



**F**isheries resources throughout ASEAN have been intensively exploited or overexploited in certain parts of each country. Excess fishing capacity and the depletion of some fish stocks are major concerns. The production of fish meal by using juvenile fish of economic importance but categorized as ‘trash,’ because of the application of non-selective fishing gears and the low market value of these components of the catch, has further deteriorated fish stocks. These juveniles typically comprise a large part of the composition of ‘trash’ fish catches. All these elements underline the urgent need to manage fisheries in the region in a more sustainable way.

### **The ASEAN-SEAFDEC Plan of Action**

During the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People”, a key output was the adoption by Ministers responsible for fisheries in

ASEAN Member Countries of ‘The Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region’ as a common regional fisheries policy.

One of the priorities in the Plan of Action is to formulate guidelines to promote the use of practical and simple indicators for multi-species and multi-gear fisheries, which characterize fisheries in Southeast Asia. Indicators can be practically and widely used to understand the status and trends of fisheries, a critical basis for any required actions in fisheries management.

### **Limitations of classical fisheries resource assessment models**

Classical fisheries resource assessment models, such as the Maximum Sustainable Yield (MSY), have been widely used in the region to evaluate resource levels, but have met with limited success. Most such models were originally developed for the assessment

of fisheries resources in temperate areas. Temperate fisheries basically target single species, according to the seasons, as there is a limited numbers of commercial species with large fisheries stocks. In contrast, fisheries in tropical areas target many species in relatively small quantities, a specificity of tropical ecosystems. In other words, fish catches in temperate regions predominantly are composed of a limited numbers of species, or even only one species, while catches in tropical fisheries are composed of many species without any dominant species. Hence, models such as MSY were developed based on different assumptions, and may not be appropriate for the assessment of fisheries resources in our tropical countries.

This problem also relates to what kinds of management measures will be taken by national fisheries management authorities. There are two major fisheries management options: input control and output control.

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MSY has normally been processed to estimate the Total Allowable Catch (TAC), which is used as a target reference point for management actions. In most cases, MSY or TAC has been mainly used for output control methods. In other words, TAC is set and once it is reached, all fisheries units are stopped until the following season. However, the Millennium Conference concluded that for many fisheries in the region, the application of output control is impractical. The multi-species and multi-gear composition of most fisheries in the region means that assessment of the resources is difficult and setting of catch limits problematic. Furthermore, the collection of catch information from scattered landing points is difficult, and in the absence of effective monitoring, controlling and surveillance (MCS) systems, fishers are likely to exceed limits on catches. On the other hand, the application of fish quotas will anyway only encourage discards of smaller or less valuable fish.

Alternative methods must therefore be used as a basis for fisheries management in the ASEAN region. To achieve this goal, a wide range of simple and practical indicators can be developed to understand the status

and trend of fisheries for effective management in this region.

Use of scientific hypotheses and assumptions may be needed for research, but must be simplified for use with fisheries management, as fisheries managers are neither scientists nor researchers. In addition, the resource users – the fishers themselves – who know the resource level in non-scientific terms, will not be convinced of the importance of the outcomes of a resource assessment tool if those outcomes are too sophisticated. Models based on inadequate hypotheses and assumptions, or not based on the data and information collected, will eventually result in low compliance levels with the management measures, which might then need to be forcibly imposed.

Recently, there has been an argument internationally about the practicability of single species management models. These models may have limited application to the comprehensive assessment of fisheries resources and as tools for assisting ecosystems management, even though practical methodologies have been developed. Although several indicators have been used by both developed and developing countries, it is generally considered that MSY is the only indicator for evaluating fisheries resources theoretically and scientifically. Some countries have complained that appropriate management measures have not been implemented because they do not have enough data and information to calculate MSY.

The establishment of close monitoring mechanisms on fishing operations has helped fisheries

**What is an indicator?**

An indicator is a pointer used to track changes in a fishery. Indicators can be used to predict or provide warning on potential problems. Indicators as a tool can provide supplementary information to improve management for sustainable fisheries. They can be used to formulate fishery management policies and frameworks, but also to facilitate timely management actions at local, national and international levels.

Several indicators should be used to track and monitor progress towards sustainability. These include indicators that reflect broader ecological, social, economical and institutional objectives.

managers to understand that many simple data and types of information can indicate a resource status and trend. In this connection, it might be suggested that the unavailability of data and information to calculate MSY should not be used as an excuse to delay the development of national management policy and measures. Therefore, the application of a wide range of appropriate indicators should be considered as a new concept for the sustainable development and management of fisheries in the ASEAN region.

### What information is required to develop an indicator?

In the past, fisheries managers have not been sufficiently concerned with collecting different types of usable information, probably because they believed that fisheries could only be managed through the scientific evaluation of resources, including the calculation of MSY. In other words, western scientists considered that fisheries could not be managed without knowing the size of fisheries resources. The terminology of “resource management” has been widely used. However, it should be noted that fisheries resources cannot be managed; what we need to do instead is to manage the fishers and fishery industries.

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In this regard, ‘fisheries management’ instead of ‘resource management’ is a more appropriate term. Of course, ideally we would prefer to assess the size of fisheries resources, but the assessment of the size of multi-species stocks is at this moment not possible. Therefore, we should take immediate management actions to achieve sustainable fisheries even without knowing the size of certain fisheries resources.

If we intend to manage the fishing capacity, we have to collect various statistics, such as the numbers of fishing boats. To understand the situation and trends in fisheries resources, we have to collect information on the amount of fish landed and on the numbers of boats involved in catching, in order to calculate the catch per unit effort (CPUE). Changes in CPUE can be used to understand exploitation levels, and to provide a guide for appropriate action to be taken by fisheries managers. In temperate regions, CPUE might be difficult to use, especially due to the fact that particular species reach marketable sizes at a particular

time of the year, because of the clearly delimited period of the spawning season. This problem is less pronounced in tropical areas as spawning take place continuously all year round, and eventually recruitment to a marketable population will also be continuous.

Several other data, which in the past were not considered important, must be re-evaluated to determine if these can be used for management purposes. Socio-economic data such as the number of fishers, number of crews, the per capita fish consumption, or incomes could also be used to understand the status of fisheries.

### Potential indicators for sustainable fisheries management in ASEAN Countries

A First Regional Technical Consultation on Indicators for Sustainable Fisheries Management in the



ASEAN Region was held by SEAFDEC in collaboration with other agencies, including FAO, in Hai Phong, Vietnam, from 2-5 May 2001. During the meeting, several potential indicators to be used as tools for sustainable fisheries management in ASEAN Countries were identified:

1. Fleet or fishing capacity indicators, including the number of fishing boats, fishing power in terms of horse power or gross tonnage, fishing time, and type and number of fishing gear;
2. Harvesting or resource indicators, including landing volume, CPUE, biomass, catch composition, number of species caught, fishing ground, average fish size, and size of mature fish; and
3. Economic and social indicators, including landing value, Revenue per Unit Effort (RPUE), export and import (in quantity and value), per capita fish consumption, investment in fisheries, number of fishers, number of employees in the fishery sectors, and fishers' profits.

The effective use of such indicators will require a substantial amount of data to be collected over a long period of time. Some of the data may already have been collected, but might not fully be utilized in support of management actions. National fisheries statistics data are usually not used for fisheries management, as fisheries managers have not seriously considered their importance. Therefore, ASEAN Member Countries need to have a clear policy to re-evaluate and fully use the various data and types of information at their disposition as new management tools.

## Pilot projects and participatory approach

SEAFDEC held the Second Regional Technical Consultation on the Use of Indicators for the Development and Management of Capture Fisheries in the ASEAN Region in Kuala Terengganu, Malaysia, from 16-18 September 2002. At the meeting, five pilot projects located in Brunei Darussalam, Indonesia, Malaysia, Philippines, and Vietnam were prepared. Each country selected local sites and particular fisheries to be targeted. The particular fisheries to be studied are trawl fisheries in Brunei Darussalam and Malaysia, a ring net fishery in the Philippines, a 'mini' purse seine fishery in Indonesia, and a small-scale fishery in Vietnam. These pilot projects will be implemented under the Special Five-year Project of SEAFDEC from 2002-2005.

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Technical officers from each country will compile existing data and relevant information. Fisheries management plans will be developed together with the local communities and stakeholders through consultations at the selected local sites. The success of the use of indicators for fisheries management will depend very largely on the active participation of stakeholders, whose close collaboration must be established to find out issues, problems and constraints.



### About the author

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