India Kerala Deep-sea Shrimp Trawl Fishery

Three-Year Evaluation Report

Version 1.3, November 2022

## FIP Information

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| *Target species scientific name(s) and common name(s)* *[state target stock(s), if relevant]* | *Aristeus alcocki, Heterocarpus chani, H. woodmasoni* (Deep-sea shrimp) |
| Fishery location | Kerala |
| Gear type(s) | Deep-sea Trawl |
| Estimated FIP Landings (weight in tons) | 3162 Metric tonnes (2019) |
| Vessel type(s) and size(s) | Deep-sea trawl vessels of 20+ OAL |
| Number of vessels | 250 |
| Management authority | Department of Fisheries, Government of Kerala <https://fisheries.kerala.gov.in/index.php> |
| Assessor name(s) | Originally assessed by Sascha Brand-Gardner, bio.inspecta Pty Ltd for ITM verificationConverted to FP format by Vineetha Aravind, PhD (FIP Manager) |
| Assessor Organization/Affiliation | bio.inspecta Pty Ltd |
| Date of report completion | 15.02.2023 |

## FIP Background (Optional)

The FIP was initiated by Seafood Exporters Association India – Forum for Deep-sea Shrimp Sustainability, Kerala (SEAI-FDSSK) but is presently managed by WWF India under ITM funding from 2021 onwards. Some of the action plans were delayed by Covid-19 situations, but the FIP is showing progress in many areas.

## Stakeholder Consultation & Meetings

*Not conducted as it was not part of ITM Report*

## Summary of Findings and Recommendations

Despite the limitations imposed by Covid-19, the FIP has made some progress in the following areas:

* Many sub-actions are completed which will lead to a stock assessment and then forming Harvest strategy and Harvest Control Rules
* Research papers are published which will help in formulating management strategies for secondary species and ETP species
* Work is progressing in reducing bycatch through implementation of square mesh cod-end (BRD)

## Summary of MSC Performance Indicator Scores

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Principle | Component | Performance Indicator | Previous Score 2018 | Current Score 2023 | Rationale or Key Points  |
| 1 | Outcome | 1.1.1 | Stock status | 60-79 | 60-79 | Consideration of the pre-assessment report revealed conflicting scores for *A. alcocki* (e.g. failed the RBF but met SG 60 under default tree) and the BMT was updated to < 60 to 60-79. Consultation with our P1 assessor looking at the details of the ELEFAN analysis in a report provided by the client suggests that this UoA likely meets the SG 60 and is on target. No major changes in the stock of *H. woodmasoni* and *H. chani* were reported by the research institute CMFRI and an age analysis for *A. alcocki* has been completed (Chakraborty et al., 2022) which will inform the stock assessment of this species. Stock assessments for all 3 species using the new CPUE standardisation methodology is underway.  |
| 1.1.2 | Stock rebuilding | - | - | Given that all 3 UoAs likely score 60-79 at this stage (and will not be scored using the RBF in the future), actions against PI 1.1.2 need to be developed in order to assess progress on this rebuilding strategy which according to the BMT are due in year 4. These new actions will be verified in the next assessment. |
| Management | 1.2.1 | Harvest Strategy | 60-79 | 60-79 | While changes to the score are not expected until year 5, several of the actions have not been completed by the due date (e.g. evaluating options for management of multi species fisheries, identify a suitable option and draft a harvest strategy). Given the actions identified and the time remaining, it is still likely that the score will be achieved. |
| 1.2.2 | Harvest control rules and tools | <60 | <60 | No score change is due. While some work has been completed to identify a potentially effective change in a management measure in the form of temporal closures, this is not in place. Whether this management action will be effective in controlling exploitation is yet to be determined. However, all actions remain on track and the score is likely to be reached. |
| 1.2.3 | Information and monitoring | <60 | <60 | An increase in score to 60-79 was due for all UoAs by year 2. There has been some progress in terms of determining an appropriate stock assessment cycle (in other words, frequency of analysis which for shrimps should be annually, based on monitoring) and the methodology required to monitor stock abundance, however the analysis has not been completed yet and some of the actions are overdue. Score remains at < 60. |
| 1.2.4 | Assessment of stock status | ≥80 | ≥80 | For UoA 1 *A alcocki*, the RBF was used in the preassessment and a default score of 80 was assigned. In the future, it is unlikely that this UoA will be scored using the RBF. It is likely that this UoA will follow the same trajectory as the other 2 UoAs for this PI and progress will be monitored with this in mind. Recent published literature (Chakraborty et al., 2022) on this species’ population dynamics should assist the score. No score change is due for the other UoAs. The assessment of stock status is currently underway. At this stage it is unclear as to whether the assessment includes reference points or identified major sources of uncertainty and will be checked next year. The actions in the action plan are behind schedule but are appropriate and remain likely to be met within the overall timeframe |
| 2 | Primary species | 2.1.1 | Outcome | ≥80 | ≥80 |  |
| 2.1.2 | Management strategy | ≥80 | ≥80 |  |
| 2.1.3 | Information | ≥80 | ≥80 |  |
| Secondary species | 2.2.1 | Outcome | 60-79 | 60-79 | No score change is due for year 1 and 2 however progress is being made. Guidelines for determining the number of species for which stock assessment is to be carried out in the context of a multigear and multispecies fisheries sector have been derived (Varghese E, et al., 2021). With the work conducted on modelling stock biomass dynamics (e.g. Sathjanandan et al 2021), the periodicity of stock assessment for all trawl species, data on the frequency distribution of the quantity of catch, species that have been (e.g. *Pricanthus* spp (Seetha et al., 2018)) or are under assessment (e.g. *Sepia* spp) and development of the Index of Resilience & Vulnerabilty Index (IRV) (Mohamed K.S. et al., 2021) which informs the risk to secondary species together should provide evidence that main secondary species are highly likely (> 70th %ile) to be above biologically based limits. SG 80 may be met but a complete list of main secondary species would need to be determined to confirm. |
| 2.2.2 | Management strategy | <60 | <60 | No score change is due but progress is being made. With the trials on square mesh cod-ends and BRDs underway, scoring issue e) regarding a review of alternative measures to minimise the mortality of unwanted catch is likely to meet SG 60. If any of these measures are implemented, it should also improve scoring issue a) and b). It is noted that many of the actions in the action plan are ongoing or not due yet and further progress if therefore likely. |
| 2.2.3 | Information | 60-79 | 60-79 | Biological data and inherent risk information is available as well as catch data (as part of the national level database which estimates landings and fishing effort) which was used to determine the high-volume species. In Kerala, there are no discards as everything is used. Catch is classified as high (food fish) and low (fish meal) value. This PI currently scores 60-79 but it is possible that SG 80 could be met at this stage. No score change is due and this may be rescored at the next verification of progress. |
| ETP species | 2.3.1 | Outcome | ≥80 | ≥80 |  |
| 2.3.2 | Management strategy | 60-79 | 60-79 | It is noted that there is no explicit action to address the 60-79 score for this PI in the action plan even though it is linked to action 4-2.1 and the high-risk species (which are mostly secondary species) and action 7 (discards). While ETP interactions are minimal it is accepted that the risk to ETPs has been evaluated (Varghese E et al 2021) and based on 3 interactions in the last 35 years from available records. This is considered to be an objective basis for confidence based on information from the gear use in the fishery. The BRD trials currently underway may meet the SG 80 for scoring issue e and be considered as a regular review. It is possible that SG 80 may be met and this will be considered at the next progress verification. |
| 2.3.3 | Information | 60-79 | ≥80 | The paper published by Varghese E et.al, 2021 gives some quantitative data on ETP interactions with trawl nets and specifically with multiday trawlnets (MDTN) which is the gear used in the UoA. The fishery is also collecting ETP information in logsheets from the model boat and is raising awareness among enforcement officials regarding the regulations that prohibit landing of these species which will improve the level of certainty that impacts and mortality are minimal. This PI can be rescored at SG 80. |
| Habitats | 2.4.1 | Outcome | <60 | <60 | There is no score change due and no tangible reports have been provided at this stage. There has been some background work done to prepare for habitat mapping and planning through contact with the Fishery Survey of India group and publication of criteria by CMFRI for developing a conservation plan for biologically sensitive areas in Kerala and other states. AIS/VMS has been installed in most boats but the regulator has not yet started tracking the footprints. The research organisation has the data and planning to prepare a fishing area map. |
| 2.4.2 | Management strategy | <60 | <60 | There remains no evidence of habitat management measures for the offshore area where the fishery operates. There is no score change due at this stage and completion dates in the action plan have not expired. In accordance with the action plan, 2023 and 2024 will be busy years of progress for the habitat component. |
| 2.4.3 | Information | <60 | <60 | Similar to above there is no score change due and no further information relating to the main habitats in the UoA (being the deep water in Kerala) has been provided at this stage. Initial contact has been made with FSI regarding mapping of the fishing area. There are a range of research projects and initiatives outlined in Walmsley et al. 2021 and Dineshbabu et al 2019 which, once completed, should assist with the information base and inform the scoring of this PI. |
| Ecosystem | 2.5.1 | Outcome | 60-79 | 60-79 | The Kerala Arabian Sea Ecosystem (KASE) model has been completed (Mohamed et al.,2021) and is built using ECOPATH and ECOSIM suite of software, encompasses an area of 86,894 km2 and has 48 functional ecological groups (aggregating more than 400 species). Fish landings and fishing effort data over the period 2007-2017 are used. ECOPATH is a trophic accounting model that is a practical way of studying the trophic interactions of all species in an ecosystem by incorporating the energy flows between trophic levels and interactions among trophic components. ECOSIM calculates corresponding changes in biomass and yield of each component when the fishing mortality of any particular group is altered. Various scenarios have been modelled using the KASE model including a shift in the ban period of trawls specifically for the fishery. This work models the impact of the fishery on the ecosystem. There is clear progress here however indirect effects of lost gear and other operational waste would also need to be considered before this PI is rescored so it remains at 60-79 at this stage. |
| 2.5.2 | Management strategy | 60-79 | 60-79 | The KASE model and scenario outputs suggest a change in fishing closure to Oct -Nov, rather than the present June-July which is likely to increase catch of not just the target species of prawns but also of other species such as threadfin bream. The regulator has been advised of this finding. If implemented, the measure would be based on an understanding of the functional relationships between the UoA and components of the ecosystem and would likely score SG 80. |
| 2.5.3 | Information | ≥80 | ≥80 |  |
| 3 | Governance and Policy | 3.1.1 | Legal and customary framework | ≥80 | ≥80 |  |
| 3.1.2 | Consultation, roles and responsibilities | ≥80 | ≥80 |  |
| 3.1.3 | Long term objectives | ≥80 | ≥80 |  |
| Fishery specific management system | 3.2.1 | Fishery specific objectives | <60 | <60 | Both short and long term fishery-specific objectives for principle 1 and 2 have not been developed yet. Action 6-1 is behind schedule. Score remains < SG 60. Given that no score change was due, the actions remains on the action plan and there is time remaining on this FIP, it remains likely that this PI can achieve SG 80 within the timeframe. |
| 3.2.2 | Decision making processes | 60-79 | 60-79 | For scoring issue a) and b), it is likely that if the trawl ban temporal closure is changed following outputs from the KASE model scenarios the score will be increased. It is also noted that the CMFRI Annual Reports may be considered as formal reporting to stakeholders. Fisheries management activities and performance of fisheries (mostly in the form of landings) is reported at a State level (e.g. Kerala) and is therefore fishery specific. Some explanations on fishery performance (e.g. covid lockdown or successful recruitment) and management action is provided (e.g. a study on the unusual landing of a species was carried out). Implementation of a harvest strategy under action A2, which contains preagreed harvest control rules (management action), may also strengthen the decision-making scoring issues. No score change is due but likely to increase within the timeframe. |
| 3.2.3 | Compliance and enforcement | 60-79 | 60-79 | It is noted that the FIP conducted a workshop for enforcement officials in 2019 and that a handbook for enforcement officials is being developed (noting the deadline for the first draft was February 2021) with the aim of strengthening the MCS system. Action under task A9 are ongoing and no score change is due at this stage. AIS/VMS has been installed on most vessels. The ‘Model boat project” by the FIP is a measure to increase compliance with the management measures through education/awareness. During this verification of progress, the information provided continues to refer to non-compliance with regulations (e.g. illegal landing centres). It will need to be demonstrated that the MCS system can enforce management measures before an SG 80 is achieved. |
| 3.2.4 | Management performance evaluation | 60-79 | 60-79 | Meetings are conducted at the level of fishery management councils, especially State management council. There are plans to review the management policy at this state level. There has been five meetings of the SFMC held to date since 2020 and there is evidence of discussions regarding reviews of regulations and other fishery matters (e.g. prohibit juvenile fishing) in the meeting minutes. More regular meetings at the village and district level are being explored. Regular meetings at various levels provide a mechanism to evaluate the fishery and review management measures. There has been no evidence of a recent external review provided at this stage. |

## Environmental Workplan Results

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| Result | Related Action on FisheryProgress  | Related MSC Performance Indicator | Explanation |
| There is information on the species discarded and are quantified  | Action 7.Monitoring of discardsDiscards from fishery are known by species and quantity | 2.3.3, 2.3.2, 2.2.3 | The paper published by Varghese E et.al, 2021 gives some quantitative data on ETP interactions with trawl nets. The paper indicates that the fishery is not posing a threat to ETP species. The maximum interaction was observed with Mechanized Gill Net (MGN) followed by Mechanized multi-Day Trawl Net (MDTN), Mechanized Trawl Net (MTN) and Out Board Hook & Line (OBHL). In terms of the percentage of the catch, it formed less than 0.05% of the total. In MDTN, there were only 3 interactions with ETP in the last 35 years and it formed only 0.027% of the catch. Many gears such as Mechanized Purse Seine (MPS) and Mechanized Ring Seine (MRS) did not record any interaction with ETP species. It is evident that there is some quantitative evidence to assess UoA related mortality and impact on ETP species. This information seems to be adequate to support measures to manage ETP species. In addition to this the FIP is collecting ETP information in the form of a log sheets from model boat. This information is yet to be analysed. |

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