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COMMITTEE ON FISHERIES

SUB-COMMITTEE ON AQUACULTURE

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EFFORTS TOWARDS IMPROVING AQUACULTURE DATA, INFORMATION AND STATISTICS: THE PAST, PRESENT AND FUTURE: FOR DISCUSSION AND DECISION

Executive Summary

This document summarizes recent activities towards improving aquaculture data, information and statistics by the FAO in collaboration with several other key organizations. It informs about the recent revision of several global classifications for statistics that introduced items of direct relevance to aquaculture. It introduces on-going FAO activities in support of the implementation of the Blue Growth initiative through enhancing information collection, consistency, comparability and communication and extends an invitation for collaboration and participation.

The Sub-Committee is invited to:

Review the document and provide comments and feedback on on-going and achieved activities;

Advise on how to improve data, information and statistics on aquaculture using different mechanisms and strategies, including the Aquaculture Subject Group of the Coordinating Working Party on Fisheries Statistics (CWP-AS), for the benefit of the member countries;

Express interests in participation and involvement to activities, in particular in the field application of information literacy enhancement in support of FAO's technical assistance towards sustainable and responsible development of aquaculture.

STATUS OF AQUACULTURE DATA AND INFORMATION COLLECTION AND DISSEMINATION BY FAO

1. The contribution of aquaculture to food security has been rapidly and consistently increasing and has reached close to 50 percent of the total production of fish for direct human consumption. Consequently, as the COFI Sub-Committee on Aquaculture (COFI-SCA) repeatedly pointed out, there are increasing needs for reliable national and international statistics with improved details conveyed in a timely manner, not only of production but also the overall aspect of the sector, including social, economic, food security and environmental impacts, as the factual base for effective monitoring of aquaculture sector development and for informed decision making processes in policy development and planning at all levels. However, the worldwide situation of aquaculture statistics has not indicated a clear improvement for the past several years.

2. FAO currently collects aquaculture production statistics through two sets of questionnaires, one for the total aquaculture production by species and the other for collecting a further breakdown of production separated by grown-out facilities as well as hatchery and nursery production. Whilst the latest FAO global database contained the aquaculture production data of the 199 countries and territories, only about two-thirds of countries regularly submit their national statistics to the FAO. About 70 countries do not respond at all to the FAO and some of them are in fact major aquaculture producers in the world and regions. This ratio and major non-reporting countries have not changed for about five years. The productions statistics of non-reporting countries were estimated by FAO statisticians, based on limited information from alternative sources.

3. Among those countries and territories that provide information to FAO, less than half cover the full range of required statistics, with the rest varying in degree of completeness or data consistency. In general, the quantity of aquaculture production has been the item with the highest reporting rate. The information on production by farming system, areas of aquaculture facilities, production and hatchery and nursery production not only had low reporting but also had quite a wide range in quality. The situation is similar to the statistics of aquaculture employment collected with a separate questionnaire. While about half of the countries provide some information, only around 20 countries provide data disaggregated by gender and difference between full-time and part-time engagement and some aquaculture producing countries do not report number of aquaculture engagement.

4. It is considered that a lack of standard methodologies and guidelines for data collection is part of the reasons for relatively slow progress in improving an overall monitoring capacity of aquaculture sector and statistics. Therefore, the large part of efforts, summarized in the following sections, have been invested toward establishing the standard concepts on how to monitor the sector activities and its sustainability as a whole, and developing pragmatic methodologies to collect necessary information.

5. The Fisheries and Aquaculture Department's biennial flagship publication, the State of the Global Fisheries and Aquaculture[1], is a most authoritative and regular source of analyzed data and information on aquaculture disseminated by FAO. The FAO disseminates statistics, information and

[1] http://www.fao.org/3/a-i3720e/index.html

other tools relevant to aquaculture through the Fisheries and Aquaculture Department website[2], FAO aquaculture thematic page[3], Aquaculture electronic bulletins dispatched four times a year and the FAO Aquaculture Newsletters, released two issues per year both in hard and soft copies.

6. In particular, FAO has disseminated two fact sheets collections, the National Aquaculture Sector Overview (NASO)[4] and the National Aquaculture Legislation Overview (NALO)[5], since 2003 following the recommendations of the COFI-SCA III (Trondheim, Norway, 7–11 August 2003). The NASO provides a general overview of the status of aquaculture and culture based fishery at the national level and currently contains 106 fact sheets. The preparation and updating process of NASO is part of a partnership consolidation process between FAO and its Member countries aimed at ensuring an efficient aquaculture information exchange to better monitor the status and trend of aquaculture at the national and regional levels.

7. The NALO consists of a series of comparative national overviews of aquaculture laws and regulations from aquaculture producing countries, and have been prepared in collaboration with the FAO Development Law Branch. The preparation of the overviews is primary based on FAOLEX[6], a legislative database containing the world's largest electronic collection of national laws and regulations on food and agriculture. Further material is collected from national sources. The NALO currently contains 59 fact sheets.

8. The Aquaculture production statistics are being disseminated through Yearbook tabulations available in CD-ROM format, on-line query, and with the application called FishStatJ to support the extraction and aggregation of fishery statistical time series[7]. The current Fishery and Aquaculture statistics dissemination system requires imputing whole values that causes serious problems when the data sets contains a large proportion of missing values and low quality information. For this reason, the information on grown-out facilities, hatchery production and aquaculture employment have not yet been disseminated as statistics, though they were systematically compiled and utilized for general analysis. At the same time, it is well noted that this is a manner against the principle to disseminate all the information received from the countries in a proper way. Accordingly, FAO considers modifying its system to allow dissemination of data sets without imputation in addition to the regular dissemination of a series of global statistics with full imputation.

9. Furthermore, the FAO has an ongoing initiative on developing World Aquaculture Performance Indicators (WAPI), a user-friendly tool for assessing and monitoring aquaculture sector performance.[8] The tool would show the status and trends of aquaculture development in a form of

[2] http://www.fao.org/fishery/statistics/en, and http://www.fao.org/fishery/aquaculture
[3] http://www.fao.org/aquaculture/
[4] http://www.fao.org/fishery/naso/search
[5] http://www.fao.org/fishery/nalo/search
[6] http://faolex.fao.org/faolex/index.htm
[7] aquaculture statistics http://www.fao.org/fishery/statistics/global-aquaculture-production/en; yearbook cd-rom: ftp://ftp.fao.org/fi/cdrom/cd_yearbook_2012/index.htm; on-line query http://www.fao.org/fishery/statistics/global-aquaculture-production/query/en; fishstatj http://www.fao.org/fishery/statistics/software/fishstatj/en
[8] The initiative is an activity related to Agenda Item 5 in the COFI-SCA VI: "Assessing and Monitoring the Aquaculture Sector Performance: Importance, Issues and Challenges" (COFI:AQ/VI/2012/5). Details about the initiative and a prototype WAPI tool is available in "Report of the FAO Expert Workshop on Assessment and Monitoring of Aquaculture Sector, Gaeta, Italy, 5−7 November 2012", http://www.fao.org/3/a-i3539e.pdf.

tables and graphs smartly designed to address common issues of interests in aquaculture sector management.

A WAPI module on aquaculture production has recently been developed and ready for test use. The module currently covers aquaculture production (both volume and value) of around 900 species and species groups at the national, regional and global levels from 1950 to the present[9]. The WAPI tool plans to include modules on fish consumption and employment as the next step.

DEVELOPMENT UNDER THE CWP-AS

10. The Coordinating Working Party on Fisheries Statistics (CWP) established the Aquaculture Subject Group (CWP-AS), the inter-sessional working group specialized in aquaculture related issues, at its 23rd session (CWP-23) held in Hobart, Australia, from 22-26 February 2010, corresponding to the Strategy and Outline Plan for Improving Information on Status and Trend of Aquaculture (Strategy-ST A)[10] that was endorsed by the COFI Sub-Committee on Aquaculture held in New Delhi in 2006.

11. The CWP-AS aims to i) review the requirements for information and data on aquaculture statistics for the purposes of research, policy-making and management; ii) develop standard concepts, definitions, classifications and methodologies for the collection, collation, analysis and dissemination of aquaculture data, information and statistics; and iii) recommend for coordination and harmonization of activities in collecting, analyzing and disseminating aquaculture statistical data and information. The standards, concepts, guidelines and classifications developed by the subject groups, including CWP-AS, would be endorsed by the CWP session to become the CWP standards for fisheries statistics.

12. The Aquaculture Group initiated its activities at two ad-hoc Aquaculture Group meetings (Puerto Varas, Chile; 3-4 October 2008 and Rome, Italy; 6 March 2009), prior to the formal establishment of its status at the CWP-23.

13. After its establishment, the CWP-AS dedicated the majority of efforts during the first round of inter-sessional period (between February 2010 and February 2013), under the joint leadership by FAO and Southeast Asian Fisheries Development Center (SEAFDEC), to finalize the CWP Handbook of aquaculture, which was conceptualized at an Expert Workshop held in Ha Long Bay, Vietnam; 10–14 November 2009.

14. The first Aquaculture Group meeting was held on 2 October 2010 in Phuket, Thailand and the second meeting was held on 14 July 2012 in Rome, Italy.

[9] Requests for testing the module and/or more information about WAPI can be sent to WAPI@fao.org.

[10] The Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture: http://www.fao.org/docrep/011/i0445t/i0445t00.htm

15. The third meeting of the Aquaculture Group was held on 5 February 2013, prior to the CWP 24th session (CWP-24; 7–8 February 2013, Rome Italy), finalized the Aquaculture component of the CWP Handbook, which was subsequently endorsed by the CWP-24. A brief summary of the contents of CWP Aquaculture Handbook is in a separate section below. The meeting agreed with the priority area of work including the dissemination of the Aquaculture Handbook with adequate language coverage, revision of standard questionnaires and corresponding guidelines, and continued efforts in the implementation of the Strategy-STA. A Task Force was established for the development of a standard aquaculture questionnaire and supporting guidelines. The Eurostat and GFCM took the responsibility of the CWP-AS coordinator for the inter-sessional period between the 24th and 25th session of CWP (2013–2016).

16. The Task Force for development of the questionnaires initiated its activities in 2014 with several meetings and follow-up collaboration. It compared the questionnaires that are currently used by different organizations and confirmed a general consistency among them. The Task Force is currently developing a draft of standard aquaculture questionnaires and supporting guideline to be tabled at the next CWP-AS meeting planned to be held just prior to this session of the Sub-Committee. The current draft of questionnaires contains core tables on harvest from grown-out, artificial seeds, wild seeds, and aquaculture areas/facilities, and supplementary tables on standing stocks and unexpected loss and social economic aspects on aquaculture activities.

17. The development of a standard focuses on setting a minimum core for securing global comparability of data collected but also encouraging countries to collect further detailed and more integrated information. The supporting guideline is planned to include a clear description on each items and target coverage of individual tables, issues on confidentiality and possible mitigation measures without jeopardizing data consistency and comparability for more integrated, pragmatic suggestions in data collection and compilation, and terminologies.

18. The CWP-AS is mandated to hold its meetings in conjunction with the COFI-SCA in order to maximize the possible participation of aquaculture experts. In reality, after the formal establishment of CWP-AS, two sessions out of four planned have been cancelled due to unavailability of CWP Members, apart from FAO, to attend. The participation of national aquaculture experts has remained low. FAO seeks the the advice of the Sub-Committee on its expectation for the CWP-AS and appropriate mechanisms to maintain adequate level of activities.

19. The Handbook intends to cover a range of basic concepts, definitions, standard classifications and corresponding codes, as applied to aquaculture data collection and statistics and to provide the principles at international level. The structure and main contents of the Handbook are as follows:

- Chapter 1: definition of ‘aquaculture’, including different types of aquaculture;
- Chapter 2: explanation of defining attribute of aquaculture activities and production for statistical purposes, including ownership, culture environment, location and classification of farming systems;
- Chapter 3 – 5: providing basic concepts of measuring inputs required for aquaculture production and outputs from aquaculture activities for statistics;
- Chapter 6: setting minimum reporting requirement for national statistics on aquaculture;
- Chapter 7: information on data collecting tools and methodologies that could be particularly useful in data collection for aquaculture;

- Chapter 8: general information on concepts and classifications commonly used in fisheries and aquaculture statistics.

20. The Handbook recommends the collection of quantity and value of inputs (i.e. seeds) distinguished as either wild or artificial origins and output (component going out from aquaculture system, usually production) separated by species, environment, type of farming systems and major destinations (i.e. either for food or non-food use; in case of seed production either as artificial seeds or for restocking), number of people engaged in aquaculture, and aquaculture facilities information, as a minimum for countries to monitor aquaculture sector. For the purpose of statistics, it is suggested that the following five groupings of farming facility systems are utilized: i) ponds; ii) cages, raceways, tanks, enclosures, pens; iii) lake, reservoirs, dams, barrages, flood plains, irrigation systems; iv) rice-fish paddies; and v) suspended/hanging systems, on-bottom systems, off-bottom systems.

21. Currently, the handbook is only available in English and all efforts will be made to translate it to other official languages of FAO in the coming months.

MODIFICATION OF GLOBAL STANDARDS AND CLASSIFICATIONS RELEVANT TO AQUACULTURE

22. Revision of the Central Product Classification of the United Nations (CPC) - The Central Product Classification of the United Nations (CPC) is an international classification of commodities and services delivered. Products by fisheries and aquaculture sub-sector are mainly covered under the Group 04 “Fish and other fishing products” and Group 212 “Prepared and preserved fish, crustaceans, molluscs and other aquatic invertebrates”. As a part of effort to harmonize the statistical classification used among the UN and other Inter-Governmental Organizations, FAO developed a proposal of revision of CPC in 2011 to make it applicable for describing the primary agriculture products, including those for fisheries and aquaculture. The proposal was accepted at the United Nations Statistics Commission (UNSC) in 2012 together with other proposals of revisions. Technical review and editing process finally completed recently and the 2.1 version of CPC will be soon available at the UN Classification Registry[11].

23. The version 2.1 of CPC will allow a separation of fish produced by aquaculture and those from capture fishery. It also separates fish products to be used for ornamental, human consumption or other uses, including seeds and feeds for aquaculture. The level of taxonomic aggregation is consistent with those used in the Harmonized Commodity Description and Coding System, commonly referred to as the Harmonized System (HS) of the World Custom Organization (WCO). Accordingly, when the aquaculture production data is collected in broad framework to cover multiple producing sectors, the CPC 2.1 can provide globally comparable framework that is also acceptable for aquaculture data requirement. The CPC 2.1 would also provide guidance for possible species aggregations when countries encounter problems in collecting and/or reporting production data by species.

[11] http://unstats.un.org/unsd/cr/registry/default.asp?lg=1

SEEA Land Use Classification

24. The United Nations Statistics Division (UNSD) finalized the revision process of the Central Framework of System of Environmental and Economic Account of the United Nations (SEEA)[12] in 2014 containing the classification of Land Use in Annex I-B that was developed based on the FAO proposal. It newly established a category of 'Land used for aquaculture', with two sub-categories, 'Land used for hatcheries' and 'Managed grow-out sites on land'; and four sub-categories under the Inland waters, 'Inland waters used for aquaculture or holding facilities', 'Inland waters used for maintenance and restoration of environmental functions', 'Other uses of inland waters n.e.c' and 'Inland waters not in use'. It also added classes for analysis of coastal areas and EEZ areas, for extended analysis of a country's economic territory, beyond land and inland waters, with the same set of sub-categories as Inland waters.

25. Accordingly, FAO modified its Land-Use questionnaire in 2014 to incorporate the newly established SEEA Land Use classification. Relating to inland water bodies, the supplementary questions are added to address the seasonal fluctuation of water surfaces and extent of rice fields. The revised questionnaire was dispatched to countries by the Statistics Division of the Economic and Social Development Department (ESS) of FAO and seven countries responded with information on inland waters in 2014, but none of them provided the information on aquaculture related land and water use.

ENHANCING INFORMATION LITERACY TO SUPPORT IMPLEMENTATION OF BLUE GROWTH INITIATIVE

26. FAO is promoting the Blue Growth initiative that is defined as "sustainable growth and development emanating from economic activities in the oceans, wetlands and coastal zones, that minimize environmental degradation, biodiversity loss and unsustainable use of living aquatic resources, and maximize economic and social benefits" achieved through responsible and sustainable fisheries and aquaculture. The availability of timely and reliable information is a critical first step of implementation of the Blue Growth initiative further enhances the need of information to be comparable and easily communicated across different segment, sectors and interests.

27. In an attempt to suggest a pragmatic solution to obtain a comprehensive picture on impacts and the contribution of small-scale fisheries and aquaculture, FAO has developed the "Guidelines to enhance fisheries and aquaculture statistics through a census framework" [13] as a part of research activities funded under the Global Strategy. The basic structure of the Guidelines follows the concepts adopted in the World Census of Agriculture, including a hierarchy of census-level questions followed by survey items directed at community and household levels while utilizing the modular approach to enhance utility and reduce implementation costs.

[12] http://unstats.un.org/unsd/envaccounting/seearev/

[13] http://www.gsars.org/guidelines-to-enhance-fisheries-and-aquaculture-statistics-through-a-census-framework/

28. The Guideline selects the household as the survey unit and minimizes a separation between aquaculture, capture fisheries, and post-harvest processing, taking into consideration that one household may often be involved in all three activities continuously, particular in the case of a small-scale operation. It tries to cover a broad range of issues as modules to accommodate the comprehensive monitoring needs to support the implementation of Blue Growth initiatives and ecosystem management approach. Countries would design their own census surveys by selecting appropriate modules and types of questions in specific categories according to their policy needs and interests as well as availability of funds. The Guideline is ready for dissemination under the Global Strategy web site for further feedbacks and anticipated experimental application in the field.

29. Water access is one of the key constraints for aquaculture in competition with other sectors, including irrigation, urban and industrial use, water pollution and constructions of dams for hydropower and impoundments. To determine suitable indicators to present the importance of water resources for fisheries and aquaculture as a whole, FAO compiled water-related indicators for 18 main fish producing countries in Asia and Africa. The indicators were selected to cover four aspects: social, economic, environmental and nutrition, relevant at a national scale and applicable to both inland capture fisheries and aquaculture. The report is ready for publication and provides evidence of the importance of inland fisheries and aquaculture in terms of food security, employment, and improvement of nutrition through in-stream water use. The information would support the sector empowered to gain proper and renewed attention in local and national policy agendas.

30. Inventories of the location and status of existing (and abandoned) farms and farming areas are an essential step that can ultimately improve siting and management. These inventories can be compared with sensitive ecosystems and habitats to highlight potential impacts, and can also be linked to the licensing process to identify unregistered or illegal farms. Satellite imagery is a powerful tool for obtaining frame information, in particular location and size of aquaculture facilities. In this regard, the FAO is developing aquaculture inventories, National Aquaculture Sector Overview map collection (NASO maps) (www.fao.org/fishery/naso-maps/nasohome/en), based on Google Earth/maps technology in collaboration with interested member countries. The NASO maps contain information on species, culture systems, and production together with the location of individual farms. Separate from the NASO maps, the FAO also accumulated a database of Google Earth images and locations of aquaculture facilities, which is planned to disseminate in 2016.

31. FAO succeeded in securing funding from the European Commission, in the context of information support for the implementation of the Blue Growth initiative, aiming at sustainability of a Good Environmental Status (GES) of the seas and freshwater bodies. Such monitoring requires in-depth understanding of key aspects of human exploitation of aquatic resources including aquaculture. One of two components of the new project entitled “Building research environments for innovation, decision-making. governance and education” (BlueBRIDGE), will specifically focus on the generation of an Aquaculture Atlas, providing an innovative environment supporting the easy, effective and efficient production of an atlas of farm activity and natural zones using satellite information, to support and complement the NASO maps initiative.

32. Reliable and timely statistics are the first and core requirement of fact-based management. The prime objective of the national statistics is to support management and decision making of countries, not for reporting to the FAO. In particular under the Blue Growth initiative where there is a strong need for a comprehensive understanding of the overall situations which encompass interests from stakeholders and environment conservation, it becomes extremely important for each country to establish its own priorities and design data collection system accordingly, without losing

comparability to global indicators. Unfortunately, the national capacity of monitoring the aquaculture sector seems to have been left behind the expansion of the sector itself in many countries. Some countries do not even have regular data collection schemes for aquaculture and rely solely on administrative information. All the initiatives mentioned above aim towards supporting the implementation of Blue Growth initiative and have reached the stage of being ready for field implementation. FAO is eager to hear voices of interest for participation, partnership, technical and financial support, or the need for assistance.