

# **SOCIO-ECONOMIC INFORMATION FOR FISHERY MANAGEMENT AND DEVELOPMENT**

by

*Adele Crispoldi-Hotta*

**Fishery Statistician**

**Fisheries Information, Data and statistics**

**FAO, Rome, Italy**

---

## **1. INTRODUCTION**

A wide array of socio-economic data is needed for effective fishery management and development planning. The increasing number of fish stocks fully exploited or approaching the level of non-sustainability requires the introduction of more sophisticated management techniques which in turn demand more specific data. Planning processes including goals of achieving sustainability of development, and growth with equity have increased demands for comprehensive fishery statistics. A growing scarcity of marine resources and their increasing value, accompanied by often inadequate management measures contribute to the increasing conflicts between various resource users. The conflicts are particularly notable between small-scale and large-scale fisheries, when economically beneficial development is blocked by the absence of an efficient system to allocate resources, capital and labor with the risk that many fisheries are subject to overcapitalization, depletion and economic waste. Understanding the socio-economic impact that different management techniques have on the communities that depend on fisheries for their livelihood also requires access to timely and reliable social and economic information.

However, the development of economic and social statistics in the area of fishery lags somewhat behind that of biological data. Renewed attention is required from national administrations as well as from regional and international agencies responsible for the collection and gathering of fishery statistics, to encourage improved regional availability and analysis of socio-economic data of the fishery sector.

## **2. SOCIO-ECONOMIC DATA FOR MANAGEMENT AND DECISION MAKING**

The most salient features for which fisheries differ from agriculture are the common property characteristic of fishery resources. This implies that management responsibilities reside with an institution rather than with individual owners as is the most frequent case in agriculture, and the uncertainty of the output of fishery operations which has important implications in the development planning process. The recognition of the importance of information for fishery management interventions has emerged in response to a tendency to depletion or over-exploitation of many fish stock, due to excessive levels of capital and labor in many fisheries around the world.

The types of information needed for fishery management and development planning are many and vary not only with the policy objectives and the kinds of decisions that need to be made, but also with different stages of fishery development. Biological, technical, economic, social, and institutional information and data are required for sound management.

How much information and routine, long-term data are essential and how reliable the data should be, has to be determined on a case by case basis. The type of data collected, their frequency, and the method of data acquisition vary greatly among countries with the varying importance of the fishery sector in the national economy. Under limited financial resources, gains in precision and reliability may be obtained at the expense of obtaining other information.

Not all data series identified as desirable components of the fishery information system, should be collected for all types of fisheries and with the same frequency. The information required for commercial harvesters (bonafide fishermen) is generally more diverse, due to the different capability of production that commercial activities have, compared to subsistence and recreational fisheries. All sectors should be monitored from the cost and benefits perspective, and some basic characteristic (descriptive data) of the technology used for fishing should also be known. In the acquisition of information and data, small-scale fisheries, as opposed to industrial pose an additional constraint, due to the scattered and frequently isolated location of fishing communities and the seasonality of the operations often associated to fishermen's seasonal migration.

Data and information on the natural and biological aspects of fisheries provide the basic guidelines for management decisions, as they are essential to indicate the limitations and constraints of the resources and would determine the level of fishing pressure that can be applied without threatening the sustainability. Fishery administrations generally have well-established systems to capture and analyze this type of information. The provision of data for stock assessment, resource management (including allocation among fishing units and licensing) and enforcement are generally the primary functions of national fishery statistical systems. Environmental and physical data can be derived from the national statistical systems and also from research. Biological data are gathered through experimental fishing, fish resource surveys and catch records.

Fishery data needed for economic research are those for which statistics have been lagging somewhat behind in the development within many national systems. The fishery economic component is essential to understand the overall functioning, in so far as it relates the benefits generated to their distribution within the fishery sector.

Economic statistics are necessary for estimating the net benefits that a nation derives from its aquatic resources, for measuring the impact of management decisions and monitoring the economic evolution of such decisions over time, as well as the influence of external factors on fisheries. As an example, FAO/SEAFDEC/97/Inf.5 presented at this Workshop, contains a case study on the use of national economic accounting to estimate the contribution of fisheries to the national economy of Norway, a major fishing nation. Essential types of data needed for such an exercise include cost of harvesting, trends in fish prices of catch, income of fishermen, returns to capital and changes in return in relation to fishing effort, price and income elasticities of demand for fish and substitute products. Information on fixed and variable costs is basic, the former including costs associated with vessel and gear maintenance and depreciation, of acquiring fishing licenses and permits, while the other cost for insurance, taxation and professional expenses for the administrative part of fishing. Variable costs would include cost of fuel per trip, crew wages and remuneration system, etc.

Most of such data are dynamic in character and are influenced by both internal and external forces. To acquire them, a diversity of approaches is required. The major sources of information are markets, fishermen and fishing communities, traders and middlemen, but also periodic official statistics assembled for more general purposes.

Social information includes the number of fishermen, according to occupational status, trends in numbers of fishermen and their occupational mobility, functioning of formal and informal fishermen's organizations, traditional concepts of property rights to access fishing grounds, and conflicts among different fishermen groups in resource exploitation. The adequate consideration of human and social aspects is important in determining the success or failure of management policies.

Fishery management decisions affect not only a fishery, but the economy as a whole. These may include:

- a) decisions concerning whether and how limited entry should be imposed for domestic fisheries, whether foreign fleets should be provided access to the country's exclusive economic zone (EEZ) and how much they should be charged for access, which management technique should be adopted in allocating resources exploitation; and
- b) how to reduce conflicts between artisanal and commercial fishermen. The consequences of these decisions must also be considered beforehand, and afterwards.

### **3. REQUIREMENTS AND PROBLEMS IN DATA COLLECTION**

The data required for rational management are complex and they evolve in response to changes in the way fisheries are exploited, to the structure of the industry, national and international laws, and resource management practices. A comprehensive fishery information system requires description of its basic components, of the structures of the activities in the fishery process, the flow of products, services and other factors. From an economic and social points of view, the system should identify linkages among its basic components, such as:

- a) social (e.g., fishing community) and productive units (fishermen, processing plants);
- b) resource units (stocks, fishing areas); and
- c) market units (e.g., wholesaler, retailer).

The flow can be followed quantitatively or financially, to capture the profits and rents from fisheries. Fish abundance and distribution, fishing power and labor skill, domestic and foreign market demand are factors influencing production. Information is costly to collect, the costs being higher initially when the benefits are lower. The acquisition of all desirable information is very costly especially where tropical conditions prevail. That is, the existence of widely scattered multispecies fisheries as they prevail in the region.

The identification of data needs is a long process based on consultation among all parties concerned, taking into account the costs of collection. It is imperative to identify the information which is of prime importance for a wide range of management decisions and also to require such information in a cost-effective manner. Data and information on the activities (fishing, landing, processing, marketing and distribution, domestic consumption, trade) usually give more emphasis to the structure rather than to the evolution over time.

The relationship linking various elements, activities, and components may be expressed by coefficients, parameters, rates, and performance indicators. Examples are elasticities, production coefficients, prices, rates of unemployment, exchange rates, and coefficient of income distribution.

#### **4. REGIONAL PERSPECTIVE**

Fisheries in the Asia and Pacific region are contributing substantially to satisfying nutritional requirements of people, generating employment and earnings, through exports and granting access rights to foreign fleets. Fisheries and aquaculture have by and large kept pace with increasing demands of large and growing populations. However, there are many signs of economic dislocations and changes that have brought excessive pressure on coastal areas, including over-exploitation of coastal resources. Also in many countries (notably Thailand, the Philippines and Indonesia) traditional collective systems of resource management have been rapidly changing under the pressures of monetary forces, and as a result of increasingly scarce resources, without being replaced by entirely satisfactory alternative systems.

A wealth of socio-economic information exists regionally both for capture and culture fisheries. National and regional studies and research available deal with: a) problems of fishermen's income and of fishing community living standards; b) policy oriented overviews of management and development options; c) analyses of fishing regulatory proposals with socio-economic perspectives; d) studies of traditional common property resource systems and community-based management system; e) descriptive and analytical studies of labor markets including gender roles in fisheries; f) economic analyses on cost; and g) earning and marketing. Many data are generated by surveys conducted on fishing communities.

Systematic collection and availability of socio-economic fishery data are not equally pursued by countries in the region. Economic statistics are already collected in countries where an established fishery licensing system exists which requires the estimation of the cost of fishing and the assessment of economic performance of different gear types. Cost and earning surveys are systematically conducted only in some countries, mainly by means of periodic interviews of a sample of fishermen. In Japan the method applied (the book-keeping system) covers aspects related to the fishery household income and expenditures.

Fish producer price surveys are conducted only in a few countries, through the recording of fish market transactions. The lack of systematic information on the value by species at point of landing has far-reaching implications on the ability of the administration to apply an interdisciplinary approach to fishery management. The collection of landed catches data by species and by gear in both quantities and values should be regarded as the absolute minimum requirement. In most countries, fish prices are available at the wholesale and retail levels, frequently being collected at regular intervals by systemic visits to fish markets. Such prices may be used for assessing seasonal price variations only.

In selected countries in the region, censuses are used to collect fishery statistics, particularly structural data (Japan, Taiwan Province of China, Thailand, Korea, Indonesia). In developing countries these have been conducted to the extent possible in conjunction with agricultural censuses to optimize resource use. Although a census is an efficient and reliable method to collect structural data, they are infrequent and they may not capture enough information on small units. The information collected is often not analyzed to the extent that data purport, or are not presented in a form that allows establishing benchmarks. Also the results of censuses are often delayed and the dissemination of the information to users takes place some years later, thus detracting substantially from the potential value of data to users and risking to take wrong decisions based on facts that may have evolved differently since the data were collected.

Sampling has the advantage of reduced implementation cost, and lower probability of error in data collection and handling. It may be best suited and effective to capture information in small scale fishing communities where seasonality of fishing obliges harvesters to diversify their sources of income.

## **5. REMARKS AND CONCLUSIONS**

Many fisheries have sharply declined in recent years, as a consequence of overfishing. In coastal and shelf areas, where species survival is also threatened by pollution and other environmental damages, the problem is more acute. Increased concern regarding the sustainable contribution of fisheries to national economic, social and nutritional goals echoed in international fora, have resulted in greater responsibilities for fishery administrations in assessing, regulating and monitoring fisheries.

However, it is apparent that most fishery administrations in the past have tended to concentrate on data for which they have exclusive responsibility, that is catch, effort and stock assessment data. Since socio-economic data collection is a responsibility frequently shared with other institutions, it has been regarded as an area of low priority in most countries.

National governments should periodically review their fishery statistical programs to:

- a) determine what changes to the on-going system are necessary to meet a rising need; and
- b) re-organizations and improvements that may be necessary.

This process requires close participation of data users, the research workers in economics and government officials requiring data in the fishery program administration. Given the constraints in planning and implementing new inquiries, benefits would be derived in the short term by intensifying analysis of socio-economic data becoming available from surveys originating outside the fishery sector (e.g., population surveys, labor surveys). Conversely the intensified and closer participation of fishery administrations to national statistical programs would maximize the benefits to be derived from these surveys and ensure a correct understanding of the complexity of fisheries.

**6. CASE STUDY OF THE PREPARATION OF NATIONAL ECONOMIC ACCOUNTS: NORWAY**

The results of the survey is given as Appendix to this paper.

**References**

Fisheries Resources and their Management in Southeast Asia - Proceedings of an International Seminar, 1974 (GTZ/FAO)

K. Brander - Guidelines for Collection and Compilation of Fishery Statistics, FAO, 1975, FIRS/T 148 (Statistics for Management)

Optimum Sustainable Yield as a Concept in Fisheries Management, American Fisheries Society, 1975

Expert Consultation on the Acquisition of Socio-economic Information in Fisheries, FAO, Rome 1985, FIPP/R344

Results of Fishery Census in Selected Countries in Asia and the Pacific Region, APCAS XIII Session, November 1990

Symposium on Socio-economic Issues in Coastal Fisheries Management, Indo-Pacific Fishery Commission, XXIV Session, November 1993

Fisheries Socio-economics in the Developing World, Regional Assessment and an Annotated Bibliography, IDRC, 1994

Status of Fishery Information and Statistics in Asia, Proceedings of the Regional Workshop on Fishery Information and Statistics in Asia, FAO/SEAFDEC/SIFR, April 1994