

## Field Report

### Fishing Grounds and Supply Lines in Indonesia Fishery Management Areas 573, 713, and 714

### Part 1: Sumbawa



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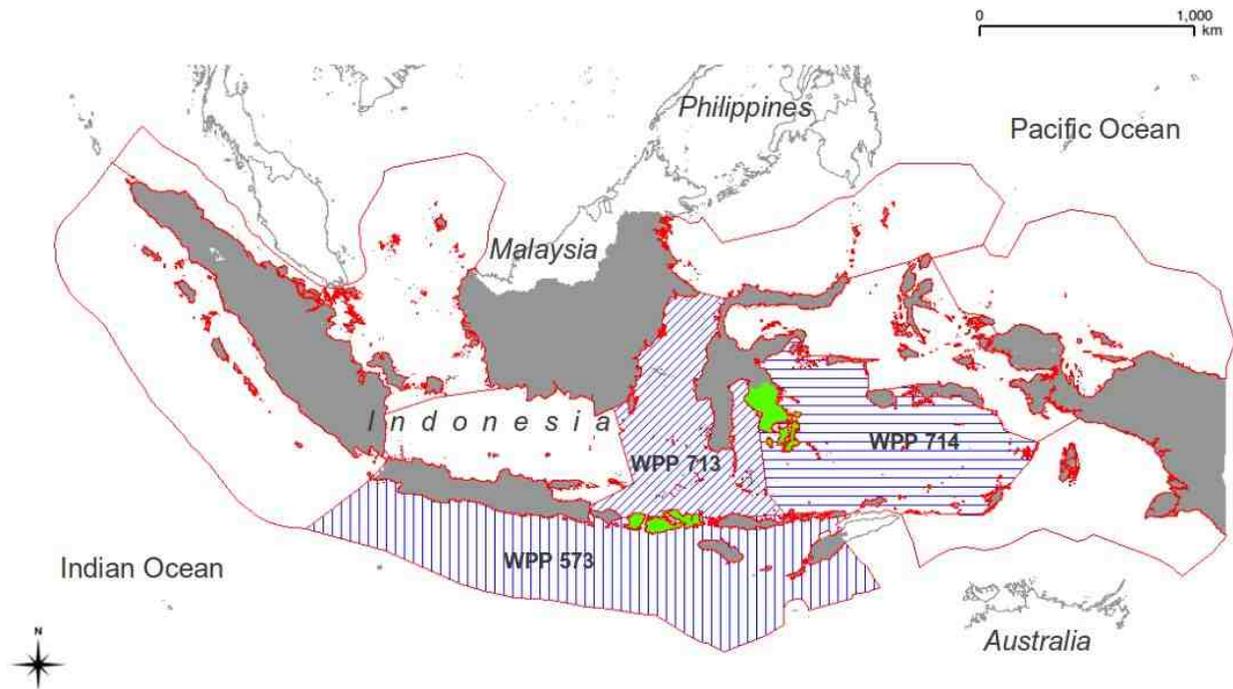
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## INTRODUCTION

This report covers a 10-day field survey to Sumbawa, conducted in December 2011 by consultants from IMACS and PNCI, together with Sumbawa and Bima Fisheries Service (DKP) staff. This survey aims to map fishing grounds, fisheries resources and infrastructure in Fisheries Management Areas in Central Indonesia. The focus for this mapping exercise is on three groups of exported species, the first one being export size and quality demersal fish from fishing grounds between 30 and 200 meter depth. This group includes snappers, groupers, emperors and sea breams of various species and size groups and is mainly caught with bottom hook and line and bottom longline. The second main category that we looked at is a group of large pelagics including mostly Yellowfin Tuna and in some places Mahi Mahi, with a small part of Bigeye Tuna, caught around FADS and also free swimming with small scale hook and line vessels. A final and third category that we looked at is the combination of Skipjack, Baby Yellowfin and Eastern Little Tuna that is landed mostly with purse seines and pole and line boats. The purse seine boats that target these fish also land varying quantities of schooling jacks and trevallies, Indian mackerel, scads and other small pelagics.



*Location of Fisheries Management areas WPP 573, 713 and 714, and IMACS Provinces Nusa Tenggara Barat and Southeast Sulawesi.*

Information was obtained from landing sites in Sumbawa Besar and Santong in Kabupaten Sumbawa Besar, Sanggar, Jala and Hu'u in Kabupaten Dompu and Rompo, Sape and Wera in Kabupaten Bima. A local tuna-processing mini-plant in Bima was also visited, as well as the local fresh fish market in Bima. There is little demersal fishing activity on the North coast West of Sumbawa Besar or on the West or South coast of West Sumbawa (East of 118 E). Also not much demersal fishing activity exists on the North coast between Teluk Saleh and Bima. In these areas the amount of suitable habitat (fishing grounds) for demersals is very limited. Interviews and data collection focused on the fish species groups mentioned above and the fishing fleets and fishers targeting these species as well as collectors and traders buying, transporting and selling these species. Information on fishing grounds used by various fishing communities was recorded on maps during the interviews.

## **SUMBAWA BESAR**

Sumbawa Besar is the easternmost fisheries center of Sumbawa. There are 9 major traders based in Sumbawa Besar, of which we interviewed the largest three. Together, these three traders may account for 50% of the capture fisheries production of Sumbawa Besar in respect to the two target fisheries (tuna / skipjack and deepwater snappers and groupers). Of these three major traders, two operate both target fisheries, whereas the third only operates the tuna / skipjack fishery. The tuna fishery of Sumbawa Besar is a recent development: The three major traders started involving fishers after 2005.

The largest tuna trader, Mr Mus Mulyadi, owns 14 boats, and he cooperates with another 40 boats. Each boat is about 12 GT. Fishers fish at FADs (rumpon) or on free-swimming tuna using kites. The popularity of kite fishing is decreasing. At peak season for tuna (April - August), these boats each catch 1000 kg per trip of four days. Over the period September - March, the trips are longer (up to 10 days), and the catch per trip is somewhat lower (600 - 1000 kg), comprising mostly skipjack and juvenile tuna. Mr Mus Mulyadi owns 20 FADs, which are anchored at 2000-3000 m. The fishing grounds are to the north of Sumbawa (between 117 and 119 E, around 8 S).

Trader Mr Bur Adi Bakti owns 1 boat and he works together with another 40 boats, each of c. 10 GT. Mr Bur Adi Bakti operates three FADs, and the fishing grounds are similar to those of Mus Mulyadi. According to Mr Bur Adi Bakti peak season is from April to December, where the fishers catch smaller fish (< 30 kg) during April - June, and larger fish (> 50 kg) during September - December. The catch-per-unit-effort during these two periods amounts to 700 kg per trip of 4-5 days. During the months July -August the

fishers catch mostly skipjack and juvenile tuna (200-300 kg per trip of 7-10 days). The fishers note that the size of their catch mostly depends on the size of available bait: Larger bait means larger fish.



*Sorting and packing demersal fish at a trader in Sumbawa Besar.*

Trader Mr Dameng owns one boat and he works together with another 27 boats of c. 15 GT. Like Mr Bur Adi Bakti, Mr Dameng owns three FADs. Besides the fishing grounds

to the north of Sumbawa, his boats also fish to the south of Sumbawa between 9 and 10 S. The southern fishing grounds usually have larger tuna. The main seasons for yellowfin tuna are April - June and September - December, during which the catch-per-trip amounts to c. 2000 kg per trip of 5 days. Fishers catch mostly small yellowfin tuna (< 30 kg) during April - June, and large tuna (> 50 kg) during September - December. During the months July and August the fishers catch mostly skipjack and juvenile tuna, with a catch-per-unit-effort of 200 - 300 kg per trip of 7-10 days.

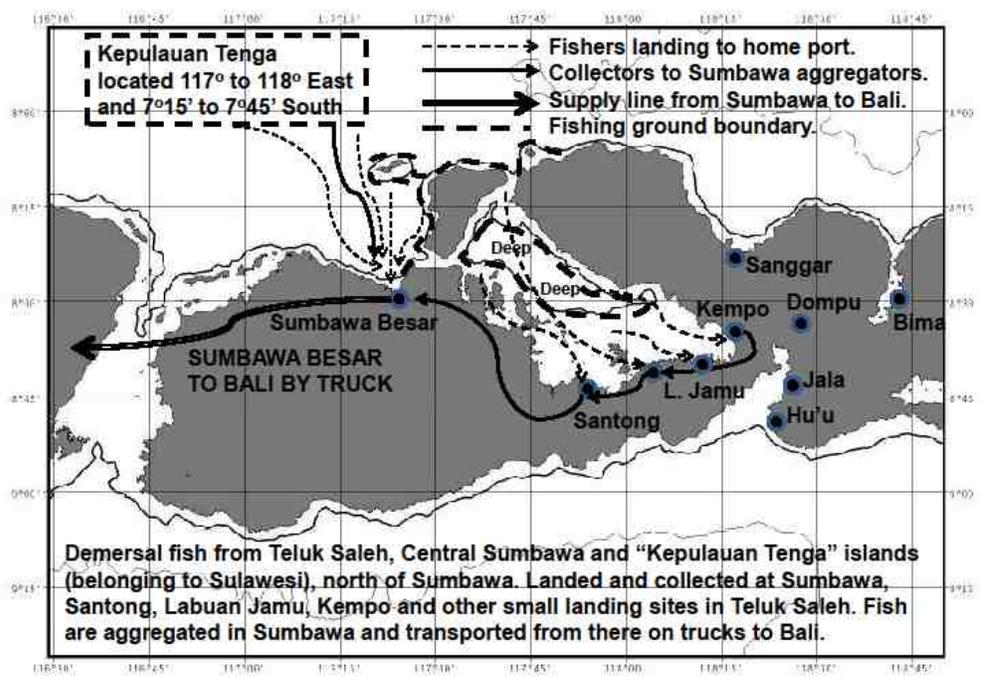
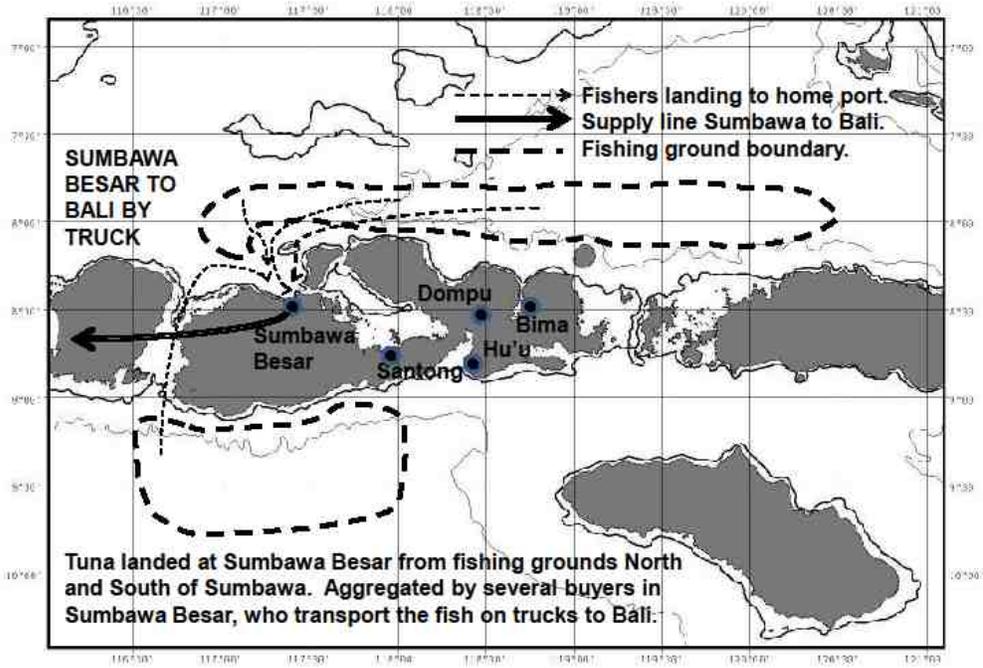
The traders have strong ties with tuna fishers: Fishers usually borrow money for their daily needs and for their family back home. The traders keep track of the earnings of each fisher, and once per year the trader pays out the balance. They sell their tuna to companies in Bali (Bali Nusa, Mina Utama, BTS, and Jaya Kota). The traders sell to Bali at a price of Rp 30,000 for the highest quality (grade A); whereas grades B, C, BS, and "Bubur" are Rp 28,000, Rp 18,000, Rp 10,000, and Rp 5,000 respectively. The traders buy yellowfin tuna from fishers at Rp 18,000 - 20,000 per kg. Traders sell skipjack locally at Rp 8,000 - 10,000 per kg, and they buy from their fishers at a slightly lower price (Rp 7,000 - 9,000 per kg). At peak season, the price of skipjack may drop to Rp 6,000 per kg. The local buyers process the skipjack as "ikan pindang" (salted and boiled), or they sell at local markets as fresh fish.

Mr Mus Mulyadi and Mr Bur Adi Bakti also operate demersal fisheries (bottom handlining). Mr Mus Mulyadi owns 60 small (c. 2 GT) catching vessels and 10 mid-sized (15 GT) collecting vessels, which operate on Balabalakang, a reef complex to the north of Sumbawa (c. 10 hours from Sumbawa Besar). The collector vessels accompany the catching vessels to the fishing grounds, and these collector vessels also catch fish themselves. A catching vessel catches about 200-300 kg per trip of 7 days, the collecting vessel catches about 1000 - 1300 kg per trip of 4 days. Mr Bur Adi Bakti owns 4 vessels and works together with 20 vessels of each 2 GT, catching 200-300 kg per trip of 7 days. These boats fish around Medang Island and in Saleh Bay. About 60-70% is "local" fish (sold by fishers at Rp 15,000 per kg) and the remainder is "export" fish, which is sold by fishers at Rp 30,000-40,000 per kg. The qualifiers "local" and "export" should be understood as price categories rather than an indication of the market, since also "local" fish is exported as fillets.



*Offloading yellowfin tuna from tuna fishing boats in Sumbawa Besar and loading of the tuna on trucks for transport to the filleting plants.*

Sumbawa Besar has two ice factories: Golden Coin, with a capacity of 100 t / day and Yuppi, with a capacity of 6 t /day. Especially at times when Golden Coin is harvesting shrimp from its tambaks, ice is in short supply, and consequently traders truck in ice from Lombok or Bali. One of the traders, Haj. Daming, produces ice at home, using 20 refrigerators.



## **SANTONG and other Landing Sites South Side Teluk Saleh**

Boats operating from Santong (Teluk Saleh) are around 3 GT, using a 16HP inboard engine, and 3-4 crew. Santong alone has at least 60 of these boats, and the total fleet of this type of boats operating in Teluk Saleh may amount to more than 400. A series of fishing villages is situated along the South coast of Teluk Saleh, from Kempo in the East to Santong in the West, with Labuan Jamu being a large one in the middle of the South coast of this bay. Kempo has a large bagan fleet, but there are also many handliners and in front of Labuan Jamu the survey team observed large numbers of small boats used for hook and line and gillnet fisheries.

Local demersal fishers in Teluk Saleh mostly use handline, mini bottom longline, and gillnets as well spear guns and bubu traps from compressor boats. About 50% of the fleet fishes mostly with gillnets and catches a wide variety of demersal species, mostly for local markets only. The hook and line fishers and spear gun and bubu trap fishers catches mostly groupers (*E. coioides* and coral trouts) and mangrove snappers (*L. argentimaculatus*). Longliners use around 350 hooks, usually 100-120 hooks per box or longline. Demersal fishing takes place at night, and usually fishers leave around 3 pm in the afternoon to return around 6 am the next morning. Fishing grounds are generally 15-50 m deep, local fishers do not often fish at depths over 50 meters. Some fishers from Sumbawa Besar fish in the deeper parts of Teluk Saleh and in the deep waters to the North of Teluk Saleh.

Up to 100 compressor boats were said to operate in Teluk Saleh, of which 12 operate from Santong. They fish with fish traps (bubu), spearguns, and probably also with cyanide for live fish and lobster. At the time of the visit, there were two of these compressor boats in Santong harbor. In Teluk Saleh, live fish buyers only buy live fish up to 1 kg individual weight. Larger ones are sold dead as fresh produce on ice.

There is a large fleet of “bagan” or lift net boats in Teluk Saleh. These boats use light attraction during dark moons to catch squid and small pelagic fish – which are also used as bait by the demersal fishers. There are about 20-25 fishing days in a month. There is no fishing during full moon because of lack of baitfish, as during that time the local lift net boats do not go out for about a week. About 50% of the fleet is out fishing at any one day. Most fishers switch to fishing for jellyfish during the months December - January - February, as this is more profitable than fishing for demersals.

Bottom longlines in Teluk Saleh yield around 20 kg per 125 hooks on a one-night set. Average catch of handliners / bottom longliners is 40-50 kg per night, of which at least 10 kg is sold to local traders for transport to aggregators in Sumbawa. With more than

200 boats each landing at least 10 kg of export quality demersals per day from Teluk Saleh, this area may be of interest for the development of a new sustainable supply line, perhaps in combination with other nearby areas such as Jala and Hu'u, just East from Teluk Saleh, on the South coast, in Dompu Kabupaten (see below).



*Santong at the South side of Teluk Saleh. Local fisherboats include compressor boats (with yellow air hoses supplying air to divers). Demersal catches include coral trout, groupers and snappers. Local fishers process jellyfish during the season for that.*

The local demersal fishers in Teluk Saleh do not take ice on their boats although an ice factory is present here. This is because their trips last only one night. The ice factory at the TPI of Santong produces 1.8 tons of ice per day.

At the time of our visit, a small local trader called Hajrudin had two styrofoam boxes with demersal fish packed on ice and ready for transport to Sumbawa. One box was filled with *E. coioides* and *P. maculatus* of 1 - 1.5 kg each, and one with small mouse grouper and various coral trout and other groupers of about 0.5 kg each. All were destined for transport and sale to aggregator in Sumbawa, who in turn sells to Bali for export to Asian countries. At the time of the visit this trader has not been able to buy snappers from the local fishers as those were sold locally at Rp 25,000 per kg. All fish transported out from Teluk Saleh is going by truck over the main East-West road, and there is no transport out by sea.

Most fishers operating in Teluk Saleh are independent, which means that new traders have opportunities to enter the market. Fishers sell red snapper for Rp 18,000 - 20,000 per kg to local trader, and for Rp 25,000 per kg to local market. This means that the trader only buys snapper if the local market is saturated. Small groupers and emperors go for around Rp 25,000 per kg, depending on species. Fishers sell tenggiri < 3 kg for Rp 25,000 per kg, tenggiri 3-4 kg for Rp 30,000 per kg, tenggiri of 5-7 kg for Rp 35,000 per kg, and tenggiri of > 7 kg for 40,000 per kg.

## **SANGGAR / KORE**

The village of Kore was visited as one of the tuna fishing villages in the Sanggar area. The position of Kore is S 8°22'106; E 118°17.564. The tuna fishery in the Sanggar area is a recent development, which started around 2003. Tuna handliners of Sanggar on the North coast of Kabupaten Dompu fish at night, using lights (circa 4 to 6 lamps per boat) to attract squid and small fish to their boats, which in turn attract yellowfin tuna and other predators. One fishing trip lasts one night only. The fishers use live squid as bait. Each boat operates about 6 handlines at a time.

The average catch by Sanggar fishers is 4 to 6 tuna per night per boat, often totaling more than 200 kg per boat for a one night trip. Unfortunately, hooks used in Sanggar are currently too small and not strong enough for tuna (more suitable for grouper or snapper than for tuna), resulting in frequent loss of catch. Larger, stronger hooks are not available in Sanggar at present but issues like this would be easy to solve in cooperation with well-organized buyers. Fishers sell tuna for Rp 12,000 - 13,000 /kg.

The tuna are filleted into loins in Sanggar, all through the year, and packed on ice for transport to Makassar, via Bima (from where it goes on a transport boat to Sulawesi) and to Lombok by truck. There are three traders in Sanggar area, two from Makassar and one from Lombok. The traders always loin the tuna locally, upon landing of the fish, and the loins are packed in styrofoam boxes on ice for up to 6 days before transport.



*Kore landing site at Sanggar, with local tuna fishing boat using lights to attract squid.*

Seasonal patterns in fishing from Sanggar include a period from March to April when fishing takes place near Satonda and Moyo islands, catching mostly larger tuna (80-90 kg). During May-July fishing continues near Sanggar, catching both small and large tuna. From August through September, the Sanggar fishermen work North of the Tambora volcano and north of Satonda Island, where they catch exclusively large tuna. At this time they land their fish at So'nae, on the north coast of the Tambora peninsula, from where the fish are trucked back to Sanggar and beyond to Lombok or to Bima for shipping to Makassar. From October through January fishing takes place near Sanggar itself, catching mostly larger tuna. During the peak of the North West Monsoon, in February, they mostly rest and do not fish. The fishers stay near the fishing grounds at all times.

There are three fishing villages in the Sanggar area, which have a fleet of at least 100 boats in total. Desa Kore in the Sanggar area has a fleet of 50 boats. The average catch is about 100 kg per trip, which means that a substantial production of day-fresh hand line tuna is realized in this area, presumably up to some 10 tons per day when the fishing is good and at least several tons per day on average.

The main by-catch of the local fleet is mahi-mahi and there is a little skipjack too. Sanggar fishers frequently catch mahi-mahi, but there is hardly a market for it here. The present tuna buyers only buy the tuna. The Mahi Mahi is locally known as "ikan

lapangan", or "fish for the field". The price paid to fishers by local collectors is only 3,000 to 4,000 Rp/kg. Sizes are 3-30 kg and the quality is good as they are from one-day trip catches. The season for big mahi-mahi is January-May, but smaller ones are caught year-round.



*Mahi mahi is the main bycatch of the Sanggar tuna fishers, sometimes specifically targeted at the rumpons. Mahi mahi currently fetches only very low prices in Sanggar.*

Local fishers could catch more mahi-mahi if they targeted them more specifically, but they are not interested at present because of the low price. Fishers from Kore (Sanggar area) mostly fish for free swimming tuna but also operate 7 rumpons, positioned 7-10 nm from the coast, aggregating tuna, mahi-mahi, and skipjack. Sometimes fishers specifically fish for mahi-mahi at these rumpons if there is no tuna around and they are empty after a night of fishing.

## **JALA and HU'U**

Jala (Kecamatan Hu'u) is home to a fleet of about 100 small scale boats. A small landing site is situated here at S 8 43.474' and E 118 25.512'. About 20 local boats here are used in a night-time hand-line fishery for deepwater demersals. Each hand-line has

6-7 hooks, while mini bottom long lines with 100 hooks are also used by these demersal fishers. Average catch is 40 kg per trip, including various species of snappers, groupers and emperors. Groupers like *E. malabaricus* are typically 4-5 kg in individual weight, red emperors (locally known as "bawal merah") are 1.5 kg individual weight, gold-banded snappers are up to 7 kg individual weight and snappers range from 1 to 10 kg in weight. Jala deepwater demersal handliners receive around 20,000-25,000 Rp per kg for snapper or grouper from local collectors.

Fishers sell their catch to small collectors along the beaches of Jala and Hu'u. These traders usually pick up fish by motor cycle and who will have to travel as far as Bima and Sape or Sumbawa besar before they can sell to larger aggregators and exporters. Much of the fish finds its way to local markets as well. There is no ice factory in the area, and fishers and traders use home-made ice frozen in plastic bags in freezers. An estimated 1.5 million plastic bags makes it into the water of Hu'u bay, when fishers and traders unpack the ice before putting it into their styrofoam boxes. Large quantities of plastic wash up on the popular surfing beaches of Hu'u as a result of this local home-made-ice industry.

Some of the fishers at Hu'u, just south of Jala, use spearguns. A small landing site at Kampung Finis (Kecamatan Hu'u) is situated at S 8 45.857' and E 118 23.919'. Here the survey team found a spearfishing catch in the afternoon, with large (ca. 3 kg individual weight) maori snapper (*L. rivulatus*) and a tiger grouper (*E. fuscoguttatus*) of about 8 kg. More fish is landed here in the morning from night time hook and line fishers. Local trader Bram uses 20 styrofoam boxes and home-made ice for his business here. He works with a group of 50 boats, and he sends his fish all the way to Sape (!) which is a long drive to the East. In Sape it is then combined with other fish and sent back over the same road to the West to Bali. Most handlining and bottom longlining fishers in Hu'u appear to be independent (i.e., not tied to a trader), selling to a network of small traders. Both fishers and local collectors / traders mentioned spontaneously that they would be interested to work with larger aggregators in their own area.

Local collector Bram bought the following demersal fish (all caught by bottom long line) at the Finis landing site during our short visit there: 3 trevallies of 1-3 kg each, 1 *Lutjanus bohar* of 6 kg, 5 *Lutjanus argentimaculatus* of 2-3 kg (range of this species in Hu'u is 1 - 10 kg), and 1 other snapper of 2 kg. Another mixed catch of shallow-water demersals included large maori snappers (*L. rivulatus*) of 5 kg, various small coral trout (*Variola louti* and *V. albimarginata*), small red emperors (0.5 kg each, c. 25 cm TL), a small long-spined snapper *Argyrops spinifer* (SPARIDAE) (c. 25 cm TL, also seen in Rompo), deepsea snappers *Dentex tumifrons* (SPARIDAE), an *E. coioides* of 3 kg.



*Demersal fish landings at Jala and Hu'u. Apart from export quality Snappers and Groupers landed by hook and line fishers, other demersals are landed by gillnet boats.*

Many of the small boats in Jala and the rest of the Hu'u bay currently fish for small pelagics with small encircling nets, and for various shallow water demersals with gillnets. There is also a small scale fishery for shrimp here and a small fishery with purse seines for skipjack and eastern little tuna (tongkol). There are also about 15 mini purse-seiners in Hu'u, making 3-day trips.

Hu'u fishers get good tenggiri catches in April, c. 100 kg per trip, on hook and line. According to a local fisheries official at Jala, there have been a number of incidents of blast fishing and cyanide fishing, resulting in various arrests but there has not been any organized action to date against these illegal practices.



*At Hu'u landing sites, high quality snappers like *L. argentimaculatus* and other prime species (top) are often mixed with lower quality fish when traders buy complete catches of local fishers (bottom left). Especially the mixing in of large *Lutjanus bohar* can cause problems as this species has extremely tough flesh at larger sizes (bottom right).*



*Besides the larger demersals, fishers at Hu'u and Jala land a variety of smaller snappers, emperors and groupers. Some are smaller species, others are juveniles of the larger species. The small paddle tail snapper is very common in the catches here.*

Jala / Hu'u also has a rumpon-based fishery for yellowfin tuna with about 17 boats, conducting 5-day trips and catching tuna over 15 kg individual weight, with many fish over 30 kg and up to 100 kg. There are two traders / boat owners who have been operating rumpon-based handline fisheries for tuna from Jala and Hu'u since 2008: (1) Group 'Dandim', working three rumpons at 3000 m depth, with 10 fishing boats, 4 crew per boat, trips of 4-5 days, using 1 ton of ice per trip. The ice is sourced from Bima. The average catch is 0.5 ton per trip, peaking at 1 ton per trip, selling to Bima mini-plant; (2) Group 'Ap', owning one rumpon, 7 fishing boats (all owned by fishers themselves), selling fish to Lombok, with ice sourced from Lombok.

The rumpons operated by the Jala / Hu'u groups are positioned among rumpons operated by groups from Labuan Lombok (presumably CV Versace and CV Baura). The fishers coordinate their fishing operations with each other at sea (who fishes at which rumpon and at what time, etc.).

Mbawi (Soro Adu) is a place at the northern end of the Bay (north of Jala and Hu/u) where the Fisheries Department (DKP) built some facilities in the past, which were constructed by DKP. Fishers do not use these facilities at present, they are located too far up in the bay behind shallow water and in a mangrove area.

## ROMPO

Rompo is a fishing village on the north side of the large Woworanda Bay in the South of Bima Kabupaten. Rompo has around 20 small demersal handline / longline boats (250-500 hooks), who fish for deepwater demersals but who sometimes switch to trolling for tenggiri (spanish mackerel), wahoo and other larger pelagics. Demersal fishing takes place at night, trolling during day time, and a fishing trip is one day (night) only. The catch-per-trip in the demersal fishery here is reportedly quite high, between 50-200 kg. On average, catch-per-250 hooks is 50 kg. Five of the 20 boats are somewhat larger and use at least 500 hooks.



*Interview team at work and fisherman showing mini long line for demersal fishing (top). Rompo produces a variety of export quality snapper and grouper species (bottom).*

Up to 1 ton of quality large demersals can be produced daily by this small fishery out of Rompo. Snappers of 8 kg individual weight are said to be common, and large *L. argentimaculatus* were indeed observed at one small collector. Handline / longline fishers from Rompo use bagan-caught fish for bait so are depending on bagan operations which stop for a week around full moon. There are about 40 bagans (lift nets) here, fishing for anchovies and squid, catching also other small pelagic like scads

and clupeids in the process. Fishers targeting large pelagics in Woworanda and Rompo fish for free-swimming fish, they do not use rompons.



*Also in Rompo, high quality larger snappers like *L. argentimaculatus* (top left) are mixed with large *L. bohar* (top right). The latter have very tough flesh which can cause problems further down the supply chain if these fish are not separated. All “export quality” snappers, groupers, emperors and breams are packed on ice from the local ice factory (bottom left) and trucked to Sape on mini vans (bottom right) by local traders.*

There is no fishing outside the bay, by the small demersal fishing boats, during the peak of the southeasterlies, which blow hard from July to September. Rompo has a working ice factory, which has a daily production of 170 blocks of 25 kg each (4,250 kg/day). Export quality fish (for either whole round fish or filleting plants) are packed on ice and trucked to Sape by local collectors. From there, the fish are ultimately trucked to Bali by the Sape aggregators. One local collector brings fish from Rompo to Sape 3-4 times per week. Big snappers are for filleting – he knows. Price paid by him to fishers for big snappers is 15,000-20,000 Rp per kg. Price for low-value large pelagics (e.g. wahoo, tille trevally) is 12,000 Rp per kg.



*Red Sea Breams (Family Sparidae) fetch among the highest prices of all fish in Rompo.*

In the same bay as Rompo, operating from small coastal villages, there is also a fleet of around 25 small boats that each fish with 25 bubu fish traps. These traps are about 1.5 meter long. These bubu are usually set on reefs in shallow waters (up to 20 m depth) and catch shallow water reef fishes.



*Rompo mini bottom longline fishers (left) usually operate over deeper water where they catch a variety of deep water snappers and groupers. But hand liners and bubu trap fishers who work over shallower water also deliver coral trout (left) to local traders.*

At Rompo there are also some 40 purse-seiners fishing for tongkol (*Euthynnus affinis* or Eastern Little Tuna, also known as Kawa Kawa), skipjack (*Katsuwonis pelamis*), baby yellowfin (tuna up to 10 kg), layang (scads, *Decapterus* spp.), lemuru (*Sardinella longiceps*) and schooling trevallies like Tille trevally and Bigeye trevally. Purse-seiners mostly land during daytime and catches are trucked to Sape and to Bima, ultimately destined mostly for local markets with some fish being trucked to Surabaya as well. Catch-per-trip of Rompo purse-seiners averages 500 kg and goes as high as 6 tons per day. The most important species in the purse seine fishery here is tongkol, and skipjack comes second. Sometimes there is a substantial catch of baby tuna.

On December 16, one mini purse-seiners brought in a very large catch of Tille trevally (about 6 tons), which was supposedly sold for Rp 100 million (total catch). There was not enough ice in Rompo to properly chill this catch when it was landed and several boxes of these fish were found rotting at local collectors in Rompo on the 17<sup>th</sup>. The field

team also found fish from this catch lying around in Bima fish market on December 18. The fish was of such bad quality at that time that even the local market would not take them. This is an example of how an exceptionally large catch can spoil both the market and future fishing opportunities. Similar situations seem to happen with tongkol and skipjack which were often seen in very bad state on local markets.

Rompo purse-seiners also fish in Komodo National Park, especially Loh Baru on the East side of Rinca island. The national park authority prohibited fishing some years ago, but the authority recently opened the park again for fishing. Now fishermen from the Bima district are free to go and fish where they want in the Park.

## **SAPE**

Sape is the number one demersal fishing port and collecting and aggregation site for demersal fish in Sumbawa. Fish from all directions comes to Sape aggregators, both from a large fleet of demersal fishers directly as from a large number of smaller collectors that bring fish from around Bima Kabupaten and even from as far as Dompu Kabupaten to the West and West Manggarai Kabupaten in Flores to the East. Approaching Sape on December 19, the police directed the survey team away from the main harbor. As the team was heading towards the fishery harbour anyway, this did not obstruct the field work. At the main harbor there was a demonstration by local people against plans for gold mining in East Sumbawa, and the demonstrators blocked the ferry terminal. Police shot 2 of the demonstrators (detiknews 2011). Sape has a long history of protests and riots, often related to incidents where Sape inhabitants resisted arrest for poaching and blast fishing, resulting in arson of a government building in one case. This tendency also increases risk to fisheries businesses run by outsiders. The older generation of local traders and exporters have made their fortunes and are very influential in the Kabupaten of Bima, with one of them a prominent member of the local parliament now.

Bottom handliners and mini bottom longliners from Sape make 3-day trips (3 nights) with a crew of 4. They take 200-250 kg of ice, and they usually fish at depths 20 - 100 meters. Some fish deeper. Common large snapper species in the deepwater catch are ruby snapper *Etelis carbunculus* and Chinaman snapper *Symphorus nematophorus*. The same boats also switch to trolling with baitfish for tenggiri when those are around. The average catch comprises about 200 to 400 kg demersal fish for a three night trip (often over 100 kg per night), plus some 60 kg of tenggiri caught on the same trip (the fishers report that catch-per-unit-effort was two times higher about five years ago). This fishery involves about 300 boats that all land their catches in Sape. The fishers report

that there are fishers from Bali fishing for tuna around Sangeang but Sape fishers do not fish for large tuna themselves. Apart from the demersal fleet, there are 43 mini purse seiners landing in Sape (part from Sape, part from Maumere). Mini purse seine fishers from Maumere land part of their catch in Maumere, part in Sape.



*Typical Sape hook and line fishing boat, delivering export quality demersals like groupers, snappers, breams and emperors to trader Sumaji, who collects and sells to aggregators from Bali who are also based in Sape, just up the road from Sumaji.*

Trader Sumaji of Sape works together with 46 handlining and mini-bottom-longline boats and collects mainly demersal fish as well as Spanish mackerel. The house of trader Samuji is located at the Sape fishing port at S 8°33.982' and E 119°0.921'. Sumaji is a younger trader / collector, who used to bring his fish to Bali, but now the traders / aggregators from Bali have set up facilities in Sape, so he only needs to bring his fish from the fisher to these facilities less than 1 kilometer up the road. There are 5 large traders / aggregators in Sape, each working with about 50 boats, and about 15 small traders who work together with fewer (< 25) boats. The five large buyers in Sape are Yani for Lombok, Amin from Denpasar, Wiwit Hartono from Denpasar, Ahun from Denpasar, and one more buyer from Denpasar whose name we did not get. Trader

Sumaji of Sape buys groupers > 0.3 kg each, snappers > 0.5 kg each (average size 1-4 kg). Chinaman snappers landed in Sape are up to 8 kg each, ruby snappers are 1-12 kg each, averaging 4-5 kg each. There are many emperors of 0.5-8 kg each (the higher end of this size range mainly comprising longnose emperors). Sape fishers do not catch many Sparidae (breams).



*Larger snappers as well as smaller groupers, coral trout and breams are all sent to Bali.*

Sape has a government-owned ice factory and a privately-owned ice factory. The government-owned ice factory has a capacity of 15 t of ice per day, but the word is that is no longer works. The privately-owned factory has a capacity of 1500 blocks of 30 kg each (45 t of ice per day), and it sells ice at Rp 11,000 per block (Rp 12,000 if crushed). According to Samuji, this capacity is often not sufficient to supply all fishers with ice and ice is brought to Sape from Bima and elsewhere. Samuji reports an increase in blast fishing over recent years. Now, also bagans participate in “dynamite” fishery. In Sape, blast fishing has become a tradition that local fishermen do not accept to be destructive.



*Beautiful small monocle breams (Nemipteridae) are specifically targeted and separately sold and sent to Bali, supposedly destined for various Asian markets.*

Storage facilities of Bali traders in Sape were visited to inspect some of the shipments destined for Bali. One box contained Nemipteridae (monocle breams), individual weight circa 0.3 kg. These are bought by the local traders from fishers at 25,000 Rp per kg, while those traders pay Rp 20,000 - 25,000 to fishers for a variety of snappers and groupers. Ruby snappers of 1.5 kg and up are bought from fishers at 15,000 Rp per kg, irrespective of size, although in Bali the smaller part of the size range was said to fetch a better price than the larger ones. Ruby snappers of 1.5 kg and lower are supposedly sold at good prices for the local market in Bali. Large emperors, bought from Sape fishers at only Rp 12,000 per kg, are used for filleting in Bali. Prices paid by aggregators to local collectors and traders could not be obtained here. The buyer from Bali also buys fish from Labuan Bajo collectors.



*Sape fishermen also land significant quantities of Spanish mackerel (tenggiri, left) and unfortunately also lots of dynamited reef fish such as surgeons (right) and fusiliers.*



*Demersal fish from Wera and other small fishing villages in Bima district, as well as some fish from Labuan Bajo on West Flores in the NTT Province are sent to Sape by small collectors where they are sorted and aggregated before transport to Bali.*

## **WERA**

Wera has 30 small vessels handling for deepwater demersals. These boats land their catches in the afternoon after which the fish collected and transported to Sape to be sold to traders there almost daily. Quantities of demersal fish from Wera are small. A small fleet of about a dozen very small boats also fishes for yellowfin tuna hesr, near Sanggean island. During and around full moon they use dead natural baits and troll those in front of dolphin pods. During dark moon periods, the handline tuna fishers from Wira use lights to attract squid and small fish, which in turn attracts tuna. They then catch the tuna using live squid as bait. Fishers from Wira catch 5 small tuna (< 10 kg) for every large tuna (> 10 kg) and together they land around 20 to 25 larger tuna each day. The small tuna and some of the larger fish are sold at local markets and a dozen of the largest fish are trucked to Bima to a mini plant there each day. The Wera tuna fishermen do not have ice, their small boats have no space for ice boxes and they are

not organized with a collector boat in their fleet. The transport of the tuna to Bima also happens without ice and therefore rejection rates at the plant there are high.



*Wera fishermen selling yesterday's tuna catch at the mini plant in Bima.*

## **BIMA**

Lift net (bagan), drift gillnet, bottom gillnet and some small hook and line boats operate from the port of Bima. Mostly, small pelagic species dominate local landings here, together with some estuarine species from Bima bay. No significant amounts of export quality fish from our target species groups seem to be caught by Bima fishers or landed at Bima port. Fish for local markets, like tongkol and various shallow reef fishes, does come to Bima, trucked by local traders from various landing places in Bima and Dompu Kabupaten. The fish market in Bima, visited on December 18 in the morning, is crowded, muddy, and very dirty. Conditions here are worse than on many other rural fish markets in Indonesia. The part of the market with a roof has thick layers of fish scales and other dirt. There was not much fish of any quality for sale at the time of the visit. Fish for sale, in decreasing order of quantity, were tongkol ("pindang" style and "bakar" style, packed in leaves), dried teri (small pelagics from local bagan), various assemblages of reef fish, fusiliers, and marine catfish. There was also some rotten tille

trevally, probably from the large Rompo catch. Reef fishes combined with piles of fusiliers and surgeon fishes distinctly looked like blast fishing catches and were reported to come from Sape fishers.



*Bima fish market: Tongkol is a very common food fish in Indonesia and finds its way to the Bima market from purse seine fleets around the island (left). Fusiliers, surgeonfish and various other small reef fish species are usually caught by blast fishing (right).*

The team visited the official fish landing area of Bima, the TPI, which is located near the harbour of Bima, on December 18. There was no fish landing action there, but the TPI includes a mini-plant, which is operated by a production manager called Agus for a company from Jakarta. Agus buys large tuna (mostly yellowfin) > 10 kg for loining. The total number of large tuna (mostly > 20 kg and up to 100 kg) bought at this mini-plant is about 25 fish per day, of which 50% is from Wira and 50% from Hu'u / Jala (Dompu). Prices to local traders / boat owners paid by the mini-plant in Bima are 20,000 / kg for high-quality tuna > 20 kg. Rejected fish are sold at the local market at 14,000 / kg for low-quality large tuna, and 10,000 / kg for small tuna (< 10 kg). At the time of the visit, several large tuna were of low quality, and these were rejected to be sold by the Wera fishers to the local (Bima) market. Agus checks quality with a thermometer and with a bore to take samples of the flesh. Jala tuna is on ice. Ice goes from Bima to Jala and the fish come back on ice. These fish have a much lower rejection rate than the from Wera which are not on ice.



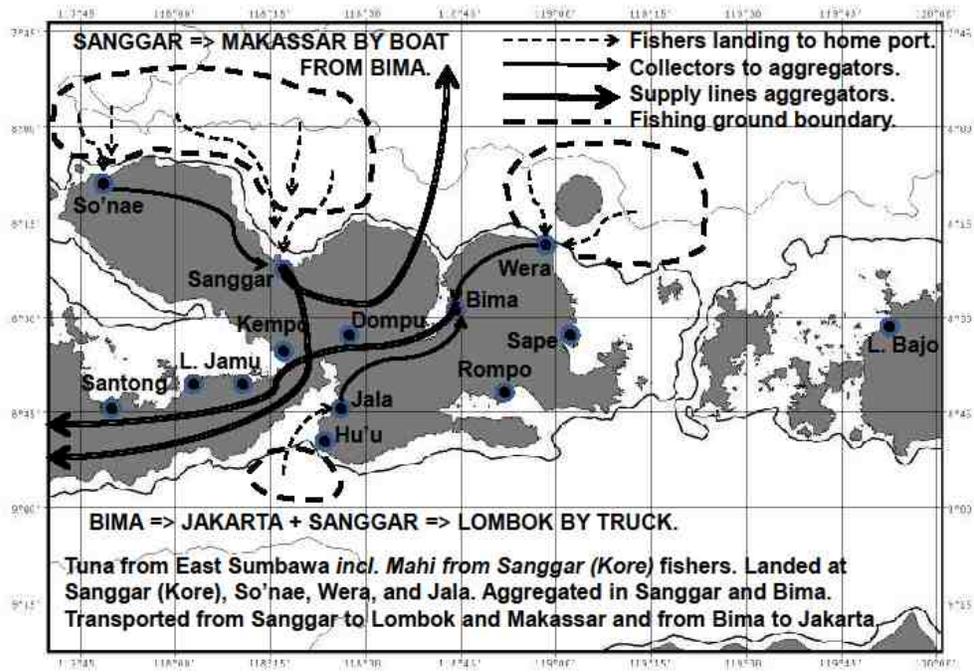
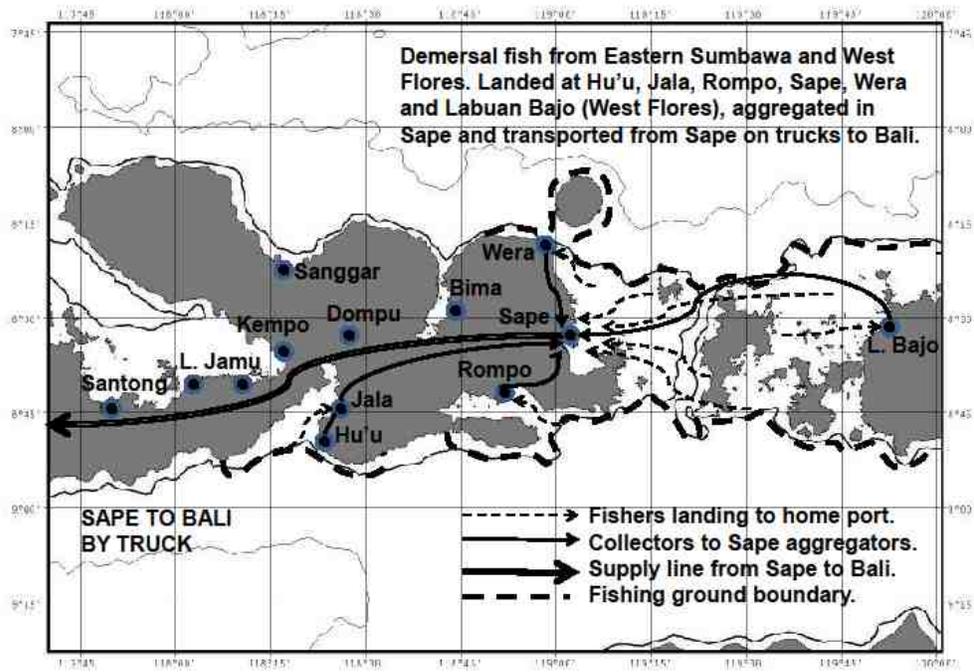
*Small reef fish and inshore pelagics of dubious quality are common on the Bima market.*

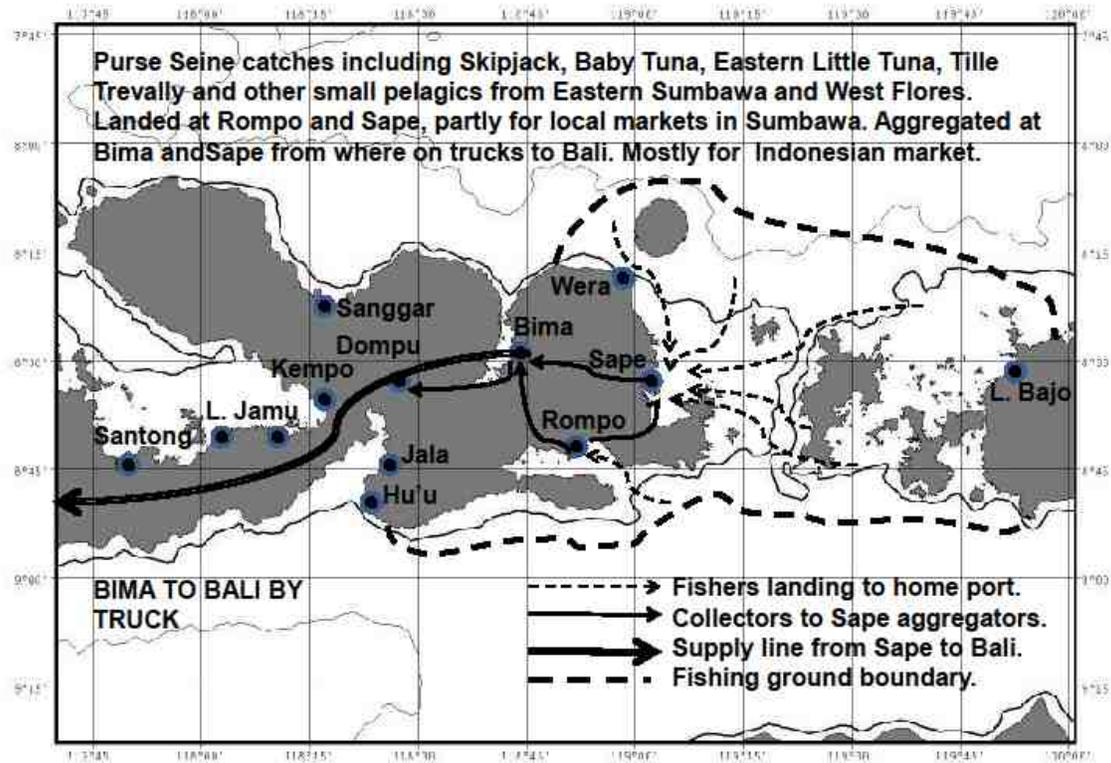


*Spoilt Tille trevallies from a May 16 purse seine catch from Rompo was on the Bima market on May 18 (left). Large tuna is checked for quality before being purchased at the Bima miniplant (right), for filleting to loins and transport to Jakarta.*



*Members of the survey team inspect “fresh” reef fish on the Bima market and frozen tuna loins at the Bima mini plant.*





## OPPORTUNITIES FOR SUSTAINABLE SUPPLY LINE DEVELOPMENT

The survey team discussed among themselves and with local DKP official the observed / perceived opportunities for development of new sustainable supply lines for export quality fish of above mentioned species groups. Fish production, quantity, quality, transportation lines, facilities like ice factories, enabling environment and similar factors were taken into account, as well as the opportunities to work directly with local fishing communities on new forms of local fisheries management on local fishing grounds.

Clearly Sumbawa Besar and Sape are already strongly organized and will not provide very easy access. Sape has the additional problem of volatility, while the plus point there is clearly the great quantity of good quality fish. But the supply lines here are strongly in the hands of several traders already and fishers are linked into the networks with local collectors. Fisheries management cannot be designed here for local waters

only since fishers fish even across provincial borders to the East and fish come from everywhere. Certainly a complicated situation exists in Sape and it may be hard to get into this situation for any new fish trading business. Similarly, Sumbawa Besar has fish, especially Tuna, but entering here may not be easy as major tuna traders are already present.

The situation was unexpectedly different in the Kabupaten of Dompu. Several newly developing fisheries for demersals in the South and tuna mainly in the North, with some tuna also down south. Considerable amounts of good fish are being landed in Kabupaten Dompu and various nearby landing sites. Demersals from Jala and Hu'u and potentially also from nearby Teluk Saleh (Santong, Labuan Jamu, Kempo and possibly more sites on East coast of this bay) from where fish now goes to Sumbawa Besar. Lots of good tuna and mahi mahi are available from the Sanggar area in the north, where tuna are being purchased by small traders only and mahi are sold for near nothing. Possibilities may exist also for development of local tuna fisheries from Sanggean area (Wera) which can be better organized. Dompu may even be able to compete with Sape traders for fish from the Bima district.

Dompu Government and small traders are interested in developing new supply lines, and fishermen are independent to make choices where to sell their fish. Proximity to the additional sources both east and west (Teluk Saleh and Rompo) could provide a buffer function. There is a limited (but not small) production of demersals on the South coast (Hu'u, Jala) and high likelihood of access to the fish for reasonable prices. There is a limited area of suitable fishing ground (shelf area) on the South coast at Hu'u, so not much room for expansion there. Currently, demersal fish from Dompu landing sites (Jala and Hu'u) go to the other side of Bima Kabupaten (Sape) where they are aggregated and sent back over the same road via Dompu to Bali. Fishermen are mostly unattached here and would welcome new buyers. There are currently no ice factories and no mini-plants in the entire Dompu district, so new investments in a mini plant with ice factory would be needed to start a new supply line here. Easy road access to Bali exists from here and transport by sea is also possible.

A large area of demersal fishing grounds is present in Teluk Saleh, just to the West of Dompu. There is a larger production here, but perhaps more challenging to get access to the fish than there is in the Dompu Kabupaten itself. Fishermen are largely independent though, so prices are most important. Some of the best options for localized management may exist in the bay of Teluk Saleh, which has narrow entry channels in the North. Very good opportunity also for localized management in and in front of the Bay of Hu'u, where demersal grounds are only used by local fishers who do not fish beyond these grounds themselves. Possibility of localized management within

Kabupaten waters also for the inshore tuna fisheries off Sanggar and the Tambora peninsula. Dompu may therefore be worth a look by investors for the development of a new sustainably supply line for export quality fish. This would certainly require investment in new facilities in the form of mini plant and ice factory plus transport trucks.

## **THE ISSUE OF SIZE IN DEVELOPMENT OF SUSTAINABLE SUPPLY CHAINS**

A complicating issue for the development of sustainable supply lines of export quality demersal species is the issue of size of the fish. Many of the most desirable species in the families of snappers, groupers and emperors reach very large sizes and the size of maturity is well above 3 kg for many of these species (Red snappers like *Lutjanus malabaricus* and *L. argentimaculatus*, Yellow Tail Snapper (*L. rivulatus*), deep water snappers like the Ruby snapper, various species of emperors and groupers. Especially for snappers there is a problem with the American market currently demanding fish below 3 kg and fillets also from that size and below. A healthy Ruby snapper fishery, for example, yields fish to handliners mostly in the range between 5 and 10 kg, with some larger fish as well. This species can grow to an enormous size of some 50 kg if not heavily exploited. Exploited populations have “smaller” fish in the catch, usually up to around 10 or 15 kg. Also the excellent “Chinaman” snapper grows to considerable size and is usually landed in sizes above 5 kg. Many groupers like the Malabar grouper, the Estuarine grouper (*E. coioides*, which moves to deep water at larger size) and the spotted grouper (*E. tauvina*) also mature at sizes well over 5 kg. Other deep water grouper species which do mature at lower sizes are also common in the catch.

One problem is the perception that larger fish would be “tough”. This is actually not the case for a number of species but it is very much true for one specific species, *Lutjanus bohar* (a beautiful large red snapper). The meat of this species becomes extremely tough at larger size and unfortunately this species is mixed in with other large snapper everywhere we looked (also outside Sumbawa, in Kupang for example). The result of mixing large bohar with other large snapper is that the overall lot gets “contaminated” with these very tough fish, and complaints from customers about the “large fish” cause the demand for smaller sizes. Smaller Bohar snappers are not tough so shipments of smaller snapper are not “contaminated” with tough fish. By avoiding large Bohar snapper, shipments of mixed large snapper could be of much better quality overall.

Another issue is the shape of the fillets. The market demands “fish shaped” thin fillets, whereas filleting factories often cut large fillets in thick pieces called “portions” which is not a preferred product. One way to work on this problem is by changing the filleting and cutting techniques to make thin diagonal fillets out of the larger fillets, instead of the

thick portions. The best way to cut fillets to get the best possible shape for the market needs to be developed and introduced to the filleting plants to enable them to work with larger fish and process these into the most desirable products possible.

The market and the consumer will need to be re-educated when it comes to larger fish. First of all, sustainable supply chains will have to work with large adult fish, and not with juveniles. New data poor management methods are all about monitoring the size in the catch, and fishermen will need to be encouraged to avoid the smaller fish while the fishery is managed to maximize the output of larger fish, not small fish. This needs to be clarified by species, which all have different sizes to reach maturity. Secondly the traders and consumers need to be educated about the various species, about the sustainability of consuming certain sizes, and about the quality of specific species and specific sizes. Cooking shows could be used for example to show that cuts of large Malabar snapper make delicious meals, with some structure but certainly not tough. This issue of size is an important one that must be recognized and for which awareness programs need to be developed as soon as possible to enable demand to meet with supply of sustainably produced demersal fish from Indonesia.

## **ANNEX 1: LOCAL RESOURCE PERSONS AND DATA-GATHERING EVENTS**

Agus Yudhi Ananto, DKP Bima: Interviewed on December 17 in Bima, joined field surveys on December 17, 18, and 19.

Kepala desa and a group of traders and fishers (c. 10 persons) in Rompo: Interviewed around 15:00, December 17 in Rompo.

Budi Sasongko, former fish trader, IMACS consultant (joined field survey)

Alwi, fish trader in Rompo, interviewed in Rompo on December 17.

Mini-plant operator at Bima TPI, Mr Agus, interviewed on December 18.

Two local traders / boat owners from Wira, interviewed at Bima TPI on December 18.

Group of fishers from Sanggar and Mr Hamzah, a DKP official based in Sanggar

Two fishers (one of whom immigrated from Java), interviewed on the beach of Desa Jala, Kecamatan Hu'u, on December 18 (around 16:00).

Fish trader Ibrahim ("Bram"), interviewed at Kampung Finis, Kecamatan Hu'u on December 18, 16:30

Visit to Jala landing site, December 19, 6:30-7:15.

Visit to Finis (Hu'u) landing site, December 19, 7:30, including another interview with fish trader Bram.

Fisher interviewed on Jala beach (Hu'u) on December 19.

Visit to Sape and interview with trader Samuji in Sape on December 19, 15:00-16:30, including a visit to the facilities of his buyers from Bali. Bpk Samuji is a good contact of Agus (DKP Bima) (ST).

Interview with two fishers and one ex-fisher in front of the house of trader Samuji, December 19 (SF).

Article on detiknews.com accessed on December 25 2011,

<http://www.detiknews.com/read/2011/12/25/065129/1799373/10/negara-harus-bertanggung-jawab-atas-kekerasan-di-bima> (detiknews 2011).

Interviews with fishers (including Amrin and Jamaludin, who is also the head of the local POKMASWAS) and trader Hajrudin at the TPI of Santong on December 20 (SG)

Interview with 5 fishers from Santong on December 20 (SF).

Interviews conducted by IMACS consultant Budi Sasongko in Sumbawa Besar in early December 2011 (BS)

Trader Mus Mulyadi of Sumbawa Besar, interviewed by Budi Sasongko in early December 2011 (MM).

Trader Bur Adi Bakti of Sumbawa Besar, interviewed by Budi Sasongko in early December 2011 (MM).

Trader H. Dameng of Sumbawa Besar, interviewed by Budi Sasongko in early December 2011 (MM).

## **ANNEX 2: CONTACT DETAILS**

Makturu H. Ar, kepala desa Rompo, mobile 081353519218

Alwi, fish trader in Rompo, 081246097020

Agus, operator of mini-plant at TPI Bima, 085711186887

Muhiddin Abd Majid, boat owner from Ujung Kalate (Wira), 085253291521

Hamzah, DKP official based in Sanggar, 085239609779

Safrudin, trader from Jala (Hu'u), 087866706274, 085237870718

Ibrahim "Bram", trader from Kampung Finis, Kecamatan Hu'u, 087866988390

Bpk Samuji, fish trader in Sape, 081237228244

Amrin, handline fisher from Santong, 08106985475

Hajrudin, fish trader from Santong, 081339837770

Mus Mulyadi, fish trader from Sumbawa Besar, 085253646680

Bur Adi Bakti, fish trader from Sumbawa Besar, 08123703060

H. Dameng fish trader from Sumbawa Besar, 081353422738