# Report of the Expert Consultation on Improving Information on Status and Trends of Aquaculture

## 1 BACKGROUND AND RATIONALE

During the past few decades, aquaculture has expanded, diversified, intensified and advanced technologically. It is anticipated that its growth and contribution to national economic and societal goals will increase in the future as enabling environments for investment and sustainable development are established. Aquaculture growth is likely to be driven by a static supply from capture fisheries, rising fish prices and diversification of species, especially those with established regional or global markets. A greater diversity of value-added products, market development and the increasing application of science and technology will also stimulate this trend.[1]

Ideally, the expansion of aquaculture should not occur faster than the acquisition of the information required for its rational management. The rapid growth of the sector raises concerns about the implications of expansion and the risk of unsustainable development. This underlines the need for an information base to ensure informed policy and development planning. Unmanaged development has resulted in societal and environmental problems, loss of market opportunities, failure to provide development support and conflicts with other traditional sectors. The recent emergence of aquaculture as a significant, recorded economic activity and the lack of easy access to adequate objective information on its social, economic and environmental characteristics have often resulted in its exclusion from development planning and the management of resources. It has also hampered investment in the sector.

The need for collection of reliable aquaculture data and information collection is embedded in the Code of Conduct for Responsible Fisheries (CCRF)[2], and some data needs are further elaborated in the associated FAO Technical Guidelines[3]. The Code recognizes that reliable and timely data are a requirement so that the competent authorities of national governments can effectively discharge their general responsibility in the promotion of sustainable aquaculture practices and integration into rural, agricultural and coastal development.

In recent years the demand for reliable data and information and for reporting on aquaculture has greatly increased, driven not only by the need to formulate and monitor sound policies and development plans, but also by new information

[1] NACA/FAO. 2001. Aquaculture in the Third Millennium. Subasinghe, R. P., Bueno, P.B., Phillips. M.J., Hough, C., McGladdery, S.E., & Arthur, J.R. (Eds.) Technical Proccedings of the Conference on Aquaculture in the Third Millennium, Bangkok, Thailand. 20-25 February 2000. NACA, Bangkok and FAO, Rome. 471p.

[2] FAO. 1995. Code of Conduct for Responsible Fisheries. Rome, FAO, 41 p. http://www.fao.org/fi/agreem/codecond/ficonde.asp

[3] FAO Fisheries Department. 1997. Aquaculture Development. FAO Technical Guidelines for Responsible Fisheries No.5. Rome, FAO, 40 p. http://www.fao.org/docrep/003/w4493e/w4493e00.htm

and reporting requirements of international agreements and initiatives[4], and by the increasing public demand for transparency and accountability. Changing perspectives in management are affecting the information requirements for information, such as the need to take a wider range of issues (besides production volume and value) into account in decision-making and to consider aquaculture development within the full scope of the environment and management of natural resources. These are essential to exercise appropriate precaution as the best approach to sustainability.

FAO plays a unique role in aquaculture statistics and the preparation of information on the global status and trends of the aquaculture sector, facilitating cooperation in the collation at the global level of national and regional data, and the production of global assessments of the state of aquaculture and development trends based on these. The quality of regional and international data ultimately depends on prevailing national statistical standards in reporting. The usefulness of the national statistics which constitute the regional and international data bases depends on their accuracy and completeness. It is clear that countries need to collect aquaculture statistics for their own national interest, for policy-making, planning and management. The provision of statistics to FAO (and regional fishery bodies) is a secondary concern.

Though aquaculture has a long history, active management of the sector is an emerging trend and the collection of statistical data and other information on aquaculture is a recent endeavour in many parts of the world. Equally, the FAO aquaculture statistics database system is a relatively recent activity, initiated only in 1984. Published FAO statistics are currently limited to production quantities and values by species and environment.

There is considerable variation in the quality of the data submitted to FAO by Member States, and some of the data (e.g. hatchery output, structural data) is not published because of quality problems. Though FAO has made considerable progress in improving its database, the latter is still in the developmental stage, lagging behind statistical systems for fisheries and agriculture. However, the growing importance of aquaculture requires closer attention to some aspects of data collection and their accurate reporting and analysis, as well as the purpose and scope of collected data.

With these concerns in mind, the FAO Advisory Committee on Fisheries Research (ACFR), through its Working Party on Status and Trends in Fisheries (WP/STRF) recommended that the FAO global system of status and trends reporting be improved in support of more effective policy-making and management, and better monitoring of environmental and ecosystem impacts, in the context of an international plan of action to be drafted for this purpose[5]. Such a strategy has been developed for capture fisheries and was adopted by the FAO Committee on Fisheries in its meeting in March 2003. Aquaculture was excluded from the strategy because of perceived differences in its information requirements, and recognition that the aquaculture sector requires a dedicated initiative.

More recently, The COFI Sub-Committee on Aquaculture[6], during its first session in April 2002 and the second session in August 2003, designated information needs for aquaculture as a priority area for attention at the global level and recommended that FAO develop an approach for improving reporting on aquaculture status and trends

[4] E.g. Code of Conduct for Responsible Fisheries, Kyoto Declaration and Plan of Action, International Convention on Biological Diversity; WTO Agreement of Sanitary and Phytosanitary Measures and OIE International Aquatic Animal Health Code; Convention on International Trade in Endangered Species; etc.

[5] Report of the Technical Consultation on Improving Information on the Status and Trends of Capture Fisheries. Rome, Italy, 25-28 March 2002. FAO Fisheries Report No. 680 Rome. 2002.

[6] Reports of the first and second sessions of the COFI Sub-Committee on Aquaculture. FAO Fisheries Reports 674 and 716.

similar to that developed for capture fisheries, with special attention to the quality of the information on which it is based. This consultation is in follow up to that recommendation.

## 2 OBJECTIVE AND SCOPE

The Fisheries Department organized this consultation with the purpose of seeking advice and guidance for improving global status and trends reporting on aquaculture.

To provide guidance, the Consultation was requested to consider a number of interlinked institutional and technical issues. The Consultation was asked to evaluate the current information base and its adequacy for monitoring of trends in the light of changing management perspectives. It was also requested to examine the procedures for global reporting and address the broader issues of quality assurance and participation in the collation and analysis of information in order to ensure transparency and consensus. During the process, the Consultation took into consideration:

- the current content and constraints in the collection of aquaculture statistics and
- availability of non-statistical information systems;
- national data collection capacities and resources, as well as the trade-off between the scope of coverage and data accuracy; and
- recent recommendations from FAO meetings on these matters.

The overall objective of the Consultation was to prepare a sustainable strategy and a plan for the improvement of status and trends reporting on aquaculture at the international level. In doing so, the Consultation:

- reviewed available information on completeness, scope and procedures for preparation of FAO status and trends reports on aquaculture (i.e. information collection and collation, quality control, analysis and dissemination), as well as the nature and quality of the information on which it is based, and the timeliness of reporting;
- reviewed regional and global institutional arrangements and mechanisms for advising on information needs for policy and management, agreeing on standards and methodologies for collecting information, and coordinating statistical activities among regional bodies;
- considered changing information requirements for sector management and suggested minimum content and related data and information needs at the national level and for global reporting, within the practical limits of national resources and capacities, to enable a more holistic, multi-faceted approach to aquaculture analysis and management;
- identified areas for improvement and suggested practical measures and mechanisms for achieving improvements in targeted areas; and
- drafted an international strategy and plan to serve as a framework for implementing these improvements.

## 3 DOCUMENTATION FOR THE CONSULTATION

The deliberations of the Consultation were supported by documents prepared by FAO, which provide background information on key topics; e.g. current status of information for monitoring and reporting status and trends of aquaculture at the national level in selected countries, current FAO procedures for monitoring and reporting global status and trends of aquaculture, key issues in establishing an adequate information base for global reporting on aquaculture, and other relevant FAO publications.

A document outlining a draft strategy (EC:STA2004/5 – See list of documents in Annex 2) and a brief plan for improving global reporting of status and trend of aquaculture, adapted from the strategy prepared earlier for capture fisheries was made available to the Consultation, which served as a starting point for discussions.

## 4 ORGANIZATION OF THE CONSULTATION

The consultation was held in English. All materials prepared before and during the meeting, as well as the discussion held, were in English. The Consultation was conducted in plenary sessions. Key background information was presented in summary form by FAO staff prior to discussions. The report of the consultation was prepared by the secretariat and reviewed and adopted by the participants.

## 5 PARTICIPATION

The Consultation was attended by selected experts representing both information "providers" (involved in the collection of statistical and non-statistical information) and information "users" (policy-makers, planners/managers). Participants were invited to attend in their personal capacities as technical experts in their fields and to achieve a balance of regional representation. List of participants of the Consultation is given in Annex 3.

## 6 PROGRAMME, VENUE AND DATE

The Consultation was held at FAO Headquarters in Rome, Italy, from 20–23 January 2004. The agenda and timetable for the Consultation (EC:STA/2004/1) are given in Annex 1.

## 7 OPENING OF THE CONSULTATION

Mr. Ichiro Nomura, Assistant Director General of FAO (Fisheries Department) opened the Consultation by addressing the participants. In his opening address, Mr Nomura expressed the gratitude of FAO to the experts for attending the Consultation and welcomed them to Rome. Mr Nomura emphasized the importance of regular, reliable, and quality information for sustainable development and management of the aquaculture sector and invited the experts to discuss and advise FAO on how to improve information on status and trends of aquaculture.

## 8 APPOINTMENT OF A CHAIR PERSON

Mr Svein Munkejord was appointed as the Chairperson to the Consultation.

## 9 ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE CONSULTATION

The Agenda (EC:STA/2004/1) shown in Annex 1 was adopted by the Consultation. The documents which were provided to the Consultation are listed in Annex 3. The Secretariat informed the process used for producing the Consultation documents.

## 10 CURRENT STATUS AND MAIN ISSUES OF NATIONAL MONITORING AND REPORTING OF AQUACULTURE STATUS AND TRENDS

The Secretariat presented the regional syntheses of procedures and issues in relation to national monitoring reporting on aquaculture (EC:STA/2004/2) which covered the regional reviews of aquaculture status and trends. The consultation was informed of the countries reviewed, the methodology used and the results obtained.

In all countries reviewed there was a separate treatment of aquaculture and fisheries. The definitions used by the countries were generally similar to those used by FAO. Administrative structures for aquaculture development management and monitoring varied between the regions. There were varying degrees of linkage between monitoring and planning and management. Annual reports on aquaculture status and trends were prepared, but only in some regions. There are wide variations between countries and regions in terms of the information that was collected for the structural statistics.

Key problems constraining collection of high quality data related to: fears of taxation results in underreporting, in other cases planned production targets may lead to over-reporting in some countries, limited infrastructural/logistical support, poor access to farms and also inadequate legal frameworks are also common problems. Non-statistical supporting information was not collected regularly or used widely.

National priorities for information included market intelligence, basic production data, environmental and socio-economic information. Priorities also included the dissemination of information in a form that could be used more effectively. In most countries there were on-going efforts to improve the information systems (including user-producer consultation and IT related aspects such as electronic reporting, internet based systems/databasing as well as some training).

***Purpose of data collection***

It is important to emphasize the importance of understanding which data is collected and for what purpose. In particular there is the need to ensure that the information is useful in management. Data collection should be a part of the management process. This is important throughout the information chain from farmers to national level (although there will be differing information needs between these levels).

***Making information useful and relevant***

The differing interests in information collection are an issue – this is particularly the case where farmers are expected to generate information that is not directly useful to them. It is important to have a dialogue with farmers in order to generate and develop information systems that are actually useful to their information needs. The involvement of producers groups is an essential feature of ensuring accurate and timely information.

Lack of ownership over the production of information inevitably means that farmers are less likely to be concerned with providing accurate information. In some circumstances the farmers/producers feel the requirement to provide information is a burden. If data providers have a clear understanding of the use of the information that they provide, this encourages their commitment to the generation of information.

***Definitions and their standardization***

The consultation emphasized the importance of definitions for aquaculture (e.g. separation of aquaculture and capture fisheries, inclusion or not of reptiles and amphibians, inclusion of ornamental species) and the types of aquaculture (intensive/extensive etc.), since it is important in the development of strategic and economic plans as well as legal frameworks. This is a long standing issue for FAO and the conclusion has been to separate fisheries and aquaculture questionnaires. Countries are encouraged to inform FAO when they submit information that contains definitions that do not correspond to FAO standardized terms (i.e. inform if data submitted include or exclude aquarium species, reptiles, amphibians, tuna fattening etc.). The current FAO definitions of brackishwater and marine environments create difficulties since these definitions may vary between countries. Combining these two environments might remove confusion from reporting. This is of particular importance in the reporting of shrimp aquaculture.

Separation of fisheries and aquaculture can be problematic especially where the two activities are integrated (e.g. enhancement of waters bodies using hatchery produced stocks). Globalization will increasingly require more standardized definitions in order to resolve disputes over trade.

Fattening of wild-caught fish is a rapidly expanding industry. FAO has been in dialogue with statistical agencies regarding the aquaculture component of tuna fattening. FAO recommended that only the weight increase in captivity should be reported as

aquaculture production. However, there is a lack of awareness of this protocol that has resulted in countries reporting the entire production under aquaculture or under capture fisheries and not distinguishing between the aquaculture and capture fisheries elements. The consultation was urged to consider this issue of definition further. This raises a practical issue of assessing the weight of the fish at stocking, since weighing the live fish is extremely difficult. The reporting of fattened tuna as aquaculture production may be intentional since it relates to fisheries management issues, such as quota controls.

*Legal and institutional frameworks*

Legal frameworks may be a constraint if they change too frequently or do not adequately cover aquaculture. When marine and freshwater aquaculture are covered by different authorities this may result in miss-information. Linked to this is the issue of government continuity/commitment to statistical collection. Many countries lack baseline information and this constrains long term trend reporting (an additional issue is that collection of information may not be continuous).

Incentives are an important aspect of the national information system, especially where the system is based on voluntary reporting. If there is no legal requirement to report then the information is unlikely to be delivered. There is a challenge to develop ways to get timely and accurate information relating to small-scale farming operations.

Licensing and registration of farms is an important aspect of developing efficient sampling schemes. The number, location and type of farms are useful information and legal frameworks to ensure collection of such information should be developed. Licensing and registration of farms are becoming increasingly important for export targeted products, since this supports traceability of products. Thus, there may be opportunities to link these developments to statistical data collection systems.

*Expanding the scope of global data compilation*

In current questionnaires there is typically a lack of information on structural and economic data (production information is reasonably good). Inclusion of economic and socio-economic data at national or regional level is valuable and should be encouraged. Market information is also increasingly useful for developing an appropriate policy (relating to development of aquaculture and subsidies).

*Collection and use of non-statistical data/information*

Non-statistical information that is useful in development and management of aquaculture includes:

- White papers on aquaculture prepared by line agencies
- Information from producer organizations and national institutions
- Market information
- Research and academic studies
- Legal frameworks and policy and planning documents
- Information on inputs related to aquaculture (such as feed ingredients, water usage, biomedication and pesticides)
- Socio-economic information
- Administrative data
- Environmental information

It was noted that although some information may not be collected regularly, this information could be used in status and trends reporting.

***Using other information collection mechanisms to obtain basic/baseline information***

The diversity of systems and environments and sheer scale of numbers of producers in Asia is a challenge to information systems. The use of a baseline system is to be encouraged (such as census information of some form of basic registration). More detailed information can be obtained from sample surveys.

To improve status and trends reporting, the consultation was asked to consider how distinct aquaculture (especially land based operations) is from agriculture since it shares many commonalities with agriculture. Synchronizing of aquaculture data collection with agriculture was urged. FAO is currently dealing with the issue of how aquaculture information can be included into Agriculture statistical processes (e.g. census information). It should be noted that agriculture production is often based on estimates of seeded areas or numbers of livestock present on the holding at the beginning of the season. Annual production is then estimated through sampling of production. This is particularly effective with annual plant crops.

***Additional recommendations***

It was noted that many countries lack a regular annual survey of aquaculture, and thus much of the information reported are estimates.

The issue of timeliness is also critical in terms of making the information produced as useful as possible (especially for trends reporting). Trends reported that are several years out of date may not be useful for predictive purposes.

Questionnaire development should be accompanied by explanatory notes. In particular, what are the data to be used for, and an explanation of the value of the data for the sector?

ARTFISH[7] – could be adapted by FAO to assist in standardization of aquaculture data collection. The consultation requested that it could be informed of the potential for adapting ARTFISH as a tool for collecting aquaculture statistical information. FAO has commenced the process for developing ARTFISH for aquaculture and FAO expects that it will be ready for testing soon.

It was noted that it would be desirable to include fisheries and aquaculture products into global food consumption and trend models (and not just for globally traded commodities).

The difference in data requirements for macro-level analysis and micro-level analysis should be addressed. For macro level analysis, detailed data are not required but timeliness of data availability is essential, whereas detailed sets of data may be required for micro level analysis but will take longer to produce. It was recommended that information collected should be clearly divided into data that is needed as quickly as possible (but which may be based on gross estimates) versus that data which must be accurate but which may have a slower rate of change and therefore can be updated less often.

## 11 CURRENT FAO PROCEDURES FOR MONITORING AND REPORTING PRODUCTION AND STATUS OF AQUACULTURE

The document "Current FAO procedures for monitoring and reporting production and status of aquaculture: review and discussion" (EC/STA/2004/3) was presented by the secretariat.

In the presentation the following issues were brought forward: goals for data collection, methods, elements included in the FISHSTAT AQ and FISHSTAT NS AQ questionnaires, schedule for the collection and processing of the questionnaires,

[7] Approaches, Rules, and Techniques for Fisheries Statistical Monitoring – software package developed by FAO for planning, entering and processing sample survey data and producing estimates of production.

processes of distribution and receipts of questionnaires, data quality control, weaknesses in current data procedures, data dissemination, publications used by FAO and collaboration with international and regional agencies and bodies in data collection and dissemination.

It was detailed that the less well known FISHSTAT NS AQ questionnaire is used to revise previous seven years data. At the end of the presentation some areas for improvement were suggested, including, the development and implementation of standardized methodologies for aquaculture data collections (e.g. ARTFISH system for aquaculture) and the intensification of FAO technical assistance in order to implement more projects improving aquaculture data collection. Among the points suggested for discussion by the consultation were the adequacy of current procedures and areas of weakness. The secretariat also suggested improvements on appropriateness of data items, frequency of collection, comments on publication and dissemination strategy, development and implementation of standardized definitions and methodologies, and the possibility of designing feedback mechanisms for data between parties.

*Standardization of methodologies*

Standardization of methodologies might seem the solution to a number of key difficulties for data processors and database developers. However, this could be problematic where the diversity in aquaculture systems (e.g. in terms of administrative structures and infrastructure) is large and standardization could lead to false- or under-reporting and/or under reporting.

The existence of different types of information systems in different countries and regions is a challenge for the development of a common approach. Procedures used for collection of data (direct to farm, use of enumerators, surveyors) vary among countries. Availability of a wide range of questionnaires limits standardization; therefore a more standardized form of survey might be useful.

*Employment data*

It was discussed to include aquaculture employment data in the FISHSTAT AQ questionnaire, instead of the use of a FISHSTAT FM questionnaire as is currently the case. The relative advantages and disadvantages of such a change were discussed. The fact that in many countries employment figures are only collected by the Ministry of labour which usually has limited linkage with the Departments or services responsible for Aquaculture Statistics was an argument in favour of leaving the situation as it is. The Secretariat mentioned that the National Aquaculture Sector Overviews (NASO), which FAO has started to compile, also covers employment data and might be a useful source of information in this respect.

It was noted that there are difficulties for database producers in determining whether to include traders of aquaculture products under aquaculture employment, and the issue of how to deal with part-time aquaculturists in statistics was raised. The secretariat mentioned that FAO has attempted to collect data on full-time, part-time and occasional aquaculture employment since the early 1990s. However, the rate of response from the member governments on this subject is low and it requires excessive estimation and time from FAO. It was noted that EUROSTAT had similar experiences and had also found it extremely difficult to obtain relevant data on this subject.

*FISHSTAT AQ*

Some suggestions were made to include more issues into the FISHSTAT AQ questionnaire form, such as numbers of hatcheries, hatchery production in million larvae, direct and indirect aquaculture jobs per hectare and per metric ton of product harvested.

***EU DG Fisheries database on aquaculture legislation and FAOLEX***

The consultation was made aware of the existence of a website accessible through the Internet with all EU regulations, directives and decisions related to aquaculture, processing and marketing[8].

Moreover, the existence of a FAOLEX website with legislation of many countries (including fisheries sector relevant legislation) was mentioned as another source of relevant information. This website is directly accessible from the FAO website at: http://faolex.fao.org/faolex/.

***Regional and international collaboration***

The follow-up possibilities of the SIPAL (Sistema Informático para la Planificación de la Acuicultura en Latinoamerica y el Caribe) project, which was developed in the early 1990s, were discussed. It was noted that interest by member countries within the region is high, but funds to restart activities in this field in Latin America are lacking at present. FAO intends to assist the Latin American countries on some of the issues covered originally under SIPAL through FIGIS.

It was noted that advantage should be taken of the desire of many international and regional agencies and bodies to complement each other on data collection and dissemination. Further increase of collaboration between the various agencies involved in aquaculture statistics issues (e.g. with NACA, SEAFDEC, EUROSTAT) should be promoted. This would allow the agencies to jointly serve their member countries.

***Food Balance Sheets***

Questions were raised whether FAO could construct specific food balance sheets for aquaculture. It was noted that the lack of information on the origin of the fish, particularly in the foreign trade data (capture fisheries or aquaculture) used to prepare these sheets might be a major constraint to achieving this.

***Quality assurance of data***

The quality and checking procedures of aquaculture data inside FAO were discussed and it was explained how data were validated and checked with national governments and other sources such as export data, information from regional bodies and other international organizations.

***Double counting of data***

In relation with the issue of the substantial quantity of fishmeal/fishoil and to a lesser extent "trash" fish used for aquaculture purposes it was discussed whether there exists some double counting. The Secretariat explained that the removal of fish used for fishmeal from fishery production would result in gaps in the data. For example, the economic value of the fishmeal industry and the employment generated by the fishmeal sub-sector could not be estimated.

The other issues briefly discussed during the session include:

- *Comparability of data between sectors* – it was recognized that there exists a need for national government to be able to compare the aquaculture data with those of other sectors; which might be important to justify investment in and indicate the importance of the sector.
- *Fishstat+ software* – *http://www.fao.org/fi/statist/statist.asp* Experts recognized that the Fishstat + software used by FAO and accessible for the public via internet is very user-friendly compared to other systems.

[8] http://europa.eu.int/comm/fisheries/doc_et_publ/factsheets/legal_texts/aqua/index_en.htm.

- *COFI reporting* – It was suggested to the secretariat to prepare a one-page summary of the main issues to solve in aquaculture status and trends reporting to be presented to the next session of COFI.

## 12 GLOBAL ISSUES IN RELATION TO STATUS AND TRENDS REPORTING ON AQUACULTURE

The secretariat presented document EC:/STA/2004/4, General issues in relation to FAO status and trends reporting on aquaculture. Issues of data quality and constraints to better data were highlighted. The opportunities for international cooperation and greater participation of stakeholders were discussed.

To improve the quality of data received from members, it was recommended that FAO develop substantial guidelines for the completion of the questionnaires and proper interpretation of concepts and terminology as has been done for capture fisheries status and trends reporting. The glossary of aquaculture terms currently being developed by FAO should be of great help to address this need. In addition, FAO was encouraged to continue the development of the aquaculture module of ARTFISH to provide tools for cost-efficient survey methodology and data processing to members. Furthermore, countries should consider appropriate inclusion of basic aquaculture questions in fishery and agricultural census.

The consultation recognised that in the face of static or declining resources for data collection and analysis, there are sources of information other than national governments are available, and these should be utilized in addition to the official statistics provided by governments (e.g. organizations of aquaculture producers could be brought into the data collection process). Additionally, registration or administrative records could also be used to gather more information.

***Prioritization of data needs:***

It was requested that the Consultation participants prioritize the data needs and establish minimum requirements for data reporting for the national, regional, and international level. A subgroup was assembled to specifically address this task by considering the purpose of each data element, the information required to report, the method of collection, the recommended frequency of collection, issues related to the implementation, and the constraints expected and capacity required.

The Expert Consultation discussed a conceptual framework for status and trends reporting in aquaculture. The Consultation agreed that the overall goal should be to report on the status and trends in aquaculture to support management and sustainable development of the sector.

To support the goal of sustainable development of the sector, the Consultation emphasised that status and trends reporting should serve the following six themes:

- Quantifying aquaculture production, species and values
- Assessing natural resource use and environmental management
- Contributions of aquaculture to poverty reduction, social impact and livelihoods
- Contributions of aquaculture to food security and food demand, and development of food policy
- Contributions of aquaculture to national economies and trade
- Development of institutions that support responsible development of aquaculture

The Consultation decided that all six themes were important in global status and trends reporting. However, it recognized that there would be practical difficulties in collection and analysis of some information within each theme, and this would influence collection priorities.

For each theme, the Consultation identified the following criteria:

- What are the potential indicators for measurement, and information required to develop the indicators.
- How the required information would be collected (source, frequency, quality considerations), with special emphasis on FISHSTAT AQ, NASO and other mechanisms for data collection.

The framework is attached as Annex 4. The Consultation suggested that the framework be used as a reference for development of supporting guidelines and strategy implementation.

The consultation endorsed the need for a working group, comparable with the Coordinating Working Party on Fishery Statistics (which deals primarily with capture fisheries). This working group would consider all aspects related to aquaculture information and statistics (for example, concepts, definitions, data requirements and questionnaire formats). It was suggested that such a group could be established under the FAO COFI Sub-Committee on Aquaculture.

While there are many data elements for which the Consultation recognized the need, it was noted that not all elements could be collected on an annual basis. Some detailed information may be contained in FAO National Aquaculture Sector Overviews (NASO) produced and updated approximately every 4–5 years. The consultation recognized that a series of such profiles could still contain valuable trend information even if not on an annual basis.

As a tool for increasing national commitment to the collection of aquaculture statistics, it was suggested to analyse what would be the consequences if certain data were not collected. That is, what tasks could not be accomplished and which planning activities would be constrained without the data.

As countries have a wide range of expertise, capacity, and experience, it was suggested that good examples of national aquaculture data reports, trends analysis, and data collection methods be provided to the global community as models and tools to facilitate improvement for all countries. Regional and inter-regional working groups may provide excellent venues for this exchange of ideas and experiences among nations with different levels of capacity and commitment. The Consultation emphasized that improvements in national aquaculture data collections and reporting are ultimately beneficial to the country and to the aquaculture sector of the country, in terms of strategic planning for the sustainable development of the industry.

## 13 INFORMATION NEEDS AND AVAILABILITY: DEFINING BASIC INFORMATION NEEDS AT THE GLOBAL LEVEL, AND RECOMMENDATIONS TO THE WORKING GROUP ON THE FAO QUESTIONNAIRE, FISHSTAT AQ

The Secretariat presented this agenda item highlighting that the deliberations of experts on this subject were important for the further work that would be done by the Working Group, which convenes on 26–28 January. In particular their input was requested on which data elements they saw as needed and which, if any, were unnecessary in the current FAO survey. Experts were asked to discuss the required frequency of data collection, and the proper methodology for each element. The experts were also requested to identify how to overcome national constraints.

The ensuing discussion was much broader in its scope and participants referred also to data and information needs at other institutional levels.

The consultation was informed that typical requirements of producers associations included not only sector-related data and information but also those concerning sectors "upstream" (e.g. fry and feed suppliers markets) and "downstream" (e.g. processing and marketing). Data and information requirements from units within the sector are different according to the scale of the production units and the aquaculture practice.

However a clear and agreed definition of the variables to be measured is essential (e.g. whether production refers to biomass growth, harvested output, or marketed production) for a reliable estimate across the sector. The range of information required includes also employment, market of utilization (domestic, foreign), processing and for some practices the quantification of variables that have an environmental impact (e.g. effluents).

The same diversity of needs applies at the national level, as data and information needed and the availability of the data varies (as an example between the list of certified producers and semi-commercial and rural units). At policy level there is the need for indicators and for the data necessary to their construction, especially those which indicate environmental performance (for example: volume of water per weight unit of the farmed organism, disposal of solid residues etc.). Better coordination between the line Ministry and the National Statistical Office typically conducting Agricultural Censuses would result in the improvement of the array of questions concerning aquaculture in the form, and thus generate useful information with little additional cost. A recent case in Myanmar demonstrated the potentiality of including even a few questions on aquaculture at the level of the household.

An area where current surveys do not adequately address aquaculture concerns is that of socio-economic data. As far as employment is concerned, the difficulty of obtaining upstream and downstream employment data was highlighted. The EU had conducted a survey of status and trends of employment in the fisheries sector (including aquaculture). This study confirmed the difficulty in obtaining data on upstream employment and highlighted a more general problem of a lack of harmonization of concepts and definitions and of a variety of frequently inconsistent sources of information.

The consultation addressed the problem of the coverage and quality of the global data set collated annually by FAO. The Secretariat was inquired on the methodology for estimating values (which were meant to measure the gross revenue at the farm, at the point of first sale), to which extent it searched for alternative global sources of information (e.g. the data set of other organizations), and the extent to which trade data were used to validate production. The consultation recommended that FAO expand data collection on social and economic aspects, and on employment in particular.

The secretariat informed the consultation that the FAO data set is based on nationally available information, and thus is influenced by national priorities for data collection. The data requirements and availability of "cash crop"-type species (salmon, shrimp, sea-basses, sea bream etc.) often produced for the international market by a highly structured, well organized sector, sometimes in large establishments, are widely different from those of the semi-commercial, subsistence, small-scale sector. While the first is generally well-monitored by national systems, and produce data of known quality, fish farming for local markets and self-consumption/subsistence in small family farms (typically in Asia) is generally not well covered in national statistical systems. For the latter, the collection of the array of data on employment of the smaller establishments (e.g. by type of occupation, gender, age, time spent in the profession) is not usually possible through standard employment surveys. This has probably resulted in underestimation of the contribution of the sector to social and economic goals, and in particular the important role of women in aquaculture, in many countries.

Some time was devoted to reaching consensus on the understanding of the terms "status" and "trends" and on the desirable frequency of the collection of data and information on the two elements. The group agreed that status is the situation prevailing at one specific point in time, thus describing the condition of the sector in respect of identified elements (as a minimum the output in volume and value, employment, but also income, market demand, prices of products and inputs etc.), whereas trends are measurements of the changes of such variables over time. Knowledge on the latter is

important for policy decisions concerning sustainability and development, as they provide the indication of a global direction.

The participants noted the usefulness of trade statistics, but recognized that this is limited by the lack of specific identification of farmed products available in international trade nomenclatures (e.g. the Combined Nomenclature, the Harmonized Commodity Description and Coding System). Participants were informed that the forthcoming session of the COFI Sub-Committee on Fish Trade was addressing this issue to make recommendations to the classification maintenance organization.

Some of the salient points emerging were:

- the agreement on definitions;
- the need to draw data lists at political level (e.g. few aggregate statistics), at policy making level (differentiate the global into sub-national–regional estimates), elaborate clear indicators; and
- the need to draw a data list at farm unit level.

Policy goals vary from country to country and determine the array of data required. For example some participants recalled that the EU policy on aquaculture had to respect 3 main basic goals:

- social aspects (guarantee employment and people's well being);
- consumer protection (guarantee the quality of the product);
- environment protection (guarantee the respect by the industry of the quality of the environment); and

that the information sought for aquaculture had to cover all those aspects.

The participants noted that the reliability of the FAO global dataset would improve when making comparisons with the information available in other national and international organizations. They recommended that the existing exchanges of data between organizations should be intensified and institutionalized through a mechanism similar to the Coordinating Working Party on Fishery Statistics. They also recommended that national offices should exploit all sources of available information on aquaculture (data held by producer organizations, regional organizations, the academy, projects, other agricultural surveys) before undertaking new surveys and also to validate results of data collected.

## 14 STRATEGY AND OUTLINE PLAN FOR IMPROVING INFORMATION ON STATUS AND TRENDS OF AQUACULTURE

*Discussion of the strategy*

The consultation reviewed the draft strategy and outline plan for improving information on status and trends of aquaculture (EC:STA/2004/5). There was broad agreement among the experts on the need for such a strategy to improving information on aquaculture status and trends. The consultation made a number of recommendations for the clarification and improvement of the strategy document.

Significant recommendations for the strategy were:

- Development of guidelines to assist planning and implementation of data collection should be included.
- Software development (e.g. ARTFISH and FIGIS) in support of data collection, exchange and analysis should be undertaken.
- The strategy should be more specific on socio-economic, environmental and economic indicators (refer also to the discussions above).
- Responsibilities of member states in data collection, and the need for resources, should be emphasized. FAO should encourage member states to invest in data collection and meet their international reporting responsibilities.

- Reference should be made of the need for coordination of data collection with the agriculture sector, when appropriate. Natural resources use and environmental management should be coordinated with departments charged with monitoring land and water use. Incorporation of aquaculture questions within censuses is consistent with this approach and should be mentioned.
- Emphasize cooperation with concerned departments at national levels, such as national statistical offices.
- Give greater emphasis to the involvement and partnership with regional organizations with a remit for aquaculture (e.g. in Asia these could include NACA and SEAFDEC).

*Discussion of a model project proposal*

A presentation of the FishCode Programme, a multi-donor global program of FAO that supports FAO members in the implementation of the FAO Code of Conduct for Responsible Fisheries proceeded the final discussion session.

Following the presentation, the consultation reviewed the draft project outline for supporting improving collection and processing of data and information on the status and trends of aquaculture.

The consultation strongly supported the idea of a project to assist FAO and its members in improving information on status and trends of aquaculture. The consultation identified a number of areas for amendment and emphasized that the objectives should be made clearer to emphasize the use of data for policy, planning and management not just collection of data and analysis. The document should emphasize the importance of data collection and how it could be used to support implementation of the CCRF.

The consultation urged FAO to seek funding support for this important initiative and suggested that the FishCode Programme would be an ideal partner for implementation of the strategy.

*Adoption of the report*

The report was adopted on 23 January 2004.

# Annex 1

## AGENDA OF THE EXPERT CONSULTATION

| | | |
|---|---|---|
| 1. | Opening of the Consultation | |
| 2. | Appointment of Chairperson(s) | |
| 3. | Adoption of the Agenda and Timetable | EC:STA/2004/1 |
| 4. | Current Status and Main Issues of National Monitoring and Reporting of Aquaculture Status and Trends: identification of institutional and technical issues for priority action at the national and global level. | EC:STA/2004/2 |
| 5. | Current FAO Procedures for Monitoring and Reporting Production and Status of Aquaculture: review and discussion | EC:STA/2004/3 |
| 6. | Global Issues in Relation to Status and Trends Reporting on Aquaculture: prioritizing key issues and defining a way forward. | EC:STA/2004/4 |
| 7. | Information Needs and Availability: defining basic information needs at the global level, and recommendations to the Working Group on the FAO Questionnaire, FISHSTAT AQ | EC:STA/2004/2,4, Info.3 |
| 8. | Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture | EC:STA/2004/5, 2-4, Info.4 |
| 9. | Adoption of the Report (including the proposed strategy and plan) | |

# Annex 2

## LIST OF DOCUMENTS OF THE EXPERT CONSULTATION

| Document | Title |
|---|---|
| EC:STA/2004/1 | Provisional Agenda and Timetable |
| EC:STA/2004/2 | Regional Syntheses/Summaries of Procedures and Issues in Relation to National Monitoring and Reporting on Aquaculture |
| EC:STA/2004/3 | Current FAO Procedures for Monitoring and Reporting Production and Status of Aquaculture |
| EC:STA/2004/4 | General Issues in Relation to FAO Status and Trends Reporting on Aquaculture |
| EC:STA/2004/5 | Draft Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture |
| EC:STA/2004/Info.1 | Provisional List of Documents |
| EC:STA/2004/Info.2 | Provisional list of Participants |
| EC:STA/2004/Info.3 | Guidelines on the Collection of Aquaculture Structural Statistics: Supplement to the Programme for the World Census of Agriculture 2000 (publication for distribution at the meeting) |
| EC:STA/2004/Info.4 | Strategy for Improving Information on Status and Trends of Capture Fisheries |

# Annex 3

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# Annex 4

## STATUS AND TRENDS REPORTING OF AQUACULTURE: AN ANALYTICAL FRAMEWORK

### 1 BACKGROUND

The following analytical framework was prepared by the Experts attending the Consultation to assist in defining information requirements for global analysis of status and trends in aquaculture development, and to provide a basis for further discussion and development of guidelines and approaches to status and trends reporting. It is organized around three questions: Why the data are needed?, What data should be collected?, and How should these data be collected? The framework has been edited but not all parts have been completed so as to accurately reflect the deliberations of the Expert Consultation.

*Why?*

The overall **goa**l of status and trends reporting in aquaculture is to support management. In order to better facilitate this goal, it is important to focus on the following status and trends:

- quantifying aquaculture production, species and values;
- assessing natural resource use and environmental management;
- contributions of aquaculture to poverty reduction, social impact and livelihoods;
- contributions of aquaculture to food security and food demand, and development of food policy;
- contributions of aquaculture to national economies and trade; and
- development of institutions that support responsible development of aquaculture.

The Expert Consultation considered that at international level the six points above should have equal priority in status and trends reporting, while recognizing that there would be constraints to reporting on some that could not be easily addressed.

*What?*

For each of the six points above, potential indicators followed by information required for developing those indicators should be identified, considering the necessary collection frequency, data quality and quantity, and any standardization required.

*How?*

Having established the indicators and information requirements, the methodology for collection of data and reporting of trends and status should be considered, with special reference to:

- information sources – the Expert Consultation gave special attention to the FISHSTAT AQ questionnaire, circulated by FAO to members. However, in some cases required information would need to come from other sources, both within and outside FAO (e.g. agriculture census information,

etc.);

- quality control issues;
- infrastructure required;

- any regional differences or considerations;
- dissemination strategies (NASO, FAO publications (such as circulars); and
- cooperation and partnerships to assist in collecting, collating and disseminating status and trends reporting.

## 2 SUPPORT REQUIREMENTS

Recognizing that there is a need to develop tools for collecting and disseminating information and building capacity for implementing the strategy for improving status and trends reporting in aquaculture, the Expert Consultation also suggested the framework should include; (a) constraints analysis and capacity building requirements and (b) tools that can support national and regional awareness and capacity building (e.g. guidelines for collection of aquaculture statistics, etc.).

## 3 POSSIBLE INDICATORS AND INFORMATION FOR IDENTIFYING THEM

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 1) Aquaculture production, species, values | Production and (farm-gate) value by species and culture environment<br>Number of aquaculture establishments (grow out and hatchery)<br>Water surface area by establishment and species | Production, species, aquaculture establishment, farm-gate value | FISHSTAT as major source of information. However, water surface area might be collected by other means.<br>Information on the values could be improved through involvement of national experts. Should aim at providing best estimate on prices.<br>Remote sensing/ satellite data could be used for water surface area and coverage information.<br>GLOBEFISH could be used to validate farm-gate prices by comparison with market prices.<br>Frequency of collection should be annual. | **Value** – difficult to assess, thus clear instructions are required in FISHSTAT *AQ*.<br>**Environment** – difficult to assess the differences between brackishwater and marine. Might include categories such as inland / freshwater, and coastal/others.<br>**Tools** – better instructions on forms for determining value would be helpful. |

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 2) Environment and resources | Land use | land area and classification | Not only FISHSTAT | Availability of information and costs of studies will be the main constraints |
| | | land area per unit of production | Special studies/NASO | |
| | | | Feed mills/associations | |
| | Water use | | AAPQIS, OIE | |
| | | total area of water and classification | DIAS (biodiversity) | Guidelines are required |
| | | volume per unit of production | Environmental authorities | |
| | Nutrient use | percentage farms with effluent treatment | Licence requirements | It is important to understand what is meant by environmental management. Two aspects to the environment – impact of environment on aquaculture and impact of aquaculture on environment should be considered. |
| | | | regional differences exist | |
| | Chemical use | classification of nutrients | more frequent studies on fast growing sub-sectors | |
| | | percentage of farms using each nutrient | consider sub-sampling countries rather than complete coverage | |
| | | feed inputs per unit of production | environmental certification | |
| | Species use | classification of chemicals | | Other aspects as alien species should be included. |
| | | percentage of farms using each chemical classification | All above are of high priority, as they reflect all aspects of sustainable development. | |
| | Disease occurrence | chemical inputs per unit of production | Environmental licenses issued for aquaculture and CCRF reporting would also be other mechanisms. | |
| | Energy use | percentage of farms using native and non-native species | Frequency of data collection – periodic studies rather than routine FISHSTAT data. | |
| | | disease classification and percentage of farms affected for each disease | | |
| | | economic costs of disease | | |
| | | energy classification (renewable or non-renewable) | | |
| | | energy inputs per unit of production | | |

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 3) Social impacts and employment | Social<br><br>Economic | Number of employees (full, part time, in full time equivalents)<br>Gender<br>Educational status<br>Age<br>Nationality<br>Income<br>Ownership of the establishment<br>Presence of associations (also covered under institutions below) | Employment data through FISHSTAT<br>Upstream and downstream information is desired, but technical difficulties are recognized.<br>May be better to concentrate on aquaculture proper.<br>Employees to be seen in a wide context recognizing social and national structural differences.<br>**Priority** – high priority for employment, but medium-high priority for other data.<br>**Frequency** – changes are such that annual surveys are not required. Information best obtained by periodic surveys/studies | FAO should undertake FAO consultations (e.g. with ILO, and UN HLD) to ensure proper data coverage. |

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 4) Food security and poverty reduction | Contribution<br><br>Consumption<br><br>Self-sufficiency<br><br>Trade balance<br><br>Price elasticity | Contribution of aquaculture to GDP<br><br>Per capita consumption (in live weight equivalents, in protein input)<br><br>Degree of self-sufficiency<br><br>Trade balance in national economy<br>Price elasticity of products/commodities | Consumption and self-sufficiency are traditionally derived from food balance sheets compiled by FAO using available basic (production and trade) data.<br><br>**Priority** – high priority<br><br>**Frequency** – annual if possible<br><br>An additional input is the annual questionnaire on the use of fishery products.<br>**Priority** – high priority, but there will be difficulties in compiling balance sheets specifically for aquaculture products.<br>Trade balance – is available from trade data, but maybe difficult to identify aquaculture products<br>Price elasticity – by special studies and not annually<br>**Priority** – medium | Tri annual average of consumption would be sufficient but annual is better if possible.<br><br>Results should be sent to national bodies and peer review for comment before publishing.<br><br>Some social information could be collected through NASOs.<br><br>Relative price difference between species originated from the wild and culture.<br>Special studies for separating fish destined for tertiary purposes vs. food use could be appropriate. This may allow interpretation of aquaculture figures in relation to fish supply, imports, and other food (meat) products. |

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 5) Economies and trade | Export value<br>Export volume<br>Investment<br>Subsidies and incentives | Export and trade figures compared across sectors<br>GDP figures<br>National export figures | Not through FISHSTAT *AQ*<br>General statistics office (GDP information)<br>National export figures<br>Trading bodies (UN COMTRADE, WTO)<br>FAO statistics, NASO, GLOBEFISH, etc.<br>**Priority** – medium at global level<br>**Frequency** – If possible annual basis and if not less frequently. | Difficult to obtain in many countries.<br>Difficult to separate aquaculture from capture fisheries and overall economic data.<br>Make estimates based on assumptions of contribution.<br>Data may not be collected on a global basis.<br>Need for inter-institutional cooperation. |

| Why? | What indicators? | What information? | How? | Constraints and support requirements |
|---|---|---|---|---|
| 6) Institutions to support responsible development of aquaculture | State support | Government and other public institutions<br>administrative structure<br>budget allocation<br>legal framework<br>staffing | For the entries in this category, information would be collected from the institutions involved or through other research – it would not be included on any existing questionnaires. | The major constraints would involve the availability of information, interest in cooperation, and improvement of communication among institutions. |
| | Education and training | Educational and research institutions<br>classification/ quantification of educational/research institutions engaged in aquaculture related activities<br>staffing | | |
| | NGO assistance | Non-Government institutions<br>quantification of NGOs engaged in aquaculture related activities (upstream and downstream) | | |
| | Banking and finance | Banking and finance institutions | | |