsukiji* market in Tokyo ranges from ¥ 1,000-2,000/kg, and auction markets determine the buying price of the tuna for processing and exporting companies. The remaining 15% is processed into various prime cuts like tuna steak, loin and others. The figure shows the composition of tuna exports from Indonesia and the final market destination.



3.2.7 The domestic market is also growing for pelagic fish.

The domestic market is also rising for pelagic fish, with the main markets being domestic wholesale, and processing, with 65% and 20% of the share respectively. Only a fraction (2%) is exported.¹⁸ The market in Indonesia is growing with per capita fish consumption increasing in recent years by 6-8%. and to around 30kg per capita per year.¹⁹ While exported fish can fetch

¹⁴ Sustainable Fisheries Partnership, Indonesia Tuna Supply Chain Analysis, 2010

<http://cmsdevelopment.sustainablefish.org.s3.amazonaws.com/2011/11/29/Indonesian%20Tuna%20Supply%20Chain%20Analysis-Summary-April%202010-50a9656f.pdf>

¹⁵ Bisnis Indonesia, 14 October 2004, page T5

¹⁶ <http://www.fao.org/docrep/field/003/u0267e/U0267E04.htm>

¹⁷ <http://edition.cnn.com/2011/WORLD/asiapcf/02/08/reef.fish.trade/index.html>

¹⁸ Indonesian Aquaculture Report 2010

¹⁹ Indonesian Aquaculture Report 2010

higher prices, the growth in domestic pelagic fish consumption represents a high potential source of market for Indonesian fisher folk.

3.3 East Java

3.2.1 East Java is the largest fish producing area in Indonesia.

East Java is the largest fish producing province in Indonesia accounting for 8% of the total national marine fish production and contributing almost 400,000 MT or 57% of fish production in Java province. While marine fish production can still be increased, fishing practices, especially among major fishing areas like East Java, has to be effectively managed to avoid exceeding sustainable limits. The introduction of a six month (from four) closed season for fishing has a disproportionately impacted on small fishers. Many of these fishing communities struggle during the closed season or get into debt to traders reducing their bargaining power in trading negotiations during the fishing season. The total fish catch has correspondingly fallen in recent years, with the total catch for groupers falling by half between 2004 and 2008²⁰ in Java Province.

Figure 7: Groupers production in Marine Culture by province (2004-08) (MT)

Regions	Year				
	2004	2005	2006	2007	2008
SUMATERA	4,905	5,448	826	4,214	1,918
JAWA	368	54	163	136	159
BALI - NUSATENGARA	239	322	195	187	194
KALIMANTAN	58	130	196	786	308
SULAWESI	356	475	1,312	611	751
MALUKU - IRIAN JAYA	626	64	440	436	938
Total	6,552	6,493	3,132	6,370	4,268

Source: Ministry of Marine Affairs and Fisheries. 2009.

The total fish catch has correspondingly fallen in recent years, with the total catch for groupers falling by half between 2004 and 2008²⁰ in Java Province.

3.2.2 Situbondo is situated in an over-fished area where Trenggalek is in an area where there is greater scope for increasing fish production.

According to the local District Marine Affairs and Fishery Office (DKP), all the 168 km coastline of Situbondo is already considered over fished. Most of the overexploited and fully exploited fish species are pelagics.²¹ Situbondo is located in an area with potential production of 796,000 MT/year, but the actual production is already 1,094,410 MT per year, which is 137% of the fishing limit set for the zone. However, Trenggalek is located in an area where there is still potential for increasing production. The fishing zone has a potential production of 1,076,890 MT per year, and current production is 623,780 MT per year, which is just 58% of the fishing limit. Marine fishery production can still be increased as long as sustainable marine fishing practices are properly implemented.²² In Trenggalek, the government is not monitoring the volume of fish landings, and whether this is still within the Total Allowable Catch (TAC). The fishers catch as many fish as they can, without any consideration of the absorptive capacity of the market. Kerapu is grown year round in floating marine fish cages in Situbondo. Trenggalek is facing the Indian Ocean and has big waves, making it unsuitable for marine culture.

²⁰ Ministry of Fisheries & Marine Affairs 2009

²¹ Interviews with officials of DKP

²² Dahuri, Dr. Rokhmin. *Sustainable Development of Indonesian Marine and Fisheries Resources*. Ministry of Marine Affairs and Fisheries. 2004

3.2.3 East Java is also a centre for fish processing industries.

Many fish processors have set up operations close to major sources of marine fishes. Currently there are 13 medium and big companies engaged in the fish canning in East Java, 74 salting/drying companies, 32 freezing companies, 62 pindang processing companies and 6 companies engaged in other processing and preserving including producing fishmeal and fish oil. Small processors also produce fish-based food products like shrimp crackers, blachan, shrimp paste, and fish crackers.

4 Sector Dynamics

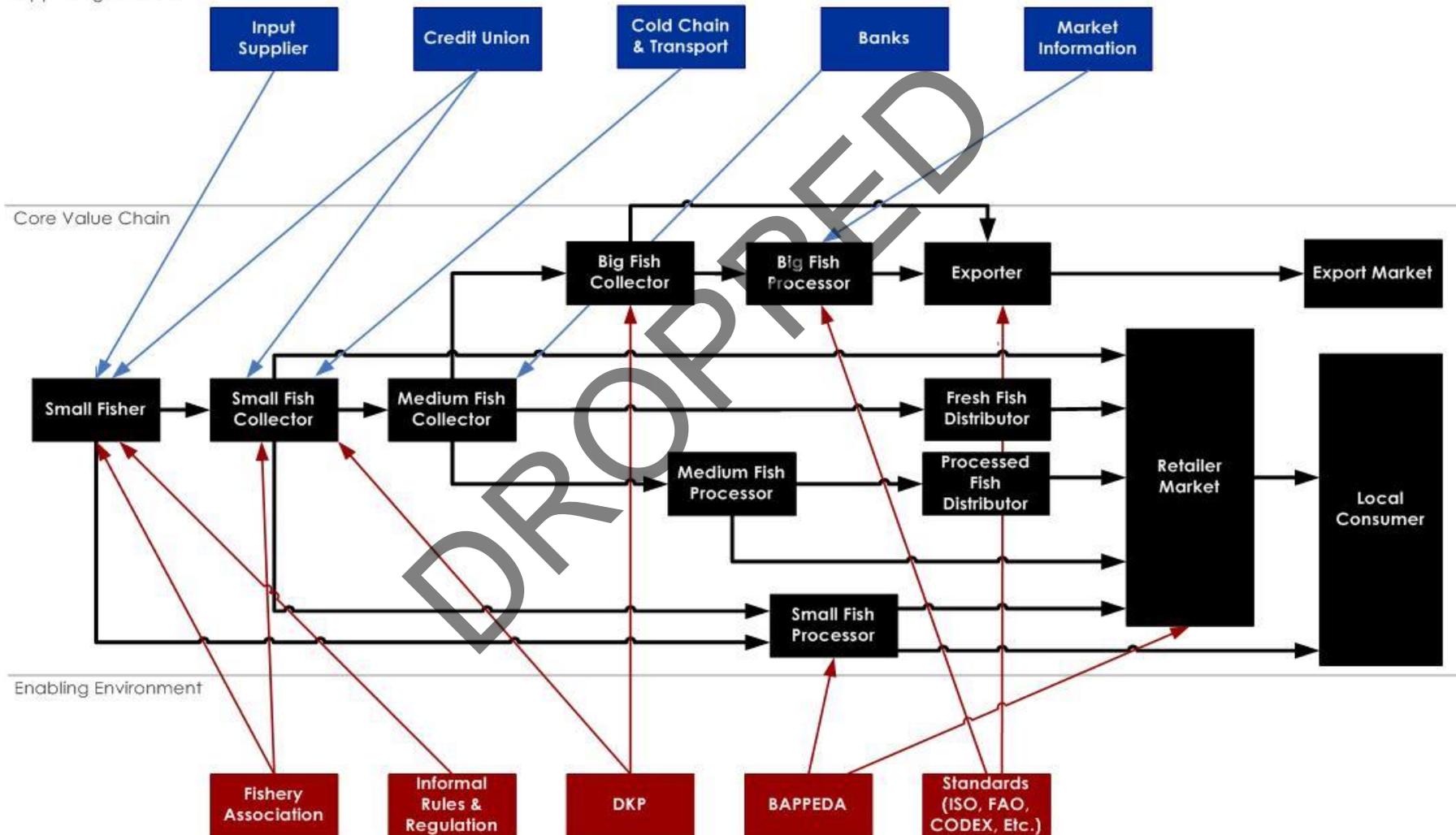
The sector dynamics provide information on how the sector functions and operates; this information has been derived from both literature and engagement with market actors relevant to the sector.

4.1 Market Map

Live Kerapu grown in floating marine fish cages in Situbondo is bought and picked up by local market traders at the farm. Growers call the trader a few days before harvest to provide ample lead time for the trader to prepare. Live Kerapu is loaded in cool chests and transported by pickup trucks to the trader's holding facility or direct to restaurants and hotels based in Surabaya. Total travel time is at least 6 hours. Depending on current market prices, growers sell Kerapu to either the local or the export market, through different traders. The export market requires Super Quality Kerapu. The size is bigger, each weighing between 500 - 800 grams, body is well - formed, colour is good, scales are complete and intact. Class B and C Kerapu are sold through a consolidator selling to restaurants in Surabaya. Super Quality/Grade A and B live Kerapu has a price difference of around IDR 20,000 per kg. There are no known Kerapu growers in Trenggalek.

Market Map Fish

Supporting Services



4.2 Core Value Chain

4.2.1 Traders in Situbondo and Trenggalek are connected to the larger higher-value export markets.

Fresh fish traders and wholesalers, big fish flour processors, and small-scale *Pindang* (processed fish) processors are among the buyers of small pelagic fishes from both Situbondo and Trenggalek. There is a variety of large, medium, and small fish buyers serving the fisher-folk in Situbondo and Trenggalek.

Table 1: Traders and capacity

TYPE of TRADER	CAPACITY	DESCRIPTION
Big Fish Collectors	35 MT/day	<ul style="list-style-type: none"> • Holders of signed supply agreements with big processors
Medium Fish Collectors	10 MT/day	<ul style="list-style-type: none"> • 4 Fulltime Workers • Additional 25 Fulltime Workers during peak season (20 are females) • Capitalization of IDR 1 Billion • May have other businesses to generate income during the closed season
Small Fish Collectors	1.5-3 MT/day	<ul style="list-style-type: none"> • Some are into Pindang processing when price of fresh fish is low

Exporters from Pemutaran buy live Kerapu from Situbondo and other districts of Java, and exports to Hong Kong. There is an established system of booking agents on major production and consolidation areas of Kerapu. The booking agents also manage the fish cages owned by exporters. Aside from growing their own Kerapu, small or undersized Kerapu bought from other fish cage owners are re-grown in the exporter's cages until they reach marketable sizes.

4.2.2 There is an established grading system operating locally, enforced by the larger traders and representative associations.

Fish grading occurs locally with larger traders applying grading according to established systems to support exports to higher-value markets. Many large traders are members of the *Asosiasi Tuna Long-line Indonesia*, which influences the grading sector by imposing sanctions on members that do not meet the Asean standards. There are different grading systems for Tuna, Kerapu, and Pelagics. Tuna is the most sensitive commodity to grading due to the high standards required for export – the price differential for Grade B tuna is significantly less than Grade A (approximately 30-40%). Offloaded tuna is being classified into 2 grades based on quality. The system of grading is standardized by the *Ministry of Marine Affairs and Fishery (KKP)* and certified by *BKIPM – UPI*. The price differential for tuna is large, with poorer quality (grade B) tuna selling for as little as a third of good quality (grade A) product.

Table 2: Grades and buying prices (Tuna)

GRADE	BUYING PRICE	DESTINATION
Grade A	US\$ 5 – 9 per kg	Exported fresh frozen
Grade B	US\$ 2 – 3 per kg	Weight > 10 kg Processed into fillet Weight < 10 kg processed into canned tuna Tuna Fillet and Canned Tuna are exported

For Kerapu, deductions are made for fishes with damages. The minimum quality requirements for live Kerapu include that fishes must have no visible injuries, must have clear eyes, no

physical defects like gill holes or broken tails, and size must at least be 500 grams. For dried fish there are three grades, with the price reducing by around one third for the lowest grade.

Table 3: Grades and buying prices (dried fish)

GRADE	DESCRIPTION	PRICE
1 st Grade	<i>teris</i> are individually dried	IDR 80,000 – 90,000
2 nd Grade	more than one <i>teris</i> stick to each other	IDR 60,000 – 70,000
3 rd Grade	<i>teris</i> were iced before drying or got wet with rain; poor texture, not firm	IDR 60,000

4.2.3 Small-holder fisher-folk are compelled to sell their catch quickly on arrival in the market.

Small and commercial fishers from Situbondo and Trenggalek immediately sell their fish catch through a network of traders that supply processors or *pasar* (market) wholesalers outside the districts or sub-districts where they are caught. Since ice is only sparingly used or not used at all, especially among small fishers, the quality of the fish catch quickly deteriorates. The fishers are **compelled to sell the fishes to whoever can immediately accept them**, sometimes at the expense of getting the market price. Small fishing households buy fish from other small fishers, or process a portion of their fish catch, into fish chips and dried fish. These processed products are sold to wholesalers or distributors for several markets.

4.2.4 Utilization of government provided infrastructure is low.

The government developed *Tempat Pelelangan Ikan* (TPIs) to serve as fish auction centers in major fish landings. This initiative was designed to facilitate the sale of fish from fishers to traders and processors, ensuring that purchase prices reflect the real market value of the fish products. However, the TPIs visited during the research period were non-functional with fish suppliers and traders completing commercial transactions without the support of the TPI. In Situbondo the fish continue to be weighed at the traders' stations just outside the *Pusat Pendaratan Ikan*(PPI)²³. This reduces the government's ability to accurately monitor the quantity and quality of fish catch and collect the respective levies for offloaded fish. The government of Prigi has set up the *Pindang Fish Processing Center* that processors can use for their processing operations, without them having to invest on a processing facility. At present, the facility is being provided by the government free of charge. But utilization is low because of the unstable supply of fish raw materials and the substantial fluctuations in the price of freshly caught fish.

4.2.5 There is an established fishing supplies industry operating proximate to the target areas.

Given the importance of the fishing industry locally, there is a correspondingly established fishing supplies industry operating proximate to Situbondo and Trenggalek. The key equipment required boats and nets. Boats from Situbondo, especially big commercial fishing vessels, are mostly made from Krapan, Rembang and Juanain Central Java, and there also boat builders in Brondong, Muncar, and Probolinggo; with medium-sized boats built in Madura, Graganand Pasuruan. The cost of acquiring a brand new commercial fishing vessel from Madura ranges

²³*Pusat Pendaratan Ikan* (PPI) is a fish landing center without an auction center.

from IDR 250M- IDR 1Bn, depending on the gross tonnage (GT). Some fishers prefer to just buy and recondition used fishing boats to save on acquisition costs, as fishing boats have a relatively long lifespan (around 20 years). Small tonnage boats, less than 5 GT can be built by the fishers within the community of fishing households with a 1-2 GT boat can be built in 2.5 months (costing around IDR 25M). The same boat can be sold by the boat-builder for IDR 40 million. Services are also widely available with boat builders and mechanics hired from within the area to fix broken boat parts or malfunctioning engines. Boat fixers are paid an average of IDR 60,000 per day.

A group of net makers in the community collectively make nets for both commercial and small fishermen. Fishing gears are usually bought from fishing stores, but some fishing areas have no fishing stores. And the fishers have to go to another sub-district to buy fishing supplies. The succeeding table shows the price for several fishing gears. In Situbondo, where Kerapu is being grown in floating fish cages in the sea, growers buy rolls of nets and hire from within the fishing community to make the fitted nets according to their specifications.

4.2.6 Cold storage facilities are limited and largely inaccessible to small fisher-folk.

Access to cold storage facilities remains limited, and the usage is very low especially by smaller fishers. There is an ice factory in Situbondo and a system exists for ice traders pick up the ice blocks from the factory and deliver them to ice retailers who resell the ice to fisher-folks and fish retailers at IDR 12,000 per block. However the distance between the ice factory and the fishing areas, and the high selling price of ice, has limited access and the use of ice among fishers and traders. The ice factory sells 10 – 200 blocks of ice per day at IDR 8,000 per block; and, often only large fish and ice traders make use of ice from the ice-factory. In Prigi, Trenggalek, the ice storage facility is reportedly for the exclusive use of the big processing facility in the area. This has resulted to the rapid deterioration of fish quality during handling.

4.2.7 There are decentralized hatchery operations providing good access to seeds for Kerapu growing.

Cultured Kerapu are grown from seed stocks of breeders held in huge land-based breeder tanks and there are both government and privately owned hatcheries operating in Situbondo. Each hatchery usually maintains their own breeder tanks where eggs are collected and hatched to produce the fry after a month. A few small-scale, satellite hatcheries buy the eggs from the bigger government and private hatcheries, an arrangement which benefits both the big and the small, satellite hatcheries.²⁴

Table 4: Hatcheries and prices, Situbondo

KERAPU	EGG PRICE	FRY PRICE	SITUBONDO CAPACITY	FINGERLINGS PRICE
Macang	IDR 1.5/pc	IDR 1,000	1 million fry/month	IDR 600-900 per cm
Cantang	IDR 1.5/pc	IDR 2,500	2 million fry/month	
Tikus	IDR 2.5/pc	IDR 1,000	500,000 fry/month	IDR 1,250/cm

²⁴The fry is grown in fish ponds for 45 days, until the fingerlings are preferably 10 cm in size. The fingerlings are then stocked in the floating marine fish cages and grown to marketable sizes for at least 7 months. Kerapu growers prefer oversized fingerlings, sizes of at least 10 cm or 2-3 oz, to shorten the culture period in the fish cages, and to be assured of a better survival and performance of the fingerlings.

4.2.8 Experienced fisher-folk are increasingly moving to shorter duration Kerapu varieties.

Increasingly, experienced fishers are moving towards stocking of shorter duration Kerapu in cages as although these sell for less value per kilo, greater profits can be realized through higher productivity. Although the *Tikus* variety has the highest farm gate and retail price, but it is not commonly grown by long-time Kerapu growers because of the relatively longer time to grow them to marketable sizes. Kerapu growers are better off growing *Cantang* or *Machang* as the benefits of a shorter production cycle for *Macang* and *Cantang* more than offset the difference in prices for *Tikus* grouper. The fisher groups who are relatively new to Kerapu culture however, have not made such an analysis, and they continue to grow *Tikus* groupers.

Table 5: Production cycles by output

STAGE	OUTPUT	PRODUCTION CYCLE
Hatchery	Fry	2 months
Nursery	Fingerlings	2 – 4 months
Cage Culture	Marketable Tikus	15 months
	Marketable Macan	10 months
	Marketable Cantang	7 months

4.3 Supporting Functions/ Services

4.3.1 There is a system of local informal financing in operation supplied by traders to the fisher-folk directly.

It is estimated that around 90% of fishers in the area have acquired this type of informal financing from traders. Small and commercial fishers sell their fish catch to traders who have provided them financing of around IDR 30-50M, for the acquisition of boats or for their fishing operations. Traders use their own capital or borrow from the Credit Union or from banks to lend to fisher – suppliers. Each fish trader generally provides financing for up to 15 fisher-folks. Supply relations between fishers and traders are typically long-term, because of this financing. Fishers are also expected to sell their fish catch to the traders with whom they are related to, provided the difference in buying price with other traders are only within IDR 2,000 per kilogram.

4.3.2 Formal financing is also available through credit unions and government schemes though more bespoke products could be developed.

Fishers get financing from government lenders, the credit union, and the *Pegadaian*, especially during the closed season. The Ministry of Marine Affairs and Fisheries (KKP) are able to provide some seed capital for selected fisher groups. However, field research found that many of these fisher groups have ceased to operate, and similar to the experience with DKP, most of the respondents interviewed were not able to access the agency's support services. The Credit Union provides financing, and requirements to apply for a loan is relatively easy to comply with compared to banks. Only members with share capital invested into the CU can access loans and the CU provides insurance to members and some basic membership training. The CU charges interest of 2% per month, whereas regular banks only charge around 1% per month. Cash dividends are provided to members at the end of the year, prorated on their capital share.

95% of the net surplus (Net Profit) of the CU is redistributed as dividends which bring down the effective rate of the loans provided by the CU to 1.3 % per month.

4.3.3 Fisher groups working as collective enterprises are a common practice locally.

Some fisher groups catch fish as collective enterprises in the fishing business. Generally, the group owns the boat, pays for the operational costs and shares whatever profit is generated. These fisher groups do not generally have legal the documentation like statutes, registration, and by – laws, but they nevertheless function as a collective unit. One fisher group in Situbondo received IDR 60-100M in financial support from the government. But the group has to also come up with their own capital as a counterpart to this government investment. It was found through field investigation that a lot of fisher groups that have been provided this type of government financing, but those who were not able to come up with their own equity, or those who did not invest the money into any form of genuine collective enterprise have already disappeared.

4.3.4 Local micro-processing industries have been set up.

There are a number of smaller processing operations serving small-fishers locally. Typical fish products made by micro and small processors are *Abonlkan Tongkol* (baby tuna), *Abonlkan Teri Nasi* (small sardines), *Abon Udang Ebi* (dried shrimps), *Teri/Teri Nasi* dried fish and fish chips. The average daily capacity of these micro processors is 25 kilograms for the fish chips and 4 – 7 kg per day for the others. Fish chip processing is very popular, because Indonesians are very fond of *krupuk*. Each fish chips processor employs 4-10 people from within the fishing community for their processing operations. In Situbondo there is an operation where 50 women have set up their individual fish chips processing businesses, after realizing how profitable the business can be.

4.3.5 Skills development services are offered by District Marine Affairs and Fishery Office (DKP).

Skills development services are offered by the local government agencies responsible for fisheries, with the DKP provides skills trainings on boatbuilding and fishnet making. However the extension of these services is limited as there is only around 7 technicians are assigned to cover an entire district. Small and commercial fishers go out to catch fish except during the closed season, and for a few days within a month, when the weather and the waves do not permit it. During the closed season (usually starting in December and lasting for 4-6 months) and around 7 days in a month, when it is difficult to catch fish, the fisher-folks use the idle time to fix their boats and mend their fishing nets. Local Government provided processing equipment like a spinner, hand sealer and gas stove to some small fish processors.

4.4 Supporting Rules and Regulations (Enabling Environment)

4.4.1 Enforcement of fishing laws is undertaken through an existing PPP arrangement

A composite team of marine soldiers, the local police and the Monitoring & Supervision Department of DKP is in – charge of enforcing fishing laws. Illegal fishers are arrested by this team. In some areas, a Community Control Group, totalling 21 groups in Situbondo, and a

community – based monitoring group in Trenggalek, help in patrolling and reporting illegal fishers. Also local associations such as the *Prigi Bay Fishers Association*, provide services which contribute to enforcement. Prigi Bay Association mediates between illegal fishers and law enforcers, to peacefully settle tense situations, and also provides training services on work ethics for crew members to prevent disruptive problems between the crew and the boat owner or commercial fisher.

4.4.2 *Asosiasi Tuna Long-line Indonesia (ATLI) is working well in providing support, information, and representation to the sector in East Java.*

The members of ATLI include 42 companies, 146 individual boat owners, 13 tuna processors and 1 boat maintenance company. The tuna fishers operate a total of 900 boats; all engaged in long-line tuna fishing, equipped with state-of-the-art devices for fishing like VMS, satellite phone and SSB. ATLI provides various technical services such as assistance in compliance with local tax policies, the use of the VMS, and some tips on how to evaluate local weather conditions. ATLI also disseminates weekly and monthly data from tuna fishers on status of tuna fishing grounds. ATLI has no office or representative in Situbondo/Trenggalek however.

5 Analysis

5.1 Problems and Underlying Causes

The problems and underlying causes are specific to the target groups the initiative seeks to support through interventions in the market system. This analysis is informed by the profile and dynamics above and generated through the Intervention Logic Analysis (ILA) tool.

5.1.1 Traders do not receive required quantity of fish (Kerapu).

Most of the fishers experience diminishing fish catches which are connected to declining fish stock due to over fishing. The close season for fishing is getting longer – from 4 to 6 months which is affecting small-fishers disproportionately. Fishers with larger boats go to other fishing grounds since different fishing grounds have different closed season. This is however, not an option for small fishers because they do not have any exclusive use of a specific fishing zone, and they have to directly compete with commercial fishers for fish catch. Also smaller fishers do not have any information on the status of these fishing grounds, or which species are already being over fished.

5.1.2 Supplies of fresh fish to the local market are of poor quality.

Fishers are not motivated to maintain the good quality or sort their fish catch, because they see no tangible benefits for doing so. Markets specifications are only known to players located near the end markets and smaller traders and fishers do not know how to sort their fishes according to quality or grade. Therefore the prices they get for their fish supplies are “all-in”. Traders and processors are concerned about the poor quality of fish that they receive from fisher folks. Processors complain of lack of supply of fresh fish particularly during the close season which often results in the cessation of their operations.

There is a lack of access to high quality inputs (feeds for fish fingerlings and good quality fingerling supply). The quality or the formulation of current commercial feeds for Kerapu fingerlings is not good. The growth and performance of the fingerlings are still lower than ideal and this also has a lasting effect on their performance when they are grown in marine floating cages. Kerapu growers prefer oversized fingerlings to assure them of better performance and a shorter culture cycle, with fingerlings measuring at least 10cm long preferred. However, the supply of these types of fingerlings is not readily available and as a result the culture period is consequently extended.

5.1.3 Lack of access to high value markets (Tuna – Japanese market)

The small scale of many fishery operations limits the small-holders' access to more lucrative markets (particularly for tuna). The capacity of small fishers to travel over long distances to catch tuna and deliver them direct to processors and exporters is limited, and they are constrained to sell to traders who often offer unfavourable payment terms. In the context of poorly functioning market infrastructure (such as TPIs), the fishers and traders could not take advantage of the auction system which provides incentives for good quality fishes delivered by suppliers who are following proper fish handling practices. A lack of good post-harvest facilities, particularly cold chains, and the poor condition of roads leading to a major fishing area like Prigi in Trenggalek, limits the number of traders that can buy from the area. Transporting fishes outside the area is done via small pick-ups and is very inefficient and costly.

5.1.4 Productivity is low for cage culture (Kerapu).

The lack of access to high quality inputs (feeds for fish fingerlings and good quality fingerling supply) also contributes to low productivity in the cage culture for Kerapu. This is compounded by the poor application of good aquaculture practices (GAP) which is found in marine culture production locally. Local small fisher folk do not have access to technical support to engage successfully in alternate production or engage in alternative production strategies during the closed season. Local fisher folk do not have the knowledge and skills or access to support services to successfully engage in alternate production strategies. Other services such as credit are needed to farm fish though these are limited for local fisher folks.

The initial investment for operating a fish cage is quite high and a lack of access to financial products which fit fish cage farming limited farmers' ability to afford improved technologies. Although most small fishers have access to credit from traders or the local Credit Union, these loans are not enough or not designed for the production cycle of fish cage farming²⁵. Current loans are paid monthly while the production cycle of cage farming is at least 10 months. The majority of fisher folks are indebted to traders and these results in a trading relationship where terms are dictated by the traders. The fishers are forced to sell their catch to the trader from whom they have loans even if the terms are not favourable.

5.1.5 Local processing operations supply poor quality fish.

Operations of small processors are highly inefficient because of the erratic supply and price of fresh fish. Production costs are high and the processed products are not affordable and

²⁵Loan amounts range from 1-2M rupiah while requirements of setting up cages is about 50M rupiah.

accessible to consumers. The seasonality of fish supply, inefficient marketing system for fresh fish and the lack of cold storage facilities have driven production costs high for small fish processors. The range of products being produced by the processors is also very limited and is heavily affected by intermittent supply of fresh fish (raw materials), causing small processors usually stop operations during the closed fishing season. The small volume of output, the high selling price, and the limited range of products offered affects their ability to sell to bigger, more lucrative markets. Processors lack good manufacturing practices (GMP) particularly in quality control (QC), equipment usage and maintenance, processing, documentation, packaging, and distribution. There are few suppliers for any of these basic services operating locally.

5.2 Services, Enabling Environment and Weaknesses Analysis

The supporting functions (also known as the services, or supporting services) and rules and regulations (also known as the enabling environment), and weaknesses are developed through analysis of the information derived from above and comprise the next steps of the ILA tool. These identify the key areas in which the initiative can target interventions.

5.2.1 Technology food safety and quality assurance services.

There is a lack of highly skilled workers that can be hired by Kerapu growers to manage large scale Kerapu fish cage operations. The cage owners also have to personally train their workers and closely monitor them before they can be left on their own. The entire fishery sector is fully dependent on DKP for technical support services. Yet the outreach of government extension offices is limited and is designed to only provide direct services to the industry. There are no efforts to set up local providers who can help complement the support services provided by government. Industry players have not received any form of trainings on food safety and proper fish handling practices and this is a major reason why the quality of fish being traded and sold is generally poor.

5.2.2 Cold chain facilities/ services.

Supply of ice is very limited and the buying price is high because ice factories are located far from fishing areas. Hence, ice is not commonly used and the quality of freshly caught fish quickly deteriorates. The ice that arrives in fishing areas is usually brought in by individual buyers and is mainly for their own use. The quality of fish being sold in *pasars* and as raw material for processors is generally poor. The absence of a cold chain causes a lot of distribution problems. The fishes could not be sold to potentially better markets far from their source. Some markets may be able to provide better prices and payment terms for fishers and traders. Because of this, consumers may be paying a high cost for the fishes due to inefficient distribution and reducing the margin of fishers and traders. The lack of cold storage facilities prevents fishers and traders from storing excess fish which they can sell during closed fishing season. This also prevents processors from getting a year – round supply of fish raw materials. There are no fishes to be bought during the closed fishing season, or the price of fish is just too high during the low season. Processing operations becomes intermittent.

5.2.3 Financial services.

Fishers are initially paid only 20% of the value of their fish to cover the cost of fishing operations and their immediate needs. The balance is paid from 20 days to 3 months after the sale. This is especially true for fishers who have availed of financing from the trader. This loan is used by the trader as leverage for the unfavourable payment term. And the fisher could not look for better buyers offering better payment terms because of this. Delays in payments are also caused by buyers who do not immediately pay the traders for the fishes they deliver. The traders, not wanting to put additional risks against their capital, will only pay their fish suppliers (small traders or fishers) after they are able to secure payment from their buyers.

5.2.4 Post harvest facilities/ services.

This includes both ice factories and cold storage facilities. Existing ice factories are too far off from fishing areas that only medium and big traders have access to ice. Fishers, small traders and retailers will have to depend on local ice retailers for supply. But the capacity of existing ice retailers is very small and the ice storage conditions are not very hygienic. The supply of ice is not reliable and the selling price is very high. Ice factories sell them for IDR 8,000 per block, but it sold in retail at IDR 12,000 per block. As a result, the quality of freshly caught fishes can quickly deteriorate, and fishers have to immediately sell them to any available buyer, who is not necessarily the best buyer offering good prices. This results in a loss of potential income for fishers and small traders. This also results in the poor quality of fishes for processing and selling for retail. Because of the high risk of being left with poor quality fish, some fish suppliers are accused of making adulterations, mixing good quality fish with their remaining poor quality stocks. With export fish such as tuna, this compromises quality and affects the reputation of the sector. For example, the unreliability of the tuna supply chain to comply with food safety, quality and sustainability requirements makes it difficult for tuna exporters to get the necessary certificate to gain access to EU markets.

6 Strategy

The strategy is designed to strengthen the weaknesses in the current service provision and enabling environment in the market system. This takes the form of (1) identifying the market potential, through calculations to show the potential of the sector; (2) a vision of change, to envisage how the value chain or market system would operate if identified problems are resolved; and (3), a set of interventions which can be targeted at specific market actors or groups of market actors which can be engaged to drive change in the system.

6.1 Market Potential

There is an **opportunity for small-holders to meet rising demand for fish in Situbondo whilst avoiding over-fishing through engaging in cage-culture fish farming**. Cage culture fish farming is a viable alternative to marine catch fishing particularly in Situbondo whose fishing grounds are already overfished. The coastal waters of Situbondo are part of the more than two million hectares of potential areas in Indonesia that is suitable for cage culture fish farming or

marine culture. Only about 4% of this potential area is utilized. The potential production from marine culture is estimated to be 46.7M MT/ year, but the current production is just 0.5M MT/ year. There are large areas (some 461,600ha) suitable for Kerapu culture identified by the Ministry of Marine Affairs and Fisheries. Most of the 168 km coastline of Situbondo can be used for Kerapu culture. Cage culture is one of the technologies. Grouper or Kerapu is among the many fish species that can be produced via cage culture fish farming, which can help production during the lean season. Grouper can be grown year-round in floating marine fish cages in Situbondo. It is estimated that based upon current selling prices, a substantial increase in productivity is possible (from 38MT to over 600 MT) through cage culture and improved practices. This would **unlock nearly AUD 8M of increased value through tapping existing and potential areas for fish production**. See table 6 below.

Table 6: Business Calculation for Fisheries Sector Development

Market/Production Value	
Average Selling Price per kg	130,000
Current Production (MT)	38
Potential Production (MT)	643
Current Value of Production (million IDR)	4,996
Total value of potential production (million IDR)	83,620
Total value of potential production (AUD)	8,361,990
Total potential value of increased production (million IDR)	78,624
Total potential value of increased production (AUD)	7,862,400

6.2 Vision of Change

The contribution of the marine fishery sector to the over-all fishery production in Indonesia is declining. The vision therefore for this sector is to **increase marine fishery production of quality fish by increasing the contribution of coastal fishing to overall production**. At the service level there are a number of areas which it is envisaged that improvements can be made. These include: (1) technology services being provided by the exporter; (2) the formation of collective enterprises by the associations; (3) an increase in proper investment financing is provided through credit unions; (4) improved processing services; and, (5) improved services to traders/ fishers on accessing higher value markets.

6.3 Interventions

6.3.1 INTERVENTION 1: Develop cage farming in Situbondo.

Kerapu culture can be promoted as an income source for fishers during the closed season in Situbondo. Existing fisher groups have proven that Kerapu culture can be a profitable collective enterprise. The technology is mature and available. Lead firms like Kerapu exporters have committed to provide potential Kerapu growers a 1-month apprenticeship on fish cages to build a larger supply base for Kerapu. Input suppliers and fish traders can be tapped to provide support services, the costs of which can be embedded or included in the mark – ups of buying prices respectively. Aside from going into Kerapu fish cage culture, small fishers can still participate in the Kerapu value chain as logistics and support service providers, constructing

the cages, making the nets, catching trash fish, providing labour for feeding, changing nets and harvesting. Small fish pond owners can also go into Kerapu nursery operations, which is a very profitable enterprise.

6.3.2 INTERVENTION 2: Develop innovative financial products for fish cage farming.

The initial investment to set up a fish cage is quite high and the appropriate financing has to be made available for potential Kerapu growers (USD 2500 approx. for four cages). Banks have begun to show interest to offer loans for Kerapu growers and the government has to help revive the sea fishing industry by providing more cash collateral this year to boost fishermen's access to bank loans.²⁶ However, as this is an area where many banks and the government have little experience – credit released to the sea fishing industry is only 1.6 percent of state-owned lender Bank Rakyat Indonesia (BRI) – the industry will likely require support to develop innovative products which can benefit small-holders as well as larger enterprises. With Bank Indonesia ready to extend loans of some Rp.200 Bn to the sea fishing industry in 2013 alone, it is imperative that products are developed by both the public and private lenders to ensure funds are channelled in ways where they can be most effective.

6.3.3 INTERVENTION 3: Establish private sector ice production facilities.

Ice production and cold chain facilities are crucial to improving quality and hygiene standards in the local fish market. Private sector investment in cold chain facilities would tap into existing demand for cold chains in the local market, and exporters and processors must be encouraged to provide the larger local traders with incentives to deal in improved quality fish. Exporters could provide upgrading support which would improve standards down the value chain, such upgrading support would include trainings on how to handle fish properly, and help in making ice and cold storage facilities more accessible for fish suppliers. Cold storage facilities can also be constructed to store excess fish which can be sold during the low season. Aside from preserving the quality of fish, this also provides some stability on the price and availability of the highly seasonal marine fishery production. The larger traders would be incentivised to share market information and to also provide support services for upgrading to local fishers or facilities used by local fishers. Small fishers and traders would be interested to respond to the upgrading opportunities provided by buyers as this can be immediately translated to increased sales.

6.3.4 INTERVENTION 4: Establish an aggregation system.

Demand aggregation services are operating in the local fish industry, though they **currently do not see the incentive in serving small fishers**. Current government initiatives to stimulate aggregation are not functioning well, with TPIs (auction houses), such as in Prigi, Trenggalek, largely avoided by smaller fishers due to the higher fees compared with non-auctioned fishes to pay for the 8% levy charged by the TPI for auctioned fishes. In smaller areas, such as Besuki, Situbondo, these fish auctions are not applicable anyway due to the obligation of many fishers to sell their fish catch to the trader/ creditor. A commercial aggregation system should be developed which supports smaller cage-culture fishers and communicates market demand,

²⁶The Ministry of Maritime Affairs and Fishery stated that they would disburse Rp.173 Bn in cash-collateral credit to more than 5,000 traditional fishermen in 2013. *Sea Fishing in Indonesia*.DIS – IBIS Industry Report. January 2012

enabling them to aggregate in compliance with relevant food safety and quality standards, leading to an improvement in the efficiency and profitability of operations.

6.3.5 INTERVENTION 5: Establish branding for Situbondo and Trenggalek fish.

Situbondo and Trenggalek are situated in an area renowned for fisheries production in Indonesia. To encourage increased private sector investment and the improvement in standards in the local sector, a brand can be established to market Situbondo and Trenggalek fish as a signifier of freshness and quality. The brand can be owned, managed and promoted by both government and commercial actors as it provides a win-win for all interest groups. The brand would provide a visible articulation of the improved representation and development of the sector.

DROPPED

Annex -Intervention Logic Analysis Table

(1) Problems	(2) Underlying Causes	(3) Services/ (4) Enabling Environment	(5) Weaknesses	(6) Interventions
1. Traders do not receive required quantity of fish (Kerapu)	<ul style="list-style-type: none"> Fish stocks are declining Increase in closed season length Local fisher folk are not engaging in alternative production strategies during the closed season Reduction in catch (production) 	Access to technology		INTERVENTION 1: Develop cage farming in Situbondo
2. Supplies of fresh fish to the local market are of poor quality.	<ul style="list-style-type: none"> Lack of knowledge on post-harvest handling Limited cold chain facilities and ice facilities 	Cold chain services (ice plants/ refrigerated trucks etc)		INTERVENTION 3: Establish private sector ice production facilities
3. Lack of access to high value markets (Tuna – Japanese market)	<ul style="list-style-type: none"> Small scale of operations limits access to more lucrative markets (tuna) Lack of post harvest facilities 	Aggregation services	Existing aggregators do not see incentive in serving the small fishers	INTERVENTION 4: Establish aggregation system
4. Productivity is low for cage culture (Kerapu)	<ul style="list-style-type: none"> Lack of access to high quality inputs (feeds for fish fingerlings and good quality fingerling supply) There are financial services providers but their financial products do not fit fish cage farming so farmers cannot afford improved technologies Farmers are not applying GAP (good marine culture/ aquaculture practices) 	Technical support services (GAP) Financial services Retailing of improved marine-inputs	Existing support services are not being extended to the fishers	INTERVENTION 2: Develop innovative financial products for fish cage farming
5. Local processing operations supply poor quality fish	<ul style="list-style-type: none"> Production costs are high and the processed products are not affordable and accessible to consumers Intermittent supply of fresh fish (raw materials) Processors lack good manufacturing practices (GMP) 	Good Manufacturing Practices (GMP) Fish supply	Providers of GMP are not operating locally	INTERVENTION 1: Develop cage farming in Situbondo INTERVENTION 3: Establish private sector ice production facilities INTEVENTION 5: Establish branding for Situbondo and Trengalek fish