



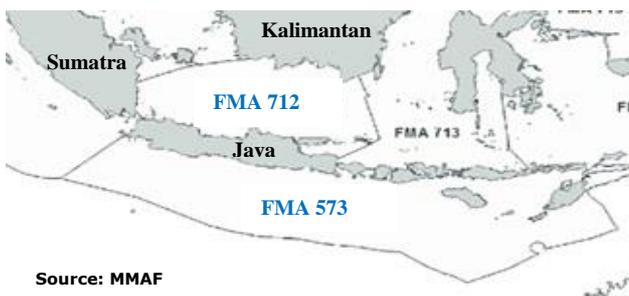
Project News: The Indonesian Seas Large Marine Ecosystem

December 2021 — Issue #4



Promoting evidence-based planning for sustainable fisheries management

MMAF, FAO initiated reviews of EAFM interventions in fisheries management areas 573 and 712 for improved, evidence-based planning for the next 5 years



Source: MMAF

The Ministry of Marine Affairs and Fisheries (MMAF) and FAO conducted a series of technical consultations and workshops during May–July 2021 to review the ecosystem approach to fisheries management (EAFM) interventions in fisheries management areas (FMA) 573 and 712 after five

years of implementation of the Fisheries Management Plans (FMP).

The review findings served as basis for evidence-based decisions to improve future FMP for sustainable fisheries resources utilization and ensure continued local economic development and improved fishers' welfare.

FMA 573 covers the Indian Ocean from south of Java to south of Nusa Tenggara, the Savu Sea, and the West Timor Sea. It is a 943 065.4 km² area and is managed by eight provincial administrations, namely Banten, West Barat, Central Java, Yogyakarta, East Java, Bali, West Nusa Tenggara, and East Nusa Tenggara.

The fisheries potential in FMA 573 ranks third among the 11 FMAs. The largest potential fish resources in the FMA 573 are the small pelagic fish group (50 percent), large pelagic fish (46 percent), reef fish (2 percent), demersal fish (1 percent) and squid (1 percent).

FMA 712 covers a 414 461.9 km² area north of Java island and is managed by eight provinces: Lampung, Banten, DKI Jakarta, West Java, Central Java, East Java, Central Kalimantan, and South Kalimantan. It has around 1 341 632 tonnes of fisheries potential with demersal fish (49 percent) as the largest, followed by small pelagic fish (27 percent), squid (9 percent), large pelagic fish (5 percent),

penaeid shrimp (4 percent), and blue swimming crab (2 percent).

“Because of the huge potentials, developing a comprehensive FMP with concrete action plans for FMA 573 and 712 should be based on sound data and analysis,” ISLME National Project Manager (NPO) M. Lukman explained

The review findings show that FMA 573 and 712 share similar issues and challenges, namely:

- degradation of fish resources and coastal habitats/ecosystems;
- inconsistent fisheries data collection system;
- conflicts between fishers, conflicts over the use of fishing gear and fishing zones;
- the need for support for the newly formed LPP (fisheries management authority in both FMAs) to immediately take up responsibilities to implement fisheries management;
- fishers’ earnings are relatively low (below the minimum regional wage); and
- limited port infrastructure capacities.

Specific priority issues that the findings highlight among others are: (a) the need for improved management of lobster seeds utilization in FMA 573; and (b) improved management of squid fisheries and reduction of threats to ETP (endangered, threatened, and protected) species in FMA 712.

The review looked at fisheries management within the framework of ecosystem approach to fisheries management (EAFM) from three main aspects: fish resources and environment; social and economy; and governance.

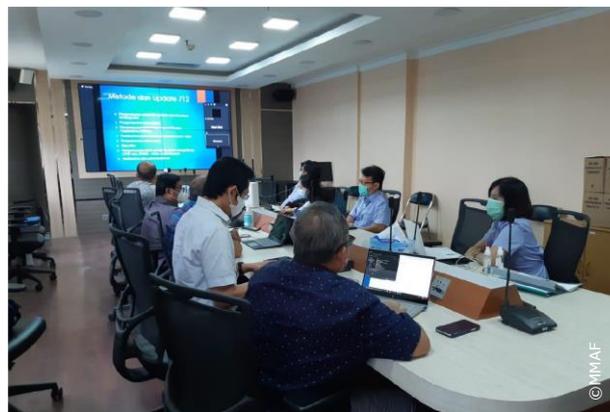
“The review captures the latest conditions in FMAs from the three aspects, and also how COVID-19 that has lasted for almost two years now, impacted the sector. The findings will be used to develop an improved FMP to feed into the 2020–2024 Mid-Term Development Plan,” said Ms. Besweni from MMAF Fish Resources Sub-Directorate.

“Certain fishes should be treated as priority fishes especially when the species have high production and economic value, have been assigned urgent status and/or have been selected as priority fishes according to local government policies,” Ms. Besweni pointed out.

The review process consisted of four key activities, conducted in participatory manner: (a) consultation meetings with MMAF, (b) data updating and verification for the FMPs, (c) technical meeting and stakeholder consultation, and (d) drafting, finalizing and disseminating the final report with close stakeholder involvement. The technical consultation meetings focused on (a) verification of data and information, (b) identification of issues and

challenges, (c) identification of management goals and targets, and (d) development of action plans.

Key stakeholders engaged in the review process represented MMAF and their implementing units, provincial governments, universities, and non-government organizations, as well as Rekam Nusantara Foundation (Rekam Foundation) as the service provider commissioned to carry out the FMA 573 and 712 reviews.



Fisheries stakeholder consultation

An additional output of this project was the development of a short video of the FMA 712 fisheries profile, highlighting issues and challenges, as well as management strategies that need to be carried out towards sustainable fisheries in FMA 712.

MMAF and FAO jointly initiate EAFM interventions for snapper and grouper fisheries management in Lamongan regency, East Java

As prime commodities in northern Java Sea (Fisheries Management Area 712), snapper and grouper fisheries provide income for local fishers and revenue for provincial administrations with promising export market potentials. Snapper and grouper fisheries mainly involve small-scale fishers (boat size <10 gross tonnes). MMAF and FAO are set to initiate EAFM interventions in Lamongan regency as a pilot site to improve snapper and grouper fishing practices and management.

The estimated total fish production in Lamongan regency is around 29 tonnes/year, making it the highest producer in the province. However, a recent EAFM assessment revealed declining fisheries population, including snapper and grouper; and fishers reported that their catch tend to be smaller in size and the fishing area was getting farther away from the coast.

The planned EAFM interventions were designed to help ensure sustainability of local fisheries resources utilization, promote habitat restoration and provide capacity building.

“The project aims to strengthen, update and review the existing snapper and grouper fishing practice and identify priority activities that are currently not yet supported and funded by the state and local budget,” said a staff from MMAF’s Directorate for Fisheries Resources Management during a site visit to Lamongan on 13–17 September 2021.

Activities during the visit included coordination meeting with provincial and Lamongan district-level Marine Affairs and Fisheries (MAF) offices, presentation sessions on snapper and grouper fisheries in Lamongan regency and in three villages, namely Kandang Semangkon, Labuhan, dan Blimbing villages, followed by a trip to the three villages for direct observation.

Involved in the activities are representatives from implementing units of the provincial and Lamongan district MAF Offices, fishery instructors/field extension officers, Brondong fishing port and heads of the three villages, snapper and grouper fishers’ representatives, MMAF’s Sub Directorate of Fisheries Resources Management and FAO.

“Stakeholder consultations are organized to gather fishers’ ideas and aspirations for informed future program activities,” explained ISLME NPO Dr. M. Lukman.

The proposed EAFM activities based on the assessment results included: (a) facilitating registration of fishing vessels and gears; (b) providing management training for fishing households in Lamongan district; (c) ensuring proper handling of snapper and grouper caught in Lamongan; (d) facilitating access to capital and markets; (e) building capacity of data collection officials; (f) equipping local fishers with financial skills and alternative income generating activities; (g) promoting adherence to regulations including reporting fishing catch for surveillance; (h) adopting innovative technology to ensure sustainable utilization of fisheries resources; (i) conducting public campaign to raise awareness on illegal, unreported and unregulated (IUU) fishing to end IUU practices; (j) improving efforts for habitat restoration; and (k) closely monitoring mangrove and coral reefs condition as the habitat for snapper and grouper.

Research findings guide integrated lobster, abalone and seaweed cultivation pilot in West Nusa Tenggara province

Integrated cultivation of lobster, shellfish, finfish and seaweed is growing in popularity. To promote a systematic, ecosystem approach to marine aquaculture in West Nusa Tenggara (NTB) province, two areas are proposed as pilot sites, namely: (a) a 438 hectare-area in Gerupuk Bay, Central Lombok Regency for lobster, abalone and snapper/grouper, and (b) a 940 hectare-area in Ujung

Betok Hamlet in East Lombok Regency for lobster and star pomfret. The project site selection, design and implementation were formulated based on the findings of a joint feasibility research by FAO and MMAF.

Fish farming using integrated multi-trophic aquaculture system (IMTAS) approach is one of the blue growth innovations. The system reduces the negative environmental and social impacts of aquaculture intensification and increase production and economic efficiency. Seaweed, shellfish, and finfish are common combinations in IMTAS as waste from the main commodities will be converted and utilized by other cultivated species in the system that absorb organic and inorganic materials. Such integrated cultivation system leads to reduced costs, increased efficiency and productivity.



Lobster fisher and his harvest (right photo)

The feasibility research was conducted by Mataram University Learning Centre-Ecosystem Approach to Fisheries Management (LC-EAFM). The research and pilot activity were part of the community-based (CB) IMTAS in West Nusa Tenggara (NTB) Province under FMA 573.

The research results offered recommendations for further development of lobster/ fish IMTAS, with floating cage technology combined with seaweed around the cage and shellfish. In addition, a business feasibility assessment was carried out to develop a sound business plan that takes into account environmental quality and impact, scale and productivity, suitable IMTAS commodity and technology selection, marketing and sustainable management including supply chain, and gender equality aspect.

The CB-IMTAS lobster/ fish pilot offer opportunities for integration with the aquaculture and capture fisheries sectors and with marine space management for increasing the competitiveness of fishery products in a sustainable manner.

Experience from this CB IMTAS pilot activity will be monitored and analysed as basic information and references for IMTAS development programs across Indonesia.

MMAF, key stakeholders discuss Harvest Control Rule for sustainable Blue Swimming Crab fisheries in northern Java Sea (FMA 712)

North Java Sea (FMA 712) contributes 48 percent to the national Blue Swimming Crab (BSC), known locally as *rajungan*, production and provides a source of income, especially for small-scale fishers in the fishing communities in the eight provinces across FMA 712. BSC ranks third in fishery export after tuna and shrimp with an export value of IDR 4.6 trillion (USD 329 million) in 2018.

However, there have been indications that BSC resource is under stress due to overfishing, likely jeopardizing its sustainability. Dr. Besweni of MMAF's Directorate for Fisheries Resources Management explained that BSC fishers reported that the size of wild caught BSC in Java sea was getting smaller and that the fishing location was getting farther.

To address the issues, the MMAF formulated Harvest Control Rules as a guideline agreed upon by fisheries managers, fishers and fishery industry stakeholders to attain the Harvest Strategy and to determine necessary measures regarding BSC stock and resources based on the latest stock indicators and monitoring. The two operational goals under the Harvest Strategy for BSC are to increase the spawning potential ratio from 20 percent to 30 percent in five years; and, to ensure that in a five-year period, 90 percent of wild caught BSC is above the minimum legal size of at least 10-centimeter carapace width.

The measures to protect BSC stock in nature under the Harvest Control Rules are differentiated into input and output controls. **The input control** covers: encouraging small-scale fishers to register BSC fishing boats, promoting adherence to fishing gear use, limiting the number of fishing boats, introducing temporary ban for BSC fishing, creating an enclosure for BSC restoration, and reporting the catch in line with the reporting standard to facilitate monitoring. While **the output control** covers setting the allowable minimum size of BSC to fish (carapace width around 10 cm or weighing 60 grams/crab) using monitoring control document and introducing a ban on capturing female crab with eggs.

For Harvest Control Rules implementation, planning of input- and output- control activities should be designed with thorough analysis from biological, social and economic aspects. "This also requires routine monitoring and periodic review of BSC stock status and concrete efforts to enforce it," said NPO for ISLME Dr. M. Lukman, while adding that raising public awareness is necessary for their meaningful engagement.

FAO supports MMAF and the Marine Affairs and Fisheries (MAF) provincial offices in Java island in their efforts to promote boat registration and the use of e-logbook to ensure traceability as part of the Harvest Strategy for sustainable fisheries. These activities are parts of the GEF/FAO-supported project, Enabling Transboundary Cooperation for Sustainable Management of the Indonesian Sea (ISLME project). The ISLME project had earlier partly supported the launch of the harvest strategy for BSC and also the EAFM assessment of BSC.

In its presentation, the government-funded National Commission for Fisheries Resources Research (KomNas KAJISKAN) shared the initial finding of a recent review that the status of BSC stock in northern Java sea may no longer be as critical as before. Data show that in the last couple of years, BSC Spawning Potential Ratio (SPR) continued to increase, albeit slowly. This is, however, not yet a sign of success since more observations into the carrying capacity in FMA 712 are needed and should be further supported with other biological indicators.

The Harvest Control Rules equip the Harvest Strategy document with the latest data and information available. The BSC monitoring system is available, detailing the sites, monitoring mechanism and BSC recording form. Provincial administration and stakeholders play an important role as the management of BSC fisheries in their respective areas is under their authorities.

For the follow-up action, the Harvest Strategy document equipped with the Harvest Control Rules will be disseminated to provincial administrations and stakeholders in FMA 712 to ensure proper understanding and implementation.

Timor-Leste intensifies public information campaign in an effort to combat IUU fishing, promote responsible fishing practices and safety at sea

Lack of awareness among fisheries actors and communities has hindered effort to promote sustainable fisheries practice and safety at sea in Timor-Leste. To address this issue, the Ministry of Agriculture and Fisheries launched a series of public information campaign to raise awareness and empower them to meaningfully participate in responsible fisheries.

The public information campaign was held from 15 July until 6 August 2021 in six municipalities, namely, Lautem, Baucau, Dili, Manatuto, Bobonaro and Liquiça.

The event was attended by 328 representatives from 12 fishing centres in the six municipalities. It was conducted with the support of GEF/FAO under the Enabling

Transboundary Cooperation for Sustainable Management of Indonesian Seas (ISLME project).



Public information session

The public information campaign aimed to educate fisheries actors and communities on:

- Combatting illegal, unreported and unregulated (IUU) fishing;
- Supporting monitoring, control and surveillance; and
- Promoting safety at sea

Through the campaign, local fisheries actors, especially local fishers developed the awareness to take action on the following:

- Identifying legal and illegal fishing vessels;
- Ending the use of harmful fishing gears and prohibited fishing practices;
- Reporting illegal operation of foreign fishing vessels, illegal fishing practice in the country and accident at sea;
- Fishing license procedures and adherence; and
- Protecting marine protected species.

The campaign activities include trainings using materials prepared by the National Directorate of Inspection for Fisheries and Aquatic Resources by combining the information and data from the Directorates and report of the Regional Fisheries Livelihood Program (RFLP) survey. At the end of the session, the participants raised their concerns, suggestions and recommendations, which will be compiled and used to plan future actions.

ISLME staff Joana DoRosario Belo said that with the lack of the necessary facilities to combat IUU fishing in Timor-Leste, the National Directorate of Inspection for Fisheries and Aquatic Resources decided to intensify sharing of information to enhance local fishers' knowledge on the campaign topics.

“Aside from awareness, the campaign activities also equip fisheries actors with skills to actively engage in combatting

illegal fishing practices by local fishers and by foreign vessels, ending the use of destructive fishing gears and prohibited fishing practices, obtaining fishing licenses, promoting adherence to procedures and in safeguarding the protected species,” Joana explained.

On safety at sea, there are some issues identified, namely, local fishers are vulnerable to rough weather, especially because there is no system in place to disseminate weather forecast. Some boats are not properly equipped with license and boat identity, making identification difficult; and not all boats have safety indicator light (necessary for fishing activity at night) installed which likely hampers effort to guide them to the closest landing centre when accident happens. Participants learned about what to do when an accident happens and how to utilize the reporting system.

Fisheries actors also learned about fisheries laws and regulations and the most common violations including catching the protected species and using banned fishing gears. They also received the list of protected species, such as turtles, sharks, manta rays and coral reefs, which are still commonly caught by local fishers due to their high value in the market, and how to protect these species and report fishing practices targeting these species.

FAO, MMAF and WWF Indonesia developed ecosystem approach to fisheries management plan for sustainable seaweed farming in Serewe Bay, East Lombok Regency

In the last couple of years, seaweed farming has been expanding rapidly in terms of area coverage and business intensity due to increasing market demands. It is a marine resource with growing economic potentials, providing livelihood for community and ensuring food security.

One of the promising locations is Serewe Bay, East Lombok Regency in West Nusa Tenggara province with around 633 hectares of potential area for seaweed farming. Currently, there are at least 500 seaweed farmers cultivating *Kappaphycus alvarezii* (Cottonii), *Kappaphycus alvarezii* (Cottonii), *Kappaphycus striatum* (Sacol), and *Eucheuma denticulatum* (Spinsum), generating approximately 1 400 to 2 000 tonnes of dry seaweed per year. Since it was first started in 1987, seaweed farming in the area had seen continuous expansion and had reportedly exceeded local carrying capacity (FAO, 2017). Immediate intervention was needed to prevent adverse impact to the environment.

To ensure sustainable management of seaweed culture in Serewe Bay, East Lombok Regency, FAO, MMAF and World Wide Fund Indonesia (WWF Indonesia) developed an

ecosystem approach to aquaculture (EAA) management plan based on the findings of an assessment conducted on October 11–19, 2021.

The seaweed EAA management plan raised some important issues in the Serewe Bay aquaculture management, including (a) **Low aquaculture performance:** unoptimal productivity was related to poor quality seeds and the locations of the aquaculture facilities are not in line with environmental regulations; (b) **Lack of environmental management:** there is serious lack of waste collection sites resulting to household wastes being dumped to the sea. Pollution also comes from intensive shrimp farms in the area and the use of explosives for fishing. In addition, deforestation of mangrove ecosystem is an urgent issue; (c) **Local Zoning Plan for Coastal Zone and Small Islands (RZWKP3K)** has not been optimally implemented and formulation of additional provisions is needed for proper zoning plan implementations; (d) **Lack of harmonized policies** among the various relevant agencies, hindering optimal coastal and marine areas management; and (e) **Lack of compliance to regulations among farmers,** specifically on marine waters zonation, business permits and environmental permits.

The aquaculture area management plan identified key priorities to address the above-mentioned challenges and stressed the importance of provision of trainings and technical consultations for certification of competence, certification of good fish farming practices (CBIB) and provision of high-quality seaweed seeds.

To address the high level of seaweed farming expansion above the area's carrying capacity, the management plan proposed to limit the number of existing business units to meet the recommended capacity. This helps ensure the sustainability of both seaweed and fish farming activities and productivity in the local waters. Some of the recommended activities were: formulate governor regulation on local environmental carrying capacity; conduct public sensitization; adjust the number of business units by setting the allowable business units and clear allocation of business units to farmers as well as establishing good coordination. The allocated marine space (stated in coordinates) was then reflected in the seaweed farming business permits issued.

Another challenge is prevention and resolution of potential conflicts between the stakeholders in the Serewe Bay area related to the use of space (zoning). To prevent conflict, problem identification and mapping were done through field stakeholder consultation and focus group discussions (FGDs). Formal and informal approaches were proposed for conflict resolutions.

Investment in facilities and infrastructure such as road, floating dock, seaweed drying facilities, seaweed seeds ward/hallway, coastal abrasion control and in developing an integrated area management program for export commodities were proposed.



Seaweed farming

Assessment process and findings

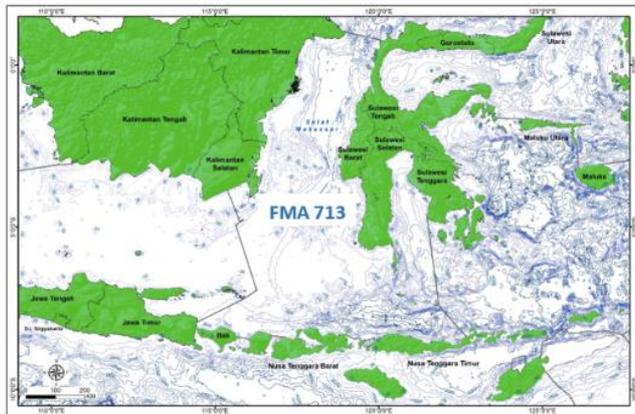
To prevent negative impacts from the rapid expansion of local seaweed farming, FAO, the Directorate General of Aquaculture of the MMAF, and WWF Indonesia conducted an assessment in Serewe Bay on October 11–19, 2021.

The assessment activities included:

- Consultations with West Nusa Tenggara Fisheries Agency and relevant local government institutions in the East Lombok Regency.
- Interviews with seaweed value chain and support sector: seaweed farmers in aquaculture area, intermediaries, seedling provider, village agency, surveillance group, by ensuring representative samples.
- Assessment of the capacity of other relevant authorities, such as Fish Disease Unit of Lombok Marine Aquaculture Centre.
- Field observations.

The results of the assessment showed that local seaweed aquaculture ecosystem-based management in general falls into the medium category. Some parameters, specifically the ones related to economic aspects, employment and some environmental management aspects were considered to be fairly good. However, there were other aspects in need of improvements, specifically, the ones related to performance, law and regulations and area management coordination.

Findings from FAO, MMAF joint review of FMA 713 shape action plans for future improvement



Source MMAF

FMA 713 covers a total of 477 192.9 km² area that falls under the authority of ten provincial administrations namely East Java, Bali, South Kalimantan, East Kalimantan, West Nusa Tenggara, East Nusa Tenggara, West Sulawesi, South Sulawesi, Central Sulawesi, and Southeast Sulawesi.

To better capture current conditions, issues and opportunities in FMA 713, FAO and MMAF initiated a joint ecosystem approach to fisheries management (EAFM) review in FMA 713. A non-profit organization Padmi Yasa Mandiri Foundation was commissioned to carry out the review.

MMAF 2017 data showed the estimated fisheries resources potential in FMA 713 was 1 177 854 tonnes. In 2019, the fisheries production in FMA 713 was 810 734 tonnes, or approximately 69 percent of the potential fish resources in 2017. Local fisheries potential included nine major commodities: small pelagic fish, large pelagic fish (non-skipjack tuna), demersal fish, reef fish, penaeid shrimp, lobster, crab, blue swimming crab, and squid. The following table showed the exploitation rate of the key commodities in 2017.

Table Exploitation rate of fish resources in the FMA 713

No.	Group of Fish Resources	Exploitation Rate	Remarks
1	Small Pelagic Fish	1.23	Over-exploited
2	Large Pelagic Fish	1.13	Over-exploited
3	Demersal Fish	0.96	Fully-exploited
4	Reef Fish	1.27	Over-exploited
5	Penaeid Shrimp	0.52	Fully-exploited
6	Lobster	1.40	Over-exploited
7	Crab	0.83	Fully-exploited
8	Blue Swimmer Crab	0.73	Fully-exploited
9	Squid	1.19	Over-exploited

Source: Decree of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 50/KEPMEN-KP/2017 on the Estimates Potential, Allowable Amount of Catch, and Level of Exploitation of Fish Resources in the Fisheries Management Area of the Republic of Indonesia

According to MMAF, the estimated fish catch decreased to 1 064 051 tonnes in 2019 from 1 097 136 tonnes in 2015. Meanwhile, the number of fishing vessels operating in FMA 713 had increased to 155 871 vessels in 2019 from 92 570 vessels in 2015.

The review findings revealed the following issues:

A. Fish resources and environment

- The catch per unit effort (CPUE) reported data show declining fish stock (snapper, grouper, squid, trevally, mackerel, scads, etc.)
- Degradation of essential habitat for fish resources such as mangroves, seagrass beds (due to coal mining), coral reefs, and other aquatic environments

B. Social-economy aspect

- Low welfare of fishers and boat crew in particular
- Conflicts between fishers over fish resources (between local and non-local/temporary fishers; and conflict over the placement of fish aggregating devices or FADs)

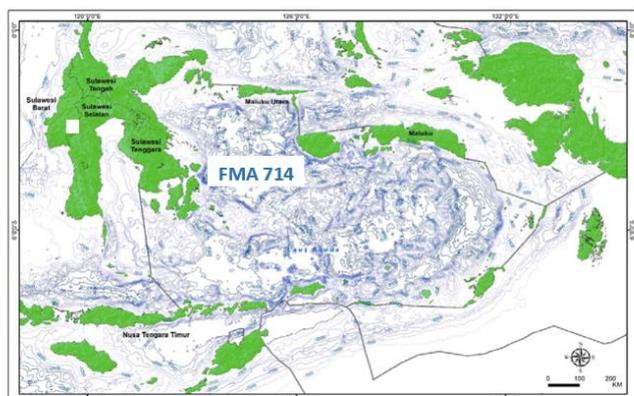
C. Governance

- Ineffective operation of the FMA 713 management by authority
- Rampant illegal, unreported, and unregulated fishing practices, such as the use of explosives and unlicensed fishing vessels
- Ineffective implementation of fish resources allocation-based licensing system
- Ineffective implementation of mutual agreement between provinces regarding temporary/non-local fishers' operation.

The recommended key activities for the next five-year period to address the above issues include: (a) formulation of Harvest Strategy for priority fish resources; (b) control and monitor fishing effort; (c) use of scientific information on the life history of fish resources in management planning; (d) improve CPUE of priority small pelagic fish (especially scads) to restore it to at least the same condition as in 2016; (e) improve coral reef, mangrove and seagrass ecosystems; (f) address social conflict through creating a fair profit-sharing system to improve fishers' welfare; and (g) improve management of FADs placement and its authority distribution between national and local governments.

For improved governance, among the proposed activities include: (a) ensure availability of quality data for enhanced management of fish resources in the next five years; (b) improve the compliance of fisheries actors to e-logbook utilization, with a target of 10 percent increase in the next five years; (c) improve the information system at fishing ports (PIPP); and (d) implement the allocated fishing effort based on the fish resources allocation within five years.

FAO, MMAF set off review of FMA 714 to inform 2022–2026 management plan



Source MMAF

Spanning across Tolo Bay and Banda Sea, FMA 714 covers a total area of 658 434.2 km² and the area management is divided under the authority of 24 regencies and cities in five provinces, namely, East Nusa Tenggara, Southeast Sulawesi, Central Sulawesi, Maluku and North Maluku.

The potential fish resources in FMA 714 were estimated around 789 000 tonnes/year, according to MMAF 2017 data. In 2019, approximately 631 782 tonnes or 80 percent of the potential had been utilized with the main types of fish caught were large pelagic, small pelagic and reef fish groups. FMA 714 has a great potential for fish resources, even though several groups of fish species were estimated to have been exploited beyond their sustainable level.

FAO and MMAF initiated an ecosystem approach review into FMA 714, conducted by Padmi Yasa Mandiri Foundation. The review aimed to capture the most recent fisheries status and conditions in FMA 714 after five years of implementation of the fisheries management plan.

According to MMAF data there were around 136 690 vessels operating in FMA 714 in 2019, of which 36 percent was boats with no engine and 35.2 percent was outboard motorboats. The most common fishing gears were hook and line, gillnet, and trap which were used by around 89.9 percent of the total fishing vessels.

Based on 2019 statistics, the main types of fish catches in FMA 714 consisted of scads, skipjack tuna, yellowfin tuna, mackerel, king mackerel, kawakawa, sardinella, and trevally; around 209 fish species were caught and landed in FMA 714. The following table showed the exploitation rate of fish resources in the area.

Table Exploitation rate of fish resources in the FMA 714

No.	Group of Fish Resources	Exploitation rate	Remarks
1	Small Pelagic Fish	0,44	Moderate
2	Large Pelagic Fish	0,78	Fully-exploited
3	Demersal Fish	0,58	Fully-exploited
4	Reef Fish	0,76	Fully-exploited
5	Penaeid Shrimp	0,39	Moderate
6	Lobster	1,73	Over-exploited
7	Crab	1,55	Over-exploited
8	Blue Swimmer Crab	0,77	Fully-exploited
9	Squid	1,00	Fully-exploited

Source: Decree of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 50/KEPMEN-KP/2017 on the Estimates Potential, Allowable Amount of Catch, and Exploitation rate of Fish Resources in the Fisheries Management Area of the Republic of Indonesia

The review identified priority EAFM management issues grouped into three aspects:

- 1. Fish resources and environment** issues, caused by land conversion (ponds, mangrove deforestation), mining activities, destructive fishing practices (bomb and cyanide), coral bleaching, no-harvest strategy for selected/priority fisheries resources in FMA 714.
- 2. Socio-Economic** issues due to: (i) violations of fishing lanes, (ii) ineffective surveillance system mainly due to limited human resources, monitoring facilities and technology application, ineffective regulations for fish aggregation devices (FADs) placement, and lack of surveillance over the installation of FADs.
- 3. Governance** issues are caused by low data quality for fish resources allocations, multi-stakeholders perceptions related to the allocations, changes in data collection mechanisms (inconsistent mechanism), and there is no updated estimation of potential fish resources in FMA 714.

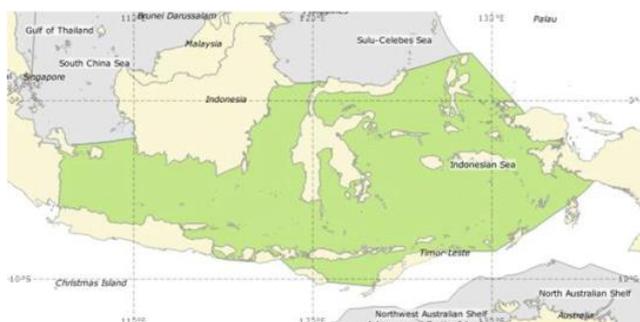
The review proposed measures to address the above-mentioned issues in the next five-year period, among others: formulation of Harvest Strategy for priority fish resources; control and monitor fishing effort; use of scientific information on the life history of fish resources in management planning; improve CPUE of priority small pelagic fish (especially scads) to restore it to at least the same condition as in 2016; and improve coral reef, mangrove and seagrass ecosystems.

For improved governance, the review findings stressed the need for harmonized fisheries efforts among provinces, which should be reflected in a local management plan. The FMP provides directives to resolve challenges towards sustainable management of fish resources in FMA 714.

The review is conducted simultaneously with FMA 714 FMP refinement process as there are laws and regulations that need to be adapted for improved FMP in FMA 714 in the next five years. These laws and regulations include: (1.) Law No. 11/2020 on Job Creation and its derivative the Government Regulation No. 27/2021 on the implementation of Marine and Fisheries Sector; (2.) the 2020–2024 Mid-term National Development Plan (RPJMN) emphasizing area-based fisheries management, with the

on-going revision of the technical regulations on FMA's fisheries management plan and management authorities.

Drawing on expert opinions for thorough Transboundary Diagnostic Analysis



Source: draft TDA report

Covering an estimated total of 2.13 million square kilometres (213 million hectares), the Indonesian Seas Large Marine Ecosystem (ISLME) is located at the heart of the Coral Triangle spanning the territorial waters of Indonesia (98 percent) and Timor-Leste (2 percent). It is one of the world's 66 large marine ecosystems and known for its rich marine biodiversity and high fisheries production.

The Ministry of Marine Affairs and Fisheries (MMAF) of Indonesia and the Ministry of Agriculture and Fisheries (MAF) of Timor-Leste met to discuss ISLME Transboundary Diagnostic Analysis (TDA) with members of the National Scientific Advisory Group (NSAG) from both countries. The meeting was aimed to assist the TDA Lead Prof Karen Edyvane from Charles Darwin University in collecting expert opinions on the causal chain analysis (CCA) and key leverage points to finalize the TDA report. The final TDA report will be the basis for the Strategic Action Programme (SAP) formulation. The TDA–SAP are core documents of the four-year project, titled “Enabling transboundary cooperation for sustainable management of Indonesian Seas (ISLME), funded by the Global Environment Facility (GEF) and implemented by FAO.

In her presentation, Prof. Edyvane explained the significance of ISLME from the point of ocean circulation, effect on climate change, biodiversity including megafauna and Threatened, Endangered and Priority- ME species (TEPs), seafood resource base, maritime shipping and trade, energy, supporting coastal and indigenous communities, socio-cultural and ethnic diversity, and base for blue economy.

The Indonesian Seas and Indonesian Through Flow (ITF), she explained, are critical in regulating global climate and results in complex oceanography. It is a major current connecting the Pacific and Indian Oceans. ITF has complex

pathways that joins the Indian Ocean via three main outflow passages. Timor-Leste is adjacent to two (of the three) ITF. It is critical to monitoring ITF and understanding climate and climate change. The seasonal and spatial variation of mixed layer depth and the upwelling and fisheries relationships in ISLME was mentioned. The marine megafauna ocean productivity, climate and climate drivers including El Nino Southern Oscillation (ENSO), Indian Ocean Dipole (IOD) influence were discussed. Monsoonal rain events influence ITF through freshwater flows from Kalimantan.

Dr. Besweni from MMAF Dir. Gen. Fisheries Resources Management expressed her hope that the TDA/SAP document can enhance the government's efforts to spur sustainable fisheries management in ISLME supported areas, namely FMA 573, 712, 713 and 714. The MMAF, she said, has introduced Measurable Capture Fisheries policy and has intensified registration of fishing boats and gears, issuance of business permit/license, regulation on fish landing, reporting mechanism and allocations for fisheries resources utilization. “Hopefully, the TDA document can reflect the rapid changes (in the fisheries sector) and the SAP can be synchronized with MMAF latest policies to provide direction for future fisheries management.”

Mr Acacio Guterres, Director General Fisheries, MAF Timor-Leste said that ISLME is a shared resource between Indonesia and Timor-Leste and therefore, need clear actions from both countries and cooperation with other countries as well. He explained that MAF has conducted fisheries activities, including fishery survey, training on EAFM by international experts, capacity needs assessment, training for fisherwomen on post-harvest fisheries, drafting an aquaculture decree, building community awareness on monitoring, control and surveillance and conducted scoping studies on fisheries and aquaculture, among others.

He said that data and information have been collected from Timor-Leste for developing the TDA and he looked forward to the findings both from the national perspective and the transboundary perspective including the TDA's proposed leverage points. “We hope that the Strategic Action Programme to be developed soon will give clear direction for future developments,” he said.

Mr Rajendra Aryal, FAO representative for Indonesia and Timor-Leste, stressed the urgency of TDA report completion. There had been delays due to the pandemic and other factors, however, he added, the project team and the ministry colleagues are doing their best to speed up the works and complete the project activities and achieve all objectives by end of 2022.

Prof Edyvane said that MMAF and MAF inputs and insight help sharpen the TDA leverage points. The leverage points

can be specific for each country and could be generally applicable for both countries. TDA, she added, is considered a living document, which can be updated periodically and can be relevant up to ten years maximum.

Strengthening partnership is a path towards robust measurable capture fisheries management



MMAF aims to promote stronger stakeholder involvement in fisheries management

MMAF held an intensive five-day Coordination Forum for improved Fisheries Resources Management in the 11 FMAs across Indonesia between 26 - 30 September 2021, entitled “Building Measurable Capture Fisheries Management on the basis of Blue Economy. The purpose of the event was to enhance operational management of the FMAs and to determine harvest control, including setting clear allocations for fisheries resources utilization in each FMA with stronger stakeholder engagement.

ISLME NPO Dr. M. Lukman welcomed the MMAF initiative saying that the forum provides room for stakeholder dialogues and concrete engagement to enhance the implementation of activities in the Indonesian Seas Large Marine Ecosystem (ISLME)-supported sites. “This will facilitate joint efforts in all program aspects, such as for availability of quality data and capacity building, among others and helps prevent program redundancies and gaps,” he said.

Under the GEF-funded ISLME project, FAO has been supporting MMAF’s measurable capture fisheries through among others, supporting boat registration, promoting the use of non-harmful fishing gears and the adoption of e-logbook for reporting and monitoring, as well as enhancing the fisheries actors’ capacity for data collection.

MMAF also presented zoning concept for Indonesian waters, grouped into

- 1) Fisheries industry zones covering:
 - zone 1: FMA 711,
 - zone 2: FMAs 572 and 573,
 - zone 3: FMAs 716 and 717,
 - zone 4: FMAs 715 and 718.
- 2) Zone for local fishermen: FMAs 571, 712, and 713
- 3) Spawning and nursery ground zone: FMA 714

To support measurable fisheries implementations in all FMAs, the forum discussed some priority agenda, mapping, clear allocations for fisheries resources utilization, specifically for priority fishes, governance, facility and infrastructure, human resources in the fisheries sector and legal basis in line with provincial regulations and the characteristics of local zone. “Fisheries resources allocation at the central and provincial level should be adjusted and updated based on the new zoning concept,” said MMAF Directorate General for Capture Fisheries M. Zaini .

Fisheries data availability, Zaini added, is crucial for measurable fisheries management in the FMAs in Indonesian waters. “We also count on stakeholders’ support for quality data availability and to strengthen data capacity, as it is part of MMAF’s top priority. Hopefully, the provinces can establish a solid synergy for data in close coordination with and engagement of all stakeholders,” Zaini told the forum

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