



Three-Year Audit Template

Three-year audit of Indonesia Blue Swimming Crab Gill net and Trap Fishery
 Authored by Vineetha Aravind

Introduction to the tool

The three-year audit template was developed by FishChoice and is based on the FisheryProgress FIP Review Guidelines and feedback from the FisheryProgress Technical Oversight Committee. The audit template is designed to present key information about the current performance of the fishery and to verify reported progress on www.FisheryProgress.org. **FisheryProgress requires the use of three-year audit template and information must be in English.**

Text in italics provides additional guidance about information that should be included in each section. Text in red provide examples for possible responses.

This audit is a modification of the audit report made in November- December 2020 including gill nets along with traps and extending the assessment o whole of Indonesia rather than FMA 712.

Basic FIP information

Fill in the following table. The management authority is the regulatory authority with fishing management responsibilities; there may be multiple authorities where joint jurisdictional responsibilities occur.

Target species scientific name and common name	<i>Portunus pelagicus</i> Blue Swimming Crab	
Fishery location	Indonesia, Indonesia EEZ	
Gear type(s)	Bottom set gill net, Baited collapsible trap (bubu) and solid traps	
Catch quantity (weight)	78,200 Metric tonnes	
Vessel type(s) and size(s)	Small fishing boats of less than 10 GT	

Number of vessels	6870
Management authority	Indonesian Ministry of Marine Affairs and Fisheries (MMAF) and the East Java Provincial Government
	Asosiasi Pengelolaan Rajungan Indonesia (APRI)

Stakeholder consultation & meetings

Fill in the following table and include a high-level summary of the subjects that were discussed. Additional rows may need to be added or modified depending on number of participants and meetings completed.

Note: Stakeholder consultation was done remotely on 27th November, 2020 via zoom due to the present conditions of Covid-19.

Meetings were held separately with Scientists, Government officials, enumerators, fishermen groups and APRI members.

As this report is a modified report of the one prepared in Nov-Dec 2020, only one meeting with Dr Hawis Maduppa the FIP implementer was conducted to collect extra information needed.

Name	Affiliation	Date and Subjects Discussed
Dr. Hawis Madduppa	Executive Director of APRI	<ul style="list-style-type: none"> • Scope and history of FIP • background of fishery • main activities of FIP • implementation of FIP action plan • Documentation
Prof. Dr. Ir. Indra Jaya	Head of Komnas Kajiskan	<ul style="list-style-type: none"> • Stock assessment methodologies • Production models • Data collection • Bycatch species • ETP species • Collaboration with FIP and FIP implementers
Prof. La Sara	Lecturer and researcher from Faculty of Fisheries and Marine Science, University of Halu Uleo	
Dr. Zairion	Lecturer and researcher from Faculty of Fisheries and Marine Science, IPB University	
Ir. Sri Redjeki	Lecturer and researcher from Faculty of Fisheries and Marine Science, Diponegoro University	
Dr. Ir. Besweni	Head of LPTPK PSDI DJPT	<ul style="list-style-type: none"> • Background of fishery • Implementation of GTK5 • Harvest control rules • Difficulties in enforcement
Jadmika Sufiadi	Head of SDI Fisheries Bureau of East Java Province	
Sujyanto	Fisheries Bureau of Central Java Province	

Yenni Buraera	Fisheries Bureau of Southeast Sulawesi Province	<ul style="list-style-type: none"> • Replacement of fishing gear • Identification of protected areas
Herry Martono	Fisheries Bureau of Rembang District, Central Java Province	
Hairul Anwar	S.Sos, MM Fisheries Bureau of Pamekasan District, East Java Province	
Adam Azhar	Fisheries Bureau of South Konawe District, Southeast Sulawesi Province	
Jumari	Head of Layur Village	
Budi Istanto	Head of Gedongmulyo Village	
Muhammad Yusuf	Head of Pagagan Village	
Ridho Zulfikar	Community Management Officer of Rembang District, Central Java Province	
Rasyid Prasetyo	Enumerator of Rembang District, Central Java Province	
Ir. Kuncoro C. Nugroho	Chairman of APRI	
Bambang A. Nugraha	Secretary General of APRI	
Wita Setioko	Company of Bumi Menara Internusa	<ul style="list-style-type: none"> • Control document implementation • APRI's efforts in sustainable fishing • Traceability
Luqman Amyrul	Company of Bumi Menara Internusa	
Husna Mubarak	Company of Kelola Mina Laut	
Dimas	Company of Kelola Mina Laut	
Ary Saiful Bachri	Company of Muria Bahari Indonesia	
Wenny	Company of Muria Bahari Indonesia	
Richard	Company of Prima Cakrawala Abadi	
Waanto	Company of Handy Seafood International	
Hendro	Company of Kemilau Bintang Timur	
Chandra Sasmita	Company of Grahamakmur Ciptapratama	
Yoga Sadana	Company of Siger Jaya Abadi	

Aik Wulandari	Company of Nirwana Segara	
Bunga Tarigan	Company of Toba Surimi Industries	
Rini Rachmanniah	Company of Nirwana Segara	
Alimar	Company of Fresh On Time Seafood	
Tang Tee Por	Company of Rex Canning	
Kelompok Nelayan Gedongmulyo	Fishermen Group of Gedongmulyo, Rembang District	<ul style="list-style-type: none"> • Awareness of HS • Awareness about sustainable fishing • ETP species • GTK5
Kelompok Nelayan Pamekasan	Fishermen Group of Pamekasan District	
Kelompok Nelayan Pamandati	Fishermen Group of Pamandati District	
Ridho Zulfikar	Community management officer of Rembang District	<ul style="list-style-type: none"> • GTK5 • Data collection
Lailatul Qomariyah	Community management officer of Pamekasan District	
Farhan Ramadhan	Enumerator of Pamekasan District	
Muhammad Cardin	Enumerator of Pamandati District	

Summary of MSC performance indicator scores

Fill in the likely scoring category (<60, 60-79, ≥80) for each performance indicator (PI) and provide a rationale for the score by referring to the text used in v2.0 of the MSC Standard's scoring guideposts for the related Performance Indicator.

Principle	Component	Performance Indicator	Current Score	Rationale and Justification
1	Outcome	1.1.1	Stock status	<p>60-79</p> <p>Stock assessments have been conducted in the Java sea from 2016. Three stock assessments conducted by Balitbangkan & APRI, in 2016, 2017 and 2018 shows that exploitation rate E ranges between 0.55 – 0.88 indicating high levels of exploitation. LB-SPR analysis conducted during 2016-18 at 7 landing centres of Java sea showed the stocks of BSC at many sites below the internationally accepted limit reference point of 20% which is accepted as the limit reference point in the new harvest strategy of Indonesia (NOM 6/2020). A recent report on Stock Assessment has been released by APRI and is publicly available (<i>Doc: Stock Assessment Report, APRI 2020</i>) from Java Sea (FMA 712), Pamandati (FMA 714), and Pangkajene (FMA 713). The study found that the spawning potential ratio (SPR) of BSC in Indonesia ranged from 20% to 38%, which is above the limit reference point of SPR20%. There is also a decrease in the percentage of undersized and berried crabs.</p> <p>The Audit of Control document in 2019-20 reports a compliance of around 99% in abiding to MLS and 96% in non-processing berried female crab. This might have contributed to the increase in LB SPR scores.</p> <p>Pre-assessment by MRAG in 2009, mentions that the stock of BSC in Indonesia is a single stock, but a recent study by Maduppa et al., 2021 has found that BSC populations across Indonesia are likely to have several</p>

				<p>stock units. This study is important in developing management measures accordingly.</p> <p>The stock is above the point where recruitment can be impaired and this meets SG 60. A consistent value in this line for a few years can only say whether the stock is fluctuating at a level of MSY so SG 80 is not met.</p> <p>The limitation of this auditing is that the entire stock of Indonesia is vast and recent study has found different genetic stocks. It will be good if the FIP can do more studies in stock status. The scoring is based on the information provided by APRI.</p>
		1.1.2	Stock rebuilding	<p>60-79</p> <p>The harvest strategy legislated in early 2020 recognizes that stocks are depleted and require rebuilding towards the target reference point of SPR30%. The HS includes an operational objective of “the ratio of spawning potential from crabs increases to the target reference point SPR30% over a 5-year period”. An objective of BSC Management Plan (70/2016) is to establish sustainable BSC stocks and environment, but it is not giving definite steps for stock rebuilding.</p> <p>APRI is conducting stock rebuilding activities in different provinces all over Indonesia in collaboration with the National Government. From 2018 restocking and fishing gear swap are going on in various provinces successfully.</p> <p>Current monitoring programmes like data collection program conducted by enumerators and landing report can be used effectively for the implementation of stock rebuilding plan.</p>

					<p><i>Cross reference:</i> Stock enhancement and restocking of blue swimming crab (<i>Portunus pelagicus</i>) under workplan results for details.</p>
	Management	1.2.1	Harvest Strategy	60-79	<p>Indonesia has developed a Harvest Strategy for Blue swimming crab in consultation with stakeholders and got it legislated recently (NOM 6/2020). It has two operational objectives –</p> <ul style="list-style-type: none"> • the ratio of spawning potential from crabs increases to the target reference point SPR30% over a 5- year period • the target percentage of crabs caught above the minimum size caught (MLS) in accordance with government regulations (10 cm) in 5 years is 90%. <p>Monitoring programs like data collection conducted by enumerators and regular landing report are adequate to measure the effectiveness of HS implementation.</p> <p>The improvement in SPR in the recent stock assessment and the increase in compliance found during the audit of control document shows that the Harvest strategy is being implemented widely.</p> <p>Effective enforcement and continuous monitoring of the harvest strategy is needed to keep the stock status at Target reference point.</p> <p>As Maduppa et al., 2021 has pointed out, the stocks of Indonesia are not just a single genetic stock, this may call for different management strategies and it is recommended that the FIP look into this.</p>
		1.2.2	Harvest control rules and tools	60-79	<p>Indonesia’s main fisheries laws (31 of 2004 and 45 of 2009) include catch quota, minimum size and closed areas. But these are general regulations and not consistent with MSC requirements of species-specific management. The recently implemented harvest</p>

				<p>strategy discusses input controls like, vessel registration, restriction in keeping gears in management area and reporting catch to agreed standards and output control like minimum size limits.</p> <p>Recently, the National government has issued a law for registration of small fishing crafts. (NOMOR 5/PERMEN-KP/2019). Stakeholder consultations assured that this is being implemented in a step-by-step fashion by the Government by giving incentives to fishermen. If implemented promptly, this could be an HCR.</p> <p>The main management measures in place for the fishery, prescribed in Regulation 56/2016, include:</p> <ul style="list-style-type: none">• Minimum legal size of 10 cm carapace width or weight above 60 g; and,• No berried females are to be retained. <p>This seems to be effective as per the recent draft stock assessment where there is an improvement in the LB SPR scores.</p> <p>A broad TAC is implemented periodically for each major species group, but there is no explicit guidance on how it can be achieved.</p> <p>There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.</p> <p>APRI has been involved actively in the Data Management Committee (DMC) regular meeting to present the result of stock assessment. We also conduct biweekly meetings with enumerators and co-management officers to evaluate the monthly SPR value. All these efforts aimed at giving warning signs to relevant stakeholders (government, industry, and</p>
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				<p>fishers) when the SPR value goes below the limit reference point.</p> <p>Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.</p> <p>The fishery could score better if there are measures designed to give early warning signs when the stock status goes to an undesirable level.</p>
		1.2.3	Information and monitoring	<p>60-79</p> <p>Considerable progress has been made in collecting and publishing information on stock structure and stock productivity. Data collection programme of APRIs enumerators, landing report of MMAF and catch certificate provides some information on fleet composition.</p> <p>Stock abundance is currently monitored using E and SPR with data collected by the enumerators for the stock assessment process. UoA removals are also monitored using export data to produce a TAC and E e.g. 50/2017. Landing reports, an MMAF requirement, provide CPUE, the number of small BSC per fishing gear, fishing activities (number of fishing gear, time of capture), length at first maturity and percentage of berried females.</p> <p>The licensing of vessels and log book reporting were not applicable to BSC trap fishing till recently as the boats operated are <5 GT. A recent Government order has made licensing of these vessels' compulsory, but it is still in the implementation stage. There is uncertainty if species-specific catch data is available for entire distribution of stocks and all removals. In addition, the level of accuracy and precision of data needs to be verified to ensure that</p>

					<p>harvest control rules, when implemented, are triggered when appropriate and to measure the effectiveness of HCR when triggered. Therefore SG 80 is not met.</p>
		1.2.4	Assessment of stock status	60-79	<p>Sufficient information is available to score the fishery 60, but not SG 80.</p> <p>Stock status is assessed using LB-SPR model to provide an estimate of SPR relative to internationally accepted limit reference point for SPR as contained in the HS e.g. limit reference point SRP 20% (Prince, et al, 2015). The assessment also provides an estimate of E based on recognized levels of E < 0.5 moderately exploited; 0.5 < E < 1.0 indicates fully exploited; and E > 1.0 indicates over-exploited. The assessment method is based on internationally recognized techniques has been published in peer reviewed journals and tested in a range of scenarios (Hordyk, et al., 2015 a,b).</p> <p>The assessment identifies major sources of uncertainty such as representativeness of samples across the footprint of the fishery, sex ratios in catches, representativeness of length data and temporal fluctuations in abundance. LB-SPR model is particularly sensitive to variations in recruitment and the assumptions and sensitivities of the model need to be carefully considered when interpreting the outputs (Hordyk, et al., 2015b). The assessment has identified the uncertainties but has not taken into account the uncertainty.</p> <p>The assessment is reviewed by the National Commission for Fish Stock Assessment an independent entity that reports to the Minister for Marine Affairs and Fisheries.</p>
2	Primary species	2.1.1	Outcome	≥80	There are no primary species. Default score of 80

		2.1.2	Management strategy	≥80	There are no primary species. Default score of 80
		2.1.3	Information	≥80	There are no primary species. Default score of 80
	Secondary species	2.2.1	Outcome	≥80	<p>The effort of APRI in collecting information and documenting the NTS is commendable. They have developed an SOP for NTS. APRI enumerators are trained to record non-target species (NTS) landings along with BSC landings. They are provided with a code for each NTS and they can record this on a log sheet which can be used for MSC RBF. This provides enough information to do RBF.</p> <p>The pre-assessment of 2020 at Madura Islands for traps found five main crustacean secondary species and a PSA analysis showed <i>Portunus sanguinolentus</i> is in the high -risk category. APRI RBF analysis in 2019 shows that <i>P. sanguinolentus</i> is below 2% by weight of total catch so it can be excluded from this analysis. A PSA analysis with 2019 data showed that <i>Portunus pelagicus</i> is in the medium risk, <i>Scylla serrata</i> is in the low risk, <i>Charybdis feriata</i> is in the medium risk, and horseshoe crab is in the medium risk. The bait species <i>Eubleekaria jonesi</i> is also in the medium risk category. The gill net bycatch had only two species above 2% and were not in the high-risk category.</p>
		2.2.2	Management strategy	60-79	<p>Some measures are in place like prohibiting of catching undersized and berried lobster (<i>Panulirus</i> spp.), crab (<i>Scylla</i> spp.), and blue swimmer crab (<i>Portunus</i> spp.) from country region of the Republic of Indonesia (Reg. No.56, now No.12, 2020).</p> <p>The Government is promoting fishermen to move from illegal trawling to traps which are environmentally friendly. There are programmes which promotes gill nets with bigger mesh size and traps with escape vents to prevent juvenile fishing</p>

				<p>which is popularized by APRI in collaboration with BPPI.(Dr Hawis M pers. Comm).</p> <p>There is a campaign against ghost fishing called Ghost Fishing Clean Up, where fishermen are educated about ghost nets and are encouraged to collect it and hand over to APRI community organizer or enumerator for recording (including identification and weighing) (<i>Doc: TOR Ghost Fishing Rembang, Ghost Fishing Cleanup Summary 2020</i>).</p> <p>APRI in collaboration with Jepara Fisheries Department has also conducted the fishing gear workshop for blue swimming crab to the fishermen in Jepara, Central Java. In this activity APRI also gives 600 pieces of trap to Jepara fishermen to support the environmentally friendly fishing gear usage. APRI in collaboration with Sustainable Fisheries Partnership (SFP) conducted a gear exchange program that exchanged gillnets to 1600 pieces of collapsible traps in Lampung in November 2016. Recently on 8 December 2020, DKP Pamekasan and APRI conducted a training for fishers in Pagagan Village on how to use the environmentally friendly fishing gear (<i>Doc: 2017 APRI Supports Environmentally Friendly Fishing Gear, 2020 Environmental Friendly Fishing Gear Technology Implementation Pamekasan</i>).</p> <p>In the village level, such as in Betahwalang (Demak) and Pagagan (Pamekasan), village regulations has been issued related to the blue swimming crab management that includes the using of environmentally friendly fishing gear (<i>Doc: Betahwalang Village Regulation on BSC Management (2013), Pagagan Village Regulation on BSC Management (2020)</i>)</p>
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		2.2.3	Information	<p>60-79</p> <p>Qualitative information is available on the amount of main secondary bycatch species affected by the fishery. Some quantitative information is available from the study conducted by APRI in 2016 to 2019.</p> <p>Enumerators of APRI record non-target species at the landing sites but the information does not include discarded species if any. The information is adequate to support measures to manage bycatch species and the 60 is met.</p> <p>However, there are no partial strategies available and the SG 80 is not met.</p>
	ETP species	2.3.1	Outcome	<p>60-79</p> <p>Interactions of ETP species with legal gear are thought to be minimal. APRI's enumerators collect the NTS data every day on the landing site. Data collected by enumerators were reported biweekly through the biweekly meeting and reported annually. NTS species were dominated by fish, crustaceans, and molluscs, while ETP species found was only horseshoe crab (<i>Tachypleus gigas</i>). NTS Report in 2019 show that fishermen either using traps or gillnets have never encountered turtles during fishing activity (<i>Doc: 2019 APRI REPORT NTS ETP_1, Documentation APRI's Biweekly Meeting</i>). Interviews with fishermen also confirms this.</p> <p>Apart from this government is also collecting data through fisheries extension agents.</p> <p>Pre-assessment report 2020 on BSC fisheries in Madura Islands, reports that sea snake interactions are frequent. Virtual stakeholder meetings with</p>

				<p>Scientists and fishermen reported that sea snakes are never encountered in traps or gill-nets.</p> <p>The APRI 2019 surveys identified the Indo-Pacific (Coastal) horseshoe crab (<i>Tachypleus gigas</i>) as bycatch in both traps and gill nets. As this species is protected by national law it was assessed under ETP. Pre-assessment 2020 conducted an RBF for the horseshoe crab (<i>Tachypleus gigas</i>) and a medium risk score was assigned. This assessment is done only for traps and not for gill nets.</p> <p>Stakeholder meeting revealed that horse-shoe crabs are often released live by fishermen as it has no market value for them.</p> <p>The survival of Horse shoe crabs in gill nets is not clear. The catch of gill nets is removed only after the fishermen reach the shore and whether they will be able to release the crabs live is doubted. APRI has a video showing the release of horse-shoe crabs into the water live, but it is not clear whether it is from the gill net or trap. At the same time, APRI's NTS report for 2019 is showing that encounter of <i>T. gigas</i> with gill nets is very low. It was reported only from one location in gill-net and that too very low.</p> <p>So, it is taken that known direct effects of the UoA are likely to not hinder recovery of ETP species. Indirect effects on ETP species are unknown.</p> <p>The fishery is not done within 12miles zone so impact on coral reefs is minimal. There is a study on impact of BSC fishery on coral reefs from Mandangin Island, East Java, which shows that the fishery is not harming the reefs (Ardiansah et. al., draft)</p>
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		2.3.2	Management strategy	<p>60-79</p> <p>Govt Regulation No 20/2018 is in place for the protection of ETP species in Indonesia. Another Govt Regulation No. 106/2018 also aims in protection of ETP species.</p> <p>The report from Kelompok Konservasi Pasar Sorkam (Pasar Sorkam Conservation Group) (<i>Doc: Pelepasliaran Belangkas</i>) lead to the MMAF taking initiative in working on the releasing of horse shoe crab caught by fishermen.</p> <p>APRI has prepared an NTS SOP and have given training to their enumerators. APRI's enumerators and community organizer are collecting data on ETP species besides the data on Blue swimmer crab. Apart from this government is also collecting data through fisheries extension agents.</p> <p>Government of South Sumatera has put the horseshoe crab in their biodiversity strategy and action plan, and added as a conservation priority animal. They have also initiated research on domestication/ex-captive breeding and creation of collection ponds.</p> <p>Stakeholder meeting revealed that horse-shoe crabs are often released live by fishermen as it has no market value for them.</p> <p>However, the releasing of live horse shoe crabs from gill nets are to be doubted as it is reported that most of the catch in the gill nets are reaching shore dead. They are removed from the net only after reaching the landing centres. APRI's NTS report for 2019 is showing that encounter of <i>T. gigas</i> with gill nets is very low. It was reported only from one location in gill-net and that too very low.</p>
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		2.3.3	Information	<p>60-79</p> <p>There is adequate qualitative and quantitative information to assess productivity and susceptibility for ETP species from traps and gill nets in an RBF context. Fishers are not required to report interactions, but they indicated that interactions are very low.</p> <p>APRI enumerators are collecting daily data on target and non-target species and is recorded and reviewed fortnightly. They are trained to do RBF and are regularly conducting analysis of data collected.</p> <p>APRIs NTS report for 2019 is showing that encounter of <i>T. gigas</i> with gill nets is very low. It was reported only from one location in gill-net and that too very low.</p>
	Habitats	2.4.1	Outcome	<p>60-79</p> <p>The nature, distribution, and vulnerability of main habitats types in the fisheries area is studied. According to Asphama et al., 2015, BSC prefers muddy sand to muddy substratum. According to La Sara et al (2016) the BSC is found in sandy substrates mixed with mud close to mangroves and seagrass beds, but away from coral reefs. Fishers confirmed this during stakeholder meeting.</p> <p>The impact of fishery on habitat is not extensively studied but can be inferred from studies on similar gears. Results from studies in other areas suggest that traps have low impacts on habitats due to the nature of the fishery and the type of habitats encountered. Studies on the impact of gill nets on habitat has to be done.</p> <p>Vessel tracking systems studies are conducted in different areas of Indonesia, this could help in better understanding of impact of fishery on habitat.</p>

				<p>APRI also has a programme for retrieving ghost nets with the help of enumerators. (see 2.2.2). This is gaining momentum with the voluntary participation of fishermen.</p> <p>There are no VMEs identified within the fishing grounds.</p>
		2.4.2	Management strategy	<p>60-79</p> <p>There is a BSC management plan which is in different stages of implementation in various provinces of Indonesia. The level of implementation depends on the budget of the provinces. However, all the major provinces have started implementing BSC management plan.</p> <p>The Indonesian government has prohibited the use of trawls in Indonesian waters, instead promoting other gear types, particularly for small-scale fishers. The government is promoting fishing gear swap wherein 3000 traps were exchanged for trawlers to fishermen. Reports on spawning areas and larval distribution is available. APRI studies show that gill nets and traps are not fishing in coral reef areas. Therefore, the habitats are in low risk.</p>
		2.4.3	Information	<p>60-79</p> <p>There is some qualitative information available from fishers to estimate the types and distribution of main habitats, as well as fishery impacts on these habitats. Vessel tracking systems is being implemented all over Indonesia, but not yet completed. Some mapping has been analysed from vessels based in Sumenep and Pamekasan (Madura Island) (PDS, 2018).</p> <p>APRI is giving student grants to study the impact of fishery on habitat. Some of these are published like study on impact of BSC fishery on coral reefs from Mandangin Island, East Java, which shows that the fishery is not harming the reefs (Ardiansah et. al., Draft)</p>
	Ecosystem	2.5.1	Outcome	<p>60-79</p> <p>Some information on the impacts of the Blue swimmer crab (BSC) trap and gill net fishery on ecosystem components is available and others can be</p>

				<p>inferred from similar fisheries in tropical environments. The impact of traps and gill nets on the sea bottom is much less compared to trawls as they are passive gears. The habitat of BSC is muddy/sandy, and fishing is away from coral and sea grass areas so it is inferred that the impact is not much damaging. The largest impact is considered to be the removal (harvest) of the target species due to its high fishing effort and the concerns about the status of the stock. Blue swimmer crab (BSC) prey upon molluscs and crustaceans which are also found in traps and gill nets during fishing activities. BSC are prey to fish, turtles, rays in some other areas of Indo-Pacific. The high fishing effort of the BSC fisheries may affect the trophic structure and/or species composition of the ecosystem. A trophic model of the marine fisheries resources of the north coast of Central Java, Indonesia was constructed using the Ecopath with Ecosim software (Narhakim, 2003). The model consists of 27 ecological groups with a mean trophic level of 3.04. Overall, the study found that the north coast of Central Java ecosystem can be regarded as moderately mature and relatively stable system. The impact of the fishery was low to moderate in comparison with the fisheries of other systems. Therefore, it is anticipated that the Java Sea ecosystem should be moderately resilient to perturbation. Tropical ecosystems are usually resilient to disturbance due to the high biodiversity. Enough information is available for an RBF.</p>
		2.5.2	Management strategy	<p>60-79</p> <p>There are some management measures in place (e.g. minimum size limits and protection of berried females for blue swimmer crabs, prohibition of use of trawl gear) to ensure the fishery does not pose a risk of serious or irreversible harm to the ecosystem. These</p>

					<p>measures are considered likely to work based on general theory.</p> <p>APRI is working with Government agencies and enumerators on creating awareness among fishermen to implement the management measures and has found success in few villages. (Stakeholder meeting online)</p> <p>The fishing gear swapping programme of the National government and the implementation of a BSC management plan seems to be strategies to reduce the impact of fishing on ecosystem.</p>
		2.5.3	Information	60-79	<p>There is sufficient knowledge of the general ecosystem to identify key elements, along with likely fishery impacts, however, the ecosystem has not been investigated in detail. Given the scale and nature of the fishery and amount of qualitative as well as some quantitative information for the fishery components, ecosystem consequences from fishing can be inferred. Vessel tracking systems are being implemented in the provincial level, but is not yet completed. Some mapping has been analyzed from vessels based in Sumenep and Pamekasa (Madura Island) (PDS, 2018). The level of information of ecosystem component including other biological data like impact on trophic structures of the ecosystem is not known.</p> <p>Ecosystem modelling for the region implies relative resilience of the ecosystem to fishing pressure (Nurhakim, S. 2003). However, this model is quite old and fishing pressures have been increasing with many of the fisheries shown to be fully exploited or overexploited (Reg 50/2017). The SG 80 is not met.</p>
3	Governance and Policy	3.1.1	Legal and customary framework	60-79	<p>Indonesia has a number of laws for managing fisheries and marine resources and the environment. There are several ministries that can contribute to the effectiveness of achieving fisheries management objectives. They meet at an annual coordination</p>

				<p>forum meeting called Management and Utilization of Fisheries Resources. This consists of national, provincial and local fishing unit representatives. This meeting provides a framework for coordination. The recent regulation 33 of 2019 establishing the Fishery Management Councils is in the stage of implementation and is a major step towards better management.</p> <p>While there is a framework, there is a lack of coordination between the different government levels and what happens at the fishing grounds. Indonesia has a mechanism in place to adjudicate any legal disputes including that of Fisheries Law, through the Constitutional Court. An individual/group can challenge the interpretation of legal articles of any laws in Indonesia. This has been tested. Most of the disputes are resolved at village level, though.</p> <p>The management system has a mechanism to observe the legal rights created explicitly by custom of people dependent on fishing for food or livelihood. There are Laws for fishermen protection and empowerment which is observed. As these laws are not yet codified within the fishery management system and these rights are considered to be unclear, inconsistent (in that not all Indonesian laws include this recognition) and in some cases have no binding power (Huda, N. et. al. 2018).</p>
		3.1.2	Consultation, roles and responsibilities	<p>≥80</p> <p>The organizational structure, roles and responsibilities of the MMAF and each division are clearly documented in Regulation 7/2018 and includes all areas that are responsible for fisheries management (e.g. compliance, marketing etc). Similarly, Regulation 16/2012 prescribes the function of the National Committee on Fish Stock Assessment which is to provide scientific advice to the MMAF regarding Indonesian fisheries resource status. Members of this Committee represent independent fishery experts,</p>

				<p>University scientists and members from various fishing associations.</p> <p>Other stakeholders like WWF, Indonesia are also identified. The authorities and responsibilities of Provincial Governments are also well defined. The BSC Management Plan is a major step in defining roles and responsibilities.</p> <p>APRI, as the Industry body, provides a formal link between the fishers, processing sector and the Government and has played a key role in the implementation of the BSC Fishery Improvement Project, Management Plan and development of the harvest strategy.</p> <p>The composition of many of the Committees in Indonesia ensure a diverse range of stakeholders are part of the consultation processes.</p> <p>Consultation processes occur through the Fishery Management Councils which provides for a Scientific and an Advisory (Consultative) Panel. Regulation 33/2019 stipulates that the Panel is made up of representatives from NGOs, customary fishers, Industry associations, processing sector and non-fisheries sectors. This will ensure that local knowledge is considered within the management system once the Council is operationalized. In addition, prior to the MMAF introducing a regulation, public comment is sought through the website. APRI, as the Industry Association, regularly seeks information and liaises with a range of stakeholders through meetings and workshops.</p> <p>But this is a fishery-specific example and cannot be generalized to the entire fishing operations of Indonesia.</p> <p>During the development of the BSC harvest strategy, seven meetings with a diverse range of stakeholders were held and agreement reached on the reference points. The fishery provides a range of opportunities</p>
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					and communication channels for effective engagement. Altogether this calls for a score of 80, but not 100.
		3.1.3	Long term objectives	≥80	<p>Long term fishery management objectives are prescribed in Indonesian Fisheries Law No. 31/2004. Law No. 1/2014, amending Law No. 27/2007, on Coastal and Small Islands Management, has the objective to protect, conserve, rehabilitate and utilize the resources of coastal and small islands in sustainable manner. Law No. 32/2009 concerning Environmental Protection and Management has the objective to create environmentally sustainable development through planning policies and rational exploitation, development, maintenance, restoration, supervision and control. Regulation 63/2017 implements the MMAF Strategic Plan 2015-2019 which contains clear long-term objectives that includes sustainability. Regulation 9/2015 outlines the requirements for implementing the EAFM and makes explicit reference to and defines the precautionary principle. Ministerial Decree 79/2016 establishes the management plan for FMA 712 and all of the fish resources within. It sets out the objectives of fisheries management in FMA 712 which include fish resources and habitat; social and economic; and, governance components.</p> <p>There are clear long-term objectives in several pieces of legislation and explicit reference to the precautionary principle and SG80 is met. It is unclear as to whether the decision making guided by the long-term objectives is required by management policy and therefore SG100 is not met.</p>
	Fishery specific management system	3.2.1	Fishery specific objectives	60-79	Indonesia has developed and started implementing a BSC fishery management plan. The plan is in national and different provinces are implementing this at their own pace. Central Java, East Java and SE Sulawesi

				<p>provinces have Governor decree on BSC management plan and have done the implementation.</p> <p>The plan identifies the three components of using an EAFM, namely fish resources and habitat; social and economic; and governance and has an explicit objective for each component with measurable targets. For example, 70% of the crab catches landed must be of the size according to the regulations within 3 years and improvement of the condition of the crab habitat to medium rating within 5 years.</p> <p>The blue swimmer crab harvest strategy contains a long-term strategic objective which is to ensure sustainable fishing of crab resources in FMA 712. The short-term operational objectives are:</p> <ul style="list-style-type: none"> • The ratio of spawning potential from crabs increases to 30% over a 5-year period (the limit reference point is 20%); and, • the target percentage of crabs caught above the minimum size caught (MLS) in accordance with government regulations (10 cm) in 5 years is 90% <p>These objectives are measurable and explicit within the management system.</p> <p>While the short-term objectives in the harvest strategy align with outcomes expressed in MSC's Principle 1, objectives that align with outcomes expressed in Principle 2 in the BSC Management Plan are not measurable.</p> <p>Therefore there is a fishery-specific objective which once completely implemented can improve the scores considerable.</p>
		3.2.2	Decision making processes	<p>60-79</p> <p>MMAF is in the process of strengthening its decision-making systems. Decisions are now required to take account of scientific advice and monitoring processes are in place to ensure that conservation principles are followed. The core of fisheries management decision making lies with the DGCF, with scientific advice from</p>

				<p>the Centre for Fisheries Research (CFR) and the DG of Marine and Fisheries Surveillance.</p> <p>There is some evidence that scientific papers from the CFR are used as the basis to decide the TACs set out in Regulation 50/2017 for the crab resource in FMA 712. However, examples of decision-making processes in this fishery, such as how the actual catch may be reduced should the TAC be exceeded in this fully exploited resource are unclear.</p> <p>Research by BPPI has led to the initiative in popularizing gill nets with bigger mesh size and traps with escape vents for juvenile crab conservation. This is yet to be implemented in the whole of Indonesia.</p> <p>A Fisheries management council and Data management committee for Blue swimming crab fisheries was established at the Provincial level under Governor Decree, 2019. The FMC and DMC collaborates with all the stakeholders of Blue swimming crab fisheries and is led by the Agency of Marine Affairs and Fisheries at Provincial level. They meet regularly to monitor and evaluate BSC fishery and decide on its management. The Data management committee uses data from stakeholders as the basis of decision-making processes.</p> <p>The formation of FMC, work of enumerators in creating awareness among fishermen and the adherence of processors to Control document seems to be efficient in improving the stock status with considerable reduction in crabs below MLS (APRI2020)</p> <p>The Government responded to decreasing crab populations by implementing regulations in 2015 that introduced a minimum landing size of 10cm and prohibiting the capture of berried females. A trawl ban was also introduced in all FMAs in Indonesia.</p> <p>The government seems to be working on the enforcement of reducing trawl usage in the fishing area of blue swimming crab.</p>
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				<p>For the legal challenges or judicial decisions, there is an example of</p> <p>In Bangkalan, Madura a defendant was subject to sanctions related to the use of the trawl fishing gear (<i>Doc:putusan_301_pid.b_lh_2020_pn_bkl_20201203</i>). Information about the fishery's performance and progress is publicly available.</p> <p>Disputes are usually decided at village level. APRI's attempts to work with the fishermen in creating awareness about Harvest strategies seems to be working.</p>
		3.2.3	Compliance and enforcement	<p>60-79</p> <p>The Directorate General of Surveillance, Control and Monitoring of Fisheries Resources (PSDKP) is responsible for monitoring Indonesian waters beyond 12nm with surveillance support from the navy. Provincial governments oversee monitoring from the shoreline to 12nm with surveillance support from the water police. In both cases, criminal charges and prosecution can only take place through police investigations.</p> <p>The BSC Management Plan identifies the lack of law enforcement against the regulations as a priority issue. Illegal fishing practice is one of the main management issues. Government is tackling this with their fishing gear swap programme where fishermen can swap their illegal gears for legal traps which is implemented widely in Indonesia.</p> <p>PSDKP's quarterly report shows that there is monitoring and enforcement for trap. They monitor the fishing activity and also the processes in the processing plant. In the field, they also have aerial monitoring. In the quarterly report, it shows that they monitor the trap (bubu) vessel (<i>Doc: Laporan Kinerja Direktorat Jenderal PSDKP TW 1 Tahun 2020</i>). They also conduct the enforcement collaborated with law enforcers where in the 2020 first quarter the percentage of the handling of violation of marine and</p>

				<p>fisheries sector is 64,20% where the target is 35%. It indicates that the enforcement is implemented BKIPM is also monitoring to make sure that there is compliance with the law in juvenile crab landing and berried female crabs at the landing centres. To help fishers improve compliance with the regulations (on minimum landing size, no berried female, no trawl) APRI and other stakeholders are educating and encouraging the collectors and mini plant owners not to accept crabs that do not comply with the regulations. It is hoped that this will stop fishers from taking undersize crabs.</p> <p>Control Document (a form of industry self-regulation, with compliance audits all along the supply chain) is a measure applied and stakeholder consultations confirmed that processors are generally complying to this. The Control document audit of 2019-20 showed high compliance on the Minimum Legal Size (MLS) and Egg-berried Female (EBF) at the landing sites and mini plants (<i>Doc: Summary Audit Control Document</i>). The Fishery Act 31/2004 sets out penalty schedules. It includes graduated fiscal penalties, suspension or cancellation of licenses, refusal for new licenses and full removal from the fishery as penalty options. A revision of the Act No 45/2009 listed penalties and fines to deal with specific violations. The penalties and fines, depending on the type of violations could raise up to USD 1.5 million and/or jail up to 10 years. A second amendment to the Fisheries Law is underway and includes proposed new sanctions in the form of written warnings and changes to administrative fines. It is unclear as to whether sanctions have been applied in this fishery.</p> <p>In the BSC Management Plan, the issues and action plan for budget planning identifies that many catches of crabs are not reported or recorded in capture fisheries statistics as a priority issue. This suggests that fishers may not be providing information that is</p>
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				<p>important to effectively manage the fishery. APRI has deployed enumerators on all landing centres and they systematically collect data. Some fishers are generally thought to comply with the management regulations and provide information through logbooks from time to time. At the village level fishers are informed and reminded of the fishing rules.</p> <p>Evidence of systematic non-compliance is also reported in the site visit of Pre-assessment 2020, in that many undersize crabs were retained in the catch and some berried females were also retained but then transferred to a community operated “nursery” or quarantine section where crabs are maintained until they release their young (crab apartments). During the stakeholder meeting conducted remotely Government officials, fishermen and APRI talked enthusiastically about GTK5! a programme which is gaining momentum in many villages to reduce non-compliance and improve sustainability. Under this crab less than MLS are released back and berried females are kept in ‘crab apartments’ till they release their larvae and then used for processing.</p> <p>To improve the compliance and enforcement, in sites like Rembang, Pamekasan, and Konawe Selatan, village regulation is strengthened and already implemented in Pamekasan specifically Pagagan Village, while the other sites it is still in progress. APRI has made major improvements in this SG and more documented information on the compliance to this could help score higher.</p>
		3.2.4	Management performance evaluation	<p>≥80</p> <p>Total catch and MSY is periodically evaluated as evidenced through the publishing of Regulations (e.g 50/2017). The Management Plan stipulates that the plan is to be evaluated annually to measure the implementation of the plan and in particular ensure that funds, human resources and facilities are adequate to implement the action plans, and whether</p>

				<p>changes to the action plan are required in order to meet their goals. Evaluation activities are coordinated by the DGCF and carried out by the Management Committee at the Provincial level. The compliance program and the operational action plan for BSC is evaluated.</p> <p>Regulation 71/2016 regulates fishing gear and vessels within 'fishing lanes' within the FMAs. This regulation specifies that the monitoring and evaluation of fishing lanes and the placement of gear and vessels in each FMA will be conducted by the DGCF and the provincial office responsible for the relevant fisheries. Since implementation in 2011, this regulation has been amended several times demonstrating that they are evaluated and updated as required. Based on the examples provided above, there are mechanisms in place to evaluate key parts of the management system.</p> <p>The stock assessment is internally reviewed annually by MMAF's Committee for stock assessment and externally reviewed by an independent scientist as required. In addition, the management plan prescribes a review period of 5 years, however, it has only been in place since 2016. Nonetheless, the Plan has been reviewed internally by scientists from the MMAF research agency and externally from University scientists. In recognition that fisheries management remains constrained by a range of factors such as illegal fishing, a second amendment to the Fisheries Law is being drafted which constitutes a review of the overarching legal framework. SG80 is met. It is unclear whether the management system is subject to regular external review and therefore SG100 is not met.</p>
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Workplan results

Fill in the following table by reviewing the FIP's workplan and summarizing the key results that have been achieved over the last three years (or since the last audit took place) as a result of the FIP's workplan. Provide an explanation of steps that the FIP participants took in supporting and achieving each result.

The Blue swimming crab FIP of Indonesia started in 2009 and was not able to make much progress until 2014. After 2014, the FIP seems to have done a lot to make progress in many areas like, regular stock assessment, developing a Harvest strategy and creating awareness among fishermen villages in sustainability. There seems to be a good coordination between the different stakeholders during the stakeholder meeting conducted online on 27th November 2020.

The three-year audit has used the 2015 pre-assessment, 2020 pre-assessment, and many other documents for conducting this audit. A major drawback was the language. Many documents are in Bahasa and only abstracts were in English. Similarly, during the remote stakeholder meeting, only the FIP implementer from APRI, the scientists and exporters from APRI were able to converse in English. All others used Bahasa and this was translated by the FIP implementer. It is not sure whether this has affected the auditor's understanding of the FIP.

This report is an edited version of the audit report prepared during November- December 2020 which now is representing the whole of Indonesia and has included the Gill net and Traps as gears. No new stakeholder meeting was conducted, except with Dr. Hawis the FIP in charge.

Result	Related Action on FisheryProgress	Related MSC Performance Indicator	Explanation
BSC habitat mapped	Conduct a study on habitat and ecosystem impact	2.4.1, 2.4.2, 2.5.1, 2.5.2	<p>The FIP has made attempts to study the habitat and ecosystem impact of BSC fishery.</p> <p>APRI is regularly providing student grants for research in this area. This data was used for an RBF SICA analysis during the 2020 Pre-assessment in Madura islands, that has resulted in an improved score.</p> <p>Vessel tracking Systems have been implemented in some landing sites, data collected is analysed, the paper is still in draft. The results indicated no VMEs within the fishing area.</p> <p>Many provincial Governments have launched a programme for replacing destructive gears with eco-friendly ones. Under this, fishermen are encouraged to exchange their trawls for traps. This program started in March 2016, by the Agency for Fishing Technology. They also gave training to fishermen on how to make</p>

			<p>traps with escape vents and gill nets with bigger mesh size that complies with the regulations.</p> <p>Each fisherman is given 200-800 traps. Now many fisher villages are self-sufficient in making these traps. (Stakeholder consultation)</p> <p>National government has issued a law for registration of small fishing crafts. (NOMOR 5/PERMEN-KP/2019). The fishermen are encouraged to register their crafts by giving incentives like fuel.</p> <p>A trophic model constructed using the Ecopath with Ecosim software (Narhakim, 2003), regards the ecosystem of Central Java as moderately mature and relatively stable system.</p> <p>Awareness programs by APRI, along with other stakeholders in educating villagers on minimum size limits and protection of berried females for blue swimmer crabs, prohibition of use of trawl gear is ongoing. The villagers are given incentives and competitions to select the best village that follows this practice is conducted. This may change the approach of fishermen. (This is in a much progressed state in Madura Islands, other provinces are in different stages of implementing such programmes)</p>
<p>A harvest strategy developed</p>	<p>Contribute to development of harvest strategy for Indonesia BSC</p>	<p>1.2.1, 1.2.2, 1.2.3</p>	<p>Three stock assessments were carried out in 2016. 2017 and 2018. (Balitbangkan & APRI, 2016; Balitbangkan & APRI, 2017; Balitbangkan & APRI, 2018). E and LB-SPR were evaluated based on this. High values of E indicated high level of exploitation. Using LB-SPR method a limit reference point of $SPR > 20\%$ and target reference point of $SPR \geq 30\%$ were determined.</p> <p>A harvest strategy has been developed based on this.</p> <p>A Harvest strategy HS (NOM 6/2020), developed in consultation with stakeholders has been legislated recently. It has two operational objectives –</p> <ul style="list-style-type: none"> • the ratio of spawning potential from crabs increases to the target refence point $SPR 30\%$ over a 5- year period • the target percentage of crabs caught above the minimum size caught (MLS) in accordance with government regulations (10 cm) in 5 years is 90%. <p>This activity seems to be completed as the fishery now have a Harvest Strategy.</p>

			<p>The score of PI 1.2.2 has not improved because HS is not implemented in a concrete way. Maybe APRI can add another activity to work out to how to implement the h/s and hence improve the score of 1.2.1, 1.2.2 and 1.1.2. Also, PI 1.2.2 has to be added to this action point. Fixing a threshold reference point at which precautionary measures have to be started can be an improvement in this action.</p>
<p>Improved compliance and enforcement</p>	<p>Development of compliance and enforcement measures</p>	<p>3.2.3</p>	<p>This action is not updated in fisheryprogress.org.</p> <p>Stakeholder online meeting mentioned that APRI and other stakeholders are educating and encouraging the collectors and mini plant owners not to accept crabs that do not comply with the regulations. It is hoped that this will stop fishers from taking undersize crabs and improve compliance with the regulations (on minimum landing size, no berried female, no trawl). Government enforcement wing is giving warnings to fishermen not following HS. But no records of fine or punishment. Government stakeholders reported during meeting that there is regular monitoring of fishermen. The government has introduced a new law on registration of small-scale fishing vessels which they think will help in better enforcement. (NOMOR 5/PERMEN-KP/2019). They also mentioned about empowering fishing community participation through the formation of POKMASWAS, where currently there are 88 POKMASWAS that assist in monitoring and monitoring of fish resource utilization. APRI is incentivizing fishermen and conducting competitions for adhering on to HS regulations. Fisheries Bureau is said to provide environment friendly fishing gear (i.e. trap) to fishermen and is giving awareness to them. (Fishing gear swapping programme). A draft stock assessment report for 2019 (<i>Doc: PeerJ-Indonesian BSC (draft manuscript)</i>) is showing improvement in CW of crab</p>

			<p>collected and reduction in number of berried crabs from 7 locations in Java Sea.</p> <p>APRI is also working with Government agencies and enumerators on creating awareness among fishermen to implement the management measures and is finding success in some villages.</p> <p>Government has also initiated development of protected areas in few islands that could act as breeding grounds for Blue swimming crab.</p> <p>PSDKP is monitoring fishing activities in the waters and also in the processing plants. BKIPM is monitoring the activities at the landing centres.</p> <p>The FIP need to report these activities on fisheryprogress.org</p>
<p>BSC fisheries Co-management established to develop and implement priority action plans</p>	<p>Establish Indonesia BSC fisheries Co-Management at local level</p>	<p>3.1.1, 3.1.2, 3.1.3, 3.2.1, 3.2.2</p>	<p>Through the efforts of APRI various meetings were conducted with all stakeholders and Governor Regulation on Fishery Management for Blue Swimming Crab, Lobster and Mud Crab for Central Java Province has been signed in July 2017.</p> <p>The objective of the Management Committee is “to improve the welfare of the community, especially fisherman in East Java in the context of maintaining continuity and sustainability of fish resources, especially the BSC resource through BSC management”. The BSC Management Plan (70/2016) contains an overarching objective which is that the plan will direct and guide Government and stakeholders in the implementation of management of fish resources and the environment. The plan identifies the three components of using an EAFM, namely fish resources and habitat; social and economic; and governance and has an explicit objective for each component with measurable targets. The formation of BSC management committee has helped improve the score of 3.1.1, 3.1.2, 3.1.3, 3.2.1.</p> <p>3.2.2 continues to be under 60 as implementation of regulations is still an issue. Although a harvest / rebuilding strategy has been approved, the concrete decisions / steps to achieve rebuilding within the agreed timeframe are not yet clear. Since the harvest strategy is new, this is a work in progress.</p>

			<p>There is an “Umbrella Programme” summarizing the results of National meeting on management of BSC in Indonesia. It seems APRI was successful in mobilizing many of the programmes devised in the plan with the help of other organizations.</p>
<p>Provide information on the fishing effort to support development of harvest strategy on blue swimming crab</p>	<p>Fishing effort studies</p>	<p>1.2.2</p>	<p>From 2016, APRI, SFP and Pelagic Data System used geospatial vessel tracking and collected biological data from three sites Madura (which includes vessels based in Sumenep and Pamekasan), Southeast Sulawesi (which includes vessels based on Gala Island and Bangko Island), and Lampung (where most vessels are based in Labuhan Maringgai). This was integrated with the data collected by enumerators and landings/catch data. CPUE was calculated based on this.</p> <p>Another similar study was done at Betahwalang and Demak regency.</p> <p>The VTS tracking system still continues to collect data. Combining this with research work on Habitat and Ecosystem, student grant supported by APRI, enough biological data was integrated for developing a Harvest strategy. In March 3, 2020 Directorate General of Capture Fisheries (Ministry of Marine Affairs and Fisheries-MMAF) has launched a harvest strategy for management of blue swimming crab, snapper, and grouper fisheries as the fisheries management area (LPP WPPNRI). APRI, SFP, and BRPL participated in making the harvest strategy for blue swimming crab outcome Limit Reference Point (LRP) 20% and Target Reference Point (TRP) 30% for SPR .</p> <p>The purpose of this activity was to get information which could be used for stock assessment and developing the harvest strategy – so it will be better to change the PI’s here to 1.2.3 and 1.2.4.</p>
<p>Improved compliance and catch documentations to support traceability</p>	<p>Implement control document to improve compliance and traceability</p>	<p>3.2.3, 3.2.4</p>	<p>To improve compliance APRI used the control document implementation with the help of various stakeholders.</p> <p>On 21st of June 2018, the NFI Crab Council finally announced the full implementation of Control Document.</p> <p>The Director General Decree on the Establishment of Steering Committee for Traceability and Catch Documentation to support implementation of Control Document has been established (signed) in early June 2018. The members of SC include: DG of</p>

			<p>PDSPK (DG Fishery Product Competitiveness), BKIPM (Fish Quarantine and Inspection Agency): DG of Capture Fisheries (Fishing Port Authority), SFP, NFI CC and APRI. This Steering Committee will receive the audit results and will guide the supply chain to implement corrective actions, and depending on the nature of failure, the sanction to be applied.</p> <p>APRI has implemented control document for the blue swimming crab supply chain in Indonesia. The implementation of the control document is need to evaluate. From the January 2019-February 2020, APRI conducted the control document audit for the mini plants across Indonesia.</p> <p>The Summary Audit Report shows a partial compliance with a calculated % compliance ranging from 25% to 43%. The compliance to MLS and EBF is higher, hovering around 90%. This hasn't helped in improving the score for compliance. A proper analysis of Audit data may give a better score to this PI. Stakeholder meeting mentioned that the provincial Government has started issuing licenses to small scale fishermen, so that they have to register their vessels. (NOMOR 5/PERMEN-KP/2019). The registering has added benefits for the fishermen like subsidized fuel etc. This may help in better enforcement.</p>
<p>There is an improvement in the selectivity of the fishing gear and improve the implementation of collapsible trap with escape vents and net with improved mesh size</p>	<p>Improve the selectivity of fishing gear</p>	<p>2.2.1, 2.3.1, 2.3.2, 2.5.1</p>	<p>The FIP is yet to report the progress made here in fisheryprogress.org.</p> <p>BPPI, the National fishing technology development organization has made gill nets with bigger mesh sizes in compliance to the harvest strategy and traps with escape vents. This is in various stages of implementation by the provincial governments in Indonesia. South East Sulawesi, East Java, Central Java, Sumatra and Lumpong have implemented this to a greater level (Dr Hawis, pers. Comm)</p> <p>Government officials and APRI members discussed about efforts on fishing gear swap programme during stakeholder meeting.</p>
<p>There are management</p>	<p>Management measures on ghost fishing</p>	<p>2.2.2, 2.3.1, 2.3.2,</p>	<p>The FIP is yet to report the progress made here in fisheryprogress.org.</p>

<p>measures related to the ghost fishing</p>		<p>2.5.1, 2.5.2</p>	<p>Stakeholder meeting discussed that APRI along with their enumerators are conducting awareness programmes for fishermen all over Indonesia about the destructive effects of ghost nets. As a result, fishermen are voluntarily collecting ghost nets found floating in the sea and are handing it over to the enumerators at landing centres. Enumerators collect it, classify and document. This drive is supposed to reduce ghost fishing considerably.</p>
<p>There are management measures related to the post-capture handling of the bycatch especially the ETP species</p>	<p>Management measures on post capture handling of ETP species</p>	<p>2.2.2, 2.3.1, 2.3.2, 2.5.1, 2.5.2</p>	<p>The FIP is yet to report the progress made here in fisheryprogress.org.</p> <p>APRI's enumerators and community organizer are collecting data on ETP species besides the data on Blue swimmer crab. Apart from this government is also collecting data through fisheries extension agents.</p> <p>Interviews with Scientists and fishermen confirmed that turtles, sea cows and sea snakes were not encountered. Only ETP species encountered is Horse shoe crab, which according to enforcement officials and fishermen has no commercial value, so usually left back to sea alive. In some provinces there are measures for the protection of Horse shoe crabs.</p> <p>It is not sure whether the horse shoe crabs caught in gill nets can be released live. It would be good if APRI can do some studies on this. There is a video of live releasing of HS crabs, but it is not showing whether it is from gill net or traps.</p> <p>Pre-assessment, 2020 did a PSA-RBF on this and found it to be of medium risk. But this was only for traps.</p>
<p>Data available on Non-Target Species and ETP species</p>	<p>Non-Target Species Field Assessment - Using the Marine Stewardship Council's Risk Based Framework for Data Limited Fisheries</p>	<p>2.2.1, 2.2.2, 2.3.1, 2.3.2, 2.3.3,</p>	<p>Study report by Bogor Agricultural University in February 2019 on Non-Target Species of Blue Swimming Crab Fishery in East Lampung. The study was conducted from June to October 2017 at Labuhan Maringgai and Kuala Penet, Coastal area of East Lampung. The results showed that 21 Non-Target Species obtained from Labuhan Maringgai and Kuala Penet areas and it was similar in terms of species diversity.</p>

			<p>A draft report by Dr Zairion from IPB in 2019 with data from APRI on Non-Target Species of Blue Swimming Crab Fishery in East Java at Pamekasan from 2016-2019.</p> <p>These studies provided enough data to do PSA for pre-assessment 2020 at Madura islands.</p> <p>ARPI has developed an elaborate identification list for commonly encountered NTS with codes and have trained enumerators to collect data on NTS from 2018. The enumerators are also trained on RBF of MSC and how to collect data for this assessment.</p>
<p>Improved biological data to support stock status</p>	<p>Stock Assessment</p>	<p>1.1.1, 1.2.4, 2.1.1, 2.1.2, 2.1.3</p>	<p>Three published stock assessments are available, Balitbangkan & APRI, 2016; Balitbangkan & APRI, 2017; Balitbangkan & APRI, 2018.</p> <p>APRI and Centre for Fisheries Research and Development is doing stock assessment studies from 2014 onwards. APRI has trained enumerators and they are collecting data for stock assessments from different locations.</p> <p>Values of E over the last three stock assessments have ranged between 0.55 – 0.88, all sampling sites (with exception of Pemaalang in 2018) consistently had $E > 0.74$ indicating high levels of exploitation. LB-SPR for 7 locations in the Java Sea (FMA712) conducted between 2016-2018 indicate the stocks of BSC at many sites are below internationally accepted limit reference point of LB-SPR 20%, which is the limit reference point in the newly legislated HS (NOM 6/2020). The LB-SPR for all the sites sampled in 2018 was averaged to provide an estimate for the Java Sea (FMA 712) the resulting LB -SPR was 18.2% indicating that stocks in the Java Sea are below the limit reference point or PRI.</p> <p>However, a report for Stock Assessment has been released by APRI and is publicly available (<i>Doc: Stock Assessment Report, APRI 2020</i>) from Java Sea (FMA 712), Pamandati (FMA 714), and Pangkajene (FMA 713). The study found that the spawning potential ratio (SPR) of BSC in Indonesia ranged from 20% to 38%, which is above the limit reference point of SPR20%. This seems promising for the FIP.</p> <p>Pre-assessment by MRAG in 2009, mentions that the stock of BSC in Indonesia is a single stock, but a recent study by Maduppa et</p>

			al., 2021 has found that BSC populations across Indonesia are likely to have several stock units. This study is important in developing management measures accordingly.
Rebuild the stock through aquaculture program (hatchery) and releasing the juvenile crabs.	Stock enhancement and restocking of blue swimming crab (Portunus pelagicus)	1.1.2	<p>The updates in fisheryprogress.org is mentioning about crab cultivation as a stock rebuilding methodology.</p> <p>The FIP can review MSC requirements for enhanced stocks to make sure that they have included all the actions needed for the fishery to comply with these requirements.</p> <p>During stakeholder meeting APRI and Scientists mentioned about a programme called GTK5, under which they are giving awareness to fishermen villages to release crabs below MLS and retain berried crabs in “crab apartments” till they release larvae and then use them.</p> <p>This movement seems to be gaining momentum with incentives and competitions organized by APRI.</p> <p>Stock rebuilding plans are developed comprehensively in Central Java Province and East Java Province which are located in FMA712. Restocking activities and fishing gear swap were conducted in Rembang and Pamekasan District since 2018 onwards.</p> <p>It is not sure whether this programme has gained momentum all over Indonesia.</p>

Conclusions

The fishery seems to be active and making progress. Key improvements are seen in stock status monitoring, developing a harvest strategy and creating awareness among fishermen about sustainable fishing. The FIP implementers were able to initiate communication and collaboration among the various stakeholders. The implementation of various programmes is at different rates in different provinces of the country based on their budget and priorities. Considering the vast areas of implementation and the remoteness of many islands this seems to be a herculean task. It is noteworthy that APRI and the FIP implementer is doing their maximum under the present restrictions of Covid-19 situation, and the FIP seems to be making maximum progress. Major restrictions of this auditing was this was remote and is a follow up audit of the one conducted for Madura Islands in Nov- Dec, 2020.

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