



Informal and Formal Actors Can Be Further Connected

The Case of Marine Fish Value Chains, Central Maluku Regency,
Indonesia



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Because of its multiple fishing grounds, fish species, fisheries products and markets, the marine fisheries sector in the Maluku archipelago in Indonesia is very diverse. This article presents the fresh fish value chains and the formal and informal actors involved. Detailed mapping and analysis lead to the identification of practical options for action to improve the already existing connections between informal and formal actors, to the benefit of the performance of the sector at large and the livelihoods of many informal actors in particular.

The context: a variety of fishing systems

Maluku is one of the 38 archipelago provinces in Indonesia. It has more than 1,000 islands, of which 5 major ones (Figure 1). The Province has 11 regencies (*kabupaten*) and two municipalities (*kota*), e.g. Tual and Ambon City. Ambon City is the major urban centre, located on the small Ambon island. The current population is close to 2 million inhabitants.

The land size is only 5% and the surrounding seas occupy 95% of the territory. It thus goes without saying that fisheries are important for the island economies. In fact, the Maluku fisheries potency is 4.4 million Metric Tons (MT), which is 36% of Indonesia's 12 million MT national potential (Statistics of Maluku Province 2023; Decree of the Minister of Marine Affairs and Fisheries No. 19 of 2022).

Most coastal communities work as traditional fisherfolk, with men going out for fishing and women handling the fish (sorting, drying, smoking, small trade). The fishermen have very small boats for line fishing (most common at Seram island) and small boats for line fishing. The fishing activities are highly seasonal and because of climate change the seasons are less predictable than before. There are three main fishing systems, which have different fishing grounds, use different fishing gears and techniques, target different fish species and different markets, as explained in the tables on the next page.

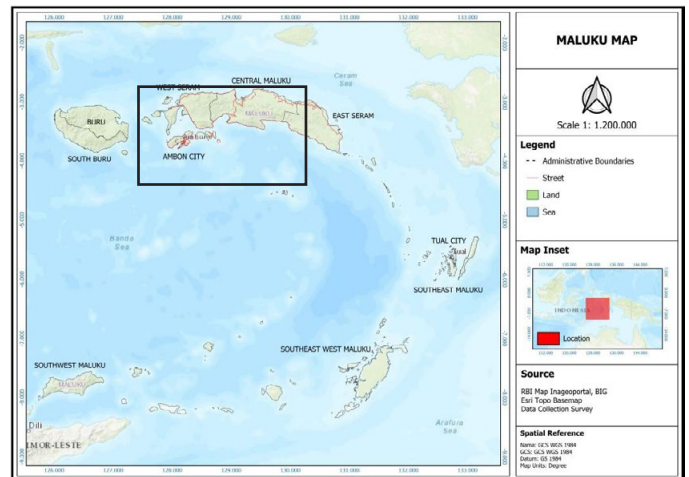


Figure 1: Map of Maluku with regencies with indication of case study focus area. Source: RBI Inageoportel, BIG, Esri Topo Basemap, Data Collection Survey.



Figure 2: Woman sorting fish.



Figure 3: Weighing small tuna (bonito) to sell to fish company.

Small Pelagic fish

Fishing grounds	Midwaters and upper layers
Fishing gear and techniques	Net fishing with mid-size boats (crew of 15-16)
Targeted fish species	Anchovies, sardines, herring
Targeted market	Local market. Fisherfolk deliver to collectors or retailers.

Observations:

- Fishing on small pelagic fish is done throughout the year, but volumes highly depend on the season. In the main season, a fishing trip can yield 60 to 80 big basins of 30-32 kgs. In this period, the average price is Rp15,000 to 20,000 per kg¹.
- In the peak fish season, when catches are high, the fish go to cold storage, and are later sent to food companies outside Maluku, to be processed into animal feed. If the cold storage cannot accommodate the fish anymore, then the fish goes to waste; they will be buried in the coastal area.
- In the low season, fishermen can catch 10-20 big basins. The price is then Rp40,000 to 50,000 per kg.
- In case of strong wind, heavy rains and high waves (June–August), fishermen have difficulties or are unable to go out fishing, leading to decreased income or no income at all.
- Overfishing and small nets cause overfishing in the context of climate change.
- The price for fish delivered to the cold storage is relatively stable. During the peak season, the price is slightly higher than the local market price. During the off-season, the cold storage price is lower than the local market price. Because of the price difference, retailers often buy frozen fish at the cold storage facilities during the off-season and sell it in the local market.

Large Pelagic fish

Fishing grounds	Midwaters and upper layers
Fishing gear and techniques	Line fishing with small boats (1-2 persons)
Targeted fish species	Tuna, swordfish, sharks
Targeted market	Mostly to the national and export markets. Fisherfolk deliver to companies through collectors.

Observations:

- Fishing for large pelagic fish is also year-round. The main seasons are January–April and October–December; November is the peak of the fishing season (Haruna et al., 2019; Pailin et al., 2020).
- Small fishermen always find it challenging to get lines for big swimbaits and fuels for fishing.
- The main fishing areas are at 7-12 miles, but some fishermen go even further away.
- To detect tuna, fishermen follow dolphins, which are often visible on the surface (MSC, 2024).
- Prices depend on volumes and quality grades.
- For export and national markets, tuna is sold in loin form; the head, tail, and other parts are sold in local markets.
- Fisherfolk who work together with the fishing company get access to loin plastics and ice to maintain the fish quality.
- For fisherfolk in remote villages, it is hard to use ice for quality maintenance, as electricity is not ensured (the average availability is 12 hours per day).
- Tuna loins from remote villages of Seram island are sent to large companies via bus drivers and then by ferries to Ambon City.

Demersal fish

Fishing grounds	(on or near) Sea bottom
Fishing gear and techniques	Line fishing with small boats (1-2 persons), fish traps
Targeted fish species	Groupers, snappers, mullets, croakers, catfish
Targeted market	Live demersal fish for export market. Frozen demersal fish for domestic and national market.

Observations:

- Line fishing is throughout the year; information about the catches, quality and prices is limited.

¹ Rp is the symbol for the Indonesian Rupee (IDR)

Actors in fresh fish supply chains

The fresh fish supply chains in Maluku are thus very diverse because of the different fishing grounds, the diversity of fish species and different market locations and channels. Fish catches are highly seasonable. During the peak season, the fish catches are abundant, resulting in low to very low prices for fisherfolk families. Excess fish that cannot be sold is often thrown back into the sea or buried in the coastal area. During the low or off-season, the price of fish is high for consumers. Actors involved in the Maluku fish value chains are large and small boat owners, boat crews, fish collectors/intermediaries, fish companies, processors, retailers, and consumers. Other stakeholders who play supportive roles, are money lenders and bus drivers. Directly or indirectly, the different actors work together to deliver the fish to the different targeted markets and consumers, in local villages, other Maluku islands, other Indonesian provinces, and export markets.

Formal commercial sector for national and export markets – informal sector for local markets. The formal commercial sector is involved in large pelagic and live demersal fish supply chains, targeting the national and export markets. Product (fish) traceability is one of the crucial requirements. Companies and traders can only be involved in these chains with Government registration. Formal companies do, however, source from local fishing communities. To comply with traceability and quality requirements, these companies provide fishermen with GPS equipment and ice. This is an interesting example of how formal companies engage with informally organized fisherfolk. The fish destined for national and export markets are cleaned before shipping. Rejected fish and fish cleaning residues are sold on the local market.

The informal sector is mainly involved in small pelagic fish and fresh and frozen demersal fish supply chains, which are primarily marketed to local and rural consumers. The informal actors include fishermen (crews), collectors, retailers, processors, money lenders, and bus drivers.

Fishing boats and crew. In Maluku, fishing boats are operated by boat owners and crews, all male. For the mid-size boats used for net fishing, the total crew is usually 15-16 men. The small boats for line fishing are small (8m x 80 cm x 70 cm) and only take one or two persons. Most boat owners are registered and pay taxes yearly. The crews are not registered and do not pay taxes. The fishing vessels routinely go to sea four or five days per week (one-day fishing). Being unregistered, the crews can decide not to participate in all trips. If 4-5 crew members are unwilling to go to sea, the boat owner must look for a replacement. If that fails, the boat cannot go out to the sea. There are no sanctions for the crews; they do not earn income that day.



Figure 4: Boat for net fishing (Ambon).



Figure 5: Boat for line fishing (Parigi village, North Seram).

Fish collectors. When boats land on the beach, the bargaining with fish collectors starts. Because the Seram island communities are small and the fisherfolk and collectors know each other, this process generally runs smoothly, even though the collectors are price setters and get the most significant margin (Apituley et al., 2017; Apituley et al., 2019). The reality is that fishing communities depend on the collectors for their daily lives and do not have a strong bargaining position, especially during peak seasons. The collectors do give fisherfolk market access and are the place for them to borrow money when they cannot go to sea.

Fish retailers. The collectors distribute the fish to retailers when they arrive at the market. In the high season, the presence of retailers is beneficial so that fish can be sold as quickly as possible. Retailers (in the local language: *Papalele*) buy one or two pans (around 30-32 kgs/pan) and sell the fish to consumers. If retailers, mostly women, live in the same village, they directly buy from the fishermen. Retailers are often the spouses of the fishermen. Other retailers wait at the market and buy fish from collectors. Female retailers can be found sitting and selling the fish in the market or walking from one village to another to sell the fish.



Figure 6: Woman selling fresh and smoked fish.



Figure 7: Fisherman's mother and wife sorting fish, Parigi village.

Motorcycle fresh food retailers. In many places in Maluku, male retailers use motorcycles to connect to the communities, local markets, and consumers. These motorcycle retailers sell vegetables, fruits, fresh and processed fish, meat, and cooking spices at affordable prices. Consumer households can order what they need to cook and eat the next day. This is an important community service. Motorcycle retailers make shopping easier for their clients and save them time.



Figure 8: Motorcycle retailers sourcing fish and food products and selling food from village to village.



Figure 9: From left to right: smoked fish, dried fish and salted fish, important activity of women in fishing communities.

Fish processing. Fish processing is done traditionally. Fish is salted, dried or smoked. Fish salting is widespread and well-known across Indonesia. Apart from being affordable, salted fish is also relatively easy to conserve and to transport. Salted fish is produced in coastal fishing communities, mostly by the wives, mothers and sisters of fishermen. There are three value chains: directly from processor to consumer, from processor to retailer to consumer and from processor to collector to retailer and consumer. The first two value chain concern relatively small quantities. Especially via the third value chain, when larger collectors are involved, smoked fish can be distributed to distant places (Apituley and Nanlohy 2024). There is much potential to improve cleanliness, hygiene and quality. These are currently often insufficient, with the consequence that the fish surplus cannot be stored and/or sold beyond the production zone.

Money lenders. Without sufficient collateral and financial accounts, fishing communities have difficulties to access money from formal financial institutions, such as banks and credit cooperatives. As a result, small fishermen, retailers (mostly men) and motorcycle retailers (mostly youth) try to borrow from family and friends. If that fails, they have to turn to informal money lenders, who charge high interest rates. As mentioned, fish collectors are often also the money lenders to fishermen during the low and off-seasons.

Car drivers. Land and sea transport are needed to connect the Maluku islands. On Seram island, trucks, buses, and pick-ups are used to transport fish from the communities to the ferry to Ambon City. Fresh fish and processed fish are further transported from there to other islands in Indonesia or to other countries.

The services of the car drivers are very important for market access of Seram fishing communities, because fish would otherwise only be sold in the village and its surroundings and large quantities would go to waste.

Car drivers also transport fish to fish companies on Seram island and Ambon City. The sales receipt is photographed and sent to the fish owner's WhatsApp. The company transfers the sales value to the fish seller's account. This system can only function if there is enough trust.



Figure 10: Fish pick-up truck transporting fish from Parigi (North Central Seram) to Ambon.

Informal and formal economies are connected

The figure below provides a summary overview of the actor network of marine fish value chains in Maluku.

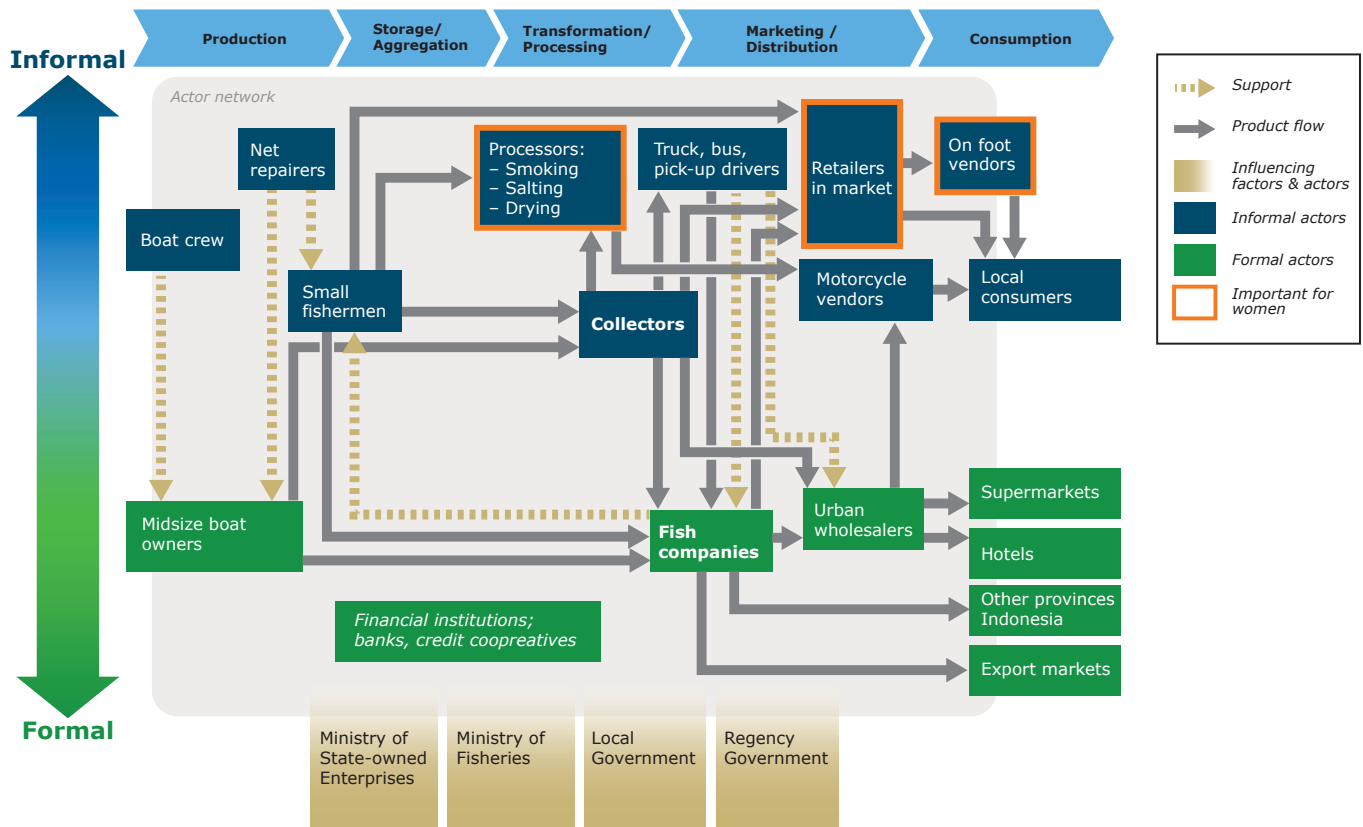


Figure 11: Actor network – Marine fisheries, Maluku, Indonesia.

There are chains for local market on Seram island, where consumers are reached via retailers in open-air markets, on-foot vendors, and motorcycle vendors. These chains are largely informally organized.

And there are chains going other cities and towns in Maluku, or to other Indonesian Provinces, or to export markets. Fish companies and wholesalers in Ambon City play important roles in these more formally organized value chains. The more valuable the fish and the more modern and distant the market, the more formal the actors involved.

There are important connections between the informal and formal economy. Collectors connect fishing communities to the local markets, but also to fish companies, who supply other parts of Indonesia and foreign markets. Transporters play an important facilitating role in getting the fish from fishing communities to larger off-takers. For tuna and bonito, companies currently provide small fishermen with GPS and ice, in order to comply with traceability and quality requirements.

As mentioned in the introduction, Maluku represents more than one third of Indonesia’s national fish production potential. This potential can be much more exploited, to the benefit of many small and larger players, and to the benefit of the national economy. This would also require that financial institutions, ministries, regencies and local governments, which are currently hardly connected to the marine fresh fish value chains, play their roles in the food system.

Fresh fish value chains in Maluku: options for action

Our statement is that if you see how the fish value chains work and how informal and formal operators are connected, you will then see options for improvement.

Based on the mapping and analyses in the previous section, we see the following practical options for action, of which many are in fact a further connection and collaboration of informal and formal actors:

- Line fishing
 - Support fishermen with finding appropriate big bait lines.
- Net fishing
 - Social control and official guidelines for net maze sizes to avoid overfishing.
- Seasonality / fish losses
 - Invest in cold storage facilities to avoid waste during peak seasons. Storage will also have a price buffering effect.
 - Explore co-ownership of these facilities of fishermen and fish companies.
 - Explore feasibility of using solar energy for fish cooling in remote villages.
 - Drying of fish left-overs as ingredient for animal feed.
- Fish processing
 - Connect to existing local processors and processor groups to improve artisanal drying, salting and smoking techniques to improve hygiene and quality. This is a precondition for sales beyond the production zone.
 - Invest more in (semi-)industrial fish processing, to absorb fish surpluses.
 - Improve the connections of fish companies via more transparent sourcing relations via collectors of fresh and salted fish.
- Farmer-company relations
 - For traceability: expand support of fish companies to small fishermen for GPS tracking and for access to, and use of ice. This can be part of contractual agreements, with loan repayment when fish are supplied.
 - For quality fish delivery: pursue and scale the collaboration of small fishermen and companies for accessing ice and loin plastics.
- Transport
 - Build further on existing transport modalities with trucks, buses and pick-ups.
 - Companies can provide boxes, trays and loin plastics to fishermen and truck drivers.
- Retail
 - Ensure hygienic spaces and ice for fish retailers in markets.
 - Promote use of cool boxes for on-foot vendors.
 - Link motorcycle vendors to fish processors / fish processor groups.
- Credit
 - Train small fishermen, artisanal processors and different categories of retailers on financial record keeping to improve their eligibility to loans.
 - Organise fisherfolk in saving and credit associations or align them, if possible, to micro-finance institutions and credit cooperatives.
- Enabling environment
 - Ministry of State-owned Enterprises to ensure fishermen access to fuel and kerosene.
 - Ministry of Fisheries to develop policies and regulations for sustainable marine fisheries.

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