Food and Agriculture Organization
of the United Nations

# Guidelines to Enhance Fisheries and Aquaculture Statistics through a Census Framework

## GUIDELINES

Publication prepared in the framework of the Global Strategy to improve Agricultural and Rural Statistics

**Cover photo:**
©FAO/CESPA-Mali
©FAO/I. Bara
©B. Mahalder/Creative Commons Attribution-Share Alike

# Guidelines to Enhance Fisheries and Aquaculture Statistics through a Census Framework

May 2015

# Contents

## FIGURES



## TABLES

# Acknowledgements

The Guidelines to Enhance Fisheries and Aquaculture Statistics through a Census Framework were prepared by Jennifer Gee, with the guidance and supervision of FAO's Senior Fishery Statistician.

Valuable input and comments were provided at different stages by the Scientific Advisory Committee (SAC) members, the staff of the Fisheries and Aquaculture Department and of the Statistics Division of the Economic and Social Development of FAO, as well as various national and international experts.

This publication was prepared with the support of the Trust Fund of the Global Strategy, funded by the UK's Department for International Development (DFID) and the Bill & Melinda Gates Foundation.

The document was edited by Sarah Pasetto, FAO/Global Strategy.

# Acronyms

| | |
|---|---|
| AFCAS | African Commission on Agricultural Statistics |
| APCAS | Asia and Pacific Commission on Agricultural Statistics |
| CCRF | Code of Conduct for Responsible Fisheries |
| COFI | Committee on Fisheries |
| CWP | Coordinating Working Party on Fishery Statistics |
| CWP-AS | Aquaculture Specialized Group |
| EAA/F | Ecosystem Approach of Aquaculture/Fisheries management |
| FAO | Food and Agricultural Organization |
| GIS | Geographic Information System |
| ILO | International Labour Organization |
| ISIC | International Standard Industrial Classification of All Economic Activities |
| ODA | Overseas Development Administration |
| PPS | probability proportional to size |
| Strategy-STA | Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture |
| UNSD | United Nations Statistics Division |
| WCA | FAO World Programme for the Census of Agriculture |

# Executive Summary

Small-scale operators make a fundamental contribution to local food security, the alleviation of poverty and the provision of livelihoods in the field of fisheries and aquaculture. However, it is extremely challenging to monitor their production and thus accurately measure the entity of their contribution. Small-scale and subsistence operators tend to be scattered geographically, and to engage in fishing and fish-farming activities only partially and/or seasonally as a supplement to other activities (e.g. by fishing and fish-trapping in nearby rivers for a few days each week, or keeping catch in backyard irrigation ponds). In addition, the harvests are often shared, traded and consumed outside the commercial marketing systems on which national statistical data collection is usually based, such that even estimating the overall number of people engaged in fisheries and aquaculture can be a difficult and costly endeavour. As a result, despite its economic and social importance especially for food security and poverty alleviation, the contribution of small-scale capture and aquaculture is poorly represented in national statistics. This may lead to the social and political marginalization of the people and communities that depend on small-scale fisheries and aquaculture.

These Guidelines on Census Survey Stages describe a method that can be employed to accurately capture the actual contribution of small-scale fisheries and aquaculture to rural communities. In principle, the basic structure of these survey stages follows the concepts adopted by the World Census of Agriculture, including the modular approach, to enhance utility and reduce implementation costs.

These Guidelines set out a methodology for the collection of data and information on various aspects of the fisheries and aquaculture sector, especially concerning small-scale operators. The methodology is conceived as a questionnaire survey to be implemented within a census framework, i.e. within agricultural, population, or rural censuses, or specialized community and household surveys. Although using a census framework is costly, it was considered the method that could most effectively and comprehensively illustrate the contribution made by small-scale operations. Once this contribution is ascertained, it can be used to adjust regular (annual/monthly) data collection systems, improve sampling schemes and remove duplications. The data obtained with a census framework also provides a benchmark that helps to bolster the data collected through regular surveys into national statistics, for non-census years.

To ensure the greatest possible data complementarity, these Guidelines propose a hierarchy for the census-level questions and survey items at both community and household levels. Countries should design their own census surveys, selecting the modules and questions for each specific category that are appropriate to their policy needs and interests and available resources. In this respect, the Guidelines emphasize that categories can be combined as appropriate; however, specific items within categories can also be extracted and combined with one another.

This document is based on the *Guidelines on the collection of structural aquaculture statistics* (Rana 1997). The main categories used therein were retained, with minor modifications and additions for community and household surveys. A crucial difference in the present Guidelines is the introduction of fisheryand post-harvest-related queries (as well as other activities). These Guidelines seek to provide guidance on designing and conducting supplementary module surveys for aquaculture in conjunction with censuses. The data from the suggested censuses and surveys play an important part in planning and policymaking; in addition, they enable monitoring of the progress being made towards reaching the Sustainable Development Goals, as well as analysis of poverty levels, food security, gender issues and community impacts. The census questions are designed to offer a frame for sample surveys, while the data provide benchmarks and enable cross-tabulations. The census questions proposed here are not intended to be

used as part of a stand-alone census, but rather to be included in the most appropriate census that is being conducted (which may be a population, an agriculture or a sector-specific census).

FAO's mandate includes promotion of the Blue Growth Initiative, which fosters responsible and sustainable fisheries and aquaculture through capacity development. FAO defines Blue Growth as "*[s]ustainable 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*" (FAO 2014d). The promotion of the Blue Growth initiative is a further incentive to improve data collection, as strengthened census and survey questionnaires are critical to the evidence-based management at the very basis of the Initiative.

When countries design or redesign their survey and census items to collect data on fisheries, aquaculture and post-harvest processing engagement, use of the standardized format provided in these Guidelines and of harmonized terminology will facilitate its integration with data collected through other means. Data integration supports the visualization of overlaps and synergies between different platforms, which in turn can expand net data coverage without the further costs that may arise e.g. from the replication of efforts due to collection for points within overlap areas.

# 1

# Introduction

## 1.1 BACKGROUND

It is estimated that approximately 58 million people worldwide are engaged in the primary sectors of fisheries and aquaculture (FAO 2014a). The importance of small-scale fisheries – including subsistence fisheries – for local and national food security, poverty alleviation and livelihoods has been emphasized in the Rio+20 document entitled *The Future We Want* and in various voluntary guidelines (FAO 2014). Small-scale and subsistence fisheries are often activities of last resort to ensure food security to those who do not have access to land (World Bank 2010). Despite the economic and social importance of small-scale fisheries and aquaculture operations, statistics on these components are relatively poor and greatly underestimated; this may lead to the social and political marginalization of the people and communities that depend on these operations. In addition, the significance of the harvest of wild aquatic organisms for rural food security is not well quantified, and the actual contribution made by this practice and by aquaculture have yet to be accurately evaluated.

Small-scale and subsistence operators tend to be geographically scattered, and often engage in fishing and fish-farming activities only on a partial or seasonal basis to supplement other activities; for example, operators may engage in fishing and fish-trapping at a nearby river some days a week, or may keep catch in a backyard irrigation pond. Second, the harvests are often shared, traded and consumed outside the commercial marketing systems on which national statistical data collection is usually based. In other words, even estimating the overall number of people engaged in fisheries and aquaculture can be a challenging and costly task.

The Code of Conduct for Responsible Fisheries (CCRF) mentions reliable and timely data as a fundamental condition for the sustainable development of fisheries and aquaculture (FAO 1995). The activities in the fisheries and aquaculture subsectors are diverse and may be conducted on several different scales. The activities also have a broad range of effects on the natural environment, and interfere with and are constrained by activities in other sectors. The CCRF, the Ecosystem Approach of Aquaculture/Fisheries management (EAA/F) and the more recent Blue Growth Initiative all promote the concept of integrated sustainable fishery and aquaculture operations through fact-based management, which requires the adequate monitoring of all aspects of the sectors' performance.

The data required concerns not only sector performance in a production context, but must also cover the broader prospects of economic and social costs and benefits, environmental aspects and the sector's contribution to food security, together with its impact on the supporting natural environment. There is an urgent need to enhance national statistical systems, to enable them meet the growing demand for data and information in accordance with the CCRF and to achieve the successful implementation of the Blue Growth Initiative. The Global Strategy to improve

Agricultural and Rural Statistics (hereinafter, Global Strategy) adopted in 2012 has defined a set of core data items (Appendix 1). While many of these items are only defined for a crop production context, they yield a good initial set of minimum core data for monitoring sector performance and sustainability. The fisheries and aquaculture core data items suggested in these Guidelines were defined on the basis of the Global Strategy's core items, and will be promoted as a standard set of core data items to support the implementation of the Blue Growth Initiative.

These Guidelines set out a possible method for establishing an integrated data collection and statistical system for fisheries and aquaculture. The Guidelines provide guidance on designing a questionnaire survey for fisheries and aquaculture that can be implemented within a census framework, i.e. within agricultural, population or rural censuses, but also specialized community and household surveys. Although using a census framework is costly, it was considered the approach that could most effectively and comprehensively illustrate the contribution made by small-scale operations.

Within the census framework, the primary purpose of surveys is to obtain an accurate and thorough description of small-scale fisheries and aquaculture operations, including their social and economic roles, their contribution to food use and security, their environmental impact and their management tools. The FAO World Programme for the Census of Agriculture (WCA) provides guidance on how to combine agricultural censuses with aquaculture (see the 2020 WCA's Volume 1 – Programme, Definitions and Concepts), and could be extended to both fisheries and aquaculture. Once the description is obtained, it could function as a master sampling frame and be used to enhance the cost-effectiveness and multi-purpose nature of a regular (annual or monthly) data collection system's sampling design, without compromising statistical validity. The data obtained from surveys within a census framework also provides a benchmark that can help to bolster the data collected through regular surveys into national statistics, for non-census years. The overall method for integrating surveys into a census framework and regular data collection is summarized in Section 1.2 below.

The Blue Growth Initiative was adopted to ensure the sustainable development of aquatic environments and to enable the production of goods and services to meet human development objectives, without comprising environmental integrity. The Initiative recognizes that if the development of fisheries and aquaculture is to contribute to the alleviation of poverty, it is necessary to adopt a human rights-based approach that goes beyond the right to fishing resources; and that other rights, such as the right to decent work and the right to social protection, must be promoted and protected.

FAO has developed a Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture (Strategy-STA), which was endorsed by the Twenty-seventh Session of the Committee on Fisheries (COFI) held in Rome in March 2007. The Strategy-STA is a voluntary instrument that applies to all types of aquaculture and has a global scope. Its overall objective is to provide a framework for improving the knowledge and understanding of the status and trends of aquaculture as bases for policy-making and management, and to ensure that the development of aquaculture is compatible with the good stewardship of resources and the environment.

As part of the Strategy's implementation, in 2010 the Aquaculture Specialized Group (CWP-AS) was established under the Coordinating Working Party on Fishery Statistics (CWP) (FAO 2010), as a mechanism for regularly monitoring and harmonizing global methodologies and standards for aquaculture statistics. In 2013, the CWP-AS finalized its Handbook (CWP 2013), which covers a range of basic concepts, definitions, standard classifications and corresponding codes, as applied to aquaculture data collection and statistics.

Since the 2000 round, the WCA has incorporated a "Supplement on aquaculture". This document collects information on the aquaculture sector, although the targeted population is limited to agricultural holdings that also engage in aquaculture activities (Rana 1997). The 23rd Session of the Asia and Pacific Commission on Agricultural Statistics (APCAS) and the 20th Session of the African Commission on Agricultural Statistics (AFCAS) recommended

that the questions be integrated, to separate the engagement of aquaculture and capture fisheries from the broader agricultural activities covered in the census questionnaires. The WCA 2010 round further integrated a range of data needs – in particular, monitoring and policymaking in support of food security – and suggested options for conducting aquaculture census surveys in conjunction with agricultural censuses.

These Guidelines further extend the supplementary survey module approach established in the WCA 2000 while maintaining a structure that is as consistent as possible with that of the WCA 2020, to facilitate the comparison and integration of information collected by other food-producing sectors. Like the WCA 2020, the Guidelines adopt a multi-stage approach, setting out: i) census-level questions for defining the survey targets, ii) a community-level survey, and iii) a household survey. These elements are described in Chapters 3, 4 and 5 respectively. These Guidelines seek to provide users with a range of options that can be of assistance in designing surveys in accordance with their needs, priorities and resources, and in selecting the appropriate modules and corresponding items.

The principal innovation is the addition of fisheryand post-harvest-related queries, which aim to cover all activities of the fisheries and aquaculture subsector. Correspondingly, the Guidelines suggest using the household as a survey unit, and covering all agricultural households in the selected survey communities. This is an important change with respect to the WCA Guidelines, which define "agricultural holdings" as a survey target that includes landless households in the livelihoods of which fisheries and aquaculture play a critical role. In addition, the Guidelines strive to minimize the separation between aquaculture, capture fisheries, and post-harvest processing, partly to reduce the risk of not covering activities falling within grey areas and partly because a single household may often be continuously involved in all three activities. This is a further reason in favour of selecting the household as the survey unit.

These Guidelines were developed in the context of the research activities funded under the Global Strategy to improve Agricultural and Rural Statistics (http://www.gsars.org/). The Global Strategy is an initiative designed to establish a clear blueprint for the introduction of long-term and coordinated improvements to the state of agricultural and rural development statistics.

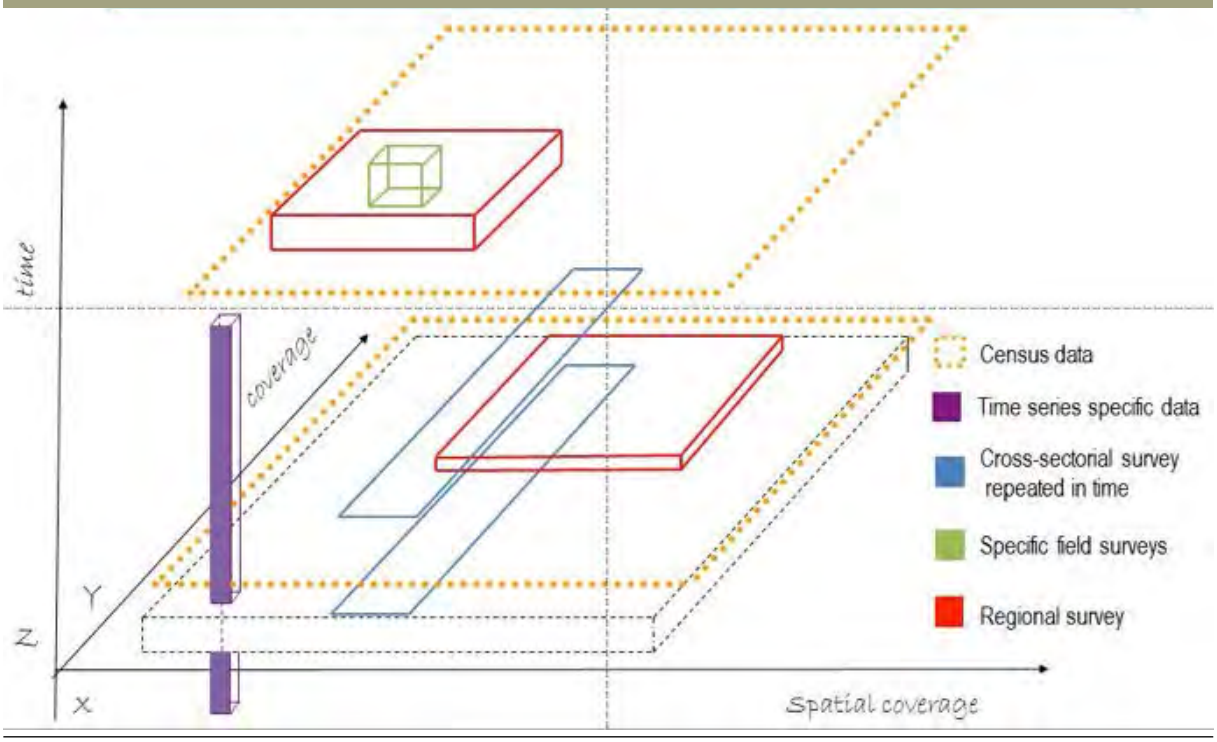
## 1.2 THE CENSUS AS PART OF A DATA INTEGRATION FRAMEWORK FOR THE IMPLEMENTATION OF THE BLUE GROWTH INITIATIVE

This Section briefly describes how the results of surveys in census frameworks will be used to improve national statistics, in particular to enhance the representativeness of small scale fisheries and aquaculture operations, and to assist in adjusting regular samplings and data collection schemes. FAO's mandate includes promotion of the Blue Growth Initiative, which fosters responsible and sustainable fisheries and aquaculture through capacity development. FAO defines Blue Growth as "*[s]ustainable 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*" (FAO 2014d).

If the data is visualized in three dimensions – temporal coverage, content depth and population coverage –, it becomes easier to envision how different types of data are generated (either actively or as a by-product) through different statistical instruments. Censuses and census-related surveys provide a one-time snapshot, and cover broad geographical areas and social segments with a wide range of contexts; their time interval is necessarily long, due to the substantial human and capital resources necessary to conduct censuses and census-related surveys. On the other hand, systematic and regular data collection through means such as annual statistical surveys offer time series information on the selected area, which is often located within selected geographical and social segments. These efforts can be balanced with the data that is generated through more detailed projects. *Ad hoc* data collection has an intermediate nature, and can provide the information required to fill the gaps ensuing from, and to draw links between, the results obtained from the census-type approach on one hand and a more focused regular data collection on the other.

If no connections between these different forms of survey may be traced, the information obtained remains isolated. To relate the data obtained through different types of survey, the Data Integration Framework supporting the implementation of the Blue Growth Initiative proposes the adoption of common core sample frame questionnaires. This would help to obtain a more coherent picture of the fisheries and aquaculture sectors especially with regard to small-scale components, in relation to which, due to their diversity and geographical dispersion, it could be difficult to effectively invest survey efforts. The promotion of the Blue Growth initiative is a further incentive to improve data collection, as strengthened census and survey questionnaires are critical to the evidence-based management at the very basis of the Initiative.

**FIGURE 1**
**Model of different forms of data from various sources**
The Figure demonstrates how the overlap of these sources can be assembled to provide a more complete picture of the fishery and aquaculture industries.




When countries design or redesign their survey and census items to collect data on fisheries, aquaculture and post-harvest processing engagement, use of the standardized format set out in these Guidelines and of a harmonized terminology will facilitate the integration of this data with data collected through other means. Data integration can foster the visualization of overlaps and synergies between different platforms. This, in turn, enables data coverage to be expanded without the additional costs that may arise e.g. from the replication of efforts due to collection for points falling within overlap areas.

These Guidelines seek to provide guidance on designing and conducting supplementary module surveys for aquaculture in conjunction with censuses. The data from the censuses and surveys suggested play an important part in planning and policymaking; they also provide a way to monitor the progress being made towards meeting the Sustainable Development Goals and to analyse poverty levels, food security, gender issues and community impact. The census questions are designed to establish a framework for sample surveys, while the data provide benchmarks and enables cross-tabulations. The census questions proposed here (especially those of Stage 1) are not intended to be used as a stand-alone census, but rather to be included in the most appropriate census that is already being conducted (which may be a population, agriculture or sector-specific census).

## 1.3 STRUCTURE OF THE GUIDELINES

The structure of these Guidelines seeks to facilitate the independent use of individual sections. Chapters 1 and 2 cover the relevant introductory and background materials, the basic concepts, setting the frame, and the minimum core data. Chapters 3, 4 and 5 cover, respectively, the stages required for including the items on engagement within an existing census; the community survey items; and, finally, the household and individual survey items.

# 2

# Basic Concepts and Structure

These Guidelines illustrate a method for establishing an integrated data collection and statistical system for fisheries and aquaculture. The objective of this publication is not to recommend any methodology in particular, but rather to present the various approaches possible, and thus assist countries in designing the censuses – and corresponding fisheries and aquaculture surveys – that are best suited to their policy directives, priorities, resource availabilities and other potential constraints.

This Chapter provides guidance on the general process for designing questionnaire surveys for fisheries and aquaculture to be implemented within a census, which may be an agricultural, population, or rural census or a specialized community and household survey. As mentioned above, although use of a census framework is costly, it was considered the most effective means for obtaining a comprehensive picture of the actual contribution made by small-scale operations.

## 2.1 SCOPE OF THE SURVEYS

The United Nations' International Standard Industrial Classification of All Economic Activities [1] (ISIC) defines the Division of Fishing and Aquaculture (03) as "capture fishery and aquaculture, covering the use of fishery resources from marine, brackish or freshwater environments, with the goal of capturing or gathering fish, crustaceans, molluscs and other marine organisms and products (e.g. aquatic plants, pearls, sponges etc.). The Division also includes activities that are normally integrated into the process of production for own account (e.g. seeding oysters for pearl production), which contains two groups: Fishing (031) and Aquaculture (032). ISIC Rev.4 defines these, respectively, as follows:

"**Fishing**: the hunting, collecting and gathering activities directed at removing or collecting live wild aquatic organisms (predominantly fish, molluscs and crustaceans) including plants from the oceanic, coastal or inland waters for human consumption and other purposes by hand or more usually by various types of fishing gear such as nets, lines and stationary traps. Such activities can be conducted on the intertidal shoreline (e.g. collection of molluscs such as mussels and oysters) or shore based netting, or from home-made dugouts or more commonly using commercially made boats in inshore, coastal waters or offshore waters. Unlike in aquaculture (group 032), the aquatic resource being captured is usually common property resource irrespective of whether the harvest from this resource is undertaken with or without exploitation rights. Such activities also include fishing restocked water bodies."

1 http://unstats.un.org/unsd/cr/registry/isic-4.asp

"**Aquaculture**: the production process involving the culturing or farming (including harvesting) of aquatic organisms (fish, molluscs, crustaceans, plants, crocodiles, alligators and amphibians) using techniques designed to increase the production of the organisms in question beyond the natural capacity of the environment (for example, regular stocking, feeding and protection from predators). Culturing/farming refers to the rearing up to their juvenile and/or adult phase under captive conditions of the above organisms. In addition, aquaculture also encompasses individual, corporate or state ownership of the individual organisms throughout the rearing or culture stage, up to and including harvesting."

Peripheral activities may include the following:

**Processing and preserving of fish, crustaceans and molluscs (Code 1020):** This class includes:

- preparation and preservation of fish, crustaceans and molluscs: freezing, deep-freezing, drying, smoking, salting, immersing in brine, canning etc.;
- production of fish, crustacean and mollusc products: cooked fish, fish fillets, roes, caviar, caviar substitutes etc.;
- production of fishmeal for human consumption or animal feed;
- production of meals and solubles from fish and other aquatic animals unfit for human consumption;
- […]
- activities of vessels engaged only in the processing and preserving of fish; and processing of seaweed.

**Building of ships and floating structures (Code 3011)** – "The building of ships, except vessels for sports or recreation, and the construction of floating structures."

**Repair of transport equipment, except motor vehicles (Code 3315)** – "This class includes the repair and maintenance of transport equipment relevant to division 30, except motorcycles and bicycles, and excluding the factory rebuilding or overhaul of ships, locomotives, railroad cars and aircraft."

**Other sports activities (Code 9319)** – This class includes sport or recreational fishing activities.

These Guidelines seek to cover all activities under Divisions 031, 032 and 1020. They do not provide guidance for other peripheral activities, although the inclusion of these in fisheries and aquaculture surveys conducted within a census framework may be advantageous in countries' individual circumstances.

The Guidelines use the term "Post-Harvest Processing" instead of "Processing and preserving of fish, crustaceans and molluscs" to indicate all treatment of fish after harvest (both aquaculture and capture) and direct sales of fish that do not occur through markets or retailers. The term also encompasses handling operations after harvest, including unloading, sorting/grading, bleeding/gutting/washing, preserving, processing and storage. The inclusion of post-harvest processing activities is an important addition, as it ensures that all relevant activities are considered and that non-economic contributions can be captured.

In these Guidelines, fisheries, aquaculture and post-harvest activities are intentionally treated in the same questionnaire until the lowest level of disaggregation (i.e. the household-level survey section, which identifies individual activities). The activities were bundled together to improve the likelihood of capturing participation and of accounting for the "grey" areas between aquaculture and fisheries. In small-scale operations, it is commonly observed that a single family is involved in all three activities of fishing, fish processing and marketing. Several rural individuals who live close to water bodies regularly engage in fishing and shell and seaweed collection, or hold fish in backyard ponds. In addition, the classification of certain activities may be ambiguous: for example, catching fish is considered "fishing", while stocking fish in ponds and rice fields for raising is considered "aquaculture". Since the surveys to be conducted under these Guidelines have the primary purpose of providing an accurate and thorough picture of the entire fisheries and aquaculture subsector, these Guidelines address aquaculture, fisheries and

ancillary activities (such as post-harvest processing and tourism) together, to avoid missing any relevant activities that fall between these categories.

At the end of each section, proposals for possible tabulations of the core items and integrations of supplemental items (if appropriate) are set out.

Women often contribute more labour time than men. In fisheries, for example, women may own the vessels used for fishing or may engage in post-harvest processing and selling activities. Especially in Asia, studies indicate that women's contribution to labour for aquaculture is often greater than that of men, although macro-level sex-disaggregated data on this topic is virtually non-existent (FAO 2011).

## 2.2 THE ENUMERATION UNIT

While the Guidelines seek to maintain a general consistency with the WCA 2020 Guidelines, they use the household rather than the holding as the recommended enumeration unit for fisheries and aquaculture surveys. The small-scale and poorest fishing communities often do not have any holdings, but are, rather, landless households. Therefore, the primary reason for using the household as the enumeration unit is that the concept of the holding is usually inappropriate for the fishery sector. Where relevant, information on properties and engagement in other agricultural activities may constitute a link and a point of comparison with the information that can be collected under the WCA.

The household is defined by the United Nations Statistics Division as follows (UNSD 2014):

"A.1 Household: A household is classified as either:

a. A one-person household, defined as an arrangement in which one person makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household or
b. A multi-person household, defined as a group of two or more persons living together who make common provision for food or other essentials for living. The following are the definitions for both fisheries and aquaculture as set out by the International Standard Industrial Classification of All Economic Activities (ISIC 2008)."

When matching the data, use of the household instead of the holding may give rise to problems if the WCA is applied to set the frame and the country uses the household for community and household surveys. In this case, there are two possibilities:

- If the country applies the WCA (or another census that uses holdings) to set the frame, the holding could be used as the enumeration unit to harmonize sampling frames instead of the household;
- The country can follow the process outlined in the *Technical Report on Integrated Survey Frameworks*, a Global Strategy publication that examines this complex subject with reference to recent developments in indirect sampling techniques. For example, the Report suggests that indirect sampling may constitute a possible technique for combining related (but not identical) target populations.

> "Indirect sampling provides a framework for the estimation of the parameters of two target populations that are related to each other through the observation units: a framework that is based on a join analysis of this relationship. One advantage is the choice of a sampling frame that can be indirectly related to the population for which the frame is incomplete, unavailable or not up-to-date; in addition, data can be obtained from observation units that are related to each other."
> (Global Strategy 2014)

The Technical Report on Integrated Survey Frameworks provides guidance on executing the necessary steps and are an excellent source for further details on more advanced stages (Global Strategy 2014).

## 2.3 BASIC SURVEY STRUCTURE – A MULTI-STAGE APPROACH:

These Guidelines recommend a three-stage survey approach, similar to that adopted by the WCA 2020.

In **Stage 1**, a set of questions to be included in census questionnaires are formulated to identify the target populations for the survey's lower stages (Stages 2 and 3). The questions concern engagement in fisheries and aquaculture activities in a broad sense, including post-harvest processing, tourism, etc. The intention is to compile a full list of activities in which the individuals may be engaged, rather than to ask respondents to select a single activity. Some countries already include this type of question in their agricultural or population censuses; nevertheless, care should be taken to ensure that the census adequately covers the population concerned, in particular that without land or permanent residency. Further details are available in Chapter 3.

**Stage 2** should be delivered at the community level. The target communities for this Stage are selected on the basis of the results obtained in Stage 1, in a statistically valid manner that is capable of representing the fisheries and aquaculture subsector. Sections 2.2-2.4 below provide guidance on selecting target communities if no Stage 1 has been undertaken. Stage 2 seeks to collect information on infrastructure and rules, the community's common or shared properties, the facilities and general services available to community members, the applicable rules and constraints, and the relevant governance mechanisms. The survey must be addressed to those who can represent the community's position, e.g. community leaders, spokespersons, officials, etc. This stage is described further in Chapter 4 below.

**Stage 3** is a survey at household level, but includes items for both households and individuals within households. In principle, all households within a community selected for Stage 2 should be surveyed at household level, regardless of the extent of their engagement in fisheries and aquaculture activities. Depending on the activities involved, only household members who engage in fisheries and aquaculture activities should be required to fill out more detailed individual-level questionnaires. The household-level survey queries engagement in the subsector in a general manner, while individual-level surveys seek information separately, depending on the specific activity in question, i.e. fishing, aquaculture, or post-harvest activities. The reasons for the engagement (e.g. household work vs. paid engagement) are important data points, and must be covered. Chapter 5 provides further details in this respect.

## 2.4 DEFINING THE SURVEY'S TARGET POPULATIONS AND SAMPLING COMMUNITIES

When Stage 1 is incorporated into a population census that – in principle – covers all the households and communities of a given country, the results will provide complete information on the engagement in the fisheries and aquaculture subsector. The communities that are to take part in Stage 2 and Stage 3 surveys should be selected on the basis of the census results, in accordance with statistical theories (e.g. probability-proportional-to-size (PPS) sampling[2] or stratified random sampling), and taking into consideration the survey's effectiveness and feasibility and the resources available.

The WCA 2010 sets out guidance for selecting samples (Chapter 10):

> *"10.2. In a sample survey, the sample of units to be enumerated must be selected using strict statistical procedures. A method known as random sampling is used. Random sampling is the process of selecting units for inclusion in the sample in such a way that each unit has a known, though not necessarily the same, chance (or probability) of selection. The simplest type of random sample is one selected by*

2 FAO 2012, EC 2008.

*"lottery", where all units have the same chance of selection in the sample; for example, in an agricultural survey, each agricultural holding would have the same chance of selection. Usually, sampling schemes are more complex than this, with units having differing probabilities of selection in the sample. In an agricultural survey, for example, large holdings may be given more chance of selection than small holdings; some very large holdings may even be completely enumerated."*

For the selected communities, these Guidelines recommend that the Stage 2 community-level survey be conducted with a survey that covers all households (Stage 3 survey items), regardless of their engagement level.

When the Stage 1 survey is conducted in conjunction with an agricultural census, it is crucial to ensure that the target population for the fisheries and aquaculture survey – and especially the components of landless and minor land holdings with or without crop production – is adequately covered by the agricultural census. The discrepancies that may arise between the agricultural census and the fisheries and aquaculture survey for the relevant population can be mitigated by adopting one of these two approaches: i) increasing the target population of the WCA's first-level survey to include those who are involved in the fisheries and aquaculture subsector, and ii) selecting further communities to be surveyed in Stages 2 and 3, in addition to those selected for the WCA supplemental surveys.

When the target communities for Stages 2 and 3 are being selected, and Stage 1 has not been conducted or has provided inadequate coverage, the following information may help to identify the communities in which the engagement in aquaculture, fisheries and/or post-harvest processing may be considered substantial:

1. General knowledge on rural communities and their economies
2. Physical distance from water bodies
3. Administrative or registry data

Countries are relatively aware of the general conditions in which local communities make their living and use nearby water bodies, even if no relevant statistics are available. When no additional information is available, this local knowledge can help to establish the basic criteria for sampling communities for Stage 2 and Stage 3 surveys. In particular, knowledge on seasonal water use is important in countries having high seasonality, e.g. monsoons. The surveys should include the communities that are known to have high fish consumption and active occasional fishing patterns.

Easy access to water bodies is an essential minimum condition for a community to be active in fisheries and aquaculture. Other than administrative information on water bodies and communities, the physical distance to nearby water bodies could also be evaluated, by means of Geographic Information Systems (GISs) or Remote Sensing (see Martínez & Flores, 2014). If the results of Stage 1 are not available, this information can be used to modify the sampling probability when selecting survey communities. To a certain extent, the information can also integrate the Stage 1 results: for example, if a certain community indicates low engagement in fisheries and aquaculture despite having easy access to nearby water bodies, the reason for this should be explored.

Some countries require parties to register or to obtain a license before engaging in commercial fisheries and aquaculture activities. Depending on the specific administrative requirements, this information could be used to establish the distribution of fisheries and aquaculture activities. However, this administrative data could be more useful in distinguishing which areas and communities focus on commercial fisheries and aquaculture, and which engage more in small-scale, occasional or subsistence fisheries and aquaculture. Depending on the survey's priorities, the target communities can be sampled with different weightings for the two categories.

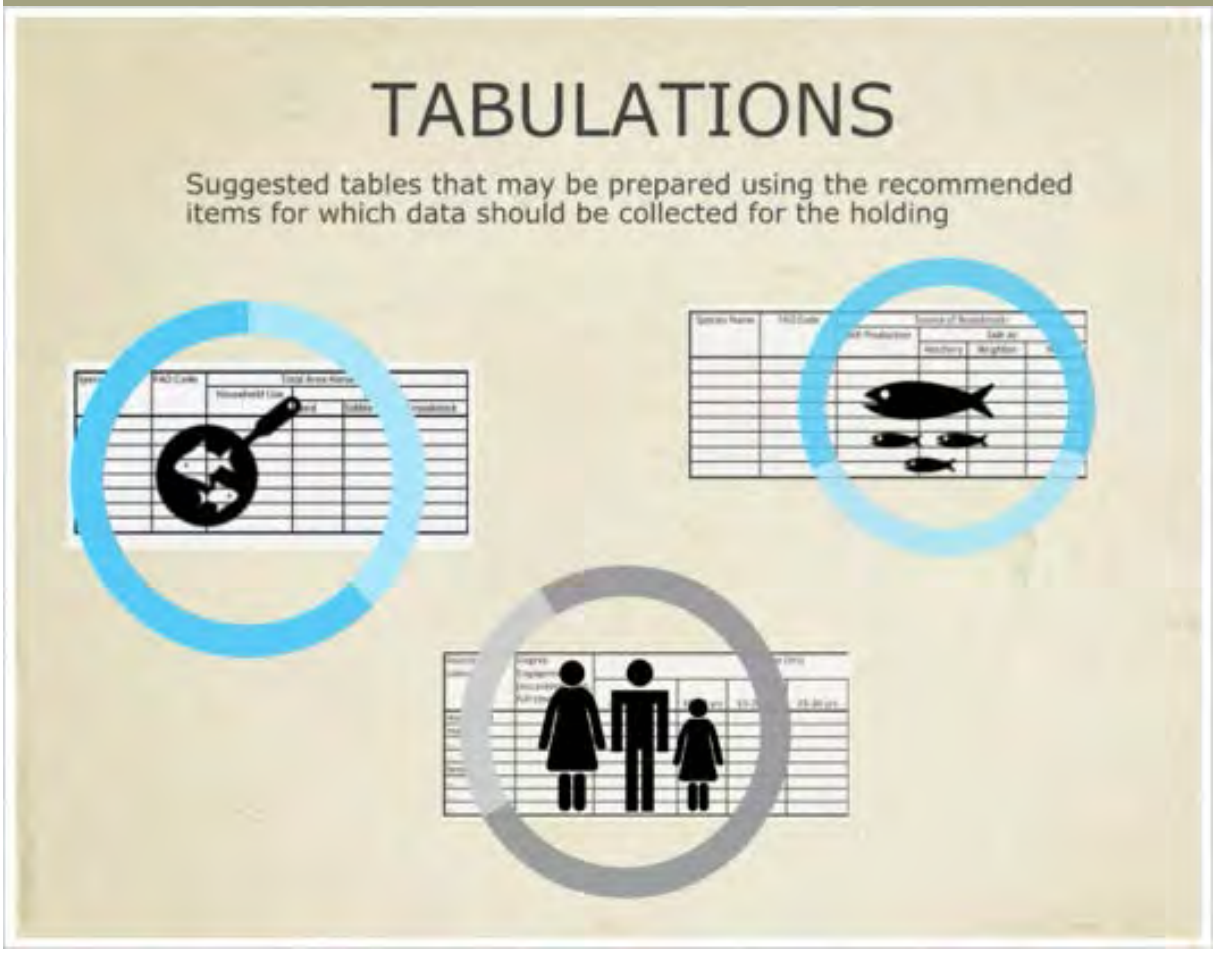
## 2.5 HOW TO DESIGN NATIONAL SURVEY QUESTIONNAIRES

Funding limitations or an interest for specific categories will lead countries to select the items that best meet their policy needs. Countries must select their own survey architecture and the relevant sampling design. With reference to these Guidelines, it is emphasized that categories may not only be combined as appropriate to countries' needs, but, also, specific items can be extracted from different categories and combined with one another.

A common hierarchical flow was used for both aquaculture and fishery items. First, census items are presented (the proposed items are the same for both activities), followed by community surveys and then household-level surveys. In the case of fisheries, it is also suggested that the household survey could be easily modified and applied as a business-level survey.

In the 1997 Guidelines on the collection of structural aquaculture statistics (Rana 1997), it was established that modularity was an important factor. Throughout the present Guidelines, this finding has been recalled and emphasized. All items proposed are presented in a suggested format, together with examples that demonstrate the items' modularity; as noted above, these can be assembled as best balances the cost of adding the items and governments' policy needs.

**FIGURE 2.1**
**Combining items from different tabulations**




The tabulations follow the relevant category descriptions and details. Figure 1 above illustrates how different items from each category can be combined to address specific policy concerns. The tabulations are intended to prompt each country to form their own tabulations as appropriate, depending on the level of detail required, the items'

relevance and the structure of the questions. In other words, the tabulations proposed in these Guidelines are meant to be "building blocks", that users can choose in accordance with their own needs and priorities.

Chapters 3 to 5 below each suggest items for surveys, as well as more detailed information that is relevant to cross-tabulations.

## 2.6 MINIMUM CORE DATA

The proposed categories are divided into "core" items and "supplemental" items. The core items were developed on the basis of the list of core items defined by the Global Strategy (World Bank 2010), which was expanded to apply to the fisheries and aquaculture subsector. The core data items constitute a standard set of data that uses common definitions and methodologies, so that the results from all countries may be internationally comparable. The use of the core items helps to maintain a close connection to other census systems, and enhances opportunities for standardization with data obtained through other data collection methods.

It is highly recommended that countries collect information on core categories. However, it is not necessary to select all core items; indeed, this may not be feasible in light of time and budgetary considerations. The supplemental items are optional; countries should include them as relevant to their particular data needs or policy directives.

The items are outlined in Table 1 below and are matched with the corresponding items from the census, community and household stages. Furthermore, in each of these stages, core and supplemental items are clearly indicated. A full table of the core items, matched with the categories from each of the three Stages, is available in **Appendix I**.

**TABLE 1**
**Minimum core data items**

| **Economic:** |
|---|
| • Output [annual fishery production, annual aquaculture production, water areas accessed by fishery, water areas under aquaculture facilities, annual fishery yield by accessed water area, annual aquaculture yield by water area under aquaculture facilities] |
| • Trade [export in quantity and value of fishery and aquaculture products, import in quantity and value of fishery and aquaculture products] |
| • Stocks [fish resources kept in aquaculture facilities at the time of survey] |
| • Stock of resources [total water area, land area used for aquaculture, land cover used for fishery, supporting activities, number of boats used] |
| • Inputs [water turnover rate for aquaculture, fertilizers used for aquaculture in quantity and value, fertilizers used for environmental enhancement in quantity and value, other chemicals used for aquaculture in quantity and value, seeds for aquaculture in quantity and value, seeds released for stock enhancement in quantity and value, feed used for aquaculture in quantity and value, feed used for fishing operations in quantity and value] |
| • Agro-processing [volume of fish used in processing food by aquaculture, value of output of processed food by aquaculture, volume of fish used in processing food by fishery, value of output of processed food by fishery, fish used for no-food uses in quantity and value by purposes] |
| • Prices [producer prices of fishery product, producer process of aquaculture product, consumer prices of fish products] |
| • Final expenditure [government expenditure on fishery development, government expenditure on aquaculture development, levies for fisheries, private investment, household consumption of fish in quantity and value] |
| • Rural infrastructure [hatcheries, ice plants] |
| • international transfer [Overseas Development Administration for fisheries and aquaculture development] |

| Social: |
| --- |
| • demographics of urban and rural populations engaged in fisheries and aquaculture [sex, age, country of birth, highest level of education completed, status in employment, total income of the household] |
| **Environment:** |
| • Land |
| • Water |
| • Air |
| **Geographic Location:** |
| • GIS coordinates |
| • degree of urbanization |

The proposed items under this category are harmonized, so that the data are internationally comparable regardless of the specific items selected by countries.

The reporting period for all items is considered one calendar year. This period can be modified to match the country's protocol for establishing reporting periods. However, the calendar year was specifically suggested to best capture the engagement's potential seasonality in different activities.

## 2.7 AREAS REQUIRING PARTICULAR ATTENTION

### 2.7.1 The Role of Women and Children

Gender equality is a stand-alone Sustainable Development Goal (SDG 5) that can be achieved only if the relevant interactions are thoroughly understood. However, the participation of women in aquaculture and fisheries activities is not always accurately reported. Women play an important role as workers in fisheries and aquaculture, mainly in post-harvest activities, but also as fishers and fish farmers. Still, women generally have less control over the fish value chain, their activities are less profitable, and they tend to have access to fish of poorer quality.

It is important to note that women may contribute more labour time to aquaculture than men. In fisheries, for example, women may own the vessels used for fishing or may conduct post-harvest processing and selling activities. Especially in Asia, studies indicate that women's contribution to labour for aquaculture is often greater than that of men, although macro-level sex-disaggregated data on this topic is almost non-existent (FAO 2011). The same studies state that

*Clear synergies exist between the gender-equality and hunger-reduction goals. Agricultural policy-makers and development practitioners have an obligation to ensure that women are able to participate fully in, and benefit from, the process of agricultural development. At the same time, promoting gender equality in agriculture can help reduce extreme poverty and hunger. Equality for women would be good for agricultural development, and agricultural development should also be good for women.* (FAO 2011)

Few women own fishponds. The majority of women are involved in fish production, from pond construction to feeding, fertilizing and harvesting (Van der Mheen-Sluijer & Sen 1994). FAO strives to treat women equitably when compiling fishery statistics. Thus, for censuses conducted in accordance with these Guidelines, the role of women in aquaculture and fisheries and related post-harvest processing activities should be given special attention, so that accurate information on gendered engagement can be collected. Post-harvest processing and queries addressing household activities were included in an effort to better capture the role of women and children in fisheries, aquaculture and post-harvest processing.

Extract from *Good practice policies to eliminate gender inequalities in fish value chains* (Dey de Pryck 2013)
"Despite the significant presence of women in the sector, most developing country fisheries data collection systems fail to capture the actual contributions of small-scale fisheries and aquaculture to employment, production and consumption. Millions of rural men and women engage in subsistence fishing on a seasonal or occasional basis, but are not recorded as "fishers" in official statistics. Conversely, in many poor fishing communities, men and women often engage in other (non-fishing) income-generating activities as a survival strategy, particularly during the closed fishing season. These fisheries sector statistics largely fail to capture the youth and children who are employed in the sector, and the limited data available are rarely sex-disaggregated. Furthermore, as fish processing work is often done within the household, census-takers and researchers fail to capture girls' labour contribution in fisheries."

### 2.7.2 Decent Rural Employment

Labour may be the only asset that people own and can use to earn income. This may be the case for a large portion of the population, particularly in rural areas, where income gained through labour is a vital means for poverty and hunger reduction. Work in aquaculture, fisheries and post-harvest processing is an example of rural employment; however, the majority of people and communities that depend on these activities for their livelihoods are poor and socially and politically marginalized. This is because employment in fisheries and aquaculture often does not provide sufficient income, exploitation of fish workers is common and the working conditions are extremely hazardous. Although fisheries and aquaculture are a diverse sector – which includes highly organized commercial operations and (more commonly) informal, small-scale and artisanal livelihoods – these critical working conditions may be found across the board. Households that are dependent on capture fisheries in general, and poor fishers in small-scale fisheries in particular, are highly vulnerable. Fish farmers engaged in small-scale aquaculture mostly depend on unpaid family labour, including that of children. Due to limited access to land, infrastructure and inputs, the yields tend to be small. Consequently, rural small-scale aquaculture often fails to contribute to poverty reduction.

Countries that wish to promote decent rural employment should consider that many of these factors can be measured with the criteria established for the survey stages.

# 3

# Stage 1: Items to be Included in the Census

This Chapter describes the items that should be included in censuses to query engagement in fisheries, aquaculture, post-harvest, and other related activities. The proposals have the sole purpose of determining the distribution of engagement within the country; more detailed survey items are suggested in the modules for community and household surveys. Due to the broadness of their scope, censuses are expensive operations. To minimize the burden and costs of including questions relating to aquaculture, fisheries and related activities, the level of detail has been limited; it is hoped that this will increase the likelihood of countries including them in census questionnaires, such as the WCA or population housing surveys.

**FIGURE 3.1**
**The proposed category for the census level, with a brief description**

| Category | Description |
|---|---|
| 01 Identification of engagement | This category identifies the work and degree of activity |

## 3.1 CATEGORIES

### *Category 01 – Identification of Engagement*

This category aims to identify the activities carried out in the household, to gain an understanding of the degree of engagement and of the diversity of the activities conducted. Here, the term "work" indicates any engagement in the activities mentioned. The definition of work established in the 2013 Resolution of the International Labour Organization (ILO) is adopted: "work is any one of five forms of work that are defined by a combination of the intended destination of the production (for own final use; or for use by others, i.e. other economic units) and the type of transaction for the work (e.g. monetary or non-monetary transactions, and transfers)" (ILO 2013). The frequency of work is defined not only with reference to whether it is fullor part-time, but also with regard to whether the respondents only participate in the activities for some days each year. The Glossary of Terms contains guidance on setting cut-off thresholds to distinguish between fulland part-time work in accordance with country norms.

**TABLE 3.1**
**Proposed items for Category 1: Identification of Engagement**

| Type of Activities |
|---|
| • Aquaculture |
| • fisheries |
| • processing |
| • harvest from beaches |
| • crop production |
| • raising livestock |
| • harvest timber |
| • provide accommodations |
| • tourism: guiding / tours |
| **Degree of Engagement** |
| • full time |
| • part time |
| • full year |
| • part of the year |
| • few days per week |
| • up to a few days per month |
| • up to a few days per year |

## 3.2 SUGGESTED TABULATIONS

Two tabulations are proposed in this Section. The first only requires identification of any engagement in a given activity, while the second also requires information on the degree of engagement. The shorter tabulation reduces the burden for existing census programmes, but loses the data points concerning the degree of engagement for a much larger sample of the population, which would naturally enhance data comparability. In both tabulations, multiple responses for engagement in activity may be entered, as it is anticipated that there will be engagement in multiple activities.

**TABLE 3.2**
**Identification of activities: suggested tabulations**

| Activities conducted | Engagement in activity (yes/no) |
|---|---|
| • Aquaculture | |
| • Fisheries | |
| • Post-harvest processing from aquaculture or fisheries | |
| • Harvest from beach | |
| • Crop production | |
| • Raise livestock | |
| • Harvest timber | |
| • Provide accommodation | |
| • Tourism: guiding/tours | |

**TABLE 3.3**
**Identification of activities and degree of engagement: suggested tabulations**

| Activities conducted | Engagement in activity (yes/no) | Frequency of Engagement | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *Full Time* | *Part Time* | *Full Year* | *Part of Year* | *Few Days / Week* | *Few Days / Month* | *Few Days / Year* |
| **Aquaculture** | | | | | | | | |
| **Fishery** | | | | | | | | |
| **Post-harvest processing from aquaculture or fisheries** | | | | | | | | |
| **Harvest from beach** | | | | | | | | |
| **Crop production** | | | | | | | | |
| **Raise livestock** | | | | | | | | |
| **Harvest timber** | | | | | | | | |
| **Provide accommodation** | | | | | | | | |
| **Tourism: guiding / tours** | | | | | | | | |

# 4

# Stage 2: Community Survey Items

Community-level data on fisheries, aquaculture, and post-harvest processing are important complements to the structural data collected at the household level (Stage 3; see Chapter 5 below). The data to be collected in all three stages were expressly selected on the basis of complementarity. These Guidelines adopt a hierarchical flow, according to which Stage 1 can be used to identify engagement distribution while Stage 2 is conducted within the selected communities (see Section 2.1 – Setting the Frame). Once Stage 2 (the community survey) has been completed by an appropriate community member (an elected official, a village leader, etc.), Stage 3, consisting in the household survey, should be conducted in all households of the selected community.

A community may be defined as a self-contained unit of social and economic activities (FAO 1983). Housing censuses use a similar concept of locality: a community is "a distinct population cluster … that has a name or a locally recognized status" (UN 1998: paras 2.49–2.51). It must be noted that in these definitions, the community or locality may not be the lowest administrative unit.

The relevant sections from Chapter 5 of the WCA 2010 are included in Appendix I below. This Chapter suggests which items may be included in such a survey, gathering information at the community level to complement and supplement the information collected as part of a census.

Community-level data collection often takes place at the village or commune level, and can be useful when examining the infrastructure and services available to community members. A community survey may also cover other data that cannot be collected from households, such as the area of communal land, the access to shared facilities and the type of governance. The community-level data often complements the household-level data: for example, community-level data on the existence of associations or cooperatives may complement data collected from each household on participation in those associations. For further information on FAO's earlier work on community-level statistics, see *Community-level Statistics* (FAO 1983).

During this stage, the categories are itemized sequentially. The items that match the core minimum data outlined by the Global Strategy precede supplemental items. **The items indicated with an asterisk (*) are non-core data items included within categories of core minimum items.**

**TABLE 4.1**
**The proposed categories for the community survey level, with a brief description**

| Category | Description |
|---|---|
| 01 Work | This category describes engagement in aquaculture, fisheries and post-harvest processing relative to total community size. |
| 02 Community Infrastructure and Services | This category seeks to define the infrastructure owned, used or accessed by the community for aquaculture, fisheries and post-harvest processing activities. |
| 03 Species Destination | This category covers basic indicators relating to the species harvested, captured and processed and their relative contribution to food security. |
| 04 Grants / Subsidies | This category covers the support provided by the government to the community for conducting aquaculture, fisheries and post-harvest processing activities. |
| ***Supplemental Items***<br>05 Governance | This category describes the regulations and licensing to which the community is subject/in which the community participates. |

## 4.1 CATEGORIES

### *Category 01 – Work*

This Category aims to describe the community's composition, and the proportion thereof that participates in aquaculture, fisheries and post-harvest processing activities as compared to other activities. Emphasis is placed on the role of local workers rather than that of migrant workers. In this category too, the term "work" is used to indicate any engagement in the activities outlined. As above, the definition of work follows that established in the 2013 ILO resolution (see above, Section 3.1).

**TABLE 4.2**
**Proposed items for Category 01: Work**

| Items |
|---|
| • Total Population of Community* |
| • Households engaged in aquaculture, fisheries, agriculture, tourism, forestry, or post-harvest processing |
| • Seasonal or Regular Engagement* |
| • Local vs migrant workers |
| • Type of household (settled, mobile, homeless) |
| • Engagement in listed activities by month |

### *Category 02 – Community Infrastructure and Services*

This Category seeks to define the infrastructure that is communally owned, used or accessed by the community for fisheries, aquaculture and post-harvest processing activities. Items are also suggested if they are not otherwise included or available in the frame survey and are important measures of social health.

**TABLE 4.3**
**Items proposed for Category 02: Community Infrastructure and Services**

| *Items* |
|---|
| **Community Area and Access** |
| • Total area of community* |
| • If community is prone to natural disasters* |
| • Total water surface area |
| • Total area of irrigation ponds |
| • Total area of rice fields |
| • Total area of aquaculture operations |
| • Proportion of population with motorable access |
| • Proportion of population with paved access |
| • Proportion of population with bus/wagon stop within community |
| • Average distance to nearest bus/ wagon stop |
| • Type of transportation used (foot, bicycle, car, etc.) |
| • Time to nearest urban centre |
| • Degree of urbanization (urban vs. rural areas in community) |
| • Occurrence of soil or land degradation (including, mangrove forests, eelgrass beds, etc.) and suspected causation |
| • Pollution or emissions (water AND air) due to aquaculture, fisheries, agriculture, tourism, forestry, or post-harvest processing activity. Amount, degree and causation. |
| **Community Infrastructure (owned by community or co-op and distance to travel to each item)** |
| • Water bodies |
| • Water access points |
| • Hatchery or grow out facilities owned by community or co-op |
| • Community or co-op owned cold storage facility |
| • Irrigation services |
| • Repair facilities – gear, equipment or boats |
| • Gear Storage |
| • Boat Storage |
| • Processing Facility |
| • Cold storage |
| • Market |
| **Supporting Resources (presence; if not, travelling time to nearest)** |
| • Source of marketing information (private body, co-op, government, other) |
| • How market information is accessed (unavailable, mobile device, computer, radio, middleman, etc.) |
| • Presence of a credit institution |
| • Insurance services |
| • Veterinarian Services |
| • Extension Services (government, NGO, private or other) |

| |
|---|
| • Feed dealer |
| • Seed/fingerling/fry dealer |
| **Community Resources** |
| • Education institutions (primary, secondary, vocational or higher education)* |
| • Access to health care (presence of hospital or clinics or distance to)* |
| • Access to community water source (presence or distance to)* |
| • Presence of radio, telephone and Internet services (each item) |
| • Availability of public transport: bus, train, or boat |
| • Whether electricity is connected |

### *Category 03 – Species Destination*

This Category describes the species cultured, captured and processed, as well as the destination of each species. Destinations such as "household consumption" are often not captured by surveys or censuses, as these focus too heavily on economically important species; therefore, contributions that are valuable to food security are often overlooked. Category 03 also provides an opportunity to enumerate the species having non-market destinations, and allows for the (potentially) different focuses on species to be examined depending on the destination, e.g. household consumption or trade.

The basic indicators relating to the species produced by the community are collected here, and make it possible to draw interesting comparisons to data reported through other means (administrative, other surveys, industrial aquaculture production figures, etc.).

**TABLE 4.4**
**Proposed items for Category 03: Species destination**

| |
|---|
| **List all main species cultured, captured and processed, including:** |
| **Native or non-native** |
| **Destination:** |
| • International market, domestic market or both |
| • Sale |
| • Household use |
| • Stocking or public hatchery |

### *Category 04 – Grants, Subsidies and Social Protection*

In this Category, the presence and type of support mechanisms provided by the government are described. Also, social protection factors reflecting decent rural employment measures are proposed as supplemental items. These may be selected if they are relevant to countries' policy objectives.

**TABLE 4.5**
**Proposed items for Category 04: Grants, Subsidies and Social Protection**

| Does the Government provide any support mechanisms? |
|---|
| • Loan support programmes |
| • Tax preferences and insurance support |
| • Capital and infrastructure programs |
| • Marketing and price support programs |
| **Do community members have access to the following?** |
| • disability pay |
| • pensions |
| • severance pay |
| • unemployment insurance |
| • labour training programmes |
| • support for entrepreneurship or self-employment |
| • cash transfers |
| • school feeding programmes |
| • food vouchers |
| • fee waivers |

## *Supplemental Item:*

### *Category 05 – Governance*

This Category describes the regulations and licensing to which the community is subject or in which the community participates. It records the knowledge that exists of regulations and management rules (legal, traditional and community).

**TABLE 4.6**
**Proposed items for Category 05: Governance**

| Governance |
|---|
| Are operations subject to licensing or regulation requirements? |
| Are there restricted species? |
| Is there a community-based or co-operative based organization? |
| Does competition occur between villages or communities for use of resources? |
| Does the community control access to and activity concerning resources (fishing grounds, stocked lakes, etc)? |
| What knowledge exists of fisheries management rules (legal, traditional and community)? |
| Are operations subject to licensing or regulation requirements? |

Countries having a policy interest in decent rural employment should include the governance aspects listed below.

**TABLE 4.7**
**Proposed items for Category 05: Decent rural employment**

| Decent rural employment |
|---|
| The existence and volume (when known) of aspects of labour legislation. |
| Are contracts mandatory for wage labour? If they are not mandatory, what percent of the labour force has contracts? |
| Is there a minimum working age? If so, what is it? Do any workers below this age participate in the workforce? |
| Is there a minimum wage? What is it? |
| Are there maximum working hours? What are they? |

## 4.2 SUGGESTED TABULATIONS

In this Section, tabulations for each category are suggested. These tabulations should not be interpreted as the only possible way to tabulate the proposed items, but rather as indicating a potential starting point. In the explanation of each tabulation, a brief description of the data needs or policy interests is given, as relevant. To ensure clarity, supplementary items are set out in a separate tabulation.

### *Category 01 – Work*

Four tabulation tables are provided for this category: two for core data items and another two for supplemental data. The supplemental data may be used complementarily, to gain the greatest amount of information on activity seasonality, on how the primary focus of a community's work may shift throughout the year, and on the community's total population.

### *Suggested core item tabulations*

**TABLE 4.8.1**
**Workforce composition**

| In the community: | Number of Migrant Workers | Home Nation of Migrant Workers | Number of Settled Households | Number of Mobile Households | Number of Homeless Households |
|---|---|---|---|---|---|
| | | | | | |

**TABLE 4.8.2**
**Workforce engagement**

| | *Aquaculture* | *Fisheries* | *Post-Harvest Processing* | *Agriculture* | *Tourism* |
|---|---|---|---|---|---|
| **Indicate total number of people engaged in each activity** | | | | | |
| Of the total, how much is **Primary** Engagement | | | | | |
| Of the total, how much is **Occasional** Engagement | | | | | |

## *Suggested supplemental item tabulations*

**TABLE 4.8.3**
**Community population**

| Total Population of the Community |
|---|
| |

**TABLE 4.8.4**
**Monthly activity by sector**

| Indicate monthly activity for each sector | *Aquaculture* | *Fisheries* | *Post-Harvest Processing* | *Tourism* | *Forestry* | *Agriculture* |
|---|---|---|---|---|---|---|
| *January* | | | | | | |
| *February* | | | | | | |
| *March* | | | | | | |
| *April* | | | | | | |
| *May* | | | | | | |
| *June* | | | | | | |
| *July* | | | | | | |
| *August* | | | | | | |
| *September* | | | | | | |
| *October* | | | | | | |
| *November* | | | | | | |
| *December* | | | | | | |

### *Category 02 – Community Infrastructure and Services*

The core items of this category focus on the area of the community that is used for aquaculture production, and on the waterbody surface areas devoted to fisheries. This is followed by further queries on the tenure over water and relevant structures. Then, further items on the community's development status are queried. The supplemental items include the community's total size, the community's vulnerability to natural disasters and other development-related questions regarding access to education and health institutions.

## *Suggested core item tabulations*

**TABLE 4.9.1**
**Community area and waterbodies**

| Total Water Surface Area | Total Area of Irrigation Ponds | Total Area of Rice Fields | Total Area of Aquaculture Operations | Type of Waterbody Accessed for Fishing | Size of Waterbody Accessed for Fishing |
|---|---|---|---|---|---|
| | | | | | |

**TABLE 4.9.2**
**Transportation**

| *Proportion of Population with motorable access* | Proportion of Population with Paved Access | Proportion of Population with Bus/ Wagon Stop within Community | Average Distance to nearest Bus/ Wagon Stop | Type of Transportation Used (foot, bicycle, etc) | Travel time to nearest urban center |
|---|---|---|---|---|---|
| | | | | | |

**TABLE 4.9.3**
**Access to areas**

| Are there: | Yes / No | Is there a fee for access? | Is it community / co-op owned (not private ownership) | Distance to |
|---|---|---|---|---|
| water bodies | | | | |
| water access points | | | | |
| hatchery / grow-out facilities | | | | |
| irrigation services | | | | |
| repair facilities | | | | |
| gear storage | | | | |
| processing facility | | | | |
| cold storage | | | | |
| market | | | | |

**TABLE 4.9.4**
**Market information**

| | |
|---|---|
| Primary Source of Marketing Information (private body, co-op, government, other) | |
| How Market Information is Accessed (unavailable, mobile device, computer, radio, middleman) | |

**TABLE 4.9.5**
**Supporting resources**

| Supporting Resources for Aquaculture, Fisheries and/or Post-Harvest Processing | Presence (yes/no) | If none, travel time to nearest available (if applicable) |
|---|---|---|
| Credit Institution | | |
| Insurance Services | | |
| Veterinary Services | | |
| Extension Services | | |
| Feed Dealer | | |

| | |
|---|---|
| Fry/Seedling/Broodstock Dealer | |
| Free distribution of seed | |
| Free distribution of fertilizer | |

### *Suggested supplemental Item Tabulations*

**TABLE 4.9.6**
**Community Area**

| Total Area of Community (ha) |
|---|
| |

**TABLE 4.9.7**
**Natural disasters**

| | |
|---|---|
| Is the community vulnerable to natural disasters? | |
| If yes, specify which. | |

**TABLE 4.9.8**
**Community Resources**

| Community Resources | Presence (yes/no) | If none, travel time to nearest available |
|---|---|---|
| Primary School | | |
| Secondary School | | |
| Higher Education Institution | | |
| Vocational School | | |
| Hospital | | |
| Medical Clinic | | |
| Community Water Source | | |

### *Category 03 – Species Destination*

In this Category, the primary species used for any of the applicable aquaculture, fisheries and post-harvest processing activities should be indicated. All of the items are core data items.

## *Suggested Core Item Tabulations*

**TABLE 4.10.1**
**Species destinations**

| | Destination | | | | |
|---|---|---|---|---|---|
| **Species Name** | **Native or Non-Native Species** | **International Market, Domestic Market, or both** | **Sale** | **Household Use** | **Stocking or Public Hatchery** |
| **Aquaculture:** | | | | | |
| **Fisheries:** | | | | | |
| **Post-Harvest Processing:** | | | | | |

### *Category 04 – Grants, Subsidies and Social Protection*

All items within this category are core data items.

## *Core Item Tabulations*

**TABLE 4.11.1**
**Government support mechanisms**

| ***Which of the following government support mechanisms are present?*** | **Explain:** |
|---|---|
| **Loan support programs** | |
| **Tax preferences and insurance support** | |
| **Capital and infrastructure programs** | |
| **Marketing and price support programs** | |

## *Supplemental Item Tabulations*

Social Protection

**TABLE 4.11.2**
**Social protection mechanisms**

| **In the community, are any of the following provided?** | **Available (yes/no)** | **Received by community members?** |
|---|---|---|
| **Disability pay** | | |
| **Pensions** | | |
| **Severance pay** | | |
| **Unemployment insurance** | | |
| **Labour training programmes** | | |
| **Support for entrepreneurship or self-employment** | | |
| **Cash transfers** | | |

| | |
|---|---|
| School feeding programmes | |
| Food vouchers | |
| Fee waivers | |

## *Supplemental Items*

### *Category 05 – Governance*

This category is entirely supplemental. The inclusion of these items in the community survey is recommended if it is sought to comprehend local governance and the knowledge and perception of national governance.

**TABLE 4.12.1**
**Governance**

| | Explanation |
|---|---|
| What knowledge exists of fisheries management rules (legal, traditional and community)? | |
| Are operations subject to licence or regulation requirements? | |
| Are there restricted species (for capture or rearing)? | |
| Are there closed seasons? | |
| Does the community control or regulate access to fishing grounds, beaches, or ponds for aquaculture? | |
| Is there a community-based or co-operative based organization? | |

The following items address the governance components of decent rural employment.

**TABLE 4.12.2**
**Decent rural employment**

| | Presence (yes/no) | Amount | Explain any details or exceptions to the standards. | Are inspections on observance of these labour conditions conducted? |
|---|---|---|---|---|
| Are contracts mandatory for wage labour? If not, what percent of the labour force has contracts? | | | | |
| Is there a minimum working age? If so, what is it? Do any workers below this age participate in the workforce? | | | | |
| Is there a minimum wage? What is it? | | | | |
| Are there maximum working hours? What are they? | | | | |

# 5

# Stage 3: Household Survey Items

These Guidelines recommend that household-level surveys be conducted in all households of the communities selected for the community surveys (see Section 2.1).

Stage 3 suggests items that could supplement the information collected as part of the community survey. In the survey format, more detailed information beyond structural data can be collected. This Stage combines questions that can be addressed to a household or to a company. Some questions are more relevant to companies and others to households, and countries should select the items that are most suitable to their own particular circumstances. The large body of literature on worker-focused survey questionnaires makes it possible to add questions such as those suggested here, that are complementary to the data requested at household, community and census levels. As explained in Section 2.2 above, the unit of enumeration is the household rather than the holding.

This Stage is divided into two components. The first component covers activities at household level, and the second component addresses individuals within the household. The first component may be answered by a single respondent, preferably the head of household. For the second component, a response is required from each individual. **The items indicated with an asterisk (*) are non-core data items that have been included in these categories of core minimum items.**

**TABLE 5.1**
**The proposed categories for the household survey level, with a brief description**

| Category | Description (this category…) |
|---|---|
| ***Household Level*** | |
| **01 Land and Water Use** | seeks to define the area and type of land and water used for aquaculture, fisheries and post-harvest processing activities |
| **02 Species Destination** | identifies the principal species produced by the operation and their destination |
| **03 Equipment** | covers the structural detail and type of gear, equipment, vessels, and culture facilities used for aquaculture, fisheries and post-harvest processing |
| **04 Inputs** | covers basic indicators relating to operational inputs such as fuel, feed, fertilizers, etc.; identifies the resources input into the operations and equipment |
| **05 Unexpected Losses** | describes any losses of species, gear or equipment |

| *Individual Level* | |
|---|---|
| **06 Work** | describes the household members and external workers engaged in aquaculture, fisheries and post-harvest processing activities |
| **07 Food Consumption and Quality of Life** | identifies the basic reference points of food consumed in the household and of quality of life, when not requested through a frame census |
| *Supplemental Items* | |
| **08 Governance** | covers the support provided to the community by the government for conducting aquaculture, fisheries and post-harvest processing activities, and regulations or licensing requirements |

## 5.1 CATEGORIES

### *Household Questions*

Under these categories, aquaculture, fisheries and post-harvest processing are queried separately (as appropriate) and need only be answered as applicable to the activities within the household. For example, in a household where some members engage in fisheries and one family member engages in post-harvest processing, then only the sections on fisheries and post-harvest processing should be completed.

#### *Category 01 – Land and Water Use*

Category 01 covers the basic indicators relating to the household's land and water resources that are or can be used for aquaculture, fisheries and post-harvest processing purposes. It also seeks to establish the source of water. It should be borne in mind that holders may have access to coastal land, sea, reservoirs, lakes, etc., where these activities could be conducted away from the household's physical location.

In many cases, the land area is typically used to site and construct rearing and water purification ponds, raceways, tanks, small farm dams, reservoirs and other man-made water impoundments. Furthermore, aquatic organisms can be reared in net enclosures placed in the sea and in inland open waters. In these cases, the total area obtained or allocated for such a culture practice should be recorded. In this Section, tenure of and access to waterbodies is also queried, for both fisheries and aquaculture activities. Where land is used simultaneously for aquaculture and crop cultivation, such as in the case of artificially stocked rice paddies, the total area of these parcels of land should be recognized as land allocated to aquaculture. However, care should be taken to ensure that these lands are not counted twice when the total household area is estimated, and that rice paddies originating from flooding paddies that are used for growing fish are excluded from the aquaculture household area total. It should be recalled that water bodies such as reservoirs, canals and other water impoundments may be used principally for the irrigation of agricultural land; however, they may also be used for fisheries. In this case, these water bodies should be included in the total water area used for fisheries.

The proposed items under this category are:

**Table 5.2**
**Proposed items for Category 01: Land and Water Use**

| For the Entire Household |
|---|
| Total area (ha) of household land (the response may be "zero")* |
| Total area covered by aquaculture structures |
| Total area covered by processing structures or facilities |
| Total area of accessed water bodies |

| Tenure*<br>Water source body and ownership and any fees paid for access; indicate purpose of access (aquaculture, fisheries, etc.): |
|---|
| • lakes |
| • reservoirs |
| • rivers (streams, creeks, etc.) |
| • groundwater |
| • canals |
| • estuaries |
| • lagoons |
| • sea |
| Landing area / landing point and ownership (own, rent, lease, co-op, free access) and size (ha)* |
| Land area used for ancillary activities (feed or fertilizer storage, net mending, boat or gear repairs, processing, marketing, etc.)* |
| Distance travelled to fishing grounds, if any (km)* |

### *Category 02 – Species Destination*

This category contains information on the species produced and the purposes of their production. As mentioned above, destinations such as "household consumption" are often not captured through surveys or censuses, as these focus too heavily on economically important species; therefore, this vital contribution to food security is often overlooked. Category 02 also enables enumeration of the species produced and examination of the (potentially) different focuses on species depending on their destination, e.g. household consumption or trade. Each component must be answered by activity; for example, if the members of a household are engaged in aquaculture, fisheries and post-harvest processing, this category would be completed separately for each activity.

**Table 5.3**
**Proposed items for Category 02: Species Destination**

| Primary and secondary activity source of income for the household<br>*(If aquaculture, fisheries or post-harvest processing are a primary or secondary source of the aquatic products consumed in the household)* |
|---|
| **Purpose of Harvest and/or Production for Household** |
| • household consumption |
| • barter for other goods |
| • sale as: |
| » seed / broodstock |
| » edible fish |
| » recreation (game fishing) |
| » ornamental purposes (aquarium fishes and plants) |
| » live feed for aquaculture |
| **Gross Catch** |
| • species name, and destination by proportion of total catch |
| • total amount of catch and value |

| |
|---|
| • list species discarded by amount (weight) or pieces discarded* |
| **Gross Production** |
| • species name, and destination by proportion of total catch |
| • total amount of production and value |
| **Gross Storage** |
| • species name and amount currently kept in aquaculture facilities |
| • species name and amount of processed product in storage |
| **Gross Processing** |
| • species name, and destination by proportion processed |
| • total amount processed and value |

### *Category 03 – Equipment*

The Equipment category is divided by sector (aquaculture, fisheries and post-harvest processing) and should be completed for each activity in which the household engages. The final section addresses the Ancillary Facilities used by the household. This section does not require an exclusive connection with any given activity; rather, the facilities can be used to support any aquaculture, fisheries and post-harvest processing activity.

#### Aquaculture

This category addresses the household's use of equipment and non-residential buildings to engage in aquaculture. See Appendix IV below for a detailed description of the types of aquaculture production facilities and systems.

**TABLE 5.4**
**Proposed items for Category 03: Equipment (Aquaculture)**

| |
|---|
| **Facilities** |
| Rearing structures (nets, ropes, rafts, raceways, ponds, etc.) |
| Feed sheds |
| Silos |
| Buildings housing tanks, ponds, raceways |
| Source of energy/power for production |
| **Value** |
| Value of structure, building, facility, equipment |
| Cost of maintenance |
| Source of energy or power used |
| **Other Facilities*** |
| Feed supply plant |
| Broodstock or hatchery |

#### Fisheries

This section describes the vessels and gear used for fishing activities and the proportion of total catch obtained from the use of the different types of gear. Appendix V below contains a full listing of the types of fishery gear.

**Table 5.5**
**Proposed items for Category 03: Equipment (Fisheries)**

| Use of Vessel (if yes, then:) |
|---|
| length |
| power source |
| tonnage |
| **Gear Used:** |
| surrounding nets |
| seine nets |
| trawl nets |
| dredges |
| lift nets |
| falling gears |
| gillnet & entangling nets |
| traps |
| hook & line |
| grappling and wounding gear |

## Post-Harvest Processing

This section describes the equipment to be used for post-harvest activities. The post-harvest processing of captured and/or cultured aquatic organisms encompasses a series of processes that may include handling, loading, transporting, processing and packing. The equipment and structures used for these purposes are queried here.

**TABLE 5.6**
**Proposed items for Category 03: Equipment (Post-Harvest Processing)**

| Equipment: |
|---|
| ice maker |
| freezers |
| salting/brining equipment |
| drying racks |
| smoking |
| canning or tinning |
| packing |
| processing plant |
| chilled storage |
| other (explain) |
| **Value** |
| Ownership (own, rent, lease, share) |

| |
|---|
| Size of structure |
| Value of structure, building, facility, equipment |
| Cost of access (if not owned) |
| Source of energy/power for production |

### Ancillary Activities or Facilities

For each of the items below, the following should be described: cost of access, whether onor off-site of the household, ownership, size (square metres).

**TABLE 5.7**
**Proposed items for Category 03: Equipment (Ancillary activities or facilities)**

| |
|---|
| Feed supply plant |
| Broodstock or hatchery |
| Net mending |
| Vessel repair |
| Fuel storage |

### *Category 04 – Inputs*

Inputs are divided by type, and may apply to multiple activities. For example, fertilizers may be used to support both enhanced aquaculture productivity or increased fisheries harvests.

This Category covers basic indicators relating to the inputs to aquaculture and fisheries operations, such as feed, fertilizers and fuel. One of the principal means of enhancing aquaculture yields is the use of different inputs for the culture system. Feeds and fertilizers are used to supply or enhance the nutrition available to the cultured species.

**Table 5.8**
**Proposed items for Category 04: Inputs**

| Frequency, Source and Cost of: |
|---|
| Feeds |
| Fertilizers |
| Fuel |
| Lubricants |
| Biocides (antibiotics, insecticides, disinfectants, fungicides and other medicines) |
| Use of veterinary services |
| Bait (natural and artificial) |
| Seed/Broodstock |
| Stocking Programmes |
| Fish Aggregating Devices |

### *Category 05 – Unexpected Losses*

The category is designed to detail the efficiency of operations, and to take into consideration the losses occurring throughout the year. Expected operational losses (e.g. fish mortality within the expected range) are beyond the scope of this category.

**Table 5.9**
**Proposed items for Category 05: Unexpected Losses**

| **Losses of Species** |
|---|
| Total Losses (% or kg) |
| Losses due to: |
| • stock enhancement |
| • disease death |
| • disease cull |
| • environmental conditions |
| • no-market cull |
| • spoiling during processing |
| • loss due to poaching (theft) |
| • any conflict with others for access to resources |
| **Loss of facilities, structures or gear** |
| feed shed |
| silos |
| buildings housing tanks, ponds, raceways, etc. |
| rearing structures (nets, ropes, rafts, raceways, ponds, etc.) |
| vessels |
| gear |
| repair or storage facilities |
| processing facilities or equipment |
| other (explain) |

## *Individual Questions*

### *Category 06 – Work*

This category describes the household members and external workers engaged in aquaculture, fisheries and post-harvest processing activities for the household. Emphasis is placed on the gender and age of the labour inputs, as well as on the amount and form of salaries paid. The term "work" here means any form of work in the activities mentioned. As above (Section 3.1), the definition of work adopted is that of the 2013 ILO resolution.

**TABLE 5.10**
**Proposed items for Category 06: Work**

| Household Members |
|---|
| • Total number of householders engaged in aquaculture, fisheries and post-harvest activities |
| • Gender |
| • Country of birth |
| • Degree of engagement (occasional, partor full-time) |
| • Age in Completed Years |
| • Highest level of education completed |
| • Salary paid (and form of payment) |
| • Days spent engaged in aquaculture, fisheries, post-harvest processing (days with any activity, no matter the duration) |
| **Non-Household Aquaculture Workers/Labourers** |
| • Number of non-householders engaged in aquaculture activities |
| • Gender |
| • Country of birth |
| • Degree of Engagement (occasional, partor full-time) |
| • Age in Completed Years |
| • Salary paid (and form of payment) |
| • Whether the workers are migrant workers |

### *Category 07 – Food Consumption and Quality of Life*

This indicator is included at individual and not household level, to better capture each individual's access to food and his/her consumption patterns.

#### Food

**TABLE 5.11**
**Proposed items for Category 07: Food Consumption and Quality of Life (Food)**

| Fish consumption |
|---|
| Amount of Fish Consumed in Average Week (indicate quantity in pieces or weight as possible) |
| Source of fish consumed |
| • Self |
| • Purchased |
| • If purchased, price paid per kg (or per unit indicated) |
| • If bartered for other goods, indicate goods and quantity |

### Other Incomes

**TABLE 5.12**
**Proposed items for Category 08: Food Consumption and Quality of Life (Other Incomes)**

| Source of other incomes for the household, including amount and source |
|---|
| Whether any food aid received (ever) |
| How many income generating activities are conducted in an average year |
| Whether the number of income sources has increased, decreased or remained the same over time |
| List activities |
| • Seasonal activities conducted |
| • Estimate of income level per activity |
| • Estimate of time invested in activity |

## *Supplemental Items*

### *Category 08 – Governance*

This Category identifies the regulations or licensing requirements to which households or company operations are subject or in which they participate. This basic information on governance is an important complement to the data that is available at administrative level.

**TABLE 5.13**
**Proposed supplemental items for Category 08: Governance**

| |
|---|
| Licensing or registration of aquaculture production |
| Participation in a cooperative association |
| • For each of the above: |
| » What is the level of governance? |
| » Is it mandatory? |
| » Is a fee paid? |
| » If yes, annual cost of fee |
| Are you licensed or registered for your fishery activity? |
| Are you part of a cooperative association? |
| Are there limited or no-fishing days? |
| Are there capture limits based on size, quantity, etc. in place? |
| Are discards banned or limited? |

## 5.2 SUGGESTED TABULATIONS

This section suggests tabulations for each category. It is recalled that these tabulations should only serve as a starting point, and are not the only method for tabulating the proposed items. For each tabulation, a brief description of the relevant data needs or policy interests is provided. To ensure clarity, supplementary items are listed in a separate tabulation.

### Household Level

#### *Category 01 – Land and Water Use*

The core item tabulations do not include the total area of the household's land (if any); however, this could be added to the table on the area of structures and water bodies accessed, if the country considers relative size to be important. All the items concerning tenure are supplemental, but should be included if issues relating to social justice are among the country's policy concerns.

#### *Core Item Tabulations*

**TABLE 5.14.1**
**Area accessed by each household**

| | |
|---|---|
| Total area covered by aquaculture structures (cage, pond, raceway, etc.) | |
| Total area covered by processing structures or facilities | |
| Total area of accessed water bodies | |

#### *Supplemental Item Tabulations*

**TABLE 5.14.2**
**Holding size**

| | |
|---|---|
| Total Size of Holding (ha) | |

**TABLE 5.14.3**
**Tenure**

| Water Source Bodies | Indicate Ownership (own, rent, lease, co-op, free access) | Indicate Fee (if any) for Access |
|---|---|---|
| Lakes | | |
| Reservoirs | | |
| Rivers | | |
| Groundwater | | |
| Canals | | |
| Estuaries | | |
| Lagoons | | |
| Sea | | |

### *Category 02 – Species Destination*

If detailed information on all species captured, harvested or processed is required, all of the supplemental items listed below should be included. For the fisheries context, an item on discards has been suggested; this should be included only if countries have set catch limits in such a way that discards in fishery operations do occur.

## *Core Item Tabulations*

**TABLE 5.15.1**
**Household sources of income**

| | |
|---|---|
| **Primary source of income for the household (activity):** | |
| **Secondary source of income for the household (activity):** | |

**TABLE 5.15.2**
**Sources of aquatic product consumption**

| **Are the following activities primary or secondary sources of the aquatic products consumed in the household?** | **Indicate whether primary or secondary:** |
|---|---|
| **Aquaculture** | |
| **Fisheries** | |
| **Post-harvest processing** | |

**TABLE 5.15.4**
**Species destinations**

| **Species Produced (by Name)** | **Purpose** | | | | | |
|---|---|---|---|---|---|---|
| | | | | **Sale as:** | | |
| | **Weight by Activity and by Main Species (kg)** | **Household Use** | **Barter for other goods** | **Seed/ Broodstock** | **Edible Fish** | **Other (e.g. recreational, ornamental, live feed, tourism, industrial use)** |
| **Aquaculture** | | | | | | |
| **Fisheries** | | | | | | |
| **Post-Harvest Processing** | | | | | | |

## *Supplemental Item Tabulations*

**TABLE 5.15.5**
**Discards**

| List Species Produced by Name | Count or Weight of Discards |
|---|---|
| | |

### *Category 03 – Equipment*

In this Category, the tabulations are divided by aquaculture, fisheries and post-harvest processing activities, and should be completed for each activity in which the household members engage. The supplemental items include a tabulation on "other facilities"; this can be completed only once for the entire household, and not necessarily for each activity.

## *Core Item Tabulations*

### Aquaculture

**TABLE 5.16.1**
**Aquaculture equipment**

| Production facilities | Size | Value | Cost of maintenance | Source of energy/ power |
|---|---|---|---|---|
| Rearing structures (nets, ropes, rafts, raceways, ponds, etc.) | | | | |
| Feed shed | | | | |
| Silos | | | | |
| Buildings housing tanks, ponds, raceways, etc. | | | | |
| Other (explain) | | | | |

### Fisheries

**TABLE 5.16.2**
**Fisheries equipment: Vessels**

| Vessel (y/n) | | | |
|---|---|---|---|
| if yes, then: | Length | Power source | Tonnage |
| | | | |

**TABLE 5.16.3**
**Fisheries equipment: gear**

| Gear | Ownership (own, rent, lease, share) | Value | Cost of access (if not owned) |
|---|---|---|---|
| Surrounding nets | | | |
| Seine nets | | | |
| Trawl nets | | | |
| Dredges | | | |
| Lift nets | | | |
| Falling gears | | | |
| Gillnet & entangling nets | | | |
| Traps | | | |
| Hook & line | | | |
| Grappling and wounding gear | | | |
| Stupefying gear | | | |

## Post-Harvest Processing

**TABLE 5.16.4**
**Post-harvest processing equipment**

| Post-harvest processing equipment | Ownership (own, rent, lease, share) | Value | Cost of access (if not owned) |
|---|---|---|---|
| Ice maker | | | |
| Freezers | | | |
| Salting/brining equipment | | | |
| Drying racks | | | |
| Smoking facilities | | | |
| Canning or tinning equipment | | | |
| Packing | | | |
| Processing plant | | | |
| Chilled storage | | | |
| Other (explain) | | | |

## *Supplemental Item Tabulations*

### Other Facilities

**TABLE 5.16.5**
**Other facilities**

| Other facilities | Ownership (own, rent, lease, share) | Size | Value | Cost of access (if not owned) |
|---|---|---|---|---|
| Feed supply plant | | | | |
| Broodstock or hatchery | | | | |
| Net mending | | | | |
| Vessel repair | | | | |
| Fuel storage | | | | |
| Storage | | | | |

### *Category 04 – Inputs*

Inputs are divided into several thematic categories. There are no supplemental items under this category.

## *Core Item Tabulations*

**TABLE 5.17.1**
**Inputs**

| Inputs | Frequency of Use | Cost | Source | Amount Used |
|---|---|---|---|---|
| Feeds | | | | |
| Fertilizers | | | | |
| Fuel | | | | |
| Lubricants | | | | |
| Biocides (antibiotics, insecticides, disinfectants, fungicides and other medicines) | | | | |
| Veterinary Services | | | | |
| Bait (natural and artificial) | | | | |
| Seed/Broodstock | | | | |
| Stocking Programmes | | | | |
| Fish Aggregating Devices | | | | |

### *Category 05 – Unexpected Losses*

Unexpected losses are grouped into tabulations under losses of species and losses of facilities, structures or gear. There are no supplemental items under this category.

## *Core Item Tabulations*

**TABLE 5.18.1**
**Unexpected losses: species**

| Species Losses | Total Losses (kg) | |
|---|---|---|
| | *Due to:* | % or kg |
| | Stock enhancement (release to wild) | |
| | Disease death | |
| | Disease cull | |
| | Environmental conditions | |
| | No market cull | |
| | Spoiling during processing | |
| | Poaching | |
| | Conflicts around access to resource | |

**TABLE 5.18.2**
**Unexpected losses: facilities, structures, and gear**

| Facilities, structures and gear | Losses (explain by extreme event) |
|---|---|
| **Feed shed** | |
| **Silos** | |
| **Buildings housing tanks, ponds, raceways, etc.** | |
| **Rearing structures (nets, ropes, rafts, raceways, ponds, etc.)** | |
| **Vessels** | |
| **Gear** | |
| **Repair or storage facilities** | |
| **Processing equipment** | |
| **Processing facilities** | |

## Individual Items

### *Category 06 – Work*

These tabulations are divided into household members and outside workers (hired by the household). One table is presented for each of the aquaculture, fisheries and post-harvest processing categories, and should be completed as appropriate, taking into account all household members in addition to any outside workers. As with all other items, the reference period is one year.

### *Core Item Tabulations*

#### Household Members

**TABLE 5.19.1**
**Household members' work: aquaculture**

| Aquaculture – Household Member | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |
| **Country of Birth** | | | | |
| **Employment Status:** Paid employment | | | | |
| If paid employment, with a contract? | | | | |
| Self-employment | | | | |
| Own-account work | | | | |
| Contributing family worker | | | | |
| **Wages Paid (indicate amount of money, shares, food, other)** | | | | |
| **Degree of Engagement (occasional, part, full time)** | | | | |
| **Permanent or Temporary** | | | | |
| **Seasonal Hiring (yes/no)** | | | | |
| **Days spent working in aquaculture (including partial days)** | | | | |

**TABLE 5.19.2**
**Household members' work: fisheries**

| Fisheries – Household Member | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |
| **Country of Birth** | | | | |
| **Employment Status:** | | | | |
| Paid employment | | | | |
| If paid employment, with a contract? | | | | |
| Self-employment | | | | |
| Own-account work | | | | |
| Contributing family worker | | | | |
| **Wages Paid (indicate amount of money, shares, food, other)** | | | | |
| **Degree of Engagement (occasional, part-, full-time)** | | | | |
| **Permanent or Temporary** | | | | |
| **Seasonal Hiring (yes/no)** | | | | |
| **Days spent working in fisheries (including partial days)** | | | | |

**TABLE 5.19.3**
**Household members' work: post-harvest processing**

| Post-Harvest Processing – Household Member | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |
| **Country of Birth** | | | | |
| **Employment Status:** | | | | |
| Paid employment | | | | |
| If paid employment, with a contract? | | | | |
| Self-employment | | | | |
| Own-account work | | | | |
| contributing family worker | | | | |
| **Wages Paid (indicate amount of money, shares, food, other)** | | | | |
| **Degree of Engagement (occasional, part-, full-time)** | | | | |
| **Permanent or Temporary** | | | | |
| **Seasonal Hiring (yes/no)** | | | | |
| **Days spent working in post-harvest processing (including partial days)** | | | | |

Outside Workers:

**TABLE 5.19.4**
**Employment of outside workers**

| Do you hire outside workers? | (yes/no) |
|---|---|
| | If yes, complete below |

**TABLE 5.19.5**
**Employment of outside workers: aquaculture**

| Aquaculture – Outside Worker | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |
| **Country of Birth** | | | | |
| **Employment Status:** | | | | |
| Paid employment | | | | |
| If paid employment, with a contract? | | | | |
| Self-employment | | | | |
| Own-account work | | | | |
| Contributing family worker | | | | |
| **Wages Paid (indicate amount of money, shares, food, other)** | | | | |
| **Degree of Engagement (occasional, part-, full-time)** | | | | |
| **Permanent or Temporary** | | | | |
| **Seasonal Hiring (yes/no)** | | | | |
| **Days spent working in aquaculture (including partial days)** | | | | |

**TABLE 5.19.6**
**Employment of outside workers: fisheries**

| Fisheries – Outside Worker | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |
| **Country of Birth** | | | | |
| **Employment Status:** | | | | |
| Paid employment | | | | |
| If paid employment, with a contract? | | | | |
| Self-employment | | | | |
| Own-account work | | | | |
| Contributing family worker | | | | |
| **Wages Paid (indicate amount of money, shares, food, other)** | | | | |
| **Degree of Engagement (occasional, part-, full-time)** | | | | |
| **Permanent or Temporary** | | | | |
| **Seasonal Hiring (yes/no)** | | | | |
| **Days spent working in fisheries (including partial days)** | | | | |

**TABLE 5.19.7**
**Employment of outside workers: post-harvest processing**

| Post-Harvest Processing – Outside Worker | Household member 1 | Household member 2 | Household member 3 | Household member 4 |
|---|---|---|---|---|
| **Gender** | | | | |
| **Age in Completed Years** | | | | |
| **Highest Level of Education Completed** | | | | |

| |
|---|
| **Country of Birth** |
| **Employment Status:** |
| Paid employment |
| If paid employment, with a contract? |
| Self-employment |
| Own-account work |
| Contributing family worker |
| **Wages Paid (indicate amount of money, shares, food, other)** |
| **Degree of Engagement (occasional, part-, full-time)** |
| **Permanent or Temporary** |
| **Seasonal Hiring (yes/no)** |
| **Days spent working in post-harvest processing (including partial days)** |

*Category 07 – Food Consumption and Quality of Life*

## *Core Item Tabulations*

**TABLE 5.20.1**
**Consumption of aquatic species**

| Food consumption – Aquatic species | Source | | | |
|---|---|---|---|---|
| **Amount of Fish (or aquatic species) consumed in an average week** | **Self** | **Purchased** | **If purchased, cost (per kg or other indicated unit)** | **Bartered, in exchange for goods or services** |
| | | | | |

### Other Incomes

**TABLE 5.20.2**
**Other sources of income**

| Income-generating activities (indicate amount for any sources) | |
|---|---|
| Did you receive any food aid (not only this year)? | |
| Pensions received | |
| Disability insurance received | |
| Severance pay received | |
| Unemployment insurance received | |
| How many income-generating activities are conducted in the household (even if only once per year)? | |
| Has the number of income sources for your household increased, decreased or stayed the same over time? Please describe the trend. | |

**TABLE 5.20.2A**
**Other sources of income: details**

| Activity (source of income) | Seasonality (when the activity is carried out) | Estimate of income level per time unit | Estimate of time invested |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## *Supplemental Items*

### *Category 08 – Governance*

The entire category is a supplemental item. If it is sought to gain an understanding of local governance and knowledge and of the perception of national governance at the household level, it is recommended that these items be included in the community survey.

**TABLE 5.21.1**
**Governance**

| Regulations/ Licensing | Yes/ No | With which level of governance? | Is this mandatory? | Do you pay a fee? | Cost (annually) if fee paid |
|---|---|---|---|---|---|
| Are you licensed or registered for your aquaculture production? | | | | | |
| Are you part of a cooperative association? | | | | | |

# References

**Allison, E., Franz, N., Fuentavilla, C., Westlund, L. & Willmann, R.** 2012. Greening Small-Scale Fisheries and Aquaculture. In UNEP, FAO, IMO, UNDP, IUCN, *Green Economy in a Blue World*. World Fish Center and GRIDArendal Report.

**Australia.** 1991. Australian Government Publishing Service. *Ecologically Sustainable Development Working Groups Final Report – Fisheries*.

**CWP.** 1992. Aquaculture. In *Proceedings of the 15th Session of the Co-ordinating Working Party Atlantic Fishery Statistics*, Dartmouth, Canada, 8 – 14 July 1992. CWP-15/8B.

_____ 2002. Section J: AQUACULTURE. CWP Handbook of Fishery Statistical Standards. Available at http://www.fao.org/fishery/cwp/handbook/J/en. Accessed 18 September 2014.

_____ 2013. Final Draft of CWP Handbook of Fishery Statistical Standards, Aquaculture Component. FAO Publication, Rome.

**Dey de Pryck, J.** 2013. Good Practice Policies to Eliminate Gender Inequalities in Fish Value Chains. FAO Publication, Rome. Available at: http://www.fao.org/fsnforum/righttofood/sites/default/files/gender_and_fish_value_chains.pdf. Accessed 26 September 2014.

**Eurostat.** 2008. Survey sampling reference guidelines. Introduction to sample design and estimation techniques. Eurostat Methodologies and Working Papers. Eurostat Publication, Luxembourg.

**FAO.** 1983. Statistics Division, Economic and Social Development Department. *Community-level Statistics*. FAO Economic and Social Development Paper N. 33. FAO Publication, Rome.

_____ 1994. Regional Office for Asia and the Pacific (RAPA). *Report of the Fifteenth Session of the Asia and Pacific Commission on Agricultural Statistics*. FAO Publication, Bangkok.

**FAO.** 1998. *Guidelines for the routine collection of capture fishery data*. FAO Fisheries Technical Paper No. 382. FAO Publication, Rome.

_____ 2001. "Fisheries development". FAO Fisheries and Aquaculture Department website, http://www.fao.org/fishery/topic/2013/en. Accessed 26 September 2014.

_____ 2010. "Coordinating Working Party on Fishery Statistics (CWP)". FAO Fisheries and Aquaculture Department website, http://www.fao.org/fishery/cwp/en. Accessed 26 September 2014.

_____ 2010. *Report of the Twenty-Third Session of the Coordinated Working Party on Fishery Statistics*. FAO Fisheries and Aquaculture Report No. 942. FAO Publication, Rome.

_____ 2011. *The State of Food and Agriculture 2010–2011. Women in Agriculture: Closing the Gender Gap for Development*. FAO Publication, Rome.

_____ 2012. Reference Material on Sampling Methods. Regional Workshop on use of Sampling for Agricultural Census and Surveys held on 14-18 May 2012, Bangkok, Thailand.

_____ 2014a. *The State of World Fisheries and Aquaculture*. Available at http://www.fao.org/fishery/sofia/en. Accessed 17 September 2014. FAO Publication, Rome.

_____ 2014b. "Ecosystem Approach to Aquaculture (EAA)". FAO Fisheries and Aquaculture Department website, http://www.fao.org/fishery/topic/16035/en. Accessed 26 September 2014.

_____ 2014c. "World Programme for the Census of Agriculture". Economic and Social Development Department website, http://www.fao.org/economic/ess/ess-wca/it/. Accessed 19 September 2014.

_____ 2014d. Committee on Fisheries. FAO's Programme of Work in Fisheries and Aquaculture under the Reviewed Strategic Framework. COFI/2014/8.

**ILO & FAO.** 2014. "Decent Employment for Agricultural and Rural Development and Poverty Reduction". Food, Agriculture & Decent Work website, http://www.fao-ilo.org/ilo-dec-employ/en/. Accessed 12 December 2014.

**Global Strategy to improve Agricultural and Rural Statistics.** 2014. Technical Report on the Integrated Survey Framework. Technical Report Series GO-02-2014. FAO Publication, Rome.

**Garcia, S.M.** 2009. Glossary. In Cochrane, K. and Garcia, S.M. (eds), A fishery managers' handbook. FAO and Wiley-Blackwell: 473-505.

**Geospace International.** 2007. *Census Mapping and Methodology Using Remote Sensing and GIS Technology*. Available at http://siteresources.worldbank.org/SCBEXTERNAL/Resources/Seychelles_Census_Mapping_Methodology.pdf. Accessed 25 September 2014.

**Iglesias Martínez, L.** 2013. *Improving the use of GPS, GIS and RS for Setting up a Master Sampling Frame*. Literature Review. Available at http://unstats.un.org/unsd/demographic/meetings/egm/sampling_1203/docs/no_3.pdf. Accessed 24 September 2014.

**ILO.** 1990. *International Standard Classification of Occupations: ISCO-88*. ILO Publication, Geneva.

____ 1993. *Resolutions Concerning International Classification of Status in Employment Adopted by the 15th International Conference of Labour Statisticians*, January 1993, para. 10.

**ISIC.** 2008. *International Standard Industrial Classification of All Economic Activities Revision 4*. Statistical Papers. Series M No.4, Rev. 4. United Nations Publication, New York, USA.

**Nandeesha M.C., Heng N. & Yun K.** 1994. Role of women in small-scale aquaculture development in Southeastern Cambodia. *Naga*, 17(4): 7-9.

**Nédélec, C. & Prado, J.** 1990. *Definition and classification of fishing gear categories*. FAO Fisheries Technical Paper No. 222, Revision 1. FAO Publication, Rome.

**New, M. & Crispoldi-Hotta, A.** 1992. Problems in the application of the FAO definition of aquaculture. *FAO Aquaculture Newsletter 1*. Food and Agriculture Organization of the United Nations, Rome, Italy.

**Rana, K.J.** 1997. *Guidelines on the collection of structural aquaculture statistics*. Supplement to the Programme of the World Census of Agriculture 2000. FAO Statistical Development Series, No. 5b. FAO Publication, Rome.

**Satia, B.** 1989. A Regional Survey of the Aquaculture Sector in Africa, South of the Sahara. ADCP/REP/89/36. FAO Publication, Rome.

**SEAFDEC.** 1994. *Status of Fishery Information and Statistics in Asia. Volume I. Proceedings of the Regional Workshop on Fishery Information and Statistics in Asia. 18-22 January 1994, Bangkok, Thailand*. SEAFDEC Secretariat Publication, Bangkok.

**Turner, A.** 2003. Sampling Frames and Master Samples. Draft Report to Expert Group Meeting to Review the Draft Handbook on Designing of Household Sample Surveys. ESA/STAT/AC.93/3. FAO Publication, Rome.

**UN.** 1990. *International standard industrial classification of all economic activities*. Series M, No.4, Rev. 3. New York, USA.

___ 1998. *Principles and Recommendations for Population and Housing Censuses*. Revision 1. New York, USA.

___ 2009. Department of Economic and Social Affairs, Statistics Division. *Handbook on Geospatial Infrastructure in Support of Census Activities*. Studies in Methods. Series F No. 103. UN Publication, New York, USA.

**UNECE & Eurostat.** 2006. Conference of European Statisticians Recommendations for the 2010 Censuses of Population and Housing. New York, USA and Geneva, Switzerland.

**Van der Mheen-Sluijer, J. & Sen, S.** 1994. Meeting on the information needs on gender issues in aquaculture. In *Report of the Aquaculture for Local Community Development Programme*. FAO Publication, Harare.

**Welcomme, R.** 1996. "Definitions of aquaculture and intensification of production from fisheries". *FAO Aquaculture Newsletter*, No. 12.

_____ 1997. World Inland Fisheries and Aquaculture - Changing Attitudes to Management. World Fisheries Congress. In Hancock D.A., Smith D.C., Grant A. and Beumer J.P. (eds) *Developing and Sustaining World Fisheries Resources: the state of science and management: Second World Fisheries Congress Proceedings* (pp. 443-451). CSIRO Publication, Australia.

**World Bank.** 2010. *Global Strategy to Improve Agricultural and Rural Statistics*. Report No. 56719-GLB. World Bank Publication. Washington, D.C.

# Glossary of Terms

**Artisanal Fisheries**
"The term tends to imply a simple, individual (self-employed) or family type of enterprise (as opposed to an industrial company), most often operated by the owner (even though the vessels may sometimes belong to the fishmonger or some external investor), with the support of the household. The term has no obvious reference to size but tends to have a connotation of relatively low levels of technology but this may not always be the case. In practice the definition varies between countries, from example from gleaning or a one-man canoe in poor developing countries to more than 20m trawlers, seiners or long-liners in developed ones (e.g. in Europe). Artisanal fisheries can be subsistence or commercial fisheries providing for local consumption or export." See small-scale fisheries.
(Garcia 2009)

**By-Catch** (or *bycatch*)
Part of a catch of a fishing unit taken incidentally, in addition to the target species towards which the fishing effort is directed. It may be retained for human use or some or all of it may be returned to the sea as discards, usually dead or dying.
(Modified from FAO, 1998 and Australia, 1991)

**Contributing Family Worker**
"A contributing family worker is a person who holds a self employment job in a market-oriented establishment operated by a related person living in the same household, and who cannot be regarded as a partner because of the degree of his or her commitment to the operation of the establishment, in terms of the working time or other factors to be determined by national circumstances, is not at a level comparable with that of the head of the establishment."
(UN, 1998: para. 2.82)

**CWP**
The Coordinating Working Party on Fishery Statistics was established in 1959 and has been in operation since 1960. Its mission is to provide a mechanism for the coordination of the fishery statistical programmes of regional fishery bodies and other inter-governmental organizations engaged in fishery statistics (FAO 1995). The CWP's three main functions are:

- To keep under continuous review the fishery statistics requirements for research, policy-making and management;
- To reach agreement on standard concepts, definitions, classifications and methodologies for the collection and collation of fishery statistics;
- To make proposals for the coordination and streamlining of statistical activities among relevant intergovernmental organizations.

**EAA**
Ecosystem Approach to Aquaculture. "An ecosystem approach to aquaculture (EAA) strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems including their interactions, flows and processes and applying an integrated approach within ecologically and operationally meaningful boundaries."
(FAO 2014)

### EAF
Ecosystem Approach to Fisheries. "An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries." (FAO 2004)

### FAD
Fish Aggregating Device. Man-made objects used to attract fish in the open ocean for capture through recreational or commercial fisheries.

### Full-Time Work
Part-time work is always defined vis-a-vis full-time work; however, the latter is often not defined. The definition depends on the statutory standards or practice in force in each country and can range from approximately 35 to 48 hrs per week. The cut-off points between full- and part- time work are set by each country.

### GIS (Geographic Information System)
A set of tools for collecting, storing/retrieving, transforming and displaying spatial data.
(Iglesias Martínez 2013)

### ISIC
International Standard Industrial Classification. A United Nations system for the classification of economic data.

### Master Sampling Frame
Used to select samples for multiple surveys on different content, or in subsequent rounds of a periodic survey. Can also be the sampling frame that constitutes the foundation for all data collections based on sample survey/census in a sector.
(Iglesias Martínez 2013, Turner 2003)

### Own-Account Workers
"Own-account workers are those workers who, working on their own account or with one or more partners, hold the type of job defined as a self-employed job, and have not engaged on a continuous basis any employees to work for them during the reference period.

It should be noted that during the reference period the members of this group may have engaged employees, provided that this is on a non-continuous basis. The partners may or may not be members of the same family or household." (ILO 1993)

### Part-Time Work
The ILO (Part-Time Work) Convention 1994 (No. 175) defines a part-time worker as someone "employed person whose normal hours of work are less than those of comparable full-time workers". The threshold of hours varies by country and should be established in accordance with the national legislative framework in force.

### Remote Sensing
Imagery obtained with a sensor other than, or in addition to, a conventional camera; specific analysis techniques are then applied to process and interpret the imagery.
(Iglesias Martínez 2013)

### Sampling Frame

Sampling Frames may be defined as the set of source materials from which the sample is selected, which must include the target population.
(Turner 2003)

### WCA

A programme established in the 1950s to facilitate countries in their conduction of national agricultural censuses.

"The programme assists countries by providing guidelines to generate internationally comparable figures on variable defining structure of agriculture, such as number and area of farms by size, number of livestock by type and age/sex classification, land tenure and land use, crops grown and agricultural inputs. FAO encourages countries to develop their programmes of censuses and surveys, keeping in view their priorities, practices and resource availability within the framework of a modular approach advocated in WCA 2010." (FAO 2014c)

# Appendix

## CORE DATA ITEMS FROM THE GLOBAL STRATEGY

The core data items from the Global Strategy are matched with their corresponding elements from the components of the three Stages.

**Legend**

| A Items for Inclusion with Census | | B Community | | C Household | |
|---|---|---|---|---|---|
| A01 | Identification of operations | B01 | Work | C01 | 01 Land and Water Use |
| | | B02 | Community Infrastructure and Services | C02 | 02 Species Destination |
| | | B03 | Species Destination | C03 | 03 Equipment |
| | | B04 | Grants/Subsidies | C04 | 04 Inputs |
| | | B05 | Governance | C05 | 05 Unexpected Losses |
| | | | | C06 | 06 Work |
| | | | | C07 | 07 Food Consumption and Quality of Life |
| | | | | C08 | 08 Governance |

**Comparison Table**

| Group of Variables | Key Variables | Core Data Items | Guidelines Stage/ Category |
|---|---|---|---|
| **Economic** | | | |
| **Output** | Production | Core crops (eg. wheat, rice, etc) | n/a |
| | | Core livestock (eg., cattle, sheep, pigs, etc.) | n/a |
| | | Core forestry products | n/a |

| | | | |
|---|---|---|---|
| | | Core fishery and aquaculture products | B03, C03 |
| | Area harvested and planted | Core crops | B02, C02 |
| | | Water surface accessed for fishing | B02, C03 |
| | Yields/births/productivity | Core crops, core livestock, core forestry, core fishery, core aquaculture | B02, C04 |
| **Trade** | Exports in quantity and value | Core crops, core livestock, core forestry, core fishery, core aquaculture | B03, C03 |
| | Imports in quantity and value | Core crops, core livestock, core forestry, core fishery, core aquaculture | B03, C04 |
| **Stocks** | Quantities in storage | Core crops | C02 |
| **Stock of resources** | Land cover and use | Land area | B02, C02 |
| | Economically active population | Number of people in working age by sex | B01, C01 |
| | Livestock | Number of live animals | n/a |
| | Machinery | Number of tractors, harvesters, seeders, etc | C04 |
| **Inputs** | Water | Quantity of water withdrawn for agricultural irrigation | B02, C02 |
| | Fertilizers in quantity and value | Core fertilizers by core crops | C05 |
| | Pesticides in quantity and value | Core pesticides(e.g. fungicides, herbicides, inseticides, disinfectants) by core crops | C05 |
| **Agro Processing** | Volume of core crops/ livestock/fishery used in processing food | By industry | C02 |
| | Value of output of processed food | By industry | C02 |
| | Other uses (e.g. biofuel) | | C03, B03 |
| **Prices** | Producer prices | Core crops, core livestock, core forestry, core fishery, core aquaculture | C03, C06 |
| | Consumer prices | Core crops, core livestock, core forestry, core fishery, core aquaculture | n/a |
| **Final expenditure** | Government expenditure on agriculture and rural development | Public investments, subsidies, etc. | B02, B05 |

| | | | |
|---|---|---|---|
| | Private investments | Investment in machinery, in research and development, in infrastructure | C04 |
| | Household consumption | Consumption of core crops/livestock/etc in quantity and value | C08 |
| **Rural infrastructure** | Irrigation/roads/railways/ communications | Area equipped for irrigation/roads in km/ railways in km/ communications | B02 |
| **International transfer** | Official development assistance (ODA) for agriculture and rural development | | B02 |
| **Social** | | | |
| **Demographics of urban and rural populations** | Sex | By sex | C01 |
| | Age in completed years | By sex | C01 |
| | Highest level of education completed | One digit ISCED by sex | C01 |
| | Labour status | Employed, unemployed, inactive by sex | C01 |
| | Status in employment | Self-employment and employee by sex | C01 |
| | Economic sector in employment | International standard industrial classification by sex | A01, B01, C01 |
| | Occupation in employment | International standard classification of occupations by sex | A01, B01, C02 |
| | Total income of household | | C08 |
| | Household composition | By sex | C01 |
| | Number of family/hired workers on the holding | By sex | C01 |
| | Housing conditions | Type of building, building character, main material, etc. | C08 |
| **Environment:** | | | |
| **Land** | Soil degradation | | B02 |
| **Water** | Pollution due to agriculture | | B02 |
| **Air** | Emissions due to agriculture | | B02 |
| **Geographic Location:** | | | |
| **GIS coordinates** | Location of statistical unit | Parcel, province, region, country | B02 |
| **Degree of urbanization** | Urban/rural areas | | B02 |

# Appendix

## WCA 2010 COMMUNITY-LEVEL DATA SECTION

## CHAPTER 5

### *COMMUNITY-LEVEL DATA*

*A new element of the 2010 round of agricultural censuses is the collection of community-level data. This chapter outlines the purpose of collecting community-level data and discusses the items suitable for inclusion in the community survey. Some methodological issues are also discussed.*

#### Introduction

5.1. Past agricultural census programmes have focused on data on the structure of agricultural holdings collected directly from each agricultural holding. These structural data concern matters that are decided upon by the holding, such as what crops to grow and what agricultural inputs to use, and therefore can only be reported by the holding itself, not by public administrations

5.2. However, some types of administrative data are of interest in an agricultural census, especially for decentralized planning, identification of poor villages, planning of targeted area development programmes, and targeting communities for relief operations in case of natural disasters. A community-level data collection, often at the village or the commune level, can be useful for examining the infrastructure and services available to holdings. Data on whether the community is prone to natural disasters or subject to seasonal food shortages can be of interest for food security analysis. A community survey may cover agriculture-related data not able to be collected from holdings, such as the area of communal land. Often, the community-level data complements the holding-level data; for example, community-level data on the existence of farmers' associations may complement data on participation in those associations collected from each agricultural holding. For information on previous work done by FAO on community-level statistics, see *Community-level Statistics* (FAO, 1983)

5.3. There is a strong demand for community-level data in the agricultural census and, to meet this need, a community-level component has been included in WCA 2010. Countries are encouraged to include this element according to national circumstances and data requirements. Community-level data are of statistical interest for three main reasons

5.4. First, the data are of interest in their own right in analyzing the characteristics of communities. For example, data on the percentage of communities with an agricultural input supplier can be useful in understanding farmers' constraints in the adoption of improved agricultural practices. Population or household characteristics, such as the number of people living in communities prone to natural disasters, can also be estimated

5.5. Second, the data can be useful for analysis in relation to holding-level data. For example, one could tabulate the number of holdings growing particular cash crops against whether or not an agricultural produce market exists in the community, to help understand the way farmers' cropping patterns are influenced by access to markets. Similarly, tabulating the number of holdings participating in farmers' associations in communities where such organizations exist can help to highlight the effectiveness of those organizations

5.6. Third, data from a community survey may be of interest for checking holding-level data collected in the agricultural census. Often, cadastral information is used for this purpose

5.7. One factor in the collection of community-level data in the agricultural census is that it is usually necessary to make contact with the community administration in carrying out the census fieldwork. Sometimes, the community administration is involved in the census data collection itself or the listing of households or holdings. In these circumstances, community-level data can be collected at little cost

### *Defining a community*

5.8. A community can be defined as a self-contained unit of social and economic activities (FAO, 1983). Housing censuses use the similar concept of locality, which is "a distinct population cluster … that has a name or a locally recognized status" (UN, 1998b, paragraphs 2.49–2.51). Under these definitions, the community or locality may not be the same as the lowest administrative unit

5.9. For statistical purposes, the unit chosen for the community survey should take account of operational factors and the circumstances of the country

- **DATA COLLECTED**. Often, the data requires that the community maintains certain administrative records, which are usually only available for administrative units, commonly the village or commune. Sometimes, the lowest administrative unit has no substantial administrative function, and the community unit may need to be defined at a higher level
- **COST.** The data collection and processing task must be manageable and this may influence whether to collect data at, for example, the commune or village level
- **IDENTIFYING COMMUNITY UNITS.** Most countries maintain lists of community units down to a certain level. Ready access to such information is needed to do a community survey
- **STABILITY OF COMMUNITY UNITS.** In many countries, changes in administrative units are common and not well-coordinated, making it difficult to carry out a community survey
- **CENSUS METHODOLOGY.** If EAs for the census fieldwork are based on the commune unit, for example, it would be easiest to also collect community-level data at that level. Problems may arise if EAs cross locality boundaries

5.10. Deciding on the scope of a community survey is another issue. Normally, countries do not cover all communities in the country as part of the agricultural census, but limit the collection to those communities containing agricultural holdings. This is convenient operationally as field staff need to visit those communities to enumerate the holdings. Covering only rural communities may not be fully satisfactory because some agricultural holdings are in urban areas. Countries should endeavour to cover at least all rural communities

5.11. Community surveys are only applicable in countries with a suitable community-level organization. Sometimes,

rural areas are not organized into communities. Even if they are, the communities may not have clear-cut physical boundaries or the community administration may be weak

### Community-level items

5.12. Many types of data are of possible interest for the community survey, and it is not possible to make specific recommendations on the community-level items each country should include in its census. Some general guidelines are provided in this section. The content of the community survey should be determined taking into account data needs and the availability of community-level data from other sources

5.13. Countries should make every effort to coordinate community-level data from the different sources. Many countries maintain a community register or database, sometimes based on the population census. Provided a common geographic coding system is used, the agricultural census can be linked with existing community databases, so that there is no need to duplicate data already available. All community-level data collections should be coordinated, so that a series of linked community databases would be available covering specific areas of interest, such as agriculture, health and population. The agricultural census could then focus on just the agriculture-related data

5.14. Other issues to be considered in deciding on the content of the community survey are:

- The community survey should not be used for collecting holding-level data. The holdings themselves grow crops and raise livestock, and these data should be collected directly from holdings, not by asking a community official to provide estimates. For example, the community administration cannot report on how many people are literate, as it has no way of knowing this information. If these data are required, it is better to directly ask households some literacy-related questions. Note that population by age and sex at the national or regional level can be estimated from the holding-level collection, usually more accurately than from community records. This usually applies even if sampling is used
- The collection of data directly from holdings is one of the features that distinguish an agricultural census from the administrative reporting systems used in many countries. The community survey should not be used to provide a quick and easy method of getting data that are better collected directly from holdings
- Communities should not be asked to report the same data as holdings, unless the community-level data are required specifically for checking the data reported by holdings. Even here, it is often better to incorporate those data into the holding-level field system than to provide independent community-based data. For example, enumerators could correct area data reported by holdings by referring to the cadastral records
- Community-level data are only useful if they can be presented in statistical summaries. Emphasis should be given to the tabulation needs in the design of the community survey. More information on tabulation for the community survey is given in paragraphs 12.30–12.37
- The community-level items should be limited to key administrative information or aspects of the community that are well-known to people in the community, such as weather conditions, economic activities, and whether certain services exist
- The number of community-level items should be kept to a minimum, normally, 10–20 items

5.15. A list of possible items for inclusion in the community survey is given below. The list is not exhaustive. Some items may already be available in existing databases and would not need to be collected again in the agricultural census

### Geography

2101 Location

2102 Agro-ecological, climatic, topographical, or soil types

2103 Land use

2104 Area of communal grazing land

2105 Area of communal forest

2106 Travelling time to the nearest major urban centre (by season, if applicable)

2107 Whether the community has year-round access to the nearest urban centre by a motorable road

2108 Whether the community is prone to natural disasters, such as droughts and floods (if applicable)

### Socio-economic conditions

2201 Population according to different population groupings

2202 Number of households

2203 Economic status (if applicable)

2204 Economic activities

2205 Whether there are seasonal food shortages (if applicable)

### Community infrastructure and services

2301 Presence of a fertilizer dealer; if not, travelling time to the nearest fertilizer trading centre (by season, if applicable)

2302 Presence of a pesticides dealer; if not, travelling time to the nearest pesticides trading centre (by season, if applicable)

2303 Presence of a seed dealer; if not, travelling time to the nearest seed trading centre (by season, if applicable)

2304 Presence of a credit institution; if not, travelling time to the nearest credit institution (by season, if applicable)

2305 Presence of irrigation facilities

2306 Area equipped for irrigation

2307 Availability of veterinary services; if not, travelling time to the nearest veterinary services (by season, if applicable)

2308 Presence of a periodic or permanent agricultural produce market; if not, travelling time to the nearest periodic or permanent agricultural produce market (by season, if applicable)

2309 Existence of agricultural produce collection network

2310 Presence of food storage facilities.

2311 Presence of agricultural processing facilities

2312 Presence of facilities for maintaining agricultural machinery

2313 Existence of farmers' associations, cooperatives, and other bodies providing support and services to farmers.

2314 Availability of agricultural extension service

2315 Whether electricity is connected

2316 Presence of a primary school; if not, travelling time to the nearest primary school (by season, if applicable)

2317 Presence of a health facility; if not, travelling time to the nearest health facility (by season, if applicable)

2318 Presence of radio, telephone, and Internet services

2319 Availability of public transport: bus, train, boat

**Development programmes**

2401 Presence of specific development projects in the community

### *Concepts and definitions for community-level items*

5.16. **LOCATION** (Item 2101) is normally based on a geographic coding system (see paragraphs 11.4–11.6). This item is needed to summarize the data by geographical groupings, to relate the data to holding-level data, and to link community databases

5.17. **AGRO-ECOLOGICAL, CLIMATIC, TOPOGRAPHICAL, OR SOIL TYPES** (Item 2102). Countries may have one or more standard groupings of areas, which may reflect different agricultural conditions, climatic conditions, or even living standards and ethnic groups

5.18. **LAND USE** (Item 2103) should be compatible with the classification used in the holding-level collection (see paragraphs 11.20–11.39). Land use data at the community level may be shown in more detail, such as showing land under water or identifying different forest types. Land use at the community level provides a comprehensive picture of all land in the community, not just the land operated by holdings as obtained in the holding-level collection

5.19. **AREA OF COMMUNAL GRAZING LAND** (Item 2104) and **AREA OF COMMUNAL FOREST** (Item 2105) help to fill in the gaps from the holding-level collection

5.20. **TRAVELLING TIME TO THE NEAREST MAJOR URBAN CENTRE** (Item 2106). Travelling time data provide a good picture of the isolation of the community, and the effect this has on people's agricultural practices and living standards. Travelling time may differ between seasons, such as during the wet and dry seasons. The related item **WHETHER THE COMMUNITY HAS YEAR-ROUND ACCESS TO THE NEAREST URBAN CENTRE BY A MOTORABLE ROAD** (Item 2107) helps to highlight the transportation problems faced by people in the community

5.21. **WHETHER THE COMMUNITY IS PRONE TO NATURAL DISASTERS** (Item 2108) is important for countries that face regular crises because of flooding or other natural disasters. This is often a major cause of food insecurity and may influence farmers' agricultural practices

5.22. **POPULATION ACCORDING TO POPULATION GROUP** (Item 2201) can be useful in classifying the community by type, such as according to ethnic group. Population data can also be useful for providing population-based estimates based on the community-level data. **NUMBER OF HOUSEHOLDS** (Item 2202) is used to provide household-based estimates for community-level data

5.23. **ECONOMIC STATUS** (Item 2203). In some countries, each community is assigned an economic status measure, which can be useful to analyse holding-level characteristics in relation to whether the community is "rich" or "poor"

5.24. **MAIN ECONOMIC ACTIVITIES** (Item 2204) should be based on the classification of activities used in Item 0016 of the holding-level collection

5.25. **WHETHER THERE ARE SEASONAL FOOD SHORTAGES** (Item 2205). This item is suitable for countries where seasonal factors affect food supplies

5.26. **COMMUNITY INFRASTRUCTURE AND SERVICES** (Items 2301–2317). Countries should choose items suited to national conditions. The key for these items is whether people have ready access to specific infrastructure and services in the community itself or in a nearby centre; hence, the travelling time component in many items

5.27. **PRESENCE OF SPECIFIC DEVELOPMENT PROJECTS IN THE COMMUNITY** (Item 2401). This item is of interest where specific government or other development programmes are implemented to raise living standards or for agricultural development. These programmes might be administered by the government, non-government organizations, international agencies, or on a bilateral basis. The data provided are of interest to evaluate the benefits of those programmes

### Methodological considerations

5.28. The approach used for the collection of community-level data in the agricultural census will depend on the organization of fieldwork for the collection of holding-level data. The fieldwork for an agricultural census is usually organized by dividing the country into suitable EAs (see paragraphs 3.60–3.61). EAs often correspond with administrative units such as villages, but this may not always be the level at which community-level data are required. Often, administrative units are sub-divided to form suitable sized EA units, making it difficult to coordinate the community-and holding-level collections

5.29. Where the community administration prepares the list of households or holdings for the agricultural census, it may be possible to administer the community questionnaire at the same time. Often, census field staff personally visit each community to obtain the household/holding list, and this can provide a good opportunity to collect the community-level data

5.30. Even if the community administration does not do the household/holding listing, it may be involved in the holding survey operation itself. Often, community officials are used to help locate each household. Sometimes, they help in interviewing households - for example, as translators. In these circumstances, the community questionnaire can be administered at a suitable time

5.31. Consideration should be given to the suitability of collecting community-level data by mail, rather than by interview. The data collected should be simple enough for the community administrations to fill out the questionnaire themselves. Costs may be a factor in this regard

5.32. Sampling methods will usually not be suitable for the community survey. If the core census Stage is done on a complete enumeration basis, the community survey should be done the same; to do a sample community survey in conjunction with a full enumeration core census of holdings would make it impossible to link holding-level and

community-level data in all cases. This would limit the usefulness of the community-level data for census analysis purposes

5.33. However, sampling methods may be suitable where the core Stage is done on a sample basis. In a typical sample-based core Stage, a sample of EAs is selected, household/holding lists are prepared for each sample EA, and then a sample of households/holdings is enumerated for the census. The same sample areas could be used for the community survey, on the basis that those EAs not selected in the sample are not contacted at all during the collection of holding-level data and would require a special visit to collect the community-level data. A sample community survey would be suitable for analysing holding-level data in relation to community-level data, as such analysis only requires community-level data from the communities containing the sample holdings. However, the sampling approach may not be suitable for summarizing community-level data.

# Appendix

## THE CENSUS FRAME

WCA 2010, Sections 3.53-3.63

Agricultural census frame

3.53. In a statistical collection, the frame is the means by which the statistical units to be enumerated in the collection are identified; in this case, agricultural holdings. An ideal frame would be a list of all agricultural holdings, identifying each unit without omissions or duplications and without any units other than agricultural holdings. Such a list could be obtained through a population census, a farm register, or another source

3.54. Where a farm register exists, it can be a good frame for an agricultural census provided it is regularly updated to remove units that cease to operate as holdings and to add new holdings. Usually, a register contains some basic information about each unit, such as some sort of size measure, which is updated periodically. Farm registers can be created in different ways. Sometimes, they are initially created at the time of an agricultural census and regularly updated thereafter using information from various sources

3.55. For non-household agricultural holdings, frames may exist in the form of records from government regulatory agencies. Most countries have a business registration or licensing system. Membership information from industry associations may also be useful. Such frames can also be created by asking local officials to provide lists of agricultural units in their area of responsibility

3.56. One problem with frames based on farm registers is that they are often established for administrative purposes and therefore may not be compatible with statistical needs. The unit on the register often does not correspond with the agricultural holding unit for the agricultural census. For example, the register may be based on cadastral or other land records where each parcel of land is identified, rather than the holding unit. Also, registers are usually based on land ownership, which is not always suitable to an agricultural census because several people in a household may own land separately. Also, the land owner is not the land operator if the land is rented out. Frames based on business registration or licensing procedures are not always suitable as they represent what the business is licensed to do, not what they actually do

3.57. Another type of frame for the household sector of an agricultural census is one created from the population census as a one-time exercise, without it being kept up-to-date or maintained as a farm register afterwards. The

population census could include additional questions on agriculture to help identify agricultural holdings for the agricultural census (see paragraphs 6.18–6.27). Alternatively, the identification of agricultural holdings in the household sector could be carried out as part of the cartographic work or pre-census listing exercise. For such a frame to be useful, the agricultural census would need to be undertaken as soon as possible after the population census to ensure that the list of agricultural holdings is accurate

3.58. Another consideration with frames based on the population census is the statistical unit. Even if additional questions on agriculture are included in the population census or pre-census listing exercise, the frame would typically identify households engaged in own-account agricultural production, not agricultural holdings. Such frames may still be useful for enumeration of the agricultural census as follows: (i) contact each household with own-account agricultural production for the agricultural census; (ii) ask each household with own-account agricultural production about the management of agricultural activities in the household to identify each agricultural holding; and (iii) enumerate all agricultural holdings for the agricultural census

3.59. Even a list of all households from the population census can provide a useful frame for an agricultural census, as follows: (i) contact each household for the agricultural census; (ii) ask each household about the household's own-account agricultural production activities and the management of agricultural activities in the household, to identify each agricultural holding; and (iii) enumerate all agricultural holdings for the agricultural census

3.60. Where a frame of agricultural holdings, households with own-account agricultural production, or households is unavailable from an existing farm register or the population census, it is usually not worthwhile creating a frame in this form just for the agricultural census. Instead, a different type of frame is used. First, the country is divided into suitable geographical units, called enumeration areas (EAs), covering the whole in-scope national territory. Then, each EA is visited to identify all agricultural holding units through interviews with local authorities or visits to each household. Population censuses are usually done using this type of frame and it is often possible for the agricultural census to piggyback onto the population census field system by using the same EAs and making use of maps and other field materials

3.61. An EA is a geographical unit of suitable size to organize the census data collection - typically, 50 to 100 households. An EA could correspond to existing administrative units, such as villages. Often, it is necessary to subdivide administrative units to form suitable sized units. This is done by examining existing maps and administrative records, with field inspection undertaken as required. Aerial photographs and satellite imagery can also be useful in forming EAs

3.62. Typically, a combination of frames is used for the agricultural census. Often, the household sector is enumerated based on the population census EA frame, whereas a frame of agricultural holdings in the non-household sector is obtained from administrative sources

3.63. Care is needed in establishing frames for the agricultural census to ensure that all agricultural production units are covered. If agricultural holdings are missing from the frame, they will not be enumerated in the agricultural census and the validity of the census results will be compromised. This is especially important in an integrated agricultural statistical system, as any weaknesses in the agricultural census frame will be reflected in all the surveys that follow

# IV

# Appendix

## AQUACULTURE MODES OF PRODUCTION

The classifications and definitions set out below are from the CWP Handbook of Fishery Statistical Standards (CWP 2013).

### PONDS

Ponds are natural and/or artificial structures on land that are capable of retaining water for rearing stock. Ponds often consist of some form of banks or dykes. Under this category, ditches, flood plain depressions, derelict mining pools and similar structures are included. Pond culture is usually carried out in stagnant waters with periodic water exchange or water flushing that is done through the pond inlets and outlets. Some pond culture, e.g. trout pond, may have a high water refreshment rate.

The measurement unit should refer to the number of ponds, water surface area and water volume.

Example of pond (Photo: ©FAO/G. Bizzari)

Example of pond with outlets (Photo: ©FAO/Ch. Errath)

Example of pond (Photo: ©FAO/R. Garcia Gomez)

Example of pond (Photo: ©FAO/X. Zhou)

## TANKS

Tanks are artificial units of structure capable of holding and interchanging water. These are generally built above ground level and can be made of various materials (e.g. bricks, cement, concrete, fibreglass, plastics, wood, asbestos, metal, etc.), in various shapes and sizes. They are used in hatchery, nursery and grow-out operations.

The measurement unit should refer to surface area and water volume, and water turnover rate is an important parameter to collect.

Example of plastic tanks (Photo: ©FAO Aquaculture photo library)

Example of circular tanks (Photo: ©FAO Aquaculture photo library)

## PENS

Pens refer to areas of a waterbody (e.g. in shallow lagoons, but also inland e.g. in lakes, reservoirs) that is fenced using structures (nets, wooden bamboo) fixed to the bottom permitting free water exchange. A pen generally encloses a large volume of water.

The measurement should refer to surface areas. Information on setting environments (whether in flowing water, still water, or marine water) may be important.

Pens for aquaculture (Photo: ©FAO/R. Faidutti)

Pens for aquaculture (Photo: ©FAO/S. Khan)

## CAGES

Cages refer to open or covered enclosed structures with net, mesh or any porous material which allows natural water interchange. These structures may be floating, suspended, or fixed to the substrate, but still permitting free water interchange. Cages are either supported by frameworks made of metal, plastic, bamboo or wood, or are suspended by stakes at its four concerns in open water bodies or in ponds. Cages use both for seed and grow-out production.

The measurement unit should refer to surface area and volume. Information on setting environments (whether in flowing water, still water, or marine water) may be important.

Net cages for aquaculture (Photo: ©FAO)

Cage for aquaculture (Photo: ©FAO Aquaculture photo library/F. Cardia)

Cage for aquaculture (Photo: ©FAO/V. Crespi)

## RACEWAYS

Raceways are long and narrow rectangular tanks usually constructed with bricks and concrete and artificial material above ground, that permit a rapid flow of water. The water turnover rate is generally in excess of 20 changes per day.

The measurement unit should refer to surface area. The water turnover rate is an important parameter to collect.

Example of raceways (Photo: ©FAO Aquaculture photo library)

Example of raceways (Photo: ©FAO/X. Zhou)

## ENCLOSURES

Enclosures refer to natural water areas (e.g. natural bays) in which the shoreline forms all but one side, confined by a net mesh and other barriers allowing free water interchange and distinguished by the fact that enclosures occupy the full water column between substrate and surface.

The measurement unit should refer to surface areas. Information on setting environments (whether in flowing water, still water, or marine water) may be important.

## LAKES, RESERVOIRS, DAMS

Lakes, reservoirs and flood plains where stocking of aquatic animals are conducted on a regular basis. The stocked animals are confined in the stocked water bodies with management interventions; the products are harvested exclusively by the people entitled to ownership of the stocked material. The stocked material should constitute a significant proportion of the total fish production from the water body.

The measurement unit is the water surface area.

## FLOOD PLAINS

No definition in CWP

## BARRAGES

Barrages are semi-permanent or seasonal enclosures formed by impervious man-made barriers and appropriate natural features.

The measurement unit should refer to surface areas. Information on setting environments (whether in flowing water, still water, or marine water) may be important.

Example of Barrages (Photo: ©FAO/J. Aguilar Manjarrez)

## IRRIGATION SYSTEMS (CHANNELS AND DITCHES)

Irrigation channels and ditches refer to waterbodies that are used for fish aquaculture but the primary function of which is to convert water for irrigation purpose, such as channels and ditches excavated or constructed with concrete in the ground.

The measurement unit should refer to surface area.

## RICE-FISH PADDIES

Rice-fish paddies refer to paddy fields used for culture of fish and other aquatic animals, including both concurrent cultures of aquatic animals with rice plantation and seasonal rotation of fish and rice crop farming in the same paddy field.

The measurement unit should refer to surface area.

## SUSPENDED/HANGING SYSTEMS

Suspended/hanging systems are floating structures such as rafts built of wood, bamboo and long lines with seaweed nets or hanging lantern nets, growth ropes, pearl nets, net bags or trays, normally equipped with floats and safely anchored in a sheltered coastal area. This system may be used for the suspended culture of seaweed, molluscs and other animals such as sea cucumbers.

The measurement unit should refer to the number of farming structures, surface areas and length of lines or ropes.

Oyster farm showing flotation structures with suspended system below the water
(Photo: ©FAO/M. Namundjebo)

Mussel farm showing stake structure above water
(Photo: ©FAO/P. Johnson)

Mussel farm showing stake structure above water (Photo: ©FAO/R. Messori)

## OFF-BOTTOM SYSTEMS

Off-bottom systems are structures such as trestles and long lines installed on stakes impaled in the seabed or inter-tidal zone. Culture nets, lantern nets, growth ropes, pearl nets, net bags or trays are usually used in these structures to farm seaweed and molluscs.

The measurement unit should refer to the number of farming structures, surface areas and the length of lines or ropes.

Seaweed culture showing line systems (Photo: ©FAO/S. Jayaraj)

Stake system for cultivating seaweed on a beach (Photo: ©FAO Aquaculture photo library/S. Venturini)

Seaweed aquaculture (Photo: ©FAO Aquaculture photo library/J. Moehl)

## ON-BOTTOM SYSTEMS

On-bottom systems refer to the farming of molluscs (e.g. clams and oysters), sea weeds, or holothurians directly seeded on muddy or sandy areas in the inter-tidal zone or on the seabed.

Example of on-bottom system for oyster culture (Photo: ©FAO)

**Hatcheries** refer to the installations that house facilities for breeding, nursing and rearing seed of fish, invertebrates or aquatic plants to fry, fingerling or juvenile stages.

**Nurseries** generally refer to the second phase in the rearing process of aquatic organisms and refer to small, mainly outdoor ponds and tanks.

An example of hatchery or nursery system (Photo: ©FAO)

## ADDITIONAL INFORMATION

The following are images of feed and production of feed that may assist the enumerator in identifying activities beyond fish rearing. Further below are some examples of post-harvest production activities and facilities.

## FEED/PELLET

Feed to be used for aquaculture (Photo: ©FAO Aquaculture photo library/M. Hasan)

Feed for aquaculture (Photo: ©FAO Aquaculture photo library/ V. Ushakov, FAO Kyrgyzstan)

Making feed for aquaculture (Photo: ©FAO Aquaculture photo library/A. Coche)

V

# Appendix

## FISHERIES GEAR TYPES

The classifications set out below are from the CWP Handbook (CWP 2013)

The Definitions are taken from the Nédélec & Prado (1991).

### SURROUNDING NETS

Sub-categories include purse seines, surrounding nets without purse lines, and surrounding nets (nei).

These nets catch the fish by surrounding them both from the sides and from underneath, thus preventing them from escaping in deep waters by diving downwards. Apart from a few exceptions, they are surface nets in which the float line is supported by numerous floats.

Tuna purse seining fishing operation (Source: ©FAO)

## SEINE NETS

Sub-categories include beach seines, boat seines, and seine nets (nei).

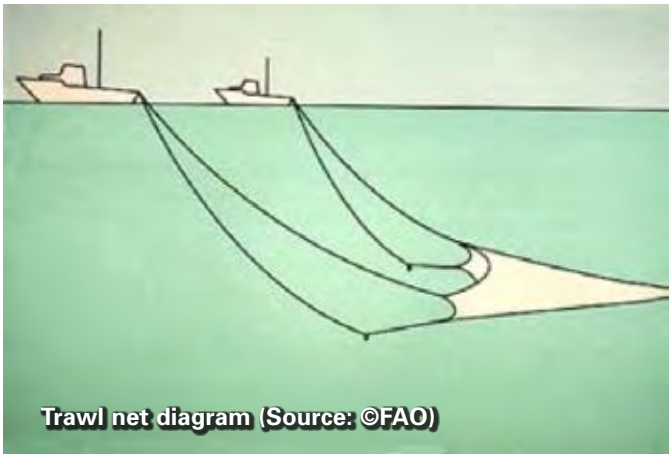
These nets, which are usually set from a boat, can be operated either from the short (beach seines) or from the boat itself (e.g. Danish or Scottish seines). The manner of capture is to surround an area of water with a very long net, with or without a bag at the centre. The net is usually operated by two ropes fixed to its ends, used north for hauling it in and for herding fish.

Beach seine (Photo: ©FAO/M. Marzot)

## TRAWLS

Sub-categories include: beam trawls, single boat bottom otter trawls, twin bottom otter trawls, bottom pair trawls, bottom trawls (nei), single boat midwater otter trawls, midwater pair trawls, midwater trawls (nei), semipelagic trawls, and trawls.

These are towed nets consisting of a cone-shaped body, closed by a bag or codend and extended at the opening by wings. They can be towed by one or two boats and, according to the type, are used on the bottom or in midwater (pelagic). In certain cases, as in trawling for shrimp or flatfish, the trawler can be specially rigged with outriggers to tow up to four trawls at the same time (double rigging).



Trawl net diagram (Source: ©FAO)

## DREDGES

Sub-categories include towed dredges, hand dredges, mechanized dredges, and dredges (nei).

These are gear dragged along the bottom, usually to collect molluscs such as mussels, oysters, scallops, clams, etc. The shellfish are held in a sort of bag or sieve which allows the water, sand or mud to run out.

Dredging net fishing for oysters (Photo: ©L. Gray)

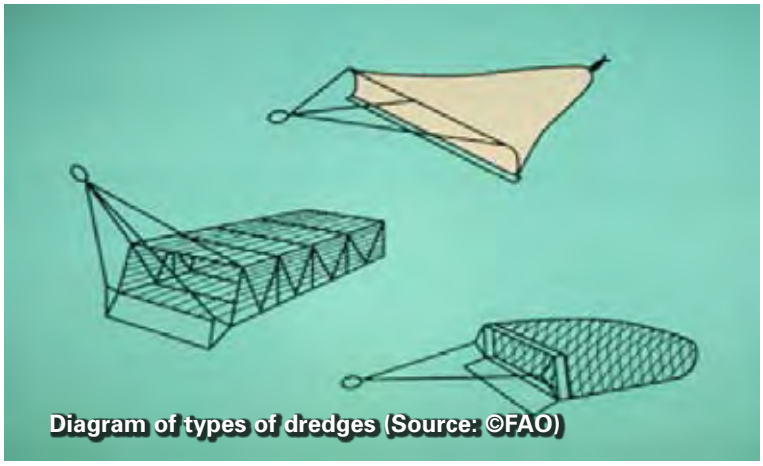


Diagram of types of dredges (Source: ©FAO)

## LIFT NETS

Sub-categories include portable lift nets, boat-operated lift nets, shore-operated stationary lift nets, and lift nets (nei).

The fish, which may be attracted by light or bait, are captured in nets consisting of a horizontal netting panel or a bag shaped like a parallelepiped, pyramid or cone with the opening facing upwards. After being submerged at the required depth, the nets are lifted or hauled out of the water, by hand or mechanically, from the shore or from a boat. The fish that are above the net when hauling commences are retained in it.

Lift net (Photo: ©FAO/R. Garcia Gomez)

Lift net in operation (Photo: courtesy of ©B. Mahalder/Creative Commons Attribution-Share Alike 3.0 Unported license: http://commons.wikimedia.org/wiki/File:Fishing_by_lift_net_in_the_haor_area_of_Bangladesh.jpg)

## FALLING GEAR

Sub-categories include cast nets, cover pots/lantern nets, and falling gear (nei). These nets, cast from the shore or from a boat, catch the fish by falling and closing in on them. Their use is usually restricted to shallow waters.

Fisherman casting a type of falling gear (Photo: ©FAO/P. Singh)

Falling gear in operation (Photo: ©FAO /J.C. Henry)

## GILLNETS AND ENTANGLING NETS

Sub-categories include set gillnets (anchored), drift gillnets, encircling gillnets, fixed gillnets (on stakes), trammel nets, combined gillnets-trammel nets, gillnets and entangling nets (nei).

With this type of gear, the fish are filled, entangled or enmeshed in the netting, which may be either single (gillnets) or tripe (trammelnets). Several types of nets may be combined in one gear (for example, a trammelnet combined with a gillnet). These nets can be used either along or, as is more usual, in large numbers placed in lines ('fleets' of nets). Depending on their design, ballasting and buoyance, these nets may be used to fish on the surface, in midwater or on the bottom.

Gillnet (Photo: ©FAO Aquaculture photo library)

## TRAPS

Sub-categories include stationary uncovered pound nets, pots, fyke nets, stow nets, barriers fences, weirs, etc., aerial traps, and traps (nei).

These are usually large nets, which are anchored or fixed on stakes, open at the surface and provided with various types of fish herding and retaining devices. They are mostly divided into chambers closed at the bottom by netting. In Japan, this group is usually referred to as 'set-nets' (not to be confused with the fixed gillnets mentioned above).

A barrier as an example of a trap (Photo: ©FAO)

Fish traps (Photo: ©FAO/ M. Marzot)

Fish traps (Photo: ©FAO Aquaculture photo library)

## HOOKS AND LINES

Sub-categories include handlines and hand-operated pole and lines, mechanized lines and pole-and-lines, set longlines, drifting longlines, longlines (nei), vertical lines, trolling lines, hooks and lines (nei).

The fish are attracted by natural or artificial bait (lures) placed on a hook fixed to the end of a line or snood, on which they are caught. Hooks or metallic points (jigs) are also used to catch fish by tearing them when they swim nearby. This is the case especially with the jigging lines for squids, which are linked to artificial lures with multiple hooks. The line is given a jerking up-and-down movement which attracts squid to the jig, on which can then be caught. Hook-and-line units may be used singly or in large numbers.

Using hooks and lines (Photo: ©FAO)

Line fishing (Photo: ©FAO/G. Bizzarri)

Line fishing (Photo: ©FAO/J.V. Acker)

## MISCELLANEOUS GEARS

Sub-categories include harpoons, hand implements (wrenching gear, clamps, tongs, rakes, gears), and pumps.

This heading covers a great variety of other fishing gear and methods which are not specified elsewhere or that are based on mixed principles. This item includes: hand and landing nets, drive-in-nets, gathering by hand with simple hand implements with or without diving equipment, poisons and explosives, trained animals, electrical fishing.

The Miscellaneous Gears category includes gathering by hand; this category may include items gathered from a beach or shoreline or in the water, such as shellfish or sea cucumbers. This activity is more likely to be conducted by women and may not readily be considered as a mainstream fishing activity. However, it is important to query household members for engagement in this type of activity. This is example of the importance of questions on gear type, not only for providing structural statistics, but also for prompting respondents to detail their activities.

**Harpoons as an example of miscellaneous gear type (Photo: ©FAO)**

Hand implement as an example of miscellaneous gear (Photo: ©FAO/G. Napolitano)

Hand implement as an example of miscellaneous gear (Photo: ©FAO/J. Holmes)

Electric shock as an example of miscellaneous gear (Photo: ©FAO/AFP Hoang Dinh Nam)

## ADDITIONAL INFORMATION

The following images of nets stored on land or that are being repaired may assist the enumerator in identifying activities. Further below are some examples of post-harvest production activities and facilities.

## GEARS ON LAND/IN STORAGE

Canoes containing newly made gillnets (Photo: ©FAO/CESPA-Mali)

Fisherman carrying fishing net (Photo: ©FAO/A. Senna)

Fishing nets suspended on land (Photo: ©FAO/A. Vitale)

Repairs to fishing nets in the fishing port (Photo: ©FAO/ D. Minkoh)

Fishing net rolled up on the ground (Photo: ©FAO)

# VI

# Appendix

## CATEGORIES OF FISH, SHELLFISH, ETC FOR CONSIDERATION IN REPORTING

Using the International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) as a basis, below are suggested categories for reporting fishery or aquaculture activities. Under each category, examples are provided. An excellent resource for translating these species into the regionally appropriate names/terms is available online at http://www.fishbase.org.

### FRESHWATER FISHES

| Capture | Aquaculture |
|---|---|
| Carps, barbels and other cyprinids | Carps, barbels and other cyprinids |
| Tilapias and other cichlids | Tilapias and other cichlids |
| Miscellaneous freshwater fishes | Miscellaneous freshwater fishes |

Common carp
(Photo: ©FAO Aquaculture photo library)

Common carp (Photo: ©FAO Aquaculture photo library)

Tilapia (Photo: ©FAO)

Tambaqui (Photo: ©FAO)

Piranha (Photo: ©FAO/R. Grisolia)

Catla (Photo: K. Mahmood/ Creative Commons Attribution-Share Alike 4.0 International License: http://commons.wikimedia.org/wiki/File:Catla_catla.JPG)

Nile perch
(Photo: ©FAO/Sudanese Gov. FAO photo)

## DIADROMOUS FISHES

| Capture | Aquaculture |
|---|---|
| River eels | River eels |
| Salmons, trouts, smelts | Salmons, trouts, smelts |
| Shads | Shads |
| Miscellaneous diadromous fishes | Miscellaneous diadromous fishes |
| Sturgeons, paddlefishes | Sturgeons, paddlefishes |

Atlantic salmon (Photo: ©FAO/S.P. Lall)

Atlantic salmon (Photo: ©FAO)

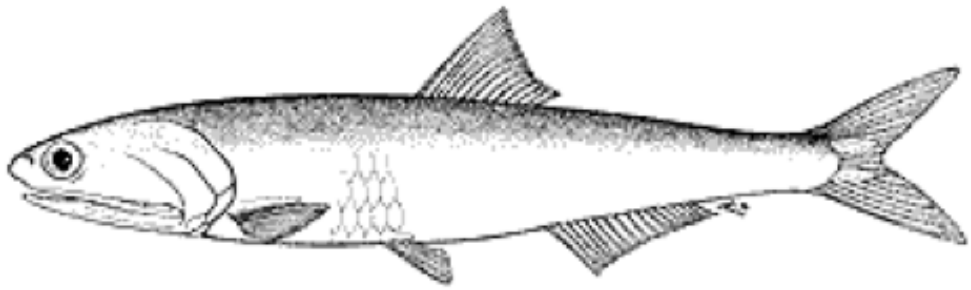
Red salmon (Photo: ©FAO Aquaculture photo library)

Rainbow Trout (Photo: ©FAO)

## MARINE FISHES

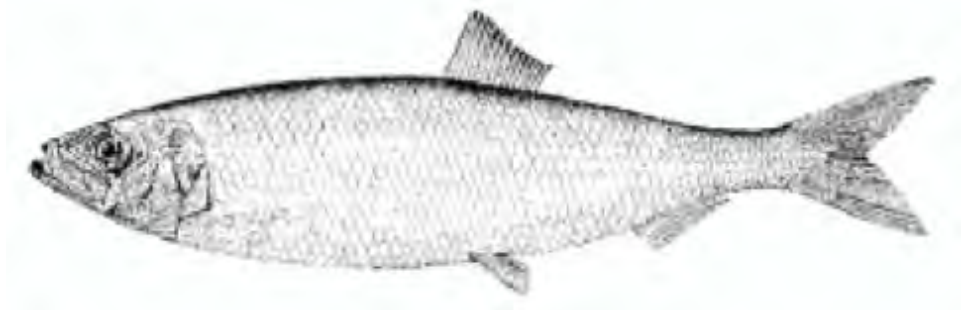
| Capture | Aquaculture |
|---|---|
| Herrings, sardines, anchovies | Flounders, halibuts, soles |
| Flounders, halibuts, soles | Cods, hakes, haddocks |
| Cods, hakes, haddocks | Tunas, bonitos, billfishes |
| Tunas, bonitos, billfishes | Miscellaneous pelagic fishes |
| Miscellaneous pelagic fishes | Miscellaneous demersal fishes |
| Sharks, rays, chimaeras | Miscellaneous coastal fishes |
| Miscellaneous demersal fishes | Marine fishes, not identified |
| Miscellaneous coastal fishes | |
| Marine fishes, not identified | |

Anchovies (Photo: ©FAO/ R. Rorandelli)



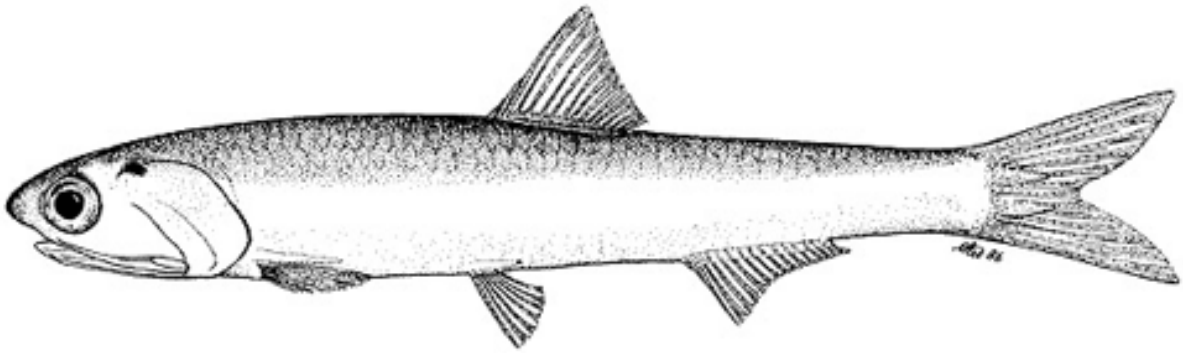
**Anchoveta (Peruvian anchovy) (Photo: ©FAO)**

**Goldstripe sardinella (Photo: ©FAO)**

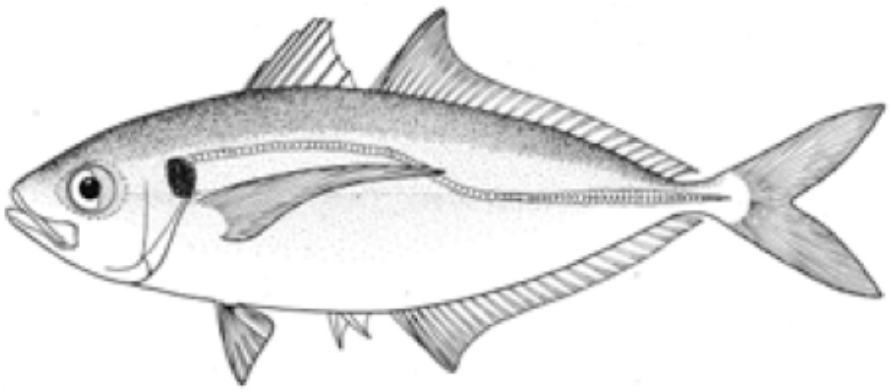


**Atlantic herring (Photo: ©FAO)**

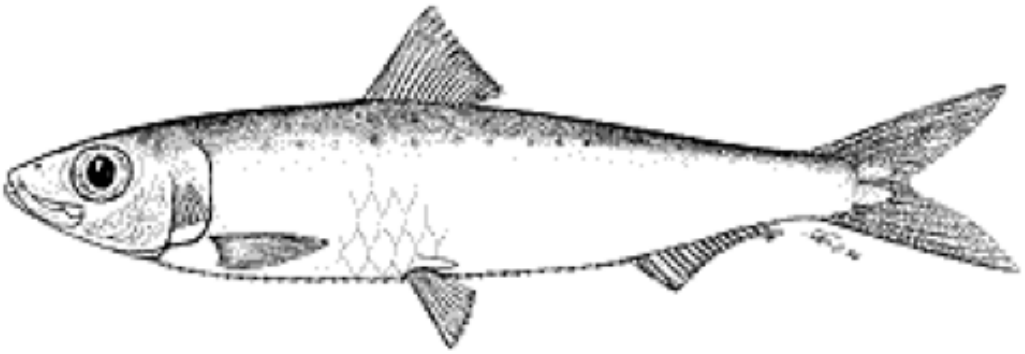
Atlantic herring (Photo: FishBase)



European anchovy (Photo: ©FAO)



Yellow stripe scad (Photo: ©FAO)

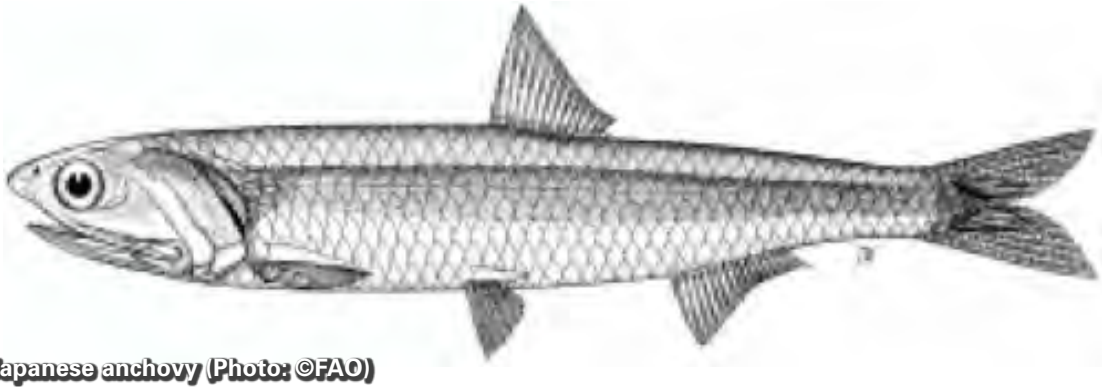


European pilchard (Photo: ©FAO)

European pilchard (Photo: FishBank/Christoph Hübner)

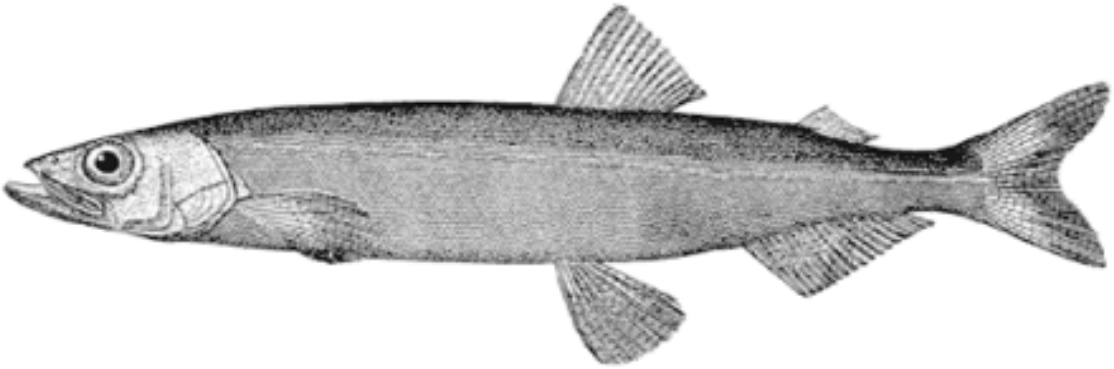
Chub mackerel (Photo: ©FAO)

Chub mackerel (Photo: FishBase)



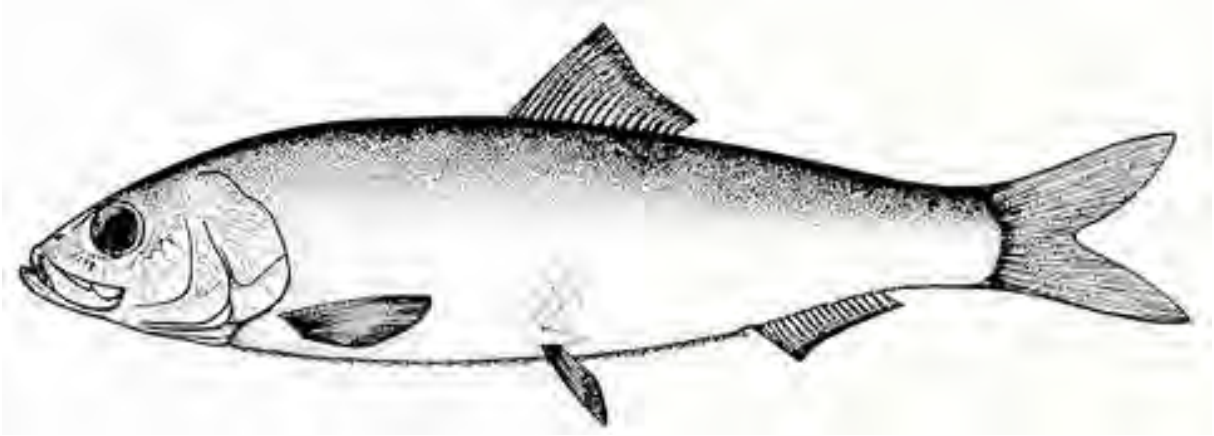
Japanese anchovy (Photo: ©FAO)

Japanese anchovy (Photo: Creative Commons Attribution-Share Alike 4.0 International License: http://commons.wikimedia.org/wiki/File:Engraulis_japonicus_01.JPG)



Capelin (Photo: ©FAO)

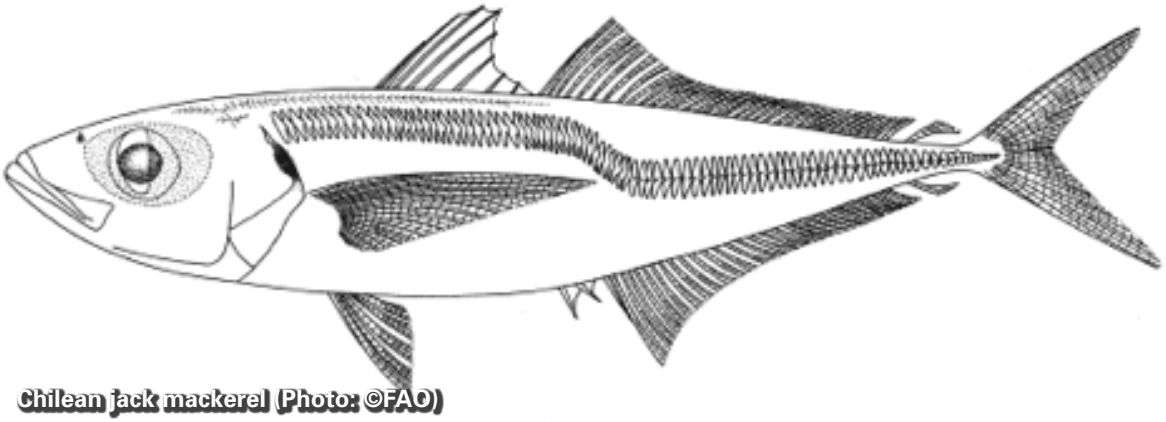
Atlantic mackerel (Photo: ©FAO)



Araucanian herring (Photo: ©FAO)

Gulf menhaden (Photo: ©FAO)

Gulf menhaden (Photo: Joel Boumje)



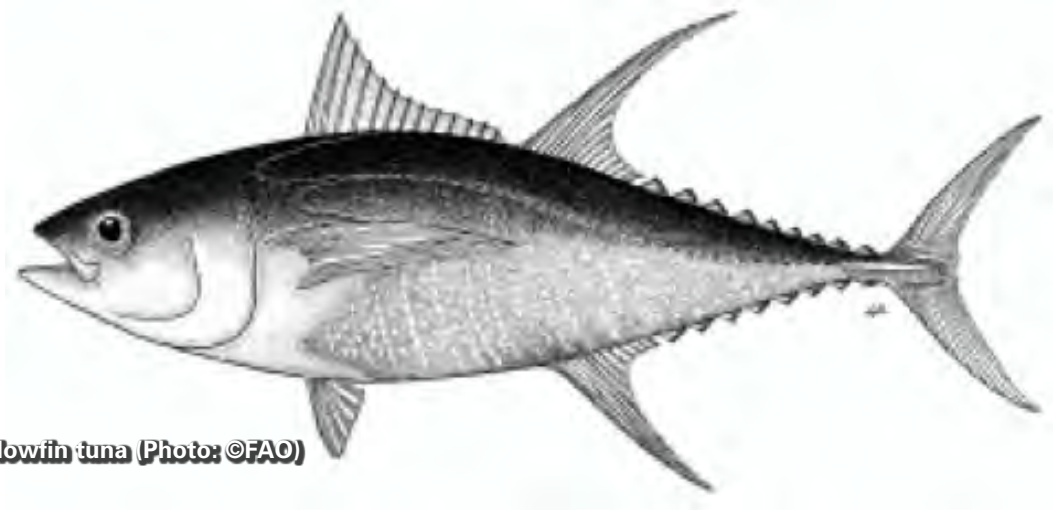
Chilean jack mackerel (Photo: ©FAO)

Common sole (Photo: ©FAO)

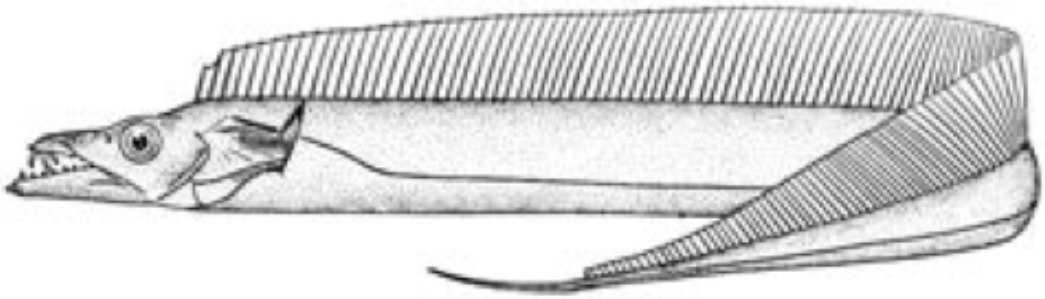
Flathead sole (Photo: ©FAO)

Red tuna (Photo: ©FAO/ A. Senna)

Skipjack tuna (Photo: ©FAO)



Yellowfin tuna (Photo: ©FAO)



Largehead hairtail (Photo: ©FAO)

Gilthead Sea bream (Photo: ©FAO)

Flat head grey mullet

Grouper (Photo: ©FAO)

## CRUSTACEANS

| Capture | Aquaculture |
|---|---|
| Capture | Aquaculture |
| Miscellaneous marine crustaceans | Miscellaneous marine crustaceans |
| Shrimps, prawns | Shrimps, prawns |
| Crabs, sea-spiders | Crabs, sea-spiders |
| King crabs, squat-lobsters | Freshwater crustaceans |
| Freshwater crustaceans | Lobsters, spiny-rock lobsters |
| Lobsters, spiny-rock lobsters | |
| Krill, planktonic crustaceans | |

Lagoon land crab (Photo: ©FAO/ B. Polimeni)

Crab (Photo: ©FAO/ R. Rorandelli)

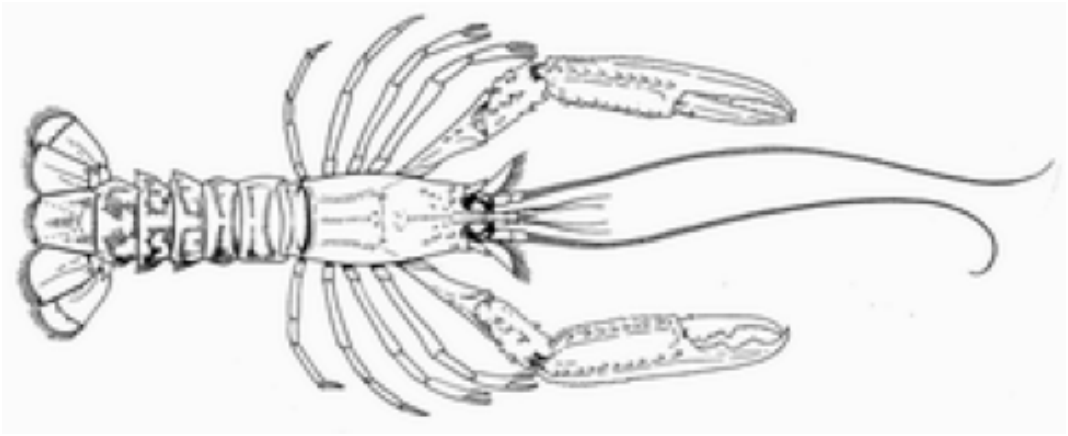
Queen crab (Photo: ©FAO)

Red claw crayfish (Photo: ©FAO)

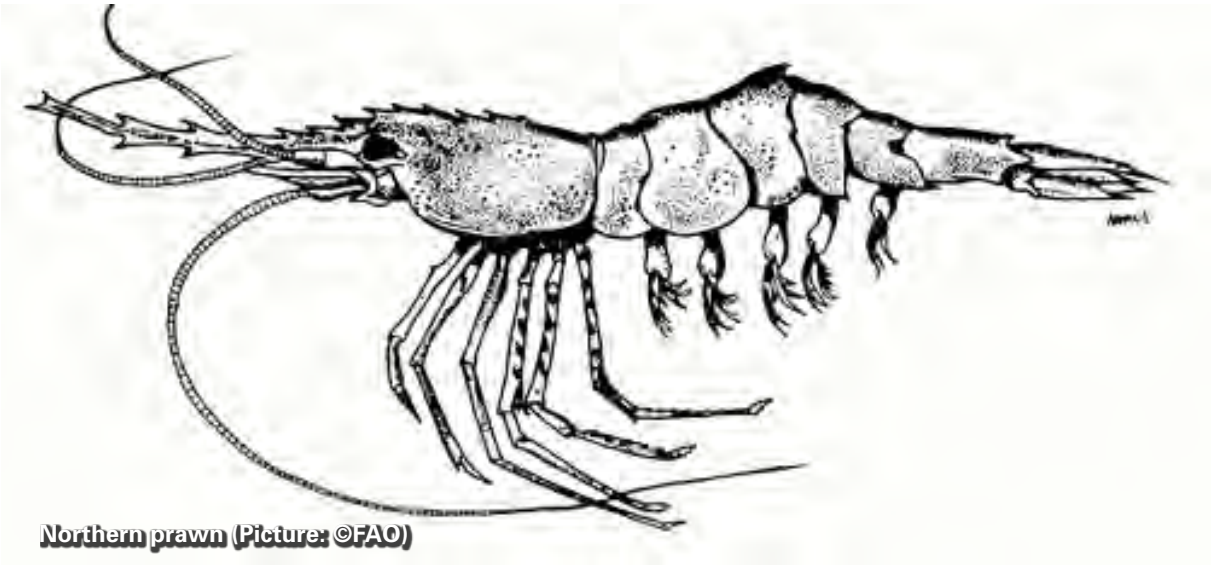
Red swamp crawfish (Photo: ©FAO)

Spiny lobster (Photo: ©FAO Aquaculture photo library / I. Christensen)

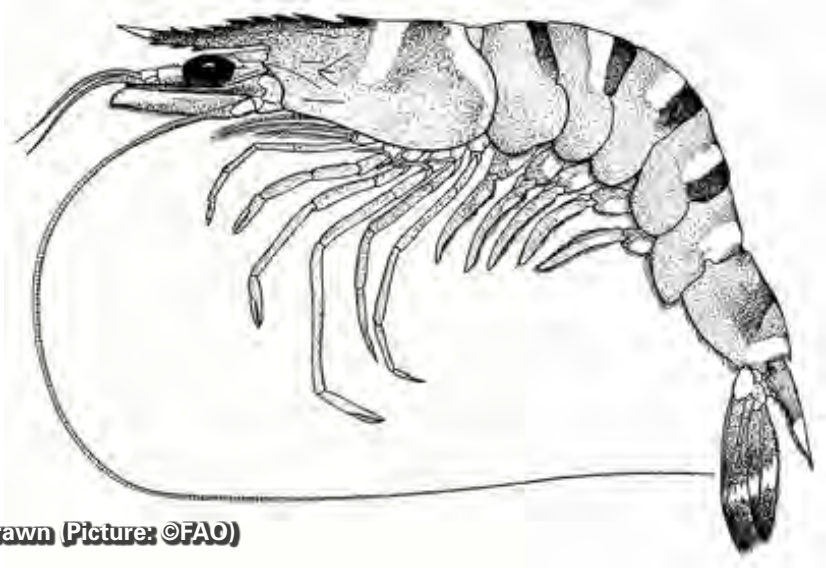
Danube crawfish (Photo: ©FAO/ V. Maksimov)



Norway lobster (Picture: ©FAO)



Northern prawn (Picture: ©FAO)

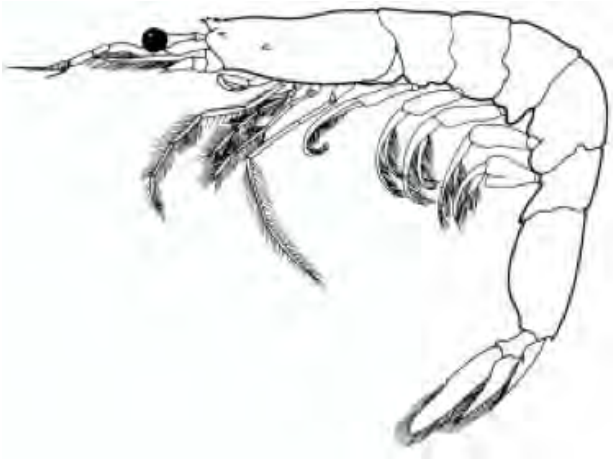


Giant tiger prawn (Picture: ©FAO)

Giant tiger prawn (Photo: ©FAO/L. Evans)

Giant tiger prawn (Photo: E. DeMuylder)

Shrimps (Photo: ©FAO/ M. Salustro)



Akiami paste shrimp (Photo: ©FAO)

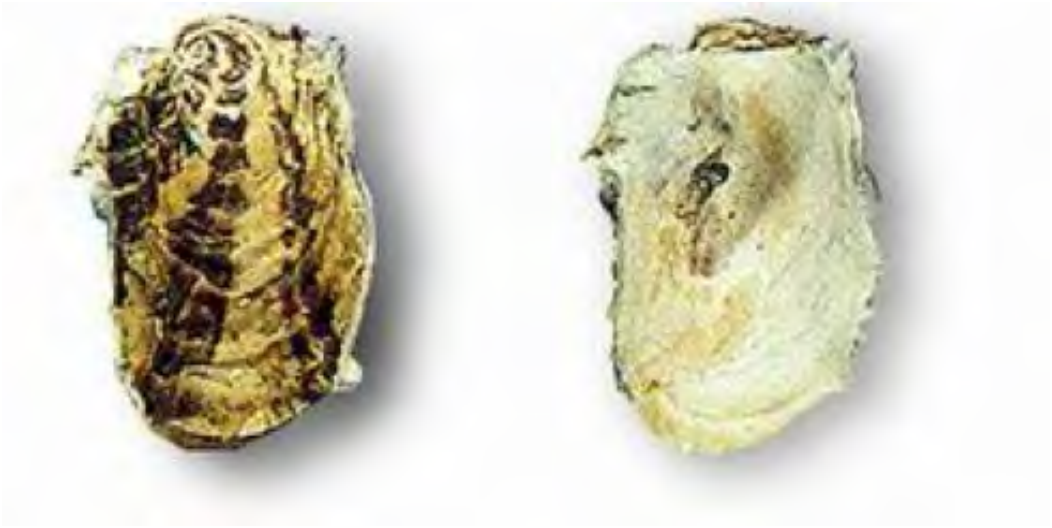
Black Tiger (Photo: ©FAO/ A. Berry)

## MOLLUSCS

| Capture | Aquaculture |
|---|---|
| Clams, cockles, arkshells | Clams, cockles, arkshells |
| Scallops, pectens | Scallops, pectens |
| Squids, cuttlefishes, octopuses | Squids, cuttlefishes, octopuses |
| Oysters | Oysters |
| Abalones, winkles, conchs | Abalones, winkles, conchs |
| Mussels | Mussels |
| Freshwater molluscs | Freshwater molluscs |
| Miscellaneous marine molluscs | Miscellaneous marine molluscs |

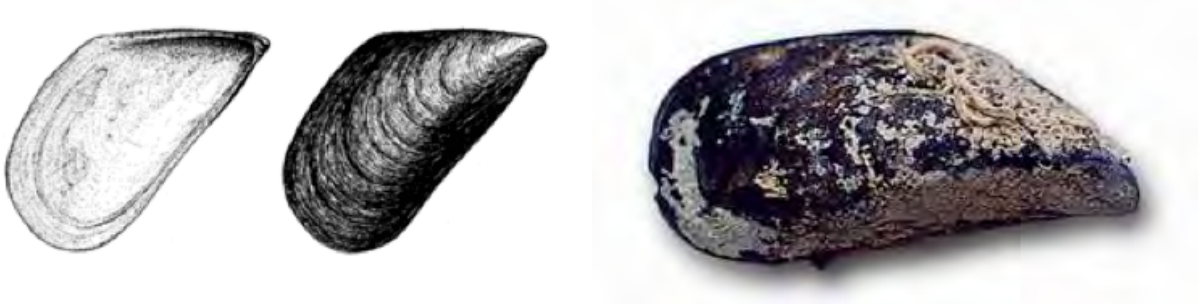
Abalone (Photo: Creative Commons Attribution-Share Alike 3.0 International License: http://commons.wikimedia.org/wiki/File:White_abalone_Haliotis_sorenseni.jpg)

Oysters (Crassostrea gigas sp.)
(Photo: ©FAO/ G. Bizzarri)

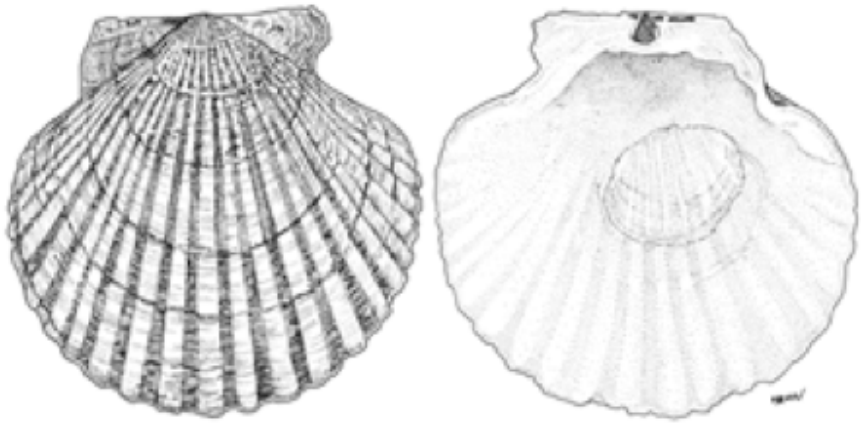


American cupped oyster (Photo: ©FAO)

Blue mussel (Photo: ©FAO)



Mediterranean mussel (Photo: ©FAO)

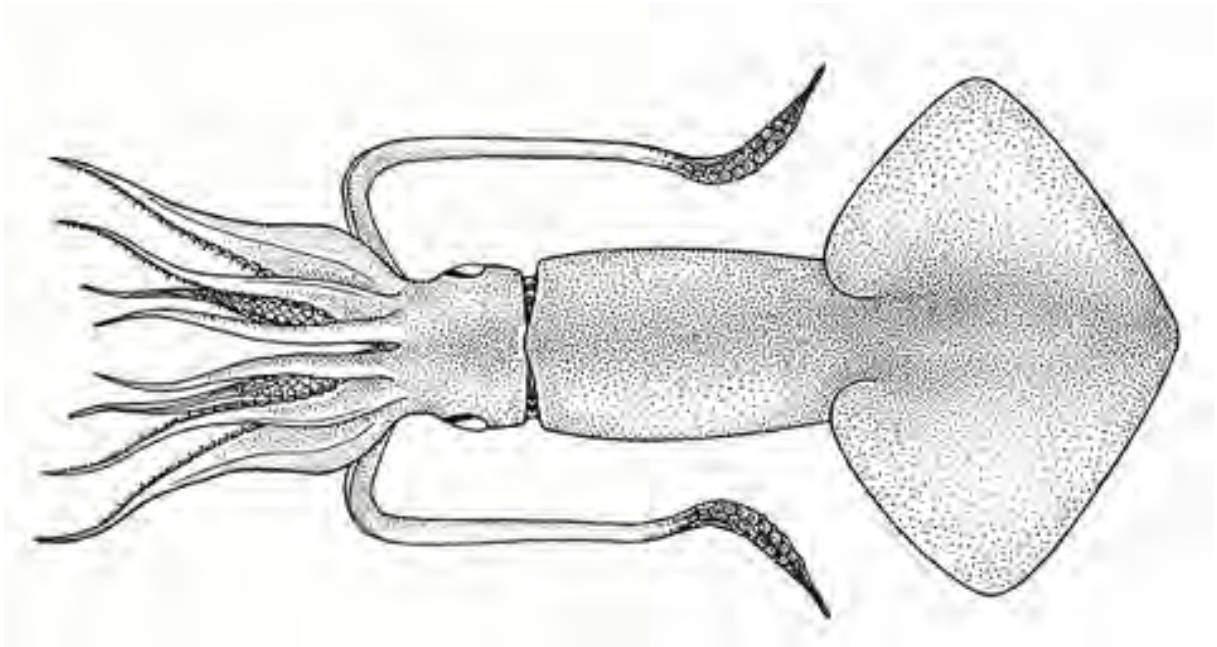


Yesso scallop (Photo: ©FAO)

Clams (Photo: ©FAO/ G. Napolitano)

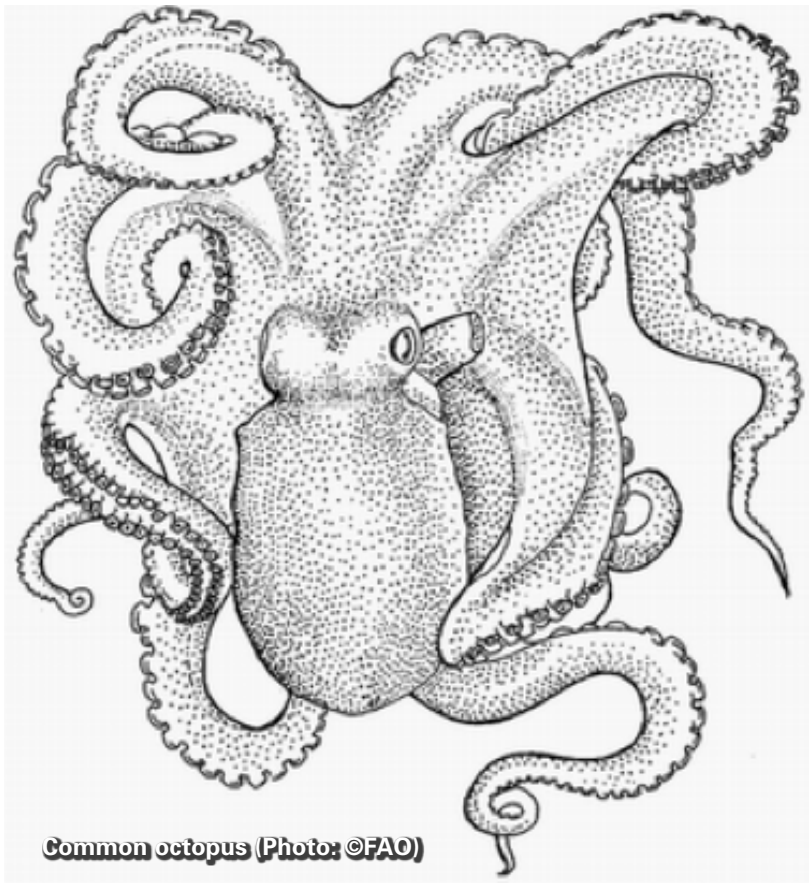
Squid (Photo: ©FAO/ M. Salustro)

Cuttlefish (Photo: ©FAO/ G. Pangare)



Jumbo flying squid (Photo: ©FAO)

Octopus (Photo: ©FAO/ G. Bizzarri)

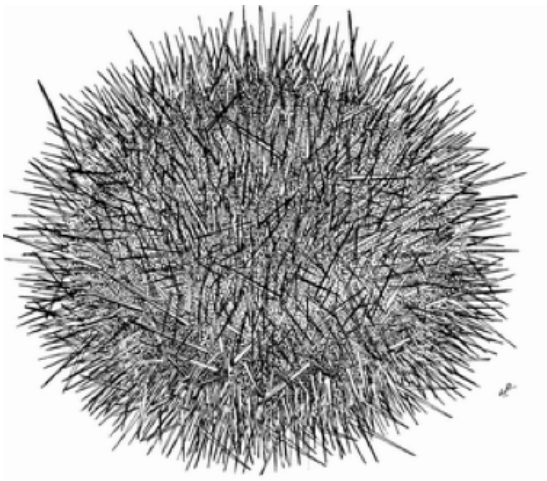


Common octopus (Photo: ©FAO)

Sea cucumber A. japonicus (Photo: ©FAO Aquaculture photo library / A. Lovatelli)

Sea cucumber (Photo: ©FAO Aquaculture photo library / A. Lovatelli)

Sea cucumber (Photo: ©FAO Aquaculture photo library / A. Lovatelli)



Chilean sea urchin (Photo: ©FAO)

Sea urchin (Photo: Creative Commons Attribution-Share Alike 3.0 Unported license: http://commons.wikimedia.org/wiki/File:Paracentrotus_lividus_profil.JPG)

## WHALES, SEALS AND OTHER AQUATIC MAMMALS

| Capture |
|---|
| Sperm-whales, pilot-whales |
| Blue-whales, fin-whales |
| Miscellaneous aquatic mammals |
| Eared seals, hair seals, walruses |

Sperm whale (Photo: ©FAO)

Blue whale (Photo: ©FAO)

West Indian manatee (Photo: ©FAO)

Harbour seal (Photo: ©FAO)

## MISCELLANEOUS AQUATIC ANIMALS

| Capture | Aquaculture |
|---|---|
| Crocodiles and alligators | Sea-squirts and other tunicates |
| Horseshoe crabs and other arachnoids | Sea-urchins and other echinoderms |
| Sea-squirts and other tunicates | Frogs and other amphibians |
| Sea-urchins and other echinoderms | Turtles |
| Frogs and other amphibians | Miscellaneous aquatic invertebrates |
| Turtles | |
| Miscellaneous aquatic invertebrates | |

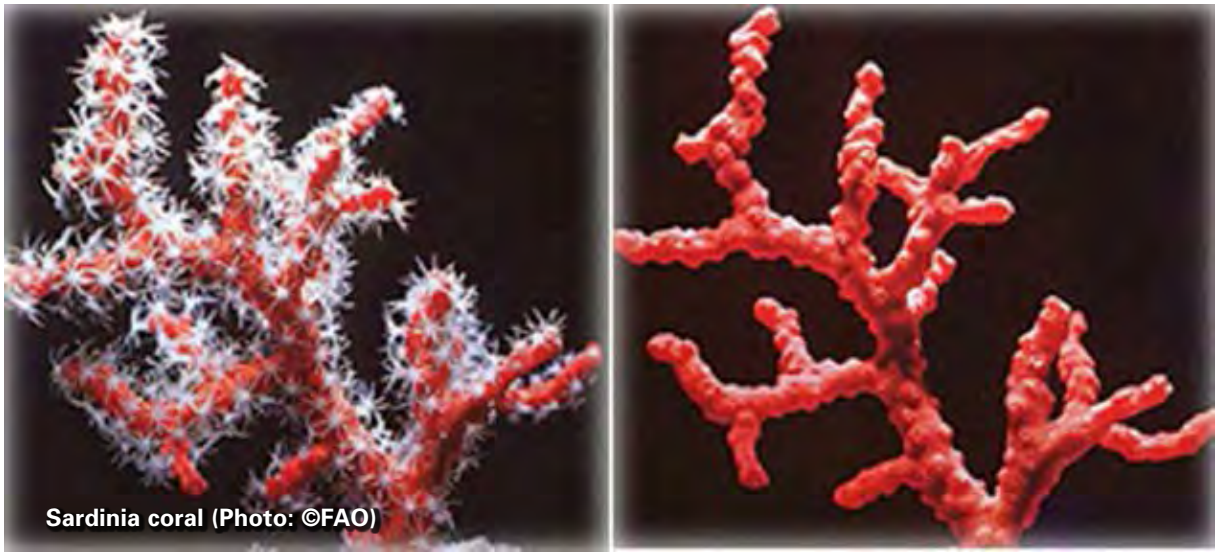
Yacare caiman (Photo: Photo courtesy of ©Rodrigovigil /Creative Commons Attribution-Share Alike 3.0 Unported license: http://commons.wikimedia.org/wiki/File:Esteros_Ibera_Caiman_Yacare.jpg)

Spectacled caiman (Photo: Photo courtesy of ©Rklawton/Creative Commons Attribution-Share Alike 2.5 Generic license: http://commons.wikimedia.org/wiki/File:Spectacled_Caiman.JPG)

Moon jellyfish (Photo: © Hans Hillewaert/ Creative Commons Attribution-Share Alike 4.0 International Liscense: http://commons.wikimedia.org/wiki/File:Aurelia_aurita_1.jpg)

## MISCELLANEOUS AQUATIC ANIMAL PRODUCTS

| Capture | Aquaculture |
|---|---|
| Corals | Pearls, mother-of-pearl, shells |
| Pearls, mother-of-pearl, shells | |
| Sponges | |



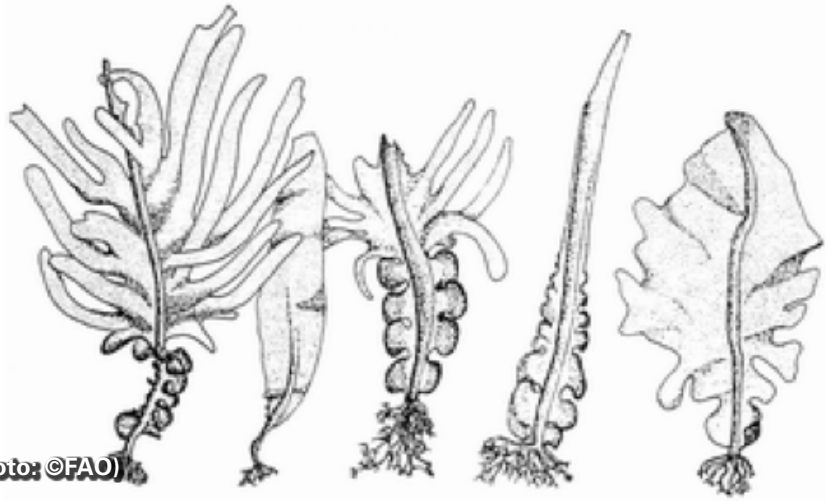
Sardinia coral (Photo: ©FAO)

Corals (Photo: ©FAO)

Acropoa corals (Photo: ©FAO)

## AQUATIC PLANTS

| Capture | Aquaculture |
|---|---|
| Green seaweeds | Green seaweeds |
| Brown seaweeds | Brown seaweeds |
| Miscellaneous aquatic plants | Miscellaneous aquatic plants |
| Red seaweeds | Red seaweeds |



Wakame (Photo: ©FAO)

Japanese kelp (Photo: ©FAO Aquaculture photo library / X. Bang)

Seaweed (Photo: ©FAO)

Laver (Nori) (Photo: ©FAO)

# VII

# Appendix

## POST-HARVEST PROCESSING

This Appendix shows a sampling of methods that may be applied at home for processing the species harvested or captured to preserve them and/or to increase their market value. The examples presented are not intended to be exhaustive, but rather to provide a starting point to illustrate what processing activities may look like; it is expected that individual countries will provide specific details of the activities relevant to their particular operations. The classification is from the International Standard Industrial Classification of All Economic Activities (ISIC) Rev. 4 Code 1020.

### SMOKING

Smoking fish on a type of oven (Photo: ©FAO/CESPA-Mali)

Smoking fish (Photo: ©FAO/T. Fenyes)

Smoking fish (Photo: ©FAO/I. Balderi)

Smoking fish (Photo: ©FAO)

## BRINING / SALTING

Salting of fish in brine vats (Photo: ©FAO/F. Maimone)

Salting of fish (Photo: ©FAO/G. Bizzarri)

## DRYING

Drying fish (Photo: ©FAO/Y. Diei Ouadi)

Drying fish (Photo: ©FAO/I. Bara)

Dried fish (Photo: ©FAO/J. Villamora)

## COOKING

Cooking fish (Photo: ©FAO/C. Thomas)

## CANNING

Canning fish in canning jars (Photo: © www.food-skills-for-self-sufficiency.com)

Canning fish in canning jars (Photo: © www.food-skills-for-self-sufficiency.com)

## ICE STORAGE

Ice making operation (Photo: ©FAO/ R. Faidutti)

Ice for conservation of fish (Photo: ©FAO/ R. Faidutti)

## MARKET

Selling ornamental fish (Photo: ©FAO)

Fish market (Photo: ©FAO/ S. Jayaraj)

Sun-dried fish for sale in a local market (Photo: ©FAO/P. Cenini)

Selling Queen Conch at the market (Photo: ©FAO/M. Taconet)

Fish market (Photo: ©FAO/D. Minkoh)