



Sri Lanka  
Blue Swimming Crab  
Fishery Improvement Project

# Technical Training Programme Stock Assessment and Fishery Management

## Workshop Report I

Updated on 10<sup>th</sup> May 2021



*Implemented through*

**District Fisheries Office - Kilinochchi**  
**Department of Fisheries & Aquatic Resources Development**

*Co-financed by*

**Department of Fisheries & Aquatic Resources Development**  
**Seafood Exporters' Association of Sri Lanka**  
**National Fisheries Institute Crab Council**  
**Market Development Facility**

*Conducted by*

**pelagikos pvt ltd**

## Narrative Report

### Technical training programme on stock assessment and fishery management

The first technical training programme on stock assessment and fishery management was conducted by pelagikos private limited with officers of the District Fisheries Office (DFO) in Kilinochchi District on Thursday 6<sup>th</sup> and Friday 7<sup>th</sup> of May 2021. The number of participants in the training programme was kept to a minimum in view of the prevailing COVID19 situation in the country. The Assistant Director a Fishery Inspector and two Development Officers participated in the first day's programme (see *Attendance Sheet in Annex A*). The Assistant Director, the District Fisheries Officer, two Fisheries Inspectors and two Development Officers participated in the second day's programme see *Attendance Sheet in Annex A*). The programme was designed by Dr. Steve Creech, Director pelagikos pvt ltd and conducted by Dr. Creech and T. Sutharshan, the Coordinator of the blue swimming crab (BSC) fishery improvement project (FIP) for the Palk Bay BSC fishery (*i.e.* Jaffna, Kilinochchi and Mannar districts)

### Day One (Thursday 6<sup>th</sup> May)

The following topics were covered in the first day's programme

- Topic One:** *Taxonomy, biology, behavioural ecology of blue swimming crabs;*
- Topic Two:** *Stock assessment methods for data limited fisheries;*
- Topic Three:** *Management plans and reference points for fisheries;*
- Topic Four:** *Harvest control strategies, management rules and tools for sustainable blue swimming crab fishing.*

Soft copies of each PowerPoint presentation were submitted along with this Workshop Report.

- Topic One:** *Biology, behavioural ecology and taxonomy of blue swimming crabs*  
The importance of understanding the basic biology of the species to be managed was emphasized. Understanding BSC biology focused on age, size, growth, mortality, fecundity and diet and the implication for fishery management. Behavioural ecology looked at the life cycle of BSC and the different behaviour of male and female crabs and the implication of these for fishery management. Taxonomy was explained as an extension of understanding the population extent / the number of populations / the number of stocks in a given area (*i.e.* country) and the geographic range of the species or species group. Blue swimming crabs are found from the East African coast to the Philippines and the west coast of Australia. DFO officers' knowledge of the biology and ecology of BSC was poor to nonexistent. They are a little bit better informed now, but one workshop does not a BSC expert make. A collection of scientific publications on the biology and ecology of BSC was given to the participants at the end of the workshop (see Annex B).

**Topic Two:** *Stock assessment methods for data limited fisheries*

The information and data requirements for conventional / traditional stock assessment methods were briefly reviewed in the context of information and data available for species / stocks in Sri Lanka. The conclusion that there is insufficient information and data for almost every species of fish commonly caught in Sri Lanka was used to explain why there are currently no assessments of the stock status of any coastal fisheries in Sri Lanka, using conventional stock assessment methods.

The availability of life history data for every species in Sri Lanka – either from the literature or by conducting local studies – was highlighted and the link was made between life history parameters and length-based spawning potential ratio (LBSPR), as an alternative means of assessing the status of a stock. As the name implies length based spawning potential ration using length data from the fishery, together with life history parameters pertaining to the species / population of the species to estimate the current status of the stock. The theoretical basis of LBSPR was explained – in essence a mathematical model uses estimates of the ratio of growth (K) to mortality (M) i.e.  $M/K$  and the ratio of length / size at which 50% of the population attains maturity ( $L_{m50}$ ) compared to the asymptotic length (average size of the oldest age group / cohort  $L_{inf}$ ) i.e.  $L_{inf}/L_{m50}$  to estimate the spawning potential of the stock as if there were no fishing (unfished fishery). Length / size data from the fishery is then used to calculate the current spawning potential of the stock. LBSPR is the ratio of the spawning potential of the fished compared to the unfished fishery e.g. 0.30 or 30% spawning potential. DFO officers' knowledge of *Stock assessment methods for data limited fisheries* was unsurprisingly nonexistent.

Data from the 2020 Palk Bay BSC fishery assessment was used to demonstrate the how to run a LBSPR assessment, using the App available in the Barefoot Ecologist's Toolbox (<http://barefootecologist.com.au/>). A couple of scientific publications on LBSPR, including one on using LBSPR in Sri Lanka were presented to the participants at the end of the workshop (see Annex B). The FIP provided the DFO with two laptop computers and a printer to enable DFO to run the LBSPR, as part of the FIP's ongoing programme to build the technical capacity of all three DFO in the Palk Bay fishery to be able to collect, analyse, interpret and discuss annual stock assessment data and results with fishing communities in the future.

**Topic Three:** *Management plans and reference points for fisheries;*

The key components of a fishery management plan (see below) were presented and discussed in the context of the management plan prepared by fishermen and the DFAR for the BSC fishery in the Palk Bay in 2018. The importance of each component was discussed and examples were given from the Palk Bay BSC Fishery Management Plan (2018 – 2021).

1. Name of the species
2. Geographic area
3. Administrative area(s)
4. Scope of the management measures (Commercial, recreational, domestic markets, export markets)
5. Harvest Control Strategy
  - Input controls
  - Outputs controls
6. Reference Points for management (target and limit)

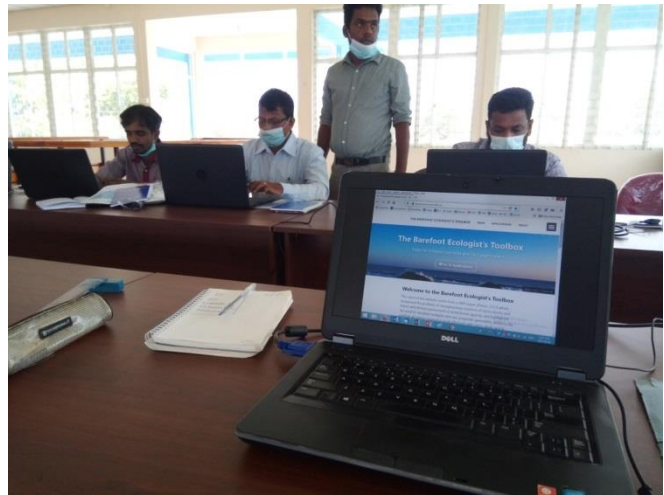
7. Stock assessment method and schedule (annual, three year, five year)
8. Stock assessment results
9. Harvest Control Rules
  - *Above the target reference point*
  - *At the target reference point*
  - *Below the target reference point /above the limit reference point*
  - *Below the limit reference point*
10. Harvest Control (Management) Tools
11. Bycatch (discarded accidental catch) management strategy
12. Monitoring and surveillance
13. Dispute Resolution
14. Fishery Improvement Plan
  - *Status of the stock*
  - *Ecological impact on non-target species, habitats and ecosystems*
  - *Management*
15. Duration of the management plan (1 year / 3 years / 5 years)
16. Fishery Management Committee
  - *Department of Fisheries and Aquatic Resources*
  - *Fishermen / fishermen's representative harvesting the species, including women*

One or two references on fishery management planning were given to participants at the end of the workshop (*see Annex B*).

**Topic Four:** *Harvest control strategies, management rules and tools for sustainable blue swimming crab fishing.*

This session focused on the proposal by fishermen, agreed by DFAR in the current Palk Bay Fishery Management Plan 2018 - 2021. What should be done if (1) stock status is above the target reference point for two or more years; (2) at the target reference point for two or more years; (3) below the target reference point but above the limit reference point for two or more years; (4) below the limit reference point? The proposals by the fishermen, agreed by DFAR were discussed one by one. These proposals in the Palk Bay Fishery Management Plan 2018 – 2021 will be reviewed / updated in District Fishery Management Meetings in 2021.

## Images from Day One (Thursday 6<sup>th</sup> May)





## Day Two (Friday 7<sup>th</sup> May 2021)

The following topic was covered in the second day's programme. The proposed Field Visit to Palakuda Landing Centre was canceled due to COVID19 concerns. Instead a bag of blue swimming crabs were purchased from Palakuda in the morning and brought to the DFO Kilinochchi

**Topic Five:** *Compliance Survey – Voluntary Code of Conduct for Responsible Fishing*

**Field visit** Palakuda landing centre and blue swimming crab collection centres (0800 – 1030)

A soft copy the PowerPoint presentation for Topic Five was submitted along with this Workshop Report.

**Topic Five:** *Compliance Survey – Voluntary Code of Conduct for Responsible Fishing*

The Voluntary Code of Conduct for Responsible BSC Fishing developed by the BSC FIP in consultation with BSC fishing communities and DFAR in 2016 was presented. The results of the Compliance Survey in 2017 and 2018 were discussed and plans were made to conduct a new survey in 2021. The 2019 and 2020 Compliance Surveys in the Palk Bay fishery were cancelled due to COVID19. The field data collection sheet for the 2021 Compliance Survey in the Palk Bay fishery is presented in Annex C.

The participants also discussed the request by the FIP to conduct Fishery Inspector Division (FID) meetings prior to the annual District Fishery Management Meeting in 2021. A format for collecting data by FID was prepared and shared with FIs and the AD during the meeting (see Annex D). The FIP has undertaken to meet the cost of FIs and AD's travel to landing centres in Kilinochchi District over the next six months. A format was also prepared and shared with the FIs and AD, through which to collect monthly field information (see Annex E). FIs proposed and the FIP agreed to convene a quarterly district meeting to review the FIs / AD's observations on the BSC fishery in Kilinochchi District every three months.

**Field visit** Palakuda landing centre and blue swimming crab collection centres (0800 – 1030)

The Field Visit planned to Palakuda Landing Centre was canceled due to COVID19 concerns regarding six DFAR officer traveling in a van to a fishery landing centre. Instead a bag of blue swimming crabs were purchased from Palakuda in the morning and brought to the DFO Kilinochchi. The DFO officers were taught how to identify male and female blue swimming crabs and a possible reason for the morphological differences between male and female was explained. The DFO officers were taught how to identify mature and immature female BSC; how to correctly pick up and hold a crab without getting bitten / pinched; how to measure BSC using the BSC FIP HiTec crab measure device (v2.7) and weigh crabs using electronic kitchen scales.

Several female crabs bought were carrying / brooding eggs. A discussion about why it is impossible to prohibit fishermen catching female crabs with eggs and why it is not necessary if the stock status is good was developed while measuring and weighing crabs.

The workshop concluded with a discussion about other species in the district that the DFO might like to begin to manage. Mud crab was the species chosen. A plan to collect weight data from purchasing centres for 2020 and scientific information from the literature was agreed at the end of the workshop. The FIP will follow up on this information and data at the first Fishery Inspector Quarterly Management Meeting. In the meantime T. Sutharshan will work with the FIs and data from 2020, 2019 and 2018 to run LBSPR using the App in the Barefoot Ecologist's Toolbox. A revision session on the data and information and analysis will be conducted by Dr. Creech in the first Fishery Inspector Quarterly Management Meeting (August 2021).

### Images from Day Two (Friday 7<sup>th</sup> May 2021)

