



## Using Indicators for the Sustainable Development and Management of Fisheries in the ASEAN Region

by *Phaik-Ean Chee*

### Introduction

The 'Identification of Indicators for Sustainable Development and Management of Capture Fisheries' is one of the projects formulated under the Special Five-Year Programme of SEAFDEC to support ASEAN Member Countries in the implementation of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region adopted at the Millennium Conference in November 2001. This has already been discussed in articles in two previous issues of *Fish for the People*. This article aims to describe the current implementation of case studies across the region.

The state of fishery resources in the ASEAN region is now compelling Member Countries to seek immediate options to better manage their resources. Alternative methodologies for the assessment of these resources are required that should not depend solely on the use of costly time consuming scientific biological assessment models. Fisheries assessment methodologies that are valid and acceptable to stakeholders, and that are cost-effective and feasible, should be developed to produce knowledge to support management on a sustainable basis.

Yet in developing countries, there is still a need to

identify appropriate and relevant indicators to meet the requirements of national fisheries policies, bearing in mind the complexities of the resource base and the limitations of the institutions responsible for fisheries management. A mechanism for the introduction of the use of sustainability indicators in fisheries development and management has to be put in place.

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The use of indicators of sustainability is a tool to monitor and control the development of fisheries in ASEAN. Such indicators should be developed and used by relevant national management authorities. To use indicators in alternative management regimes such as rights-based fisheries effective, one has to gain the active participation of stakeholders. Selection of indicators should be based on available data and information, and indicators should be kept practical, simple, applicable, and cost-effective, but at the same time, scientifically valid and supported by time series data. This could also be achieved following the technical guidelines proposed by FAO.

frameworks. The development and application of a set of rules and regulations that govern the behaviour of fishers is required since compliance has to be evaluated. These should be outlined in management plans.

For the development of a management plan for a proposed pilot study, a fishery first has to be identified. It is proposed that a fishery that is small, rather localized and selective and involving a small fishing community, be selected. This fishery should be legal and subject to management measures.

During the initial phase, effort should be made to compile available information on the fishery to be studied. A profile workshop involving stakeholders of the selected fishery for the pilot study should be organised. Owing to the general low level of education of fishers in Southeast Asia, the management authority must play a very active role in compiling all existing and current information on the selected fishery (such as description and status of the fishery, and current management measures implemented) and document the information that must finally be presented back to the stakeholders for discussion. During this discussion, the stakeholders should be brought to understand the need for fisheries management. Current issues within the fishery that have not been addressed should be raised by the stakeholders.

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The fishery manager should then organize sessions to draft the plan guided by the discussions and issues

raised at the first meeting with stakeholders. The initial structure of the plan should be developed thereafter. Most importantly, the plan should focus on achievable objectives and on mechanisms for the regular review of the plan. Indicators should link defined objectives with management actions, and specific indicators should be identified to evaluate the effectiveness of the plan and management measures. These will provide the feedback necessary for further improvement of the plan. This review should also include the effectiveness of agreed indicators as well as agreement by the stakeholders to provide the necessary data on indicators.



The draft plan should be circulated to stakeholders for comments at another consultation. Comments by stakeholders can again be incorporated into the plan. Then, the final draft of the plan should be accepted for implementation in the pilot study. Both the draft management plan and the development of the process in the formulation of the plan should be part of the final output of this pilot study, as emphasized by FAO.

### **Implementation of pilot projects in SEAFDEC Member Countries**

After more than a year of pilot project implementation, a Second Regional Technical Consultation on the use of indicators was held in March 2004, as presented in the last issue of Fish for the People, during which the progress of the project implementation and the preliminary results were discussed. These are presented as follow.

#### **Brunei Darussalam**



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## **A Proposal for the implementation of pilot studies on indicators**

At the SEAFDEC-FAO Regional Workshop on the Management of Fishing Capacity, held in Penang in November 2000, the introduction and review of definitions of resource indicators was recommended. The Workshop also suggested that simple indicative assessments, based on existing information to identify minimum data requirements for monitoring, be immediately undertaken. During the more recent First Regional Technical Consultation on the Use of Indicators for the Sustainable Development and Management of Capture Fisheries in the ASEAN Region, held in September 2002, a proposal was made to help ASEAN Member Countries to make practical use of indicators for fisheries management, in particular for the management of specific fisheries at specific sites.

This proposal included initial project formulation, data collection, analysis and interpretation for five pilot studies on indicators. It was anticipated that the type of data to be collected would be governed largely by the conditions and the management measures implemented for the particular fishery targeted. The mechanism for data collection should ideally be contained or built into existing routine statistical collection networks, which could take into consideration management objectives and requirements. Research support for data collection and the corroboration of results is required, through activities such as the taxonomic identification of species, the standardization of fishing efforts, and the collection of biological information on selected species.

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While such an approach may be followed in most cases, the choice of data to be collected depends on

agreement with the relevant stakeholders of the fishery, since the use of indicators should be understood, accepted and supported by stakeholders. Appropriately selected indicators should help in ensuring good communication and coordination of actions between all stakeholders. The collected data should link objectives and goals with indicators and data categories necessary to generate them. Thus there is a strong need for the preparation of fisheries management plans in the first place, as highlighted in the FAO Code of Conduct for Responsible Fisheries.

## **Fisheries management plans**

A Fishery Management Plan as defined by FAO Technical Guidelines is “a formal or informal arrangement between a fishery authority and interested parties that identifies partners in the fishery and their respective roles, details the agreed objectives for the fishery, specifies the management rules and regulations that apply to it and provides other details about the fishery that are relevant to the task of the management authority, which may include achievement of multiple objectives”. Fisheries management plans should be developed to guide management direction based on clear government policy and vision. It has been realized that fisheries managed following a top-down approach run a high risk of being non-sustainable. Alternatively, a bottom-up approach that includes active stakeholder consultation and participation offers transparency in decision-making for more effective management. In many traditional or artisanal fisheries, traditions and cultures of the fishers who are the major stakeholders need also to be incorporated with other formal management measures.

“Fisheries management plans should be developed to guide management direction based on clear government policy and vision, following a bottom-up approach”

Plans are evolutionary and dynamic, and successful management plans are the consequence of commitment and collaboration by all parties concerned. Plans should be subject to regular reviews, and proper indicators are necessary for every goal or objective pursued. Furthermore, fisheries management requires an adequate institutional base including regulations and enforcement

achieved through optimising fishing capacity to match sustainable use of the stock. Management of fisheries in Malaysia is the responsibility of the Department of Fisheries. In the past, stakeholders were not involved much, but recently efforts are being made to consult them as often as possible on management issues and mitigation measures implemented.

The project started in January 2003 with the implementation of several activities in the planning stage. These activities included the preparation of the project proposal, the assessment of the status of fishery resources in the study area, and the preparation for paper presentation to the stakeholders. The two major achievements up to now are the National Conference on Management of Coastal Fisheries in Malaysia and the formation of the National Steering Committee for the Management of Coastal Fisheries in the country.

The core group formed for the pilot project on indicators comprises 20 researchers and managers from the Department of Fisheries. The group first met in June 2003 to prepare the scope, framework, criteria, objectives, potential indicators and reference points for Zone B trawl fisheries in the states of Kedah and Perlis on the northwest coast of Peninsular Malaysia. Zone B refers to the fishing zone from 5-12 nautical miles from the shore, with Zone B trawlers not authorized to fish in areas closer than 5 nm. Many potential indicators, including resource, environment, socio-economic, and fleet indicators were proposed.

A National Expert Meeting was organized in July 2003 to review the proposed indicators identified by the core group. The experts included researchers, managers and officials from various fishery-related agencies in Kedah and Perlis. The meeting finalized the scope, framework, criteria, objectives, potential indicators and reference points for trawl fisheries in the two states. The outputs were presented at a First Stakeholders Consultative Workshop, held in August 2003, and attended by about 60 participants, half of whom were local stakeholders.

The workshop discussed the potential indicators and agreed to update information on these before finally selecting and testing the best of them during the Second Stakeholders Consultative Workshop held in mid 2004.

Next, a socio-economic survey on Zone B trawl fishers in Kedah and Perlis was jointly conducted with the Fisheries Development Authority of Malaysia (FDAM) from December 2003 to February 2004. This survey was conducted to compile missing socio-economic data and to update existing data. A total of 443 respondents were interviewed on a wide spectrum of questions, from



social status and income to understanding of fisheries management. In addition, a fishery resource survey in Zone B (12 – 30 nm) off Kedah and Perlis was conducted using a commercial trawler in February 2004. During this survey, data on selected environmental parameters were also collected.

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### Philippines

The project started in September 2003, when the project team was formed to carry out the study. The project proposal was refined, focusing on important aspects of the pilot study such as the identification of possible indicators of sustainable development from the trawl fishery and how these will be used. To start with, the fisheries management plan was formulated as a directive approach to this project, involving the Department of Fisheries and the stakeholders who play a vital role in capture fisheries.

The goal pursued for marine capture fisheries in Brunei Darussalam is to develop activities towards the maximum economic yield. 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.

The fisheries management plan, including the identified indicators, was then discussed with stakeholders in order to get their response and, above all, to encourage active participation in bringing capture fisheries to the maximum sustainable yield. Cooperation from the stakeholders was also sought to obtain the information required (on fish production, income, and expenditure) that would be used as indicators in the study of the trawl fishery.

Stakeholders were selected according to the types of fishing gear they use, in this case trawls, and by fishing zone (classified according to the distance to the coast, with zone 3 the farther). Nine out of 18 stakeholders invited from Zone 2 responded, while all three stakeholders from Zone 3 attended. No trawlers are allowed to fish in Zone 1, which is reserved for small-scale fishermen. Thus, a total of 12 stakeholders participated in the meeting. The proposed indicators were discussed and accepted by the stakeholders. They include *harvest indicators* (landings, catch per unit effort, CPUE, total value), *fishing effort indicators* (number of vessels and fishers, fishing time), *harvest capacity indicators* (gross tonnage and horsepower), *net return indicators* (profit-rent, net return and investment) and *catch structure indicators* (catch composition, size of fish). A further stakeholder meeting is planned.

### **Indonesia**

The north coast of Central Java was selected as an

appropriate and cost-effective site location. The aim is to study the exploitation of demersal and shrimp fishery resources by small-scale fishing boats that are less than 30 GT. Observations and interviews with fishers at the landing sites indicated that some historical data on these fisheries were available. Licensing of fishing vessels is completely under the control of the local authority, and the actual fishing effort is not well known or documented, although it is believed to be very large. There is a general feeling that small-scale demersal and shrimp fisheries are “already hopeless and uncontrollable.” Since these are also multi-gear fisheries, there is seasonal movement in and out of the main fishing grounds, making the situation even more complex.

The pilot project started in May 2003 and is supported by funding from the national budget. Several indicators are being considered, including CPUE, catch data, species composition, and mean size of fish and spawners. Field sampling was designed to be carried out on a monthly basis, and the following activities have been conducted:

1. Collecting and evaluating data for small-scale demersal fisheries
2. Collecting and reviewing all existing research data
3. Collecting biological data *in situ* such as catch composition and reproductive stages of fish
4. Collecting catch-effort data *in situ*, and including the actual fishing effort
5. Collecting existing data on the share system practiced (this refers to the system practiced in the distribution of earnings between fishermen from the sale of catch usually in some fixed ratio agreed upon before venturing at sea)
6. Studying the licensing system
7. Studying the mobility of fishing boats, and
8. Conducting experimental fishing using Juvenile and Trash Fish Excluder Devices (JTED).

### **Malaysia**

The long term management objective for trawl fisheries in the coastal area, which has been targeted in the pilot study, is to sustain production at present levels. This is important in order to meet the national obligation for ensuring sufficient future supplies of fish, and can be



The main objective identified for the pilot project was to determine the status and trend of ring net fishery as a basis for its sustainable management. Other objectives are to develop a biological and economic database and to provide scientific information for formulating a fisheries management plan for the ring net fishery. The main indicators proposed include CPUE, species composition, mean size of fish and spawners.

Two stakeholder meetings were held in Cebu City, in December 2002 and in January 2003. Other activities planned include:

1. Determination of species composition, change in species composition and catch per unit effort of the ring net fishery in Camotes Sea.
2. Determination of the size and percentage of spawners of selected commercially dominant pelagic species in the ring net catch.
3. Determination of changes in the mean length of species from ring net catch.
4. Collection of primary data for catch and effort, length and weight measurements, sex and gonad maturity
5. Collection of secondary data for time series of catch and effort and length measurements
6. Monitoring of ring net landings every two days (giving a total of 10-11 days sampling a month) at the two landing sites at Looc and Taboc-looc, Danao City
7. Conducting biological studies on nine commercially important and dominant species of roundscads (*Decapterus macrosoma*, *D. tabl* and *D. kurroides*), mackerels (*Rastrelliger faughni* and *R. kanagurta*), bullet tuna (*Auxis rochei*), frigate tuna (*A. thazard*), big eyed scad (*Selar crumenphthalmus*) and moonfish (*Mene maculata*).

An initial analysis of data from 1983 to 2003 shows that there is an increasing trend for the mean annual CPUE for the ring net fishery in the Camotes Sea. These data are encouraging, and may possibly demonstrate that the co-management approach adopted by the regional Fisheries Management authority has been successful here. Another stakeholder meeting is planned for mid 2004.

## Thailand

The otter board trawl fishery of Pran Buri district was selected for study in the pilot project. The main objective of the pilot project was to improve the stock status in this area. Small otter board trawlers of overall length (LOA) less than 14m are usually operated here by local fishers and hired labour from other regions in Thailand. Fishers in Pran Buri district earn lower income than fishers from other areas. Some of these trawlers operate illegally within 3km of the shore. Almost all fishers at the site have been willing to cooperate. This was a good start, and will hopefully contribute to a productive outcome to further facilitate the management of fisheries in the district.

During the initial phase, the project site was surveyed, and the basic knowledge available was reviewed. A Consultation Meeting was held with stakeholders (fishers, processors, local authorities and local government officers), during which the pilot project and its objectives were explained, and stakeholders discussed related problems. Several indicators were proposed, such as catch rates, catch composition, mean size of spawners, mean size of fish and shrimps, and some socio-economic indicators.

Monthly collection of fishery data started in April 2003, mostly to assess the current status and trend of this fishery. A Second Stakeholders Meeting has been planned for mid-2004 to report and discuss the outcomes of the experimental survey and the progress of the pilot project, as well as the proposal for a Fisheries Management Plan. Through the meeting, it is hoped that the fishers will learn and understand more about the present fishery situation, from the various indicators selected, and will participate and comply with fisheries management in their area to help solve related problems. The selected site will first have a management plan limited to small shrimp trawl fisheries as a part of the training. If this pilot project is successful, it will be used as a case study for sustainable fishery management in other areas and other fisheries.

## Conclusion

Indicators should be used as tools in fisheries management for effective planning, communication, monitoring and evaluation. The use of indicators should be integrated into fisheries management plans,

and there should be a clear linkage between indicators and management objectives, with special consideration given to the reduction of excess fishing capacity. The active involvement as well as close consultation and communication among the stakeholders – those who contribute to or are influenced by the outcome of the fisheries management process – is crucial and must be promoted throughout. This is to ensure a common understanding, awareness, consensus building and cooperation in selecting and using indicators, thereby enhancing their compliance in fisheries management.

From the implementation of the pilot projects in some ASEAN-SEAFDEC Member Countries, the process of stakeholder consultation has already been established. This is seen as an important step in improving fisheries management, in particular of small-scale fisheries.

In Brunei Darussalam and Thailand, the pilot projects have been developed on the basis of the existing close relationship that the Department of Fisheries has established with the fishers and other stakeholders themselves. In Indonesia and the Philippines, contacts with the fishers and other stakeholders were mainly

developed through arrangements made at the local level through local fisheries management authorities. In both situations, close connection and consultation between government and fishermen has been established through the implementation of the pilot projects.

In Malaysia, a systematic process of consultation, as outlined in the table below, had so far been achieved through a series of well-organized interactions among stakeholders who include representatives of fishers and the fishing industry, academics, government agencies, non-governmental organizations and the staff of the Department of Fisheries Malaysia.

The results achieved so far from the implementation of pilot projects are positive and encouraging. Furthermore, the pilot projects have also helped through practical hands-on experience for project officers in their respective countries. Through working in various ASEAN Member Countries, it has also provided experience on the management of fisheries in different scenarios with different scale and development levels. It is hoped that the results will provide a basis for the formulation of



<b>Malaysia – a systematic process of consultation</b>	
<b>Development of Process</b>	<b>Activities</b>
Planning stage	<ul style="list-style-type: none"> <li>- Preparation of project proposal</li> <li>- Assessment of status of fishery resources</li> <li>- Preparation of information and data to be presented to stakeholders.</li> </ul>
Convening a national conference	<p>The National Conference on Management of Coastal Fisheries in Malaysia was held with the following objectives:</p> <ol style="list-style-type: none"> <li>a) To present an evaluation of the status of coastal fisheries resources</li> <li>b) To examine the potential use of participatory management)</li> <li>c) To identify key follow-up actions for improved management of coastal fisheries in Malaysia.</li> </ol>
Forming a National Steering Committee	<p>As suggested immediate actions during the national conference, a National Steering Committee on Management of Coastal Fisheries in the country was formed.</p> <p>The Committee comprises representatives of the Fisheries Development Authority of Malaysia (FDAM), the Malaysian Institute for Maritime Affairs (MIMA), the WorldFish Center (WFC) and the Ministry of Agriculture (MOA) and is chaired by the Deputy Director General of the Department of Fisheries (DOF) Malaysia.</p> <p>The task of the committee is to oversee activities implemented towards the management of coastal fisheries, including this indicator project.</p>
Conducting a Core Group Meeting	<p>To prepare the scope, framework, criteria, objectives, potential indicators and reference points for the Zone B trawl fisheries in Kedah and Perlis.</p>
Conducting a National Expert Meeting	<p>The meeting finalized the scope, framework, criteria, objectives, potential indicators and reference points for trawl fisheries in Kedah and Perlis.</p>
Holding the First Stakeholders Consultative Workshop	<p>The output from the National Expert Meeting was presented to stakeholders. The Workshop finalized the choice of potential indicators, and agreed to update information for all the selected potential indicators, to be presented during the Second Stakeholders Consultative Workshop.</p>
Holding The Second Stakeholders Consultative Workshop	<p>To discuss selected potential indicators before testing the “best ones”.</p>



a document on guidelines for the use of indicators for improved marine and inland fisheries management in the ASEAN region, which will support the promotion and use of indicators for sustainable development and management of capture fisheries. These proposed guidelines will be developed as a major output from this project, as proposed through the tentative framework adopted during the second regional technical consultation on the use of indicators.

### About the author

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### Readings

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