

CURRENT FAO FISHERY STATISTICS PROGRAMME

by

Richard Grainger

Senior Fishery Statistician

Fisheries Information, Data and Statistics Unit

FAO, Rome, Italy

and

Theo Visser

Associate Professional Officer

Fishery Information and Statistics

FAO Regional Office for Asia and the Pacific

Bangkok, Thailand

1. INTRODUCTION

FAO is the only source of comprehensive global fishery statistics and most reviews of the state of world fisheries, past trends and future prospects rely on FAO statistics. FAO analyses these statistics in order to monitor many aspects of the world fisheries such as fishery production from capture fisheries and aquaculture, fish production and trade of fishery commodities, fish consumption, fishing fleets, and employment in fisheries. On the basis of these analyses, FAO prepares advice on fishery policy to member countries, reviews trends and outlines prospects of the contribution of fish to food security. The contribution of fish to national food supply (particularly for its protein) is monitored for all countries of the world and this necessitates collating information on production, disposition of catches to food and non-food uses, and production and trade of fishery commodities.

2. THE NATIONAL COMPONENT

Building up data on world fisheries requires an international effort and cooperation. International classification and standardized data submission procedures have to be maintained in order to ensure that the collected statistics are comparable across countries so as to allow for summation and analyses at both regional and global levels.

FIDI, the FAO Fishery Information, Data and Statistics Unit, is responsible for the collection of global fishery statistics. Statistics on catches and landings have been collated by the FAO since 1950. Data on number of fishermen and fishing fleet statistics became available since 1970, data on production and trade in fishery commodities since 1976, and aquaculture production and value statistics since 1984.

Fishery statistics are usually obtained from national reporting offices and, wherever possible, verified from other sources. Annually all countries receive at least the FISHSTAT National Summary (NS1) questionnaire for reporting of data on fish production. This form is viewed as the absolute minimum reporting required. Most countries however receive a number of additional questionnaires related to trade, export, aquaculture, etc. The list of the questionnaire sent out by FAO to countries in the Asia-Pacific region is given as Annex 1.

In addition, FAO data concerning the nominal catch of fish included in ISSCAAP (International Standard Statistical Classification of Aquatic Animals) group 36 (tunas, bonitos and billfishes) are generally reviewed in collaboration with the regional agency concerned with tuna statistics, in addition to the reporting by countries themselves. In the absence of reported (catch) data, or when the reported data is thought unreliable, FAO tries to estimate the likely production using data from other sources (trade figures, national statistical publications, research publications, etc.). If no other data is available for a reliable estimate, the value of the preceding year is simply repeated.

The resulting statistics are stored in databases and disseminated through annual publications such as the FAO Yearbooks of Fishery Statistics, for catches and landings, aquaculture and commodities (and less frequent for the fleet statistics). The data are also made available in electronic form by the distribution of diskettes with yearly updated platform independent databases with time series: FISHSTAT PC, AQUACULT PC and FISHCOMM PC. Aggregated data are also available through the FAO Internet site, from where databases can be queried or down loaded.

3. FAO FISHERIES DATABASES

The following databases are maintained by FIDI:

a) Nominal catch and landings

This database contains the volume of fish catches landed by country of capture, by species or a higher taxonomic level (ISSCAAP groups), and by FAO major fishing areas. Volume is measured in tons for all items except aquatic mammals, alligators and crocodiles, which are measured by number of animals, and pearls, shells, corals and sponges which are measured in kilograms. Weights are of the whole animal (live weight), a diagram with the catch concepts is given as Annex 2. Coverage includes harvest by commercial, artisanal and subsistence fisheries, including aquaculture.

Disaggregation of FAO's total fishery production statistics into capture fishery and aquaculture components has been completed for the period 1984-1995. It is planned to publish capture fishery statistics separately in Vol. 82 of the Yearbook of Fishery Statistics to be published in 1998, possibly together with aquaculture production statistics. It is planned eventually to disaggregate the total fishery production statistics for the remaining period 1950-1983 and, as a first step, time series of aquaculture production statistics are being extended to cover this period. Volume 82 of the Yearbook will carry a different name from the current "catches and landings", depending on what is included.

b) Aquaculture production of fish

This database system is still under development. One problem is obtaining a universally acceptable and permanent definition of aquaculture for data collection. An important objective for the aquaculture database is to include the collection of data on aquaculture production units (surface area of growing waters, number of cages, number of pens, etc.) and type of culture in addition to the existing statistics on production quantity (in live weight)

In addition, the price per kilogram by species, country and environment (fresh/brackish/seawater) should also be included. The same coding scheme and record format used for nominal catches and landings is being used to store these data.

c) Fishery commodities

This database contains statistics on the annual production of fishery commodities as well as imports and exports (including re-exports) of fishery commodities by country and commodity description (including processing method) in terms of volume and value. The data are coded using the FAO International Standard Statistical Classification of Fishery Commodities (ISSCFC) which is derived from the United Nations Standard International Trade Classification (revision 3) and linked to the Harmonized Commodity Description and Coding System (HS) of the World Customs Organization (WCO).

The quality of these data varies depending on each country's ability to collect and compile such statistics. FIDI uses all the verification information at its disposal, such as foreign trade statistics, industry and commodity reports to evaluate data accuracy and completeness, and corresponds with the countries when data are questionable. Production statistics of fishery commodities, refer to the quantities of preserved and processed fishery commodities, produced both ashore and on-board vessels utilizing catches from commercial fisheries and aquaculture production. Products from imported raw materials are also included. Data are expressed in tons and refer to the net weight of the commodities, i.e., excluding the weight of the container.

Statistics include species from which the commodity is produced, the commodity form (whole, filleted, shucked, etc.) and form of preservation (fresh, frozen, canned, cured, meal, etc.). They do not include aquatic plants, mother-of-pearl and other shells, pearls, corals and sponges, turtles, frogs and crocodiles. Product such as costume jewelry and fish leather are also excluded. International trade statistics for preserved and processed fishery commodities, refer to the quantities and values of annual imports and exports (including re-exports when applicable) of fish and fishery products. Quantities are expressed in tons (product weight), and values are expressed in thousand US\$. The conversion from national currencies into US\$ is done by applying average annual exchange rates from the International Monetary Fund (IMF).

Import and export trade statistics are obtained primarily from country reports provided to FAO in published form or on magnetic computer tapes. About 60 countries, including the major trading nations, provide data on magnetic tapes. Country of origin for imports or country of destination for exports are not included in the database. Data refer to the calendar year, except for a few countries which report data on a split year basis (in which case data are shown under the calendar year in which the split year ends).

d) Fleet statistics

FIDI collects annual statistics by country on the number and total tonnage of fish catching, processing, and support vessels utilized in commercial, subsistence and artisanal fisheries.

The data are reported by size of vessel measured in gross registered tons (GRT) and by type of vessel according to some 50 types of vessel defined in the International Statistical Classification of Fishery Vessels (ISCFV). Data for calendar years 1970 to 1995 constitute the series that have been collected, compiled and edited. Data for the years 1970, 1975, and 1977 to 1991 have been published.

Fishing fleet data are collected in several ways. The primary means is to collect the data directly from each country through a questionnaire and exploratory notes. For non-reporting countries and countries submitting incomplete data, other sources are used such as national publications, international fishery magazines, FAO fishery country profiles, FAO projects, and the Lloyd's Register of Shipping. The latter contains the number and total gross tonnage (GT) of insured vessels but does not include vessels under 100 GT. Therefore, a large portion of the fishing fleets for most countries is excluded from this publication. The same also applies to most fishing vessels of Southeast Asia which are smaller than 100 GT.

e) Employment statistics

This database contains statistics on the number of commercial and subsistence fishers for the period 1970-1995. It is collected on an annual basis by means of a questionnaire which requests separation of the number of workers according to the time devoted to fishing as an occupation (full-time, part-time, occasional). Based on the revision of the International Standard Classification of Occupations, information on the number of people engaged in commercial aquaculture including the disaggregation of employment data by gender, is also collected since 1990.

f) Apparent consumption of fish and fishery products

FIDI is responsible for supplying annual statistics of supply/utilization accounts for eight groups of primary fishery commodities and nine groups of processed products. The per caput supply are derived from the food balance sheets which indicates the import, export, production and other uses of fishery products. In FAO's work, these data are required to meet the requests of its statutory bodies to keep the world's food and nutrition situation under constant review, to update FAO's analytical work in the field of food security, and to provide the statistical base for the projections of demand, supply and other assessment studies. The derived consumption statistics are as good as the basic catch, utilization, trade, and production data on which they are based. Therefore trends in some cases may reflect the improved primary data rather than real changes to food intake.

Statistics on production and trade of aquatic organisms which are not utilized for food are in principle, included in the FAO statistics. Some trade statistics on ornamental fish are also made available. Although the questionnaire for aquaculture production statistics includes production of ornamental fish, in reality no country has ever reported on them. The same applies to catches for research purposes which FAO recommends should be included in capture fishery production statistics because these are very rarely reported. "Sharks for their fins" should certainly be included in catch statistics, but again they are often omitted, particularly when the sharks are finned and most of the carcass discarded. Shark fins are generally included in trade statistics but are often not specifically identified as such. Attempts should be made in the future to report on sharks caught for all purposes.

4. TECHNICAL ASSISTANCE

From the above it is clear that FAO is extremely dependent upon the data provided by national sources and this is where many problems lie. It is known that despite FIDI's corrective actions, editing and queering, the data received at FAO HQ are, at times, of unacceptable quality and/or completeness. This may be mainly attributed to the lack of regular and self-sustained data collection systems at national level. This is a serious problem, not so much for FAO, but mainly for the countries concerned. It is clear that countries need to collect fishery statistics for their own national interest, for policy-making, planning, fisheries management, etc. The provision of statistics to FAO (and regional fishery bodies), is only of secondary importance. The usefulness of the national statistics is dependent on their accuracy and completeness. In view of the current status of fishery statistics, it is for the greatest importance that the fishery statistical system is reviewed and improved.

At the national level, FAO provides technical assistance to countries in enhancing their capacity to collect, process and analyze fishery statistical data. Due to its institutional mandate, such enhancements are limited to systems to collect and process statistics of catches, landings and aquaculture, which are generally the prime responsibility of line agencies with which FAO cooperates. One of the primary objectives of the technical assistance efforts is to bridge the existing gap between nationally submitted statistics and FIDI's global and regional databases, particularly in the sector of artisanal fisheries and more specifically for inland water fisheries. Such activities include:

- a) the development of generic computer software which can be tailored to meet the needs of national fishery statistical systems while complying with international standards and requirements;
- b) the provision of methodological guidelines in applied fishery statistics and computing; and
- c) holding of training courses and workshops at national level focusing on integrated fishery statistical systems as well as the methodological and operational aspects of catch and effort statistical surveys.

5. FISHERY STATISTICAL SOFTWARE

A major effort has been put into the production of software packages for the statistical monitoring of fisheries. The present ARTFISH/ARTSER program (MS DOS version 2.0), developed by FIDI in 1994, is a general purpose system designed to handle sample-based surveys operating with varying sampling scenarios and estimation approaches. The underlying methodology of the program is a generalized approach taken from the analysis of many fishery statistical surveys found in the world. Its data management component (ARTFISH) caters for stratification in space and time, organization of collected data into databases, and the estimation for total catch, fishing effort, prices and values with a wide range of indicators for various sources of variation. It can be customized to a very large extent to adapt to local fishing practices. Its reporting component (ARTSER) operates with estimated data and provides users with tables and graphical presentations, and interfaces with commonly used applications software.

Experience has shown that a statistical system for artisanal fisheries is central to various other biological and socio-economic systems which, though of a different data scope, require interfaces with basic estimates on catch, fishing effort, prices and values. Thus, the underline concept of ARTFISH is that it provides a single depository of basic data, which can be used by other systems without duplicating or conflicting problems.

The present situation in most countries particularly in Africa, indicates that, for the next decade, the statistical infrastructure and the qualifications and skills of national staff will require simple, self-sustained and flexible tools of the ARTFISH type, supplemented with basic training and low-cost technical advice. FIDI has in its plans the implementation of a fully integrated ARTFISH/ARTSER Windows version, which will be ready for distribution by the end of 1997. Functionally, the Windows version is expected to offer the known advantages of a system operating under Windows, that is better screen handling, more flexible selection of system configuration and options, easy integration with other software applications, etc. Moreover, the Windows version is expected to offer users a complete suite of statistical services including:

- a) **ARTPLAN:** A survey planner that will assist in the design of a sample survey. This software component will operate on parameters supplied by users and generate a simulated fishery which will then be used for testing and evaluating alternative sampling scenarios. This technique can be effectively used in order to anticipate commonly occurring shortcomings related to accessibility to landing sites, time schedule of sampling, frequency sample size, mobility, and cost-benefit tradeoffs.
- b) **ARTFISH/ARTSER for Windows.** Functionally this component will follow the same methodological approach used by its MS DOS equivalent. However, it will provide enhanced system functions, more transparent handling of data inter-relations, and much improved reporting features and integration with internationally utilized computer standards, including reporting national statistics in standard format to FAO or other international bodies.
- c) **ARTHELP.** Help on-line tutorial. The above two components will be fully described and supported by a comprehensive set of documents, slides, and graphics which will be interactive and provide users with tutorial and help functions to the depth of knowledge they are willing and able to obtain.
- d) **ARTBIEC.** Bio-economic component. This will consist of a number of supplementary modules, each focusing on a specific applications sector. It is envisaged that special procedures should be developed for linking the ARTFISH estimates with samples of length-frequency and other important biological data, whereas other modules will provide linkages to socio-economic information.

The above plan also envisages the collaboration of FIDI with other fishery institutions in member countries or on regional level showing interest and willingness to participate in the systems development. The multi-lingual requirements of the software, the amount of work required for the fourth component (ARTBIEC), and the obvious advantages of a jointly issued product (dissemination, installation, training, technical advice, troubleshooting), have already been taken into consideration. Potential partners (such as ORSTOM, DANIDA) will shortly be contacted in this respect.

FAO QUESTIONNAIRES ON FISHERY STATISTICS

FAO questionnaires sent out annually to countries in the Asia-Pacific:

FISHSTAT NS 1	(National Summary)
FISHSTAT NS 2	(Inland Catch) - only for landlocked countries
FISHSTAT NS 6	(Aquatic mammals)
FISHSTAT NS 7	(Crocodiles and alligators)
FISHSTAT NS 8	(Pearls, shells, corals and sponges)
FISHSTAT NS 9	(Aquatic Plants)
FISHSTAT AQ	(Aquaculture production)
FISHSTAT CF	(Conversion factors)
FISHSTAT FC 1	(Fishery commodities)
FISHSTAT FF	(Fishery Fleet)
FISHSTAT FM	(Fishermen)
FISHSTAT IW	(Inland waters)
FISHSTAT TR	(Importations and Exportations)
FISHSTAT 51 A	(Indian Ocean, Western - Summary)
FISHSTAT 57 AB	(Indian Ocean - Summary)
FISHERMEN	(Commercial and Subsistence)
FISHSURV REC	(Recreational Fishery)

Disposition of nominal catches:

STATLANT 08 A	(Southern Ocean - Summary)
STATLANT 08 B	(Southern Ocean - Catch/Effort)
STATLANT 21 A	(NAFO - Summary)
STATLANT 21 B	(NAFO - Catch/Effort)
STATLANT 27 A	(ICES - Summary)
STATLANT 27 B	(ICES - Catch/Effort)
STATLANT 34 A	(CECAF - Summary)
STATLANT 34 B	(CECAF - Catch/Effort)
STATLANT 37 A	(GFCM - Summary)
STATLANT 37 B	(GFCM - Catch/Effort)
STATLANT 41 A	(Atlantic, Southwest - Summary)
STATLANT 41 B	(Atlantic, Southwest - Catch/Effort)
STATLANT 47 A	(Southeast Atlantic - Summary)
STATLANT 47 B	(Southeast Atlantic - Catch/Effort)
STATPAC 87 A	(PCSP - Summary)

CATCH CONCEPTS DIAGRAM

