

PILOT PROJECT* ON THE USE OF INDICATORS FOR THE SUSTAINABLE DEVELOPMENT IN CAPTURE FISHERIES WITH FOCUS ON THE DEMERSAL TRAWL FISHERY OF BRUNEI DARUSSALAM

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Introduction

The fisheries sector plays an important role in the economy of the country. The fisheries of Brunei Darussalam contributes about 0.12% in the GDP and is targeting a greater contribution by optimizing its annual potential of about 21,000 tonnes with the value of B\$ 112 million. In this project, the demersal trawl fishery is chosen for the indicators study, although a number of sectors (not only trawlers) are also involved in the study of indicators of sustainable development.

The demersal fishing ground of Brunei Darussalam is one of the smallest in the region. This area is further decreased by the presence of the oil structures and reef areas sharing the entire continental shelf. The trawlers generally operate in Zones 2 and 3 of the fishing zones set by the Department of Fisheries. Zone 2 covers an area from 3 nautical miles from the coastline up to 20 nm while Zone 3 extends from 20nm to 45nm from the shoreline. The trawlable area covers about 4,600 km² or about 12% of the total water area of EEZ. At present there are 18 trawlers operating in Zone 2 and 3 trawlers in Zone 3. They are using otter trawl nets with the vessel engine capacities of between 180-350 hp and between 350 400 hp in Zone 2 and 3 respectively. In 2002, the Department of Fisheries enforced the use of cod end of mesh size of 51mm for all trawlers, with the aim to reduce bycatch by at least 18%. The trawling labour force, of about 105 crew members, is dominated by the foreigners mainly from Indonesia, Malaysia and the Philippines.



Figure 1: Fishing Zones of Brunei Darussalam

The Trawl Fishery

Species Caught

The species caught by the trawlers are generally demersal but due to the development of the gear, they catch some pelagics as well. Overall the catch is dominated by small and unmarketable species such as leiognathids and juvenile fishes that are usually discarded at sea. About 30% of the total catch from trawlers consists of various species of leiognathids. Other species groups include Mullidae, Nemipteridae, Sciaenidae, Carangidae, Synodontidae, Ariidae, Gerreidae and many others in smaller percentages.

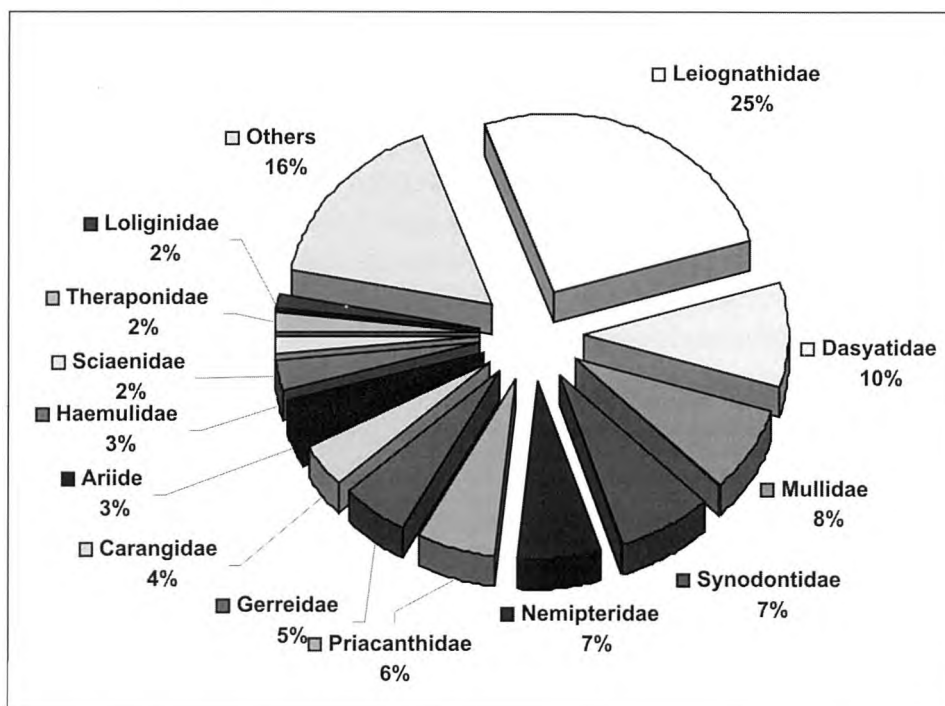


Figure 2: Catch composition of landings of commercial trawlers in Muara

Status of Fishery

Recently the performance of commercial trawlers was observed to be way below expectations with the annual fish production of only 2,788 tonnes in 2003 versus the estimated trawl Maximum Sustainable Yield (MSY) of about 3,500 tonnes. The catch per unit effort (CPUE) from the trawlers had shown a continuous decline causing an alarm not only to the operators but also to the consumers and the authorities.

Table 1 shows the CPUE had declined steadily since 1995 from 1.12 tonnes/day to 0.64 tonnes/day in 2001 and further declined to 0.57 tonnes/day in 2003. It was also found that the fishing effort in terms of the number of days and number of trawlers increased but yielded less catch in the previous years.

Table 1: Annual CPUE of commercial trawlers from 1993 to 2003

Year	Number of trawlers	Production (mt)	Effort (days)	CPUE (mt/day)
1993	16	2,845.0	2,300	1.24
1994	17	2,975.4	3,177	0.94
1995	17	3,295.5	2,931	1.12
1996	23	3,822.8	4,016	0.95
1997	24	4,229.8	4,471	0.95
1998	22	4,104.8	4,735	0.87
1999	23	3,009.4	4,775	0.63
2000	23	3,366.9	4,653	0.72
2001	25	3,587.6	5,645	0.64
2002	25	2,720.0	4,358	0.65
2003	18	2,788.0	4894	0.57

Investigation showed that some indicator species of overexploitation are showing up such as the decrease in some species such as the pomfrets, croakers, lizardfishes *etc.*

Steps had been taken to overcome the situation by imposing the moratorium on the issuance licenses for commercial trawlers starting from the year 2001. During the period of the moratorium, there will be no increase in trawl licenses from the present number (quota) and any licenses revoked will not be replaced/offered to the new comers. Similarly, the Department of Fisheries will conduct close monitoring of the performance of the trawlers and continuous stock assessment through resource surveys are being carried out. In order to enhance the resources and create alternative fishing grounds to the fishermen, the Department of Fisheries has been actively deploying a number of artificial reefs since 1985.

Pilot Project Implementation

The project was started in September 2003 where the project team was firstly formed to carry out the study. The project proposal was refined by focusing on the important aspects of the pilot study such as the identification of possible indicators of sustainable development from the trawl fishery and how it will be used. Due to the late implementation, the project is scheduled to be completed by September 2004. The main objective of the pilot project is to achieve sustainable development in capture fisheries using indicators as a tool that provides information on the condition and status of fisheries resources.

Fisheries Management Plan

To start with, the fisheries management plan has been formulated as a directive approach to this project involving the Department and also the stakeholders who play a vital role in capture fisheries.

The goal of marine capture fisheries in Brunei Darussalam is to develop the marine fisheries towards the maximum economic yield. This goal is to be achieved through the formulation and implementation of the management strategies to increase the productivity, resource sustainability and equal share among the fishers. In general the objectives of the management are: -

- ☞ Increase the marine resource productivity through resource enhancement programs;
- ☞ To promote the usage of the selective fishing gears and environmentally friendly gears in minimizing the wastage of under-size fish;
- ☞ To fully exploit the marine resources up to 21,000 tonnes and at sustainable level;
- ☞ To protect the nursery and breeding grounds through the establishment of marine protected areas; and
- ☞ To promote equal share of marine resources between the small-scale and the commercial fisheries.

Currently, some measures to mitigate the decline in the production and losses to trawl fishing operations are being undertaken by the Department of Fisheries. These includes the limited number of licenses to the trawl fishery, mesh size regulations, zonation for fishing grounds and encouraging the trawlers to shift to pelagic fishing such as purse seine and long line operations. On top of that, the law enforcement capabilities of the Department have been strengthened to prevent the exploitation of the resources by illegal fishing practices.

Before meeting with the stakeholders, the indicators for the sustainable development were first identified and selected.

Generally, the fishing operation data, which are used as indicators, are recorded in the logbook distributed to all commercial fishing vessels and to be submitted monthly to the Department. The collection of the catch data, which includes the length and species composition, is done during regular port sampling and onboard sampling as required. To fill up the information gap, new data are proposed to be collected which include:

- (i) ***Net return indicators***
 - ☞ Profit-rent
 - ☞ Net return/investment
- (ii) ***Investment indicators***
 - ☞ Market and replacement values
 - ☞ Depreciation
 - ☞ Fleet age composition
- (iii) ***Catch structure indicators***
 - ☞ Number of spawners

The fisheries management plan including the identified indicators was then discussed with the stakeholders in order to get their response and most of all, to encourage the active participation in developing the capture fisheries towards the maximum economic yield. It was also emphasized to seek cooperation from the stakeholders to provide the information requested such as production, the revenue, expenditure and so forth to be used as indicators in trawl fishery. The stakeholders were selected by fishing gear, in this case the trawl and by fishing zone. Out of 18 stakeholders from Zone 2 who were invited, only nine responded while all the three stakeholders from Zone 3 attended. A total of 12 stakeholders participated at the meeting. The proposed indicators were discussed and the following are indicators being accepted by the stakeholders.

Table 2: The list of proposed indicators agreed/disagreed by the stakeholders

Proposed indicators	Indicators agreed/disagreed
1. Harvest indicators	
1.1 Landings or catch	
1.2 CPUE	/
1.3 Value of landings	/
2. Fishing effort indicators	
2.1 Number of fishing boats	/
2.2 Fishing time (operational days)	/
2.3 Number of fishers	/
3. Harvest capacity indicators	
3.1 Gross tonnage and Horse power	/
4. Net return indicators	
4.1 profit-rent	X
4.2 net return/investment	X
5. Catch structure	
5.1 Catch composition	/
5.2 length or size composition	X
5.3 Number of species	/

It was found most stakeholders were reluctant to furnish the information on the profit-rent and net return/investment due to confidentiality, while collecting data on length and species composition consume time and additional manpower. However after the consultation, most stakeholders agreed to reveal the information regarded as confidential through personal interviews while in collecting the length and species composition, the staff of the Department will be dispatched for this purpose. From time to time basic training will be conducted for the crew. Generally, the stakeholders agreed to cooperate in data collection. Moreover submission of monthly logbooks is compulsory for all the commercial fishing vessels.

Results

Generally, the trend of the trawl fishery for the past of five years can be seen from the Table 1 covering the production (tonnes), effort (number of days) as well as the CPUE. However since the pilot project is still being conducted, preliminary results or finding have not been reached. In view of this, we have some shortcomings on how to go about the pilot project primarily in the absence of a concrete guideline to follow. Thus we resorted on looking for references from FAO for guidance. The data collected is analyzed using the designed database, however, the quality and timeliness of recorded data need to be improved. This could be sorted out through frequent meetings with the stakeholders to seek their commitment and support for the Department's program.

Constraints

In implementing the pilot project some of the constraints encountered are as follows: -

- ☞ There were constraints for the technical staff to go onboard for data collection as in the case of length and species composition due to other commitments. Often, the data collected have to be left to the crew causing some data to be doubly recorded.
- ☞ Since the pilot project has been delayed for quite sometime, the meeting with the stakeholders had to be conducted in an *ad hoc* manner, resulting in misconception and misunderstanding to the whole objective of this project. This also resulted in less response in the provision of additional information upon requested.
- ☞ Lack of knowledge and guidelines on the usage of the indicators for management purposes among the technical staff.

Proposed Solutions

In rectifying the above constraints, the following are the solutions: -

- ☞ Establish a proper mechanism for collection and analysis of data. The importance of indicators need to be clarified not only to the technical staff but also to the stakeholders involved;
- ☞ Provide intensive training and consultation on the use of indicators for the management purposes; and
- ☞ Promote active participation of the stakeholders in supporting the project, through road shows, consultation and so forth.

Conclusion

- ☞ The project is still on going, hence the results of the analysis are just preliminary
- ☞ The project requires more time to analyse the data as required.

*** Appendix 1: Project Information**

Technical Project Officer	:	Dy. Ranimah Hj A. Wahab
Project Team Members	:	Hjh Noorizan Hj Abd. Karim Idris Hj Abd. Hamid Mr. El A. Cinco Mohammad bin Mail
Date of project initiation	:	September, 2003
Planned project duration	:	One (1) year