THE CRAWFORD FUND

Master Class report

Methods for assessing data-poor fisheries

MC-688-2015. Crawford WA, Crawford Tasmania, National Crawford (Master Class)
Institut Pertanian Bogor International Convention Center, Bogor, Indonesia
August 24 to 28, 2015

Developers and Trainers:

Neil Loneragan (Murdoch University)
Budy Wiryawan (Bogor Agricultural University/Institut Pertanian Bogor)
Fayakun Satria (Ministry of Marine Affairs and Fisheries)
Adrian Hordyk (Murdoch University)
Vanessa Jaiteh (Murdoch University)
Craig Proctor (CSIRO)

10th March 2016

Table of contents

THE CRAWFORD FUND

Master Class report

1	**Title of Master Class**
	Methods for assessing data-poor fisheries (MC-688-2015)
2	**Goal/ Aim of Master Class**
	The overall aim of the Master Class was to enhance the participants' understanding of approaches for evaluating fisheries where little data on catches or fishing effort are available. Specific aims were to provide participants with the knowledge and skill to: • Use Microsoft Excel and the open-source statistical software R to analyse fisheries data and build per-recruit models; • Develop assessments of levels of sustainable fishing for situations where few data are available using a novel length-based method of assessment; • Identify areas for research that will provide more valuable information to management and policy makers; • Identify ways of obtaining valuable information on fisheries through alternative, complementary methods to data from landings and logbooks; • Enhance understanding of fisher perspectives on fish stocks, management and conservation
3	**When and where was the Master Class conducted?**
	Institut Pertanian Bogor International Convention Center, Bogor Indonesia 24th to 28th of August, 2015.
4	**No of participants and countries represented**
	39 participants, all from organisations in Indonesia (see Appendix 2a).
5	**Presenters (Names and Institutions)**
	Dr Neil Loneragan, Professor of Marine Ecology and Conservation, School of Veterinary and Life Sciences, Murdoch University, 90 South Street Murdoch, Western Australia 6150 N.loneragan@murdoch.edu.au Dr Adrian Hordyk, Research Fellow, School of VLS, Murdoch University. A.hordyk@murdoch.edu.au Mr Craig Proctor, CSIRO Oceans and Atmosphere Flagship, Hobart. c.proctor@csiro.au

	Ms Vanessa Jaiteh, PhD candidate, Murdoch University. Vanessa.jaiteh@hotmail.com Training developed in collaboration with: Dr Budy Wiryawan, Head of the Department of Fisheries Resource Utilisation, Bogor Agricultural University (IPB) and Dr Fayakun Satria, Director of the Institute of Fisheries Enhancement and Conservation and delegate of Professor Dr Hari Eko Irianto, Director of the Fisheries Research and Development Center (formerly Research Center for Fisheries Management and Conservation), Agency for Marine and Fisheries Research and Development, Ministry for Marine Affairs and Fisheries, Indonesia.
6	**Co-Sponsors and organisations providing (in-kind) support**
	Murdoch University Bogor Agricultural University CSIRO Oceans and Atmosphere Flagship Agency of Marine and Fisheries Research and Development, Ministry of Marine Affairs and Fisheries of Indonesia
7	**Expected outcomes and potential benefits to Australia**
	This Master Class builds understanding in Australia of the current research capacity, research issues and priority areas for research and capacity building in Indonesian capture fisheries. The workshop built on previous ACIAR Fisheries funded projects on tuna, Illegal, Unreported and Unregulated fisheries and the development of a strategic plan for Indonesia's capture fisheries. The participants were provided with training on presenting oral and written scientific findings from fisheries by guiding each working group in preparation of a three-slide Powerpoint presentation and an extended written summary of their findings (1,000 words with 4 figures or tables). These exercises on scientific communication helped to consolidate the previous training on analysis of fisheries data and stock assessment for data-poor fisheries. Participants have continued to work on the written extend summary with a designated trainer following the workshop. An example of an extended summary for the Yellowfin tuna working group is given in Appendix 6a and one for the three-slide presentation by the Blue swimmer crab working group is provided in Appendix 6b below. The extended summary provides the basis for the compilation of a workshop proceedings and potential content for the format of a report on Indonesian capture fisheries. The Master Class also provided knowledge on Indonesian capture fisheries, research capacity and effective means of engagement for

	developing more effective plans to enhance the science provided to policy for Indonesian fisheries and aquaculture. This has been identified as a high priority research area by the Agency of Marine and Fisheries Research and Development (AMAFRAD), in the Indonesian Ministry of Marine Affairs and Fisheries. It has also provided the basis for the directions and content of a web site being developed at Murdoch University, built around the new length-based spawning potential ratio method of assessment (http://whatsthecatch.murdoch.edu.au), to promote interactions among researchers on data-poor fisheries and provide information to researchers and undergraduate and postgraduate students on fish biology and fisheries.
7	**Participant's feedback (**Please provide information on the outcomes of the course from the participants point of view and the likelihood of application of skills, including learning in the workplace and transfer of skills, including barriers such as lack of equipment or research facilities**)**
	An evaluation form was provided to all participants on the second last day of the workshop (Appendix 8) and a total of 29 evaluations were completed. The evaluation forms had 13 questions where participants were asked to rate the training from 0 to 5, with 0 representing Not Applicable,1 = very dissatisfied to 5 = very satisfied. These questions were grouped in the categories of: Workshop Concept; Workshop Design; Workshop Instructor; Workshop Results; Self-paced Delivery. An additional four questions asked the participants to tick selected items (1 question) or provide comments or suggestions (3 questions). The mean scores for each of the 13 qualitatively scored questions ranged from 3.83 (for Using the material following the workshop, 4 = agree) to 4.5 for Instructor Helpfulness and Instructor Preparedness, with an overall mean of 4.13. Nineteen of the participants would have liked to have been better informed of the workshop goals and activities prior to the workshop and 7 or 8 would have liked more stimulating material in the workshop and more video content. Eight participants felt that the greatest benefit from the workshop was the training in R and the application of R to studying fisheries biology and completing a stock assessment. "Understanding biological parameters of fisheries that influence the status of fish stocks" was also noted as a benefit. Feedback was also obtained from the Professor Indra Jaya, the Faculty Dean of Fisheries and Marine Science at Bogor Agricultural University (see Appendix 8) and from the non-government organization MDPI* in a post by Deidre Duggan, a participant at the workshop "…Participants gained immensely from this training course. Indonesian fisheries are typically data-poor and the LB-SPR model is highly relevant in this context. Specifically for

	MDPI, the training week highlighted how our data can be analysed and presented to support and inform wider national management activities, such as activities related to Harvest Control Rules. This training workshop is applicable to many Indonesian fisheries, providing valuable tools to support the management of the data-poor fisheries of Indonesia." (see http://www.mdpi.or.id/index.php/our-program/data-collection/item/87-assessing-data-poor-fisheries-training-for-indonesian-fisheries). * - MDPI = Yayasan Masyarakat dan Perikanan Indonesia (Foundation for Community and Fisheries, Indonesia)

Appendix 3. Summary of the Master Class on ""Methods for assessing data-poor fisheries".

A Crawford Fund Master Class on "Methods for assessing data-poor fisheries" was held from 24-28 August 2015 in Bogor, Indonesia about 60 km south of Jakarta. The workshop focused on identifying sources of biological and fisheries data, fisheries assessment using per-recruit models and a new assessment method (the length-based spawning potential ratio - http://whatsthecatch.murdoch.edu.au) and interpreting and presenting the findings from these analyses.

A total of 39 participants, including University staff and postgraduate students, officers in the Indonesian Ministry of Marine Affairs and Fisheries and staff from non-government organisations (WWF, Masyarakat dan Perikanan Indonesia, Conservation International and Wildlife Conservation Society). These methods were applied to eight Indonesian fisheries: Blue-swimmer crabs, Cichlids, Coral grouper, Sardines (lemuru), Lobster, Silky sharks and Yellowfin and Skipjack tuna. Few fisheries have the financial capacity to pay for expensive scientific surveys and stock assessments, let alone facilitate meetings and workshops, which foster understanding and communication between stakeholders. The aim of this master class was to provide participants with an understanding of the general framework of fisheries biology and assessment, with a particular focus on situations where few data are available on fish catches and fishing effort. The Master Class was developed through discussions between Murdoch University, CSIRO, Bogor Agricultural University and the Ministry of Marine Affairs and Fisheries of Indonesia.

The workshop identified some areas of research that will improve assessments for the eight fisheries considered in the workshop and started to collate information on the biology, fishery and management of these species. This information may provide the basis for a reporting system on Indonesian fisheries that once established, would be reviewed on a regular basis.

See Appendix 4 below for photographs of the workshop and http://greentv.ipb.ac.id/?s=training&x=6&y=7 for a video of the workshop with interviews of

Dr Budy Wiryawan, Head of the Department of Fisheries Resource Utilisation at Bogor Agricultural University (formerly the Institut Pertanian Bogor) and Professor Neil Loneragan, Leader of the Environmental and Conservation Sciences in the School of Veterinary and Life Sciences at Murdoch University.

Appendix 4. Photographs of the workshop on "Methods for assessing data-poor fisheries" held at the Institut Pertanian Bogor International Convention Center from August 24th – 28th, 2015. Note that video of the workshop proceedings was taken by IBP Green TV and can be viewed at: http://greentv.ipb.ac.id/?s=training&x=6&y=7 .

Appendix 4: Plate 1. Trainers and participants at the Crawford Master Class on "Methods for assessing data-poor fisheries" held at the Institut Pertanian Bogor International Convention Center from August 24th – 28th, 2015.

Appendix 4: Plate 2. Trainers and participants in working groups at the Crawford Master Class on "Methods for assessing data-poor fisheries" held at the Institut Pertanian Bogor International Convention Center from August 24th – 28th, 2015. Front – Skipjack tuna working group with Dr Fayakun Satria in the foreground; Center left – Cichlid and Lobster working group; Center right – Yellowfin tuna working group; Back left – Coral grouper working group; Not shown: Front right – Silky shark working group; Back Right – Blue swimmer crab working group.

Appendix 4: Plate 3. Trainers and participants in the Silky shark working group at the Crawford Master Class on "Methods for assessing data-poor fisheries" held at the Institut Pertanian Bogor International Convention Center from August 24th – 28th, 2015. Left to right; Rear – starting third from left Vanessa Jaiteh (Murdoch University), Craig Proctor (CSIRO), Neil Loneragan (Murdoch University), Adrian Hordyk (Murdoch University).

THE CRAWFORD FUND

Appendix 5. The Master Class Program for training on "Methods for assessing data-poor fisheries". August 24th – 28th, 2015, IPB International Convention Center

Activity		Instructor
Day 1: Monday, August 24th 2015 – Welcome and Introduction to Excel for a) Fisheries Biology and b) per-recruit assessments (Yield, Spawning stock, Spawning Potential Ratio)		
08:30-09:00	Registration	Committee
09:00-10:00	Welcome ceremony	Committee
	- Speech by Dean of Faculty of Fisheries and Marine Science IPB - Speech by Chairman of committee ➔ Introduce the Instructor - Management, policy and research priorities for Indonesian fisheries - Photo session	- representative from MMAF – Dr Fayakun Satria
10:00-10:30	Snack time	
10:30-11:00	Introduction to Stock Assessment and Per-recruit Models	Prof .Neil Loneragan
11:00-13:00	Computer Exercise - Excel 1 Size, Age compositions, catch curve, maturity at size/age	Prof . Neil Loneragan
13:00-14:00	Lunch	Committee
14:00-14:30	Review of Length based Spawning Potential Ratio model approach and Life History Strategies	Prof. Neil Loneragan/ Dr Adrian Hordyk
14:30-15:30	Yield per Recruit Excel Computer Exercise - Excel 2 Yield, Spawning, Value per Recruit	Dr Adrian Hordyk/ Prof. Neil Loneragan
15:30-16:30	YPR Excel exercise	Dr Adrian Hordyk
16:30-17:00	Welcome reception	Committee
17:00	End of Day 1	

Day 2: Tuesday, August 25th 2015 – Data sources for data-poor fisheries and collation of data for priority data-poor fisheries		
08:30-09:00	Registration	Committee
09:00-09:30	Review of Introduction to Day 1 and parameters for per-recruit assessments	Prof Neil Loneragan
09:30-10:30	Sources of Data and Knowledge for Fish Stocks - landings, fishers, data systems, fisher knowledge	Mr Craig Proctor
10:30-11:00	Snack time and informal discussions	Committee
11:00-13:00	Sources of data and fisher knowledge	Ms Vanessa Jaiteh
13:00-14:00	Break and Lunch	Committee
14:00-15:00	Priority data-poor species for Indonesia: rock lobster, sardines (lemuru), shark, small pelagics, demersal species (snapper/grouper), blue swimmer crab	Group discussion
15:00 -15:30	Collation of biological data for selected species	Working groups with facilitation
15:30-16:00	Snack time and informal discussions	Committee
16:00-17:00	Report back from working groups on biological data and length data for priority species	
17:00	End of Day 2	

Day 3: Wednesday, August 26th 2015 – Use of R in Fisheries Science		
08:30-09:00	Registration	Committee
09:00-09:30	Review Day 2: data sources and biological and length data for priority data-poor fisheries	Prof. Neil Loneragan
09:30-10:30	Introduction to R for Fisheries Science	Dr Adrian Hordyk
10:30-11:00	Snacks and informal discussions	
11:00-13:00	R for fish biology - Size, Age compositions, catch curve, maturity at size/age (Repeat of Excel 1 in R)	Dr Adrian Hordyk
13:00-14:00	Break and Lunch	Committee
14:00-15:30	Per-recruit models in R, calculation of SPR and application of SPR to management	Dr Adrian Hordyk
15:30-16:00	Snack break – informal discussions	
16:00-17:00	Application of R to priority species in working groups	
17:00	End of Day 3	Committee

Day 4: Thursday, August 27th 2015 – Length based spawning potential ratio assessment for data-poor fisheries		
08:30-09:00	Registration	Committee
09:00-09:30	Overview of results from group analyses	
09:30-10:30	Influence of data on parameter estimation - *Presentation and exercise*	Dr Adrian Hordyk/Prof. Neil Loneragan
10:30-11:00	Snack time	
11:00-13:00	- Stock assessment framework for management decisions (Harvest control rules and SPR performance measures and targets) - Introduction to Length-based Spawning Potential Assessment Model and application to example data	Dr Adrian Hordyk
13:00-14:00	Lunch	Committee
14:00-15:30	- Application of LB-SPR model to priority data-poor species - Exploration of data quality on parameter estimates and model results	Dr Adrian Hordyk/working groups
15:30-16:00	Snack time	
16:00-17:00	Reports from groups on priority species	Working groups
17:00	End of Day 4	Committee

Day 5: Friday, August 28th 2015 – Presenting findings of fisheries science		
08:30-09:00	Registration and snack time	Committee
09:00-11:00	- Introduction to writing summary of key findings - working groups to write summary of key findings and implications for management	Prof. Neil Loneragan/ working groups
11:00-13:30	Break and Lunch	Committee
13:30-15:30	- Introduction to presenting scientific writing in papers - Working groups to develop list of Figures and Tables for their analyses and their format	Prof. Neil Loneragan
15:30-16:00	Closing ceremony by chairman oranising committee	Committee
16:00-16:30	Snack time and the end of 5th day	Committee
18:30-21:00	Farewell dinner	

Appendix 6. Examples of an extended summary and a three-slide Powerpoint presentation developed by two of the working groups at the Crawford Fund Master Class on "Methods for assessing data-poor fisheries".

Appendix 6a. Extended summary produced by the Yellowfin tuna working group following the Crawford Master Class "Methods for assessing data-poor fisheries" held at the Institute Pertanian Bogor International Convention Center from August 24th – 28th, 2015. Summary produced with editing and revision suggestions provided by Craig Proctor and Neil Loneragan.

An assessment of selectivity in catches of yellowfin tuna by small-scale handline fisheries in Indonesian archipelagic waters.

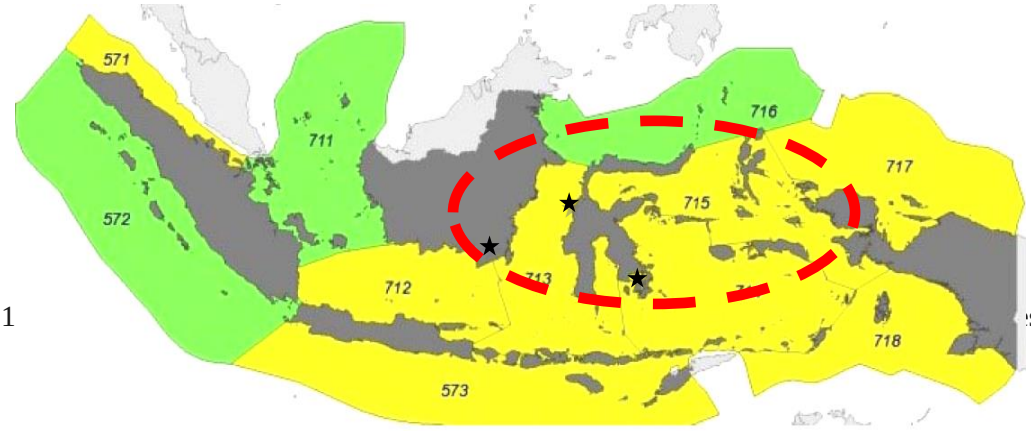
Shinta Yuniarta[1], Deirdre Duggan[2], Heri[3], Tita Nopitawati[3], Naslina Alimina[4], Rini Kusumawati[4], Nandana Godjali[2], Fajiri Wiranata[4], Agus Budiman[3]
[1]Wageningen University, The Netherlands, [2]Masyarakat dan Perikanan, Indonesia, [3]Asosiasi Perikanan Pole and Line dan Handline Indonesia, [4]Insitut Pertanian Bogor, Indonesia

Yellowfin tuna (YFT), *Thunnus albacares*, are a migratory, pelagic species, found in tropical and temperate seas worldwide and are one of the largest species of Scombridae, with a maximum reported length of ~240 cm FL (IGFA 2001). Both juveniles and adult *T. albacares* are known to school around Fish Aggregating Devices, FADs, resulting in increased catchability and generating concerns about over-fishing and sustainability. YFT is an important marine capture species and has a high economic value. Sibert *et al* (2006) reported an increase in catches from 1950-2010 for yellowfin tuna in the Pacific Ocean, with a total estimated value in 2008 of US$5 billion. However, an 8% decline in catches in 2010 from 2009 has been reported (ISSF, 2012). Indonesia is ideally located between the waters of the Indian and Pacific Oceans, through which many tuna species migrate. Large catches of commercially important tunas, including yellowfin, occur in Indonesian archipelagic waters, including in Fisheries Management Areas (FMAs) 713, 714 and 715, contributing to a multi-billion dollar Indonesian tuna industry (Figure 1).

YFT are caught in Indonesian waters using large, medium and small purse seiners, pole and line, long line and handline. Small-scale handline activities are an important component of Indonesian tuna fisheries. Despite catching a small proportion of the total catch, these fisheries provide an important source of food and livelihood option in small, remote communities (reference). Regulations and data sampling activities exist within Indonesia but small-scale handline fisheries are sometimes neglected and consequently there is a paucity of data on the catches from handline fisheries.

The data were collected from 2012 to 2015 by Masyarakat Dan Perikanan Indonesia (MDPI) enumerators using a port sampling protocol, focusing on handline vessels <30 GT and with a sampling target of 20% of all landing events at a landing site. The data were collected from Lombok (Nusa Tenggara Timur), Kupang (West Timor) and Bone (South Sulawesi), and were assessed by FMAs 713, 714 and 715 (Figure 1). The sampling coverage

of the data is ~2-3% of all Indonesian handline activities. The fork lengths (FL) of all YFT > 10 kg and a random sub-sample of YFT <10 kg were measured. The length data were analyzed using R software to plot a length frequency histogram. Estimates of the Spawning Potential Ratio (SPR) were calculated using the online Length Based-SPR assessment resource of Murdoch University (www.whatsthecatch.murdoch.edu.au) (Hordyk et al. 2015a, b; Prince et al. 2015).

Figure 1 

st to

The length frequency distribution for all fish measured (*n*= 48,453, Figure 2) shows the high frequency of catch of small fish. In the four years of data combined, 70% of the catch was below the length-at-first-maturity (L_m), with the majority of fish in the size range 30-50 cm FL. A literature review on L_m of YFT resulted in a range of values between 106 and 112 cm FL for fish taken by longline gear in the western Pacific (Sun and Yang, 1983) or 110-120 cm in the western and central Pacific (Yuen and June, 1957). In this case, the L_m value of 103.3 cm was taken from www.fishbase.org (accessed on August 27th, 2015). About one-third of the sampled yellowfin tuna were mature (Figure 2). There is a noticeable gap in the length frequency distribution in the size range 60-100 cm, with a slight peak again at 110-120cm. The range of lengths in the samples varied across years: 11-199 cm FL for 2012, 18-199 cm FL for 2013, 15-178cm FL for 2014 and 11-165cm FL for 2015.

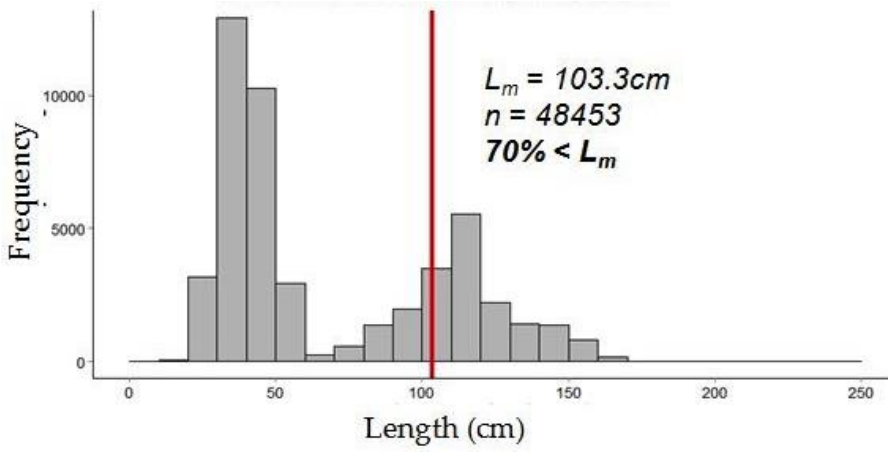


Figure 2. Length frequency distribution of YFT sampled from the small-scale handline fishery in

FMAs 713, 714, and 715 during 2012 - 2015.

The SPR estimates decreased across the years (Figure 3). The limit and target reference points were taken as 0.2 and 0.4, respectively, based on Western and Central Pacific Fisheries Commission (Willams and Terawasi 2009) advice for this stock in this region. In 2014 and 2015 the SPR was below the limit reference point and was never at or above the target reference point in any year.

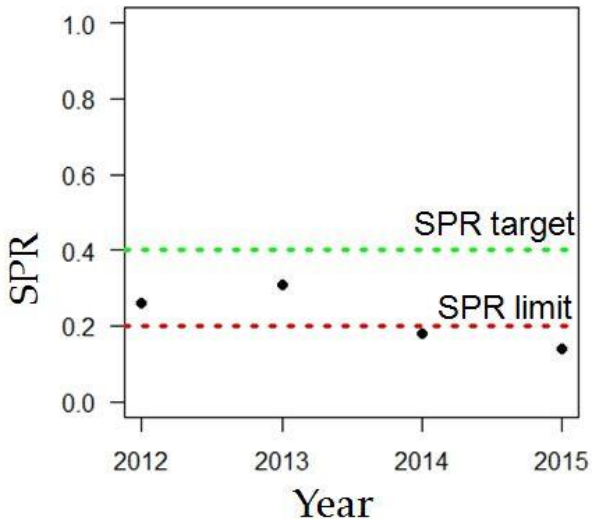


Figure 3. Spawning Potential Ratio (SPR) per year of sampling of YFT.
Target and limit reference points highlighted by the green and red lines, respectively.

Small-scale handline fisheries catch small tunas in Indonesian archipelagic waters by surface troll-line as well as by surface-handline. This could explain why there are large catches of small, immature individuals in the data. There are a number of reasons for relatively small number of fish in the length distribution between 60-100cm FL. It is thought that fishers may discard 60-100 cm fish to retain space on board for >100cm fish. Another possible reason for the gap is that 60-100 cm fish are not commonly caught on FADs at the surface or near surface. Furthermore, the local markets have a demand for small individuals, which are easy to transport. The export markets have a demand for the larger individuals. There may not be a demand for individuals 60-100cm, resulting in the fishermen adjusting fishing behaviour to avoid catches of such sized individuals. The decrease in the frequency of individuals caught >120cm may be expected because of fewer individuals surviving to larger sizes.

Preliminary application of SPR target and limit reference points to the dataset of length-frequency for YFT in FMAs 713, 714 and 715 suggest that fishing mortality caused by the handline fishery in 2014 and 2015 was too high. It is estimated as many as 70% of fish landed in this fishery were below length at maturity and did not have opportunity to spawn. It is likely the YFT stock is progressing towards an overfished state, with reduced potential to reproduce at a level that can sustain the current fishing intensity.

We argue that this research is important in improving the management of YFT in

Indonesian archipelagic waters. This study has demonstrated the scale of catch of juvenile YFT by small-scale handline fisheries in central and eastern Indonesia. To achieve improved management, similar assessments of selectivity are required for the other gear types that target YFT in Indonesia's archipelagic waters. Investigating the catch effects of different hook sizes and biologically- and economically-driven selectivity approaches are suggested as future areas of research. Outcomes from such research could support management measures to help rebuild the YFT stock in FMAs 713, 714 and 715, whilst simultaneously supporting livelihoods.

References:

Hordyk A., Ono, K., Sainsbury, K., Loneragan, N.R., Prince, J.D. 2015a Some explorations of the life history ,ratios to describe length composition, spawning-per-recruit, and the spawning potential ratio. *ICES Journal of Marine Science* 72: 204-216.

Hordyk A., Ono, K., Valencia SR, Loneragan, N.R., Prince, J.D. 2015b. A novel length-based empirical estimation method of spawning potential ratio (SPR), and tests of its performance, for small-scale, data-poor fisheries. *ICES Journal of Marine Science* 72: 217-231.

IGFA. 2001. Database of IGFA angling records until 2001. IGFA, Fort Lauderdale, USA.

International Seafood Sustainability Foundation (ISSF).2012.ISSF stock status rating-2012; Status of The World Fisheries for Tuna. Technical Report 2012-04, United stated of America.

Prince, J.D., Hordyk, A., Valencia, S.R., Loneragan, N.R., Sainsbury, K.J. 2015. Extending the principle of Beverton-Holt Life History Invariants to develop a new framework for borrowing information for data-poor fisheries from the data-rich. *ICES Journal of Marine Science* 72: 194-203.

Sibert, J., Hampton, J., Kleiber, P. and Maunder, M. 2006. Biomass, size, and trophic status of top predator in Pacific Ocean. Science, Vol. 314, pp. 1773 – 1776 .

Sun, C. L. and R. T. Yang. 1983. The inshore tuna longline fishery of Taiwan— fishing ground, fishing seasons, fishing conditions and a biological study of the major species, yellowfin tuna, 1981-82. *J. Fish. Soc. Taiwan*, 10(2):11-41.

Williams, P. and Terawasi, P. 2009. Overview of tuna fisheries in the western and central Pacific Ocean, including economic conditions – 2008. WCPFC Scientific Committee in Regular Session August 10-21 2009, Port Vila, Vanuatu.

Yuen, H.S.H., and F.C. June. 1957. Yellowfin tuna spawning in the central equatorial Pacific. Fish. Bull. U.S. Fish. Wildl. Serv., 57 (112) : 251–64

THE CRAWFORD FUND

Appendix 6b. Three-slide Powerpoint presentation produced by the Blue swimmer crab working group during the Crawford Master Class "Methods for assessing data-poor fisheries" held at the Institute Pertanian Bogor International Convention Center from August 24th – 28th, 2015.

LB SPR of Blue Swimming Crab (*Portunus pelagicus*) in Belitung

Tri Ernawati , Reggy Fiji A, Ronny Wahju

THE CRAWFORD FUND

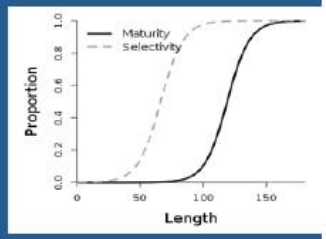
BACKGROUND AND METHODS

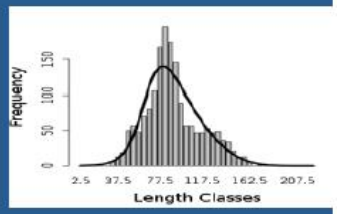
Background:

- The blue swimming crab resources in the surrounding Belitung waters has been done a lot and continously as a livelihood resource
- Intensive utilization of BSC can reduce availability of stock.

Methods :

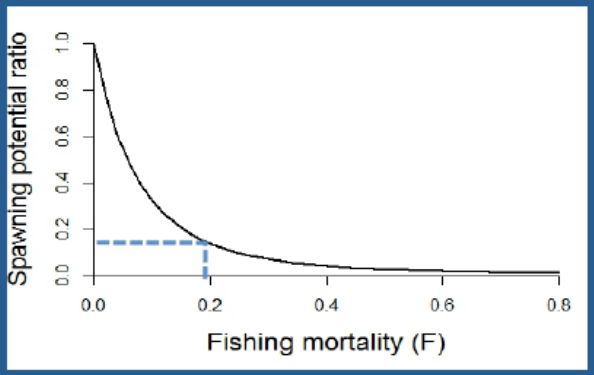
- Estimation of biological parameters of blue swimming crab
- Belitung during February - November 2014
- Collecting data from Traps &Gillnet fisheries
- The total 1699 of female crabs were analyzed
- Von Bertalanffy model
- R software

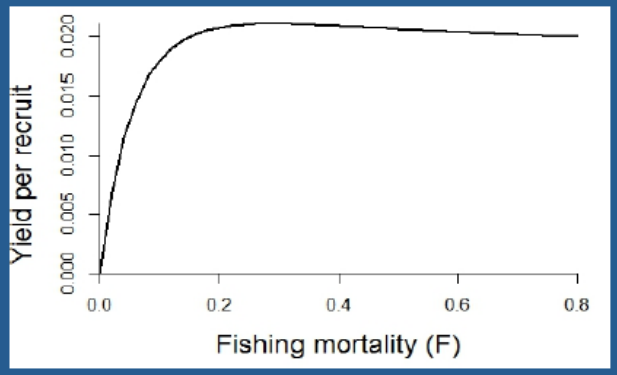




THE CRAWFORD FUND

F/M	M/k	Linf	L50	L95	SL50	SL95	SPR
1.14	1.4	180.2	119	145	66.2	92.6	14%





Management:

A precautionary approach is required in the management (effort control) and the other alternatives is provide the minimum legal size for BSC

THE CRAWFORD FUND

PO Box 4477
Kingston ACT 2604

+61 2 6188 4370
Crawford@crawfordfund.org
www.crawfordfund.org

Appendix 7: Workshop evaluation form completed by 29 participants in the Crawford Master Class "Methods for assessing data-poor fisheries" held at the Institute Pertanian Bogor International Convention Center from August 24th – 28th, 2015. Form is the generic workshop form provide by the Centre for Univeristy Teaching and Learning at Murdoch University.

WORKSHOP EVALUATION QUESTIONNAIRE

(Name of Workshop)

(Name of Presenter)

Training Location: _____

Participant Name (optional): _____

Date: _____

Job Title: _____

Years in present position? <1 1-3 4-5 5+

INSTRUCTIONS

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale:

1 = "Strongly disagree," or the lowest, most negative impression
2 = "Disagree," or the lowest, most negative impression
3 = "Neither agree nor disagree," or an adequate impression
1 = "Strongly disagree," or the lowest, most negative impression
5 = "strongly agree," or the highest, most positive impression

Choose N/A if the item is not appropriate or not applicable to this workshop. Your feedback is sincerely appreciated. Thank you.

WORKSHOP CONTENT (Circle your response to each item.)
1=Strongly disagree 2=Disagree 3=Neither agree nor disagree
4=Agree 5=Strongly agree N/A=Not applicable

1.	I was well informed about the objectives of this workshop.	1	2	3	4	5	N/A
2.	This workshop lived up to my expectations.	1	2	3	4	5	N/A

3. The content is relevant to my job. 1 2 3 4 5 N/A

WORKSHOP DESIGN (Circle your response to each item.)

4. The workshop objectives were clear to me. 1 2 3 4 5 N/A

5. The workshop activities stimulated my learning. 1 2 3 4 5 N/A

6. The activities in this workshop gave me sufficient practice and feedback. 1 2 3 4 5 N/A

7. The difficulty level of this workshop was appropriate. 1 2 3 4 5 N/A

8. The pace of this workshop was appropriate. 1 2 3 4 5 N/A

WORKSHOP INSTRUCTOR (FACILITATOR) (Circle your response to each item.)

9. The instructor was well prepared. 1 2 3 4 5 N/A

10. The instructor was helpful. 1 2 3 4 5 N/A

WORKSHOP RESULTS (Circle your response to each item.)

11. I accomplished the objectives of this workshop. 1 2 3 4 5 N/A

12. I will be able to use what I learned in this workshop. 1 2 3 4 5 N/A

SELF-PACED DELIVERY (Circle your response to each item.)

13. The workshop was a good way for me to learn this content. 1 2 3 4 5 N/A

14. How would you improve this workshop?(Check all that apply.)

___Provide better information before the workshop.
___Clarify the workshop objectives.
___Reduce the content covered in the workshop.
___Increase the content covered in the workshop.
___Update the content covered in the workshop.
___Improve the instructional methods.
___Make workshop activities more stimulating.
___Improve workshop organization.
___Make the workshop less difficult.
___Make the workshop more difficult
___Slow down the pace of the workshop.
___Speed up the pace of the workshop.
___Allot more time for the workshop.
___Shorten the time for the workshop.
___Improve the tests used in the workshop.
___Add more video to the workshop.

15. What other improvements would you recommend in this workshop?

16. What is least valuable about this workshop?

17. What is most valuable about this workshop?

Are you interested in receiving other educational materials/workshops from [your organization or partner name here] or e-mail updates about this project? Yes No

If so, please write your name, address, e-mail, phone number, and the subject(s) and grade level(s) you work with most.

THE CRAWFORD FUND

Appendix 8. Feedback letters:
Appendix 8a) from the Faculty Dean of Fisheries and Marine Science at Bogor Agricultural University on the Crawford Master Class "Methods for assessing data-poor fisheries" held at the Institute Pertanian Bogor International Convention Center from August 24th – 28th, 2015.

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
INSTITUT PERTANIAN BOGOR
FAKULTAS PERIKANAN DAN ILMU KELAUTAN
Kampus IPB Dramaga, Jl. Agatis, Bogor 16680 Jawa Barat
Telp. (0251) 8622909 - 8622911, Fax (0251) 8622907, Email : fpik@ipb.ac.id

Prof. Neil Loneragan

Professor of Marine Ecology and Conservation, Councillor Asian Fisheries Society Leader, Environmental and Conservation Sciences, School of Veterinary and Life Sciences Murdoch University South Street, Murdoch, Western Australia 6150 08 9360 6453

Re: Benefit of Training on Fishery Assessment by Murdoch University

As an implementation of Memorandum of Understanding between Bogor Agricultural University (IPB) and Murdoch University signed in 2014, a Training on Fishery Assessment has been conducted between 24-28 August 2015. As we know that Indonesian fisheries are typically data-poor and the LB-SPR model is highly relevant in this context. Therefore, We would like to thank you to Murdoch University, Crawford Foundation, ACIAR and CSIRO for collaboration in the aforementioned training.

We found the Training is very beneficial for our Post Grad Student and Lecturers who participated in that Training. We understand that one of method, developed by scientists at Murdoch University in Australia, namely the Length-Based Spawning Potential Ratio Model (LB-SPR) is a new approach to addressed one of the problems in Fisheries Management. The LB-SPR model uses life history and size composition data to assess a stock. The Spawning Potential Ratio (SPR) is the proportion of unfished reproductive potential that remains after fishing, which is higher than reproductive capacity of the stock, as sustainable fish stock. Life history data includes parameters such as Natural Mortality (M), Length at fist maturity (Lm), etc.

As a result of Training, it seems that the method applied on LB-SPR have attracted quite a lot of attention by Students and Lectures who participated in the Training to apply this new approach in their research. Participants from Bogor Agricultural University (IPB) gained a lot of experiences from this training course, especially when they joined in the focus group discussion. Specifically for IPB, the training week highlighted how our data can be analysed and presented to support and inform wider national management activities, such as activities related to Harvest Control Rules.

This training workshop is very useful for better managing Indonesian fisheries, indicated by the enormous participant who like to joint and actively involved in this training. Therefore, our institution are always welcome to continue collaboration with Murdoch University for advancing the training in the future.

Best Regards,

Prof. Indra Jaya.

KAN Komite Akreditasi Nasional Lembaga Sertifikasi Sistem Mutu

Administrasi Pendidikan
LSSM-002-IDN
Certificate No.:QSC 01146
ISO 9001 : 2008

THE CRAWFORD FUND

Appendix 8b) Feedback letter from the Faculty Dean of Fisheries and Marine Science at Bogor Agricultural University on the Crawford Master Class "Methods for assessing data-poor fisheries" held at the Institute Pertanian Bogor International Convention Center from August 24th – 28th, 2015.

MINISTRY OF MARINE AFFAIRS AND FISHERIES
AGENCY FOR MARINE AND FISHERIES RESEARCH AND DEVELOPMENT
CENTER FOR FISHERIES RESEARCH AND DEVELOPMENT
Kompleks Bina Samudra, Gedung Balitbang KP II
Jl. Pasir Putih II, Ancol Timur, Jakarta Utara 14430
Phone : (021) 64700928, Facsimile: (021) 64700929
LAMAN : WWW.KKP.GO.ID POS ELEKTRONIK : sesprikapuslitbangkan@gmail.com

November 16th , 2015

Ref. No : 1783/BALITBANGKP.1/KS.230/XI/2015

Dear Prof. Neil Loneragan,

I would like to congratulate you and team for the successful workshop "Methods for assessing data-poor fisheries" which was held on last August 24th to 28th, 2015. As I understand the workshop was funded by the Crawford Fund Master Class program, conducted by Murdoch University upon collaboration with CSIRO, Bogor Agricultural University and the Center for Fisheries Research and Development.

The significant outcome among other from the WS has enhanced capacity of participants in making scientific reporting, particularly in understanding the stock assessment methods for fisheries with few data.

Skill and knowledge gained included are applying to the selected fisheries to estimate Target and limit reference points using Length based spawning potential ratio LB-SPR methods. i.e. tuna fishery (Skipjack tuna and Yellowfin tuna), Swimming blue crab, Cichlids, Coral grouper, Lobster, Sardines (Lemuru) and Silky sharks.

Any other follow up for the work shop is most welcome, looking forward for other fruitful collaboration.

Sincerely yours,

Prof Dr. Hari Eko Irianto
Director