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Guidelines to Enhance Fisheries and Aquaculture Statistics through a Census Framework (Draft)

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Contents

Executive Summary

Small-scale operators are key contributors to local food security, poverty alleviation and to providing livelihoods, however, monitoring their production and accurately measuring these contributions is extremely challenging in the field of fishery and aquaculture. Despite the economic and social value generated by fisheries and aquaculture, the majority of people and communities dependent on them for their livelihoods are poor and socially and politically marginalized. Further, small-scale and subsistence operators are generally scattered geographically, and often engaged in fishing and fish-farming activities only partially and/or seasonally, as a supplement to other activities, e.g. fishing and fish-trapping in nearby river few days a week, and keep some catch in backyard irrigation pond. Second, the harvests are often shared, traded and consumed outside commercial marketing systems that are usually the basis of national statistics data collection. In the other words, even an estimation of overall number of people engaged in fisheries and aquaculture can be a quite challenging and costly task.

A pragmatic solution to improve overall understanding on the actual contributions of small-scale fisheries and aquaculture to rural communities is presented through the development of the census and survey modules in these guidelines. These survey modules follow the principle concepts adopted in the World Census of Agriculture of modularity to enhance utility and reduce implementation costs.

This Guideline document provides methodology to collect data and information on various aspects of the aquaculture and fisheries sector, in particular of small-scale operators. The methodology is conceived as a questionnaire survey to be implemented into a census framework: agricultural, population, or rural censuses, as well as specialized community and household surveys. A census framework was selected as the most effective approach, although it is costly, to obtain a comprehensives picture of actual contribution of small scale operations. Once this accurate snap-shop is obtained, it can then be used to help adjust regular (annual/ monthly) data collection system through improving sampling schemes and removing duplications. Data obtained through a census framework also provides a benchmark to assist in bolstering data collected through regular surveys into a national statistics for non-census years.

The guidelines present a hierarchy of census-level questions followed by survey items directed at both the community and household level to ensure the highest level of data complementarity. Countries would design their own census surveys by selecting appropriate modules and types of questions in specific categories according to their policy needs and interests as well as availability of funds. In this respect, the guidelines clarify that not only categories can be combined as best fits, but also specific items from within categories can be extracted and combined.

The document was initially built upon the 1997 publication “Guidelines on the collection of structural aquaculture statistics”. In principle, the major categories within the 1997 Guideline were maintained with minor modifications and additions for communities and households surveys. But, a critical change is the addition of fishery and post-harvest related queries (as well as other activities). These Guidelines are aimed to provide guidance toward designing and conducting supplementary module surveys for aquaculture in conjunction with censuses. The data from the census and surveys suggested plays an important role for planning and policy making while providing a way to monitor progress towards Sustainable Development Goals and to analyze poverty levels, food security, gender issues and community impacts. Census questions are designed to provide a frame for sample surveys while the data provides benchmarks and allows for cross-tabulations. The census questions proposed here are not intended to be a stand-alone census, but rather to be included in the most appropriate census being conducted (be it population, agriculture or sector specific census).

As part of FAO’s mandate the approach of “Blue Growth” is being promoted and it fosters responsible and sustainable fisheries and aquaculture through capacity development. It is defined by FAO (2014d) as **“*Sustainable growth and development emanating from economic activities***

***in the oceans, wetlands and coastal zones, that minimize environmental degradation, biodiversity loss and unsustainable use of living aquatic resources, and maximize economic and social benefits*".** The promotion of Blue Growth provides further incentive for improved data collection, and, as basis for this, strengthened questionnaires for census and surveys are critical to support the evidence-based management at the foundation of Blue Growth.

When countries are designing or redesigning their survey and census items to collect data on fishery, aquaculture and post-harvest processing engagement utilization of the standardized format in these Guidelines along with the use of harmonized definitions of terms allows for more ready integration with data collected through other means. The data integration offers a framework to help the visualization of overlaps and synergies between different platforms which then provides a means of expanding the net of data coverage without having to incur further costs from replication of efforts collecting points that fall within overlap areas.

I. Introduction

An estimated 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, in local and national food security, poverty alleviation and livelihoods was emphasized in the Rio+20 document of "The Future We Want" and in various voluntary guidelines (FAO 2014). Despite the economic and social value generated by fisheries and aquaculture, the majority of people and communities dependent on them for their livelihoods are poor and socially and politically marginalized. This is because employment in fisheries and aquaculture most often does not provide sufficient income and working conditions are hazardous. Small-scale and subsistence fisheries often provide an occupation of last resort for ensuring food security for people without having an access to land (World Bank 2010). The amount of harvest of wild aquatic organisms to support rural food security is not well quantified and the accurate evaluation of this and aquaculture's actual contributions has remained as unresolved challenge.

Small-scale and subsistence operators are generally scattered geographically, and often engaged in fishing and fish-farming activities only partially and/or seasonally, as a supplement to other activities, e.g. fishing and fish-trapping in nearby river few days a week, and keep some catch in backyard irrigation pond. Second, the harvests are often shared, traded and consumed outside commercial marketing systems that are usually the basis of national statistics data collection. In the other words, even an estimation of overall number of people engaged in fisheries and aquaculture can be a quite challenging and costly task.

The need of reliable and timely data is embedded in the Code of Conduct for Responsible Fisheries (FAO 1995) as a fundamental condition for sustainable development of fisheries and aquaculture. In particular under the Blue Growth Initiative and in the increasingly implemented ecosystem approach, the data required is not limited to the sector performance in a context of production but also needs to cover broader prospect of economic and social costs and benefits, environmental aspects and the food security contribution of the sector together with the impacts to the supporting natural environment. There is an urgent need for many countries to adjust the existing information systems to meet the emerging demand for data and information and improve national aquaculture and capture fisheries statistics to allow for analysis of the degree of employment, including information about working conditions. This also indicates an urgent need for clear guideline of data collection and monitoring methodologies to meet the changing demand.

This Guideline document provides methodology to collect data and information on various aspects of the aquaculture and fisheries sector, in particular of small-scale operators. The methodology is conceived as a questionnaire survey to be implemented into a census framework, either agricultural, population, rural censuses as well as specialized community and household surveys. A census framework was selected as the most effective approach, although it is costly, to obtain a comprehensives picture of actual contribution of small scale operations. Once this accurate snap-shop is obtained, it can then be use to help adjust regular (annual/ monthly) data collection system through improving sampling schemes and removing duplications. Data obtained through a census framework also provides a benchmark to assist in bolstering data collected through regular surveys into a national statistics for non-census years.

1.1 Background

Activities in the fisheries and aquaculture sub-sectors are not only varied and diverse; conducted on a spectrum of scales but also have a broad range of impacts on and limitation from various areas and activities outside these sectors. The CCRF, Ecosystem Approach of Aquaculture /

Fisheries management (EAA/F), and the more recent "Blue Growth Initiative", promote the concept of integrated sustainable fishery and aquaculture operations with fact-based management, which require monitoring and controlling a full aspects of the sectors' activities from economic, social and food security benefits to impacts on the natural environment. In particular, Blue Growth has been adopted to facilitate the promotion of sustainable development within aquatic environments for the production of goods and services that satisfy human development objectives without comprising environmental integrity. The Blue Growth Initiative recognizes that for fisheries and aquaculture development to lead to poverty alleviation, a human rights-based approach which goes beyond the right to the fishing resource is required, and other rights such as the right to decent work and social protection need to be promoted and protected. The document aims to provide some guidance in defining cost-effective and pragmatic approaches to address such requirements. FAO developed the Strategy and Outline Plan for Improving Information on Status and Trends of Aquaculture (Strategy-STA) which was endorsed by the twenty-seventh session of COFI (Rome, March 2007). The Strategy is a voluntary instrument applicable to all types of aquaculture and global in scope. The overall objective of the Strategy is to provide a framework for the improvement of knowledge and understanding of aquaculture status and trends as a basis for policy-making and management, and to ensure development that is compatible with good stewardship of resources and the environment.

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

Global Strategy- Improving AG-Statistics (http://www.fao.org/economic/ess/ess-capacity/ess-strategy/en/#.VBmcA_mSwsA)

The initiative to develop the global strategy came as a response to the declining quantity and quality of agricultural statistics. The global strategy will also address the emerging data requirements posed by the Millennium Development Goals (MDGs), mainly on biofuels, global warming, the environment and food security.…The purpose of the global strategy is to provide the vision for national and international statistical systems to produce the basic data and information to guide the decision making required for the 21st century. The global strategy is based on a thorough assessment of data user needs and what is currently available.

The Global Strategy Improving AG-Statistics grew out of concerns around the challenges of applying statistics to issues in agriculture development and the "general decline in the overall quality and availability of agricultural statistics" (World Bank 2010). Further, a "serious paucity" of statistical information upon which policy decisions should be based was cited as motivation for the establishment of the Global Strategy in a World Bank report (*ibid*). The Global Strategy has been designed to provide a clear blueprint to make long-term and coordinated improvements to the state of agricultural and rural development statistics (*ibid*).

For the first time in the year 2000 FAO World Programme for the Census of Agriculture (WCA) incorporated a "Supplement on aquaculture" in order to collect information on the aquaculture sector, although the targeted population was limited to the 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 integrating the questions to separate aquaculture and capture

fisheries engagement from broader agriculture activities in the census questionnaires. The year 2010 round of WCA further integrated a range of data needs especially monitoring and policy making in support of food security and provided options to conduct aquaculture census survey in conjunction with agriculture censuses. This guideline introduces a further extension of the concept of the supplementary survey module approach established in the 2000 WCA and maintains the consistent structure with those in the WCA 2020, as much as possible, to facilitate the comparison and integration of information collected by other food producing sectors.

The document was initially built upon the 1997 publication "Guidelines on the collection of structural aquaculture statistics". In principle, the major categories within the 1997 Guideline were maintained with minor modifications and additions for communities and households surveys. But, a critical change is the addition of fishery and post-harvest related queries (as well as other activities).

As part of FAO's mandate the approach of "Blue Growth" is being promoted and it fosters responsible and sustainable fisheries and aquaculture through capacity development. It is defined by FAO (2014d) as **"*Sustainable growth and development emanating from economic activities in the oceans, wetlands and coastal zones, that minimize environmental degradation, biodiversity loss and unsustainable use of living aquatic resources, and maximize economic and social benefits*".** The promotion of Blue Growth provides further incentive for improved data collection, and, as basis for this, strengthened questionnaires for census and surveys are critical to support the evidence-based management at the foundation of Blue Growth.

1.2 THE CENSUS AS PART OF AN INTEGRATED DATA FRAMEWORK

If data is visualized as existing in three dimensions – temporal coverage, content depth and population coverage, it becomes more straightforward to visualize how different types of data are generated (either actively or as a by-product) through different statistical instruments. Censuses and surveys offer a systematic and regular collection of data, but the content coverage is reduced. The time interval is necessarily large between the periods that the census or surveys are conducted to ensure the burden – both in terms of human and capital resources- is not too great. These efforts can be balanced with the data that is generated through more in-depth projects and ad-hoc data collection where the content coverage is expanded, while the entire population is covered. Without connections being created between these diverse forms of data they are left in isolation, but a carefully constructed sample frames and census questionnaires offer a means of connecting the different data together to form a more coherent picture of the fisheries and aquaculture sectors.

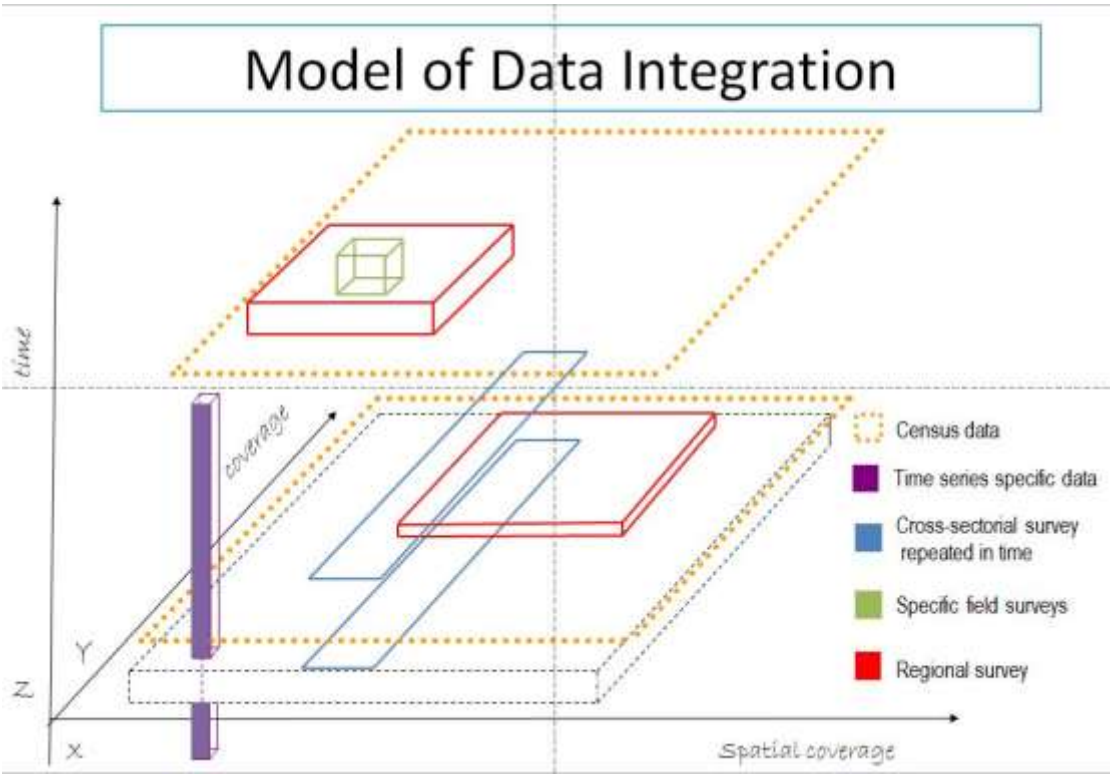


Figure 2. Model of different forms of data from various sources demonstrating how the overlap of these different sources can be assembled for a more complete picture of the fishing and aquaculture industries.

When countries are designing or redesigning their survey and census items to collect data on fishery, aquaculture and post-harvest processing engagement utilization of the standardized format in these Guidelines along with the use of harmonized definitions of terms allows for more ready integration with data collected through other means. The data integration offers a framework to help the visualization of overlaps and synergies between different platforms which then provides a means of expanding the net of data coverage without having to incur further costs from replication of efforts collecting points that fall within overlap areas.

This document aims to provide guidance toward designing and conducting supplementary module surveys for aquaculture in conjunction with censuses. The data from the census and surveys suggested plays an important role for planning and policy making while providing a way to monitor progress towards the Sustainable Development Goals and to analyze poverty levels, food security, gender issues and community impacts. Census questions are designed to provide a frame for sample surveys while the data provides benchmarks and allows for cross-tabulations. The census questions proposed (module 1) here are not intended to be a stand-alone census, but rather to be included in the most appropriate census being conducted (be it population, agriculture or sector specific census).

1.3 STRUCTURE OF DOCUMENT

This document is structured to facilitate the greatest ease of use of relevant sections. The front matter in chapters one and two cover the relevant introductory and background materials, basic concepts, setting the frame, and minimum core data. The following chapters cover the modules for items on engagement to be included with a pre-existing census; community survey items and finally, household / individual survey items.

II. Chapter 2 Basic Concepts and Structure

A. 2.1 SETTING THE FRAME - DEFINING TARGET POPULATIONS AND SELECTING SAMPLES

The objective is not to recommend a single methodology, but rather to present some of the possible approaches depending on the needs of each country along with advantages and disadvantages to guide countries in making the best choice to fit their policy directives without undue financial burdens.

The proposed categories are divided into "core" and "supplemental" items. The core items have been selected to correlate with the core data set proposed by the Global Strategy on Improving Agricultural and Rural Statistics (World Bank. 2010) and follow in section 2.4. It is highly recommended that countries collect information on core categories, although selecting all core items is not a requirement and may not be feasible when time and budgetary considerations are weighed. Supplemental items are optional and proposed for consideration by countries where these matters are relevant to their particular data needs or policy directives. The differentiation between core and supplemental items is made to assist in maximizing the benefits of conducting the census and/or survey questionnaires without the substantial burden that may accompany these efforts.

These Guidelines are laid out in a hierarchical fashion and proceed from:

- proposed items to be included in a census such as the WCA or a population housing census
- proposed items for a community-level survey
- proposed items for a household and individual survey

Of significant note is that aquaculture, fisheries and ancillary activities (such as post-harvest processing and tourism) are presented at the same time in the items for inclusion in censuses, community-level questionnaires up until the first level of the household survey items. The intended outcome of bundling these activities is to improve the likelihood that participation in any of these activities is captured, and in particular, the grey-areas that exist between aquaculture and fisheries, as defined, are not lost. For example, stock enhancement activities where broodstock are raised with aquaculture practices, but then released to the wild or fish fattening operations may fall between the cracks of the two definitions. Tabulations are proposed at the end of each section and are intended to suggest possible tabulations of the core items and how the supplemental items could also be integrated, if appropriate.

<u>How to Implement the Surveys:</u>

This document addresses not only the deployment of a census, but also the subsequent use of surveys at the community and household level to assess aquaculture, fishery and post-harvest activities. In a departure from the traditional presentation of these activities separately, the activities are not separated out until the lowest-level of disaggregation at the individual-level of household activities.

Please Note: The reporting period for all items is considered to be one calendar year. This can be modified to match with the country's protocol for establishing reporting periods, but the calendar year has been selected purposefully to best capture the potential seasonality of engagement in different activities.

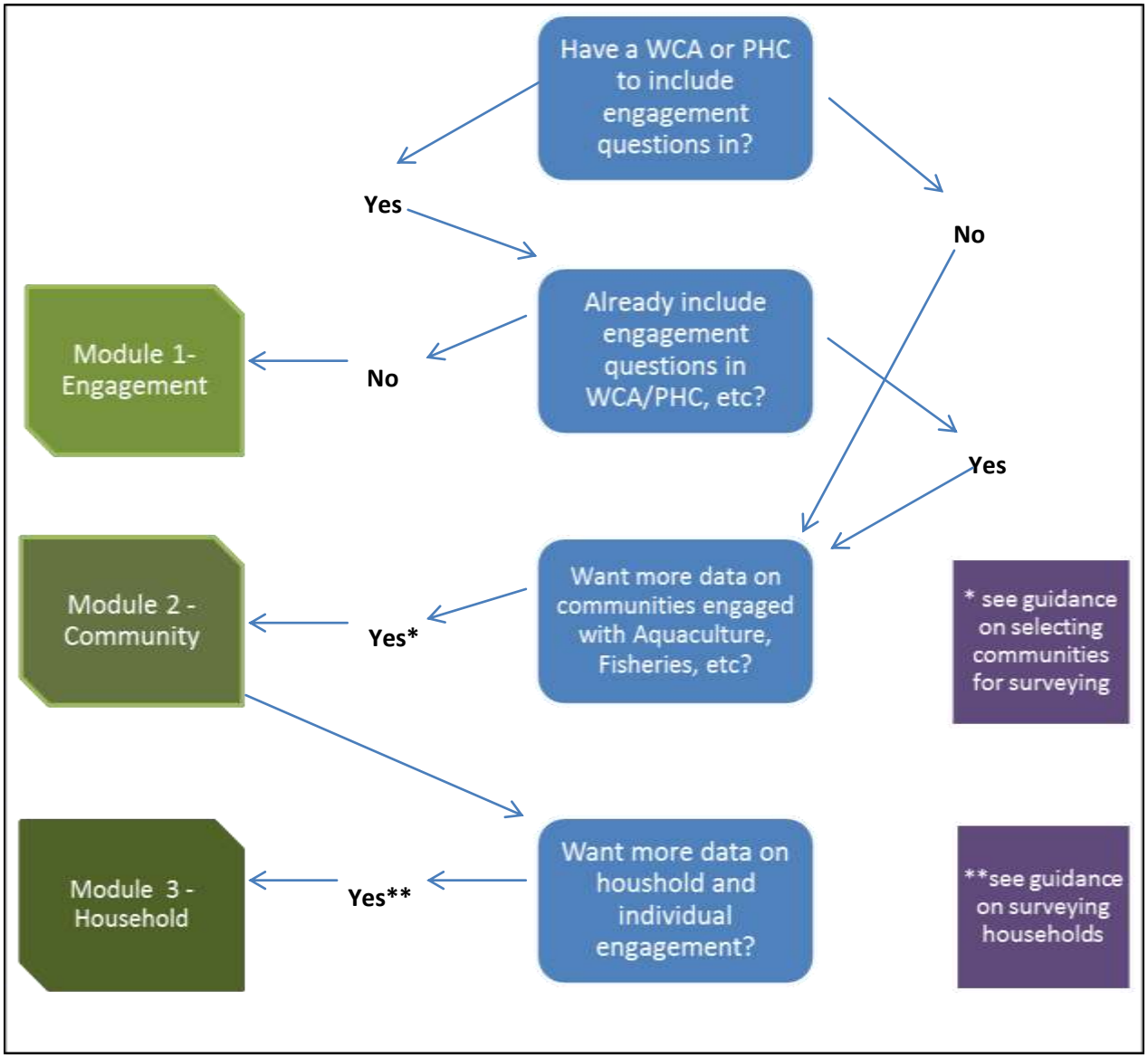


Figure 1. Decision tree for selecting modules for inclusion based on current situation as well as data and policy needs.

The core and supplementary items for the household surveys are explained and the items are further divided into items for the entire household and each member of the household's activity. Suggested tabulations are also provided.

Module 1- Engagement provides the very basic data points for collecting data on engagement in activities such as aquaculture, fisheries, post-harvest processing, tourism, etc. The intent is to provide a listing of a range of activities that individuals may be engaged in and to allow for accounting of engagement in any of these rather than requesting the respondent to only select one. This is the type of engagement question that is already included by some countries in their World Census of Agriculture survey, or in a population housing census. These items are indicated here for two potential purposes: 1. If countries are looking to restructure the engagement questions already requested to be more inclusive 2. To provide material to countries looking to query engagement in these activities for the first time in the WCA or PHC.

Module 2 – Community Items include a larger list of items to be included and are intended for delivery at the community level. This implies that the questions are not answered by different individuals in the community, but rather by a community elder, spokesperson, official, etc.. Community-level data collection can be useful for examining the infrastructure and services

available to community members and may cover other data not able to be collected from households, such as the area of communal land, access to shared facilities and type of governance.

The proposed items are relevant to the community as a whole are broadly grouped in to categories of:

- Employment
- Community Infrastructure & Services
- Destination of Species
- Regulations & Licensing
- Government Grants/Subsidies

Module 3- Household Items

The household items include items for both the household level as well as individuals within the household. The first level – household- does not propose separate inquires on aquaculture or fishery activities, but rather that is only queried at the individual level. Engagement in different activities, for different motivations (for example, household work vs. paid engagement) or in different parts of the sector (fishing vs. post-harvest processing) are important data points to cover.

Household Proposed Items

- All Household Activities
- Water Use / Access
- Destination of Species
- Regulations / Licensing
- Government Grants/Subsidies

Individual Proposed Items

- Gender / Age
- Activity / Role
- Wage / Other Form of Salary
- Time / Seasonality of Engagement
- Frequency / Quantity Consumption of Fish

Selecting Census and Survey Respondents:

In an ideal data world all households and communities would be surveyed with 100% coverage. As time and budget limitation dictate this scenario is rather implausible. A deep body of literature exists for selecting samples for conducting surveys and these guidelines propose potential methodologies, but urge countries to consult the literature to find the best fit for their particular needs.

The following work flow is suggested for identifying and selecting census and survey recipients. Please note more detail is presented in the respective sections and this is intended to only provide an overview.

The distribution of engagement in aquaculture, fisheries and/or post-harvest processing must be identified. This can be accomplished through a number of means, for example:

1. Responses to engagement questions queried through a WCA (World Census of Agriculture) or PHC (population and housing census) (such as the items proposed in module 1).
2. Administrative or Registry Data
3. GIS / Remote Sensing Data (see Martínez & Flores 2014)

In some countries fisheries and aquaculture activity is well-documented at a large(r) scale or in certain environments. For example, a country may have a good understand of commercial vessel activity as a result of log book registers, but lack an understanding of how communities and households are engaged in the sector. The country may then use the registry data (from the logbooks) to determine the distribution of engagement.

If a country knows that portions of the population fish seasonally in inland waterbodies and either sell the catch through informal markets or barter for other goods it would not be possible to identify how the engagement is distributed. In this scenario, the country may wish to use GIS / Remote Sensing to identify waterbodies where the fishing or aquaculture activity may be taking place. Using a buffer around the waterbody any communities or households within the buffer could be used to construct a matrix of engagement.

In any way the distribution of engagement is determined the next step is to determine how to select the samples for survey. Generally, a suggested technique to consider first would be sampling on probability proportional to size (PPS) (FAO 2012; EC 2008). In this method auxiliary information plays a key role. Alternately, stratified random sampling could be considered where the relevant communities are identified and from within these random samples are selected, but the reliance on homogeneity within the strata may be a limiting factor (EC 2008).Sample size would then need to be determined, always bearing in mind that cost of the survey increases with a greater sample size, but the variance decreases.
The 2010 WCA provide guidelines in Chapter 10 on selecting samples:

> *"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 "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"*

From the communities selected through the most appropriate sampling methodology these guidelines recommend that module 2 – Community survey be conducted along with a survey covering all households (survey items in module 3 – Household) no matter their engagement level.

B. 2.2 DEFINING SCOPE

Unit of Enumeration

The collection of structural information on aquaculture and fisheries requires a clear and unambiguous definition of each activity for distinction at the individual activity level. The most appropriate unit, when inclusiveness is considered, for both fisheries and aquaculture would be the household rather than the holding. The primary motivation behind using the household is that, in general, the concept of holding is not appropriate for the fishery concept. While it has some benefits including consistency with agriculture and aquaculture surveys; the concern is that often the small scale and poorest fishing community do not have any "holdings", but are made up of landless households.

The unit of enumeration has been selected to be the household rather than the holding. The definition of household is defined by the UNSD (2014) in paragraphs 2.77-2.83 as:

"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).

Aquaculture, Fisheries and Post-Harvest Processing Activities

Aquaculture:

Aquaculture falls under group 032 of ISIC 4.0 and covers both marine and freshwater aquaculture and it includes: "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."

Fisheries:

Capture fishery falls under group 031 of ISIC 4.0 and covers both marine fishing and freshwater fishing, it includes " 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."

Post-Harvest Processing:

Fish is a very perishable food commodity that requires proper handling and preservation to increase its shelf life and retain its quality and nutritional attributes. Post-harvest processing can simply be defined as any treatment of the fish for selling or simply for preserving the fish after harvest.

For dead fish, handling operations after capture are: transferring catch from gear to vessel, holding of catch before handling, sorting/grading, bleeding/gutting/washing, chilling, chilled storage, unloading. It is important to note that women may contribute more labour time to aquaculture than men. While, in fisheries women may own the vessels used for fishing or conduct post-harvest processing and selling activities. Especially in Asia, studies indicate that the contribution of women in labour for aquaculture is often greater than men's, although macro-level sex-disaggregated data on this topic is almost non-existent (FAO 2011). The inclusion of post-harvest processing activities is an important addition to this document to ensure all relevant activities are included and, in particular, non-economic contributions can be captured.

Fisheries, aquaculture and post-harvest activities have intentionally not been treated in separate questionnaires until the lowest level of disaggregation presented in these guidelines (the household level survey section identifying individual activities). The intended outcome of bundling these activities is to improve the likelihood that participation in any of these activities is

captured, and in particular, the grey-areas that exist between aquaculture and fisheries, as defined, are not lost. For example, stock enhancement activities where broodstock are raised with aquaculture practices, but then released to the wild or fish fattening operations may fall between the cracks of the two definitions.

Each of the above, relevant, descriptions for please see Appendix IV, V and VII.

C. 2.3 MODULAR APPROACH

To ensure the usability of the Guidelines a significant effort has gone into structuring the layout to highlight modularity. Limitations in available funding or interest in specific categories mean that countries will select items from the categories as they see best match their policy needs. Further, countries are encouraged to, and indeed will, select their own survey architecture and related sampling design. With that understanding this version of the Guidelines attempts to make clear that not only categories can be combined as best fits, but also specific items from within categories can be extracted and combined.

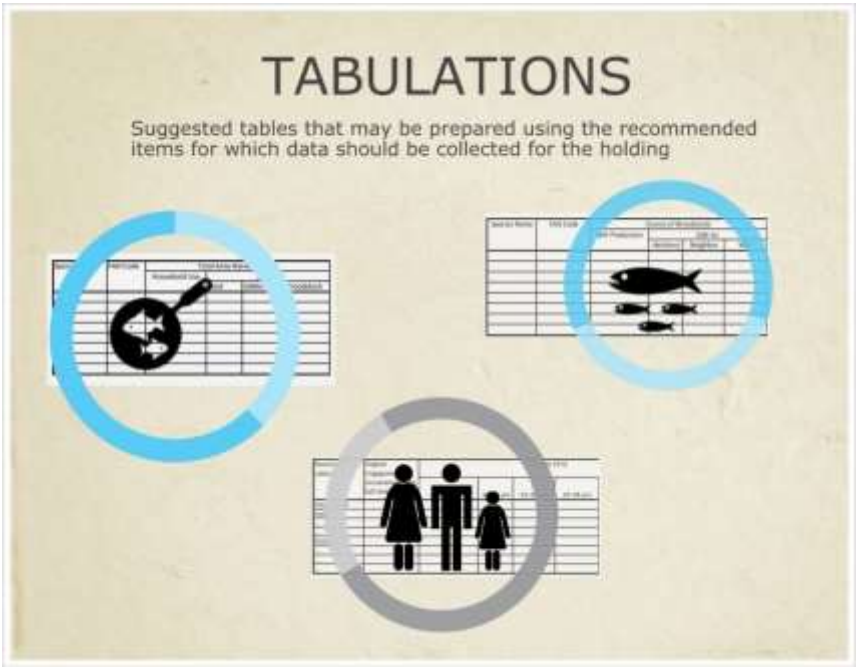
The tabulations chapter from version 1 has been restructured and each of the tabulations follows the relevant category description and details.

Sections within each of the aquaculture and fisheries chapters are included with suggested items for surveys used to extract further and more detailed information to allow for cross tabulations. Surveys are suggested for the household level and for communities. These surveys aim to collect more detailed information beyond what can be collected within the necessarily limited scope of the census questionnaire.

A common hierarchical flow was utilized for both the aquaculture and fishery items where census items are presented first (and the proposed items are the same for both activities) while community surveys follow and these are followed by the household level surveys. In the case of fisheries, it is further suggested that the household survey could be easily modified for application as a business-level survey.

Modularity was established as an important factor in the 1997 Guidelines on the collection of structural aquaculture statistics and this feature has been maintained and enhanced throughout the current work. All proposed items are presented in a suggested format with examples provided to demonstrate modularity of the proposed items which can be assembled as best balances cost of adding items with meeting policy needs for governments. It is hoped that in emphasizing the modularity of the categories and the stand-alone nature of the questions within each category countries will understand they can include a few more relevant questions without being over-whelmed by the need to include all questions from the categories.

The tabulations chapter from version 1 has been restructured and each tabulation now follows the relevant category description and details. The diagram below demonstrates how different items from each category may be combined to address specific policy questions. At a more fundamental level, the tabulations suggested after each category of items are simply proposed to act as a catalyst for each country to form their own tabulations as most appropriate. More or less detail may be relevant and the structure of the questions for each criterion within the categories can be selected at will. To reiterate, those tabulations are intended to be building blocks and the users should choose them according to their own needs and priorities.



D. 2.4 MINIMUM CORE DATA

Core data items provide a critical basis of items that countries can choose from that have common definitions and methodologies so all the measurements are internationally comparable. In addition to the core items selected by the country other items that are relevant can then be added as well.

The core items included in the Global Strategy to Improve Agricultural and Rural Statistics (Report Number 56719-GLB) have been used to set a framework for defining core items within this document. Additional items are proposed, where required and it is left to the countries to select items as best fit their policy and data needs. The items are outlined in the following table and are matched with the corresponding items from the census, community and household modules. Further, in each of the respective modules core and supplementary items are clearly indicated. The use of the core items as established by the Global Strategy help to maintain a strong connection with other census systems and enhance standardization opportunities with other data collection methods. A full table of the core items matched with the categories from each of the three modules is presented in **Appendix I.**

Economic:

- output
- trade
- stock of resources
- inputs
- agro processing
- prices
- final expenditure
- rural infrastructure
- international transfer

Social:

- demographics of urban and rural populations

Environment:
- land
- water
- air

Geographic Location:
- GIS coordinates
- degree of urbanization

The proposed items under this category are harmonized, so that no matter what items are selected by countries, as best fits their needs, the data are intentionally comparable.

The Role of Women and Children

Gender equity is a stand-alone sustainable development goal (SDG 5) and equity can only be reached based on understanding of interactions. The participation of women in aquaculture and fisheries activities is not always accurately reported. Women play an important role as workers in the fisheries and aquaculture sector, 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 have access to fish of poorer quality.

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

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.

Although few women might own fishponds, the majority of them are involved in fish production from pond construction to feeding, fertilising and harvesting (Van der Mheen-Sluijer and Sen, 1994). FAO strives to treat women equitably in fishery statistics. Thus, for this census, the role of women in aquaculture and fisheries and related post-harvest processing activities should be given special attention in order to collect accurate information on gendered engagement. The inclusion of post-harvest processing and the queries that included household activities have been 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."

Decent Rural Employment

Labour may be the only asset that people own and can use to earn income. Particularly in rural areas this may be the case for a large portion of the population where income gained through labour provides a means for poverty and hunger reduction. Work in aquaculture, fisheries and post-harvest processing provides an example of a form of rural employment however the majority of people and communities dependent on them for their livelihoods are poor and socially and politically marginalized. This is because employment in fisheries and aquaculture most often does not provide sufficient income, exploitation of fish workers is common and working conditions are extremely hazardous. Even though fisheries and aquaculture represent a diverse sector- from highly organized commercial operations to the more common informal, small-scale and artisan livelihoods –a lot of the critical working conditions are found across the board. Capture fisheries depended households in general and poor fishers in small-scale fisheries in particular are prone to very high levels of vulnerability closely related to their economic activity and the livelihoods associated to it. Fish farmers engaged in small-scale aquaculture mostly depend on unpaid family labour, including children. Due to limited access to land, infrastructure and inputs, yields tend to be small, and consequently rural small-scale aquaculture often does not contribute to reduced poverty.

Many of these factors are addressed through the criteria in the modules and if a country is interested in promoting decent rural employment many of the factors may be measured through these criterion.

III. Chapter 3

IV. Module 1: Items for Inclusion with Census

This section describes the items suggested for inclusion in a census to query engagement in fisheries, aquaculture, post-harvest, and other activities. The items proposed in this module are aimed only at determining the distribution of engagement within a country. More detailed survey items are suggested in the modules for community and household surveys. Censuses are expensive operations due to their scope and to minimize the burden of including questions relating to aquaculture, fishery or other activities the level of detail has been restricted in an effort to reduce costs, but, more importantly, increase the likelihood that these questions will be included with census questionnaires such as the World Census of Agriculture or population housing surveys being conducted by countries.

Category	Description (this category…)
01 Identification of engagement	identifies work and degree of activity

Figure X. The proposed category for census level with a brief description.

A. 3.1 CATEGORIES

Category 01 Identification of Engagement

This category aims to identify the activities carried out in the household to allow for an understanding of degree of engagement as well as diversity of activities that may be conducted. The term work is used here to mean any engagement in the activities outlined. The definition of work follows that from the 2013 ILO resolution: 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 by, not only, full or part time, but also to the level of detail if the respondents only participate in the activities a few days per year. See Glossary of Terms for guidance on setting cut offs for full vs. part time work according to country norms.

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

B. 3.2 SUGGESTED TABULATIONS:

Two tabulations are proposed here. The first asks only for identification of any engagement in activity, while the second further requests degree of engagement. The shorter tabulation reduces the burden on existing census programmes, but looses the data points of degree of engagement for a much larger sample of the populations that would further enhance data comparability. In both tabulations multiple responses are permitted for engagement in activity as it is anticipated engagement in multiple activities will occur.

Identification of Activities

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 accommodations	
tourism: guiding / tours/	

Identification of Activities with Degree of Engagement

	Frequency of Engagement

activities conducted	engagement in activity (yes/no)	*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 accommodations								
tourism: guiding / tours								

V. Chapter 4

VI. Module 2: Community Survey Items

The collection of community-level data on fisheries, aquaculture, and post-harvest processing provides an important compliment to the structural data collected at the household level (in Module 3). The data collected in all three modules is designed explicitly with complementarity in mind. These guidelines utilize a hierarchical flow whereby module 1 can be used to identify the distribution of engagement while module 2 is conducted within the selected communities (see Chapter 2.1 Setting the Frame for reference). Following the completion of module 2 – Community survey by a selected and appropriate community member (elected official, village leader, etc.) it is expected that module 3 – household survey will be conducted in all households of the selected community.

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

The relevant sections from Chapter 5 of the WCA-2010 are included in Appendix I. The following suggests potential items for inclusion in such a survey that would complement and supplement the information collected as part of a census by providing information at the community level.

Community-level data collection, often done at the village or commune level, can be useful for examining the infrastructure and services available to community members. A community survey may cover other data not able to be collected from households, such as the area of communal land, access to shared facilities and type of governance. Often, the community-level data complements the household-level data; for example, community-level data on the existence of associations or cooperatives may complement data on participation in those associations collected from each household. For information on previous work done by FAO on community-level statistics, see *Community-level Statistics* (FAO, 1983).

In this module, the categories are itemized in sequence with items matching the core minimum data outlined in the Global Strategy preceding supplemental items. **Within some of the categories that are identified as core minimum items are some non-core data items and these are items indicated with an asterisk (*).**

Category	Description (this category…)
01 Work	describes engagement in aquaculture, fisheries and post-harvest processing relative to total community size
02 Community Infrastructure and Services	seeks to define the infrastructure owned, used or accessed by the community for aquaculture, fisheries and post-harvest processing activities

03 Species Destination	covers basic indicators relating to type of species harvested, captured and processed and their relative contribution to food security.
04 Grants / Subsidies	covers the support provided to the community from government for conducting aquaculture, fisheries and post-harvest processing activities
Supplemental Items 05 Governance	describes the regulations and licencing that the community is subject to / participates in

A. 4.1 CATEGORIES

Category 01 Work

This category aims to describe the composition of the community and how much of it participates in aquaculture, fisheries and post-harvest processing activities relative to other activities. An emphasis is placed on the role of local workers compared with that of migrant workers. The term work is used here to mean any engagement in the activities outlined. The definition of work follows that from the 2013 ILO resolution: 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).

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

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 center
- 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
- Processing Facility
- Market

Supporting Resources (presence, and, if not if not travelling time to nearest…)

- Source of marketing information (private body, co-op, government, other)
- How market information is accessed (not available, mobile device, computer, radio, middle-man, 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-educations)*
- Access to health care (presence of hospital or clinics or distance to travel to)*
- Access to community water source (presence or distance to travel to)*
- Presence of radio, telephone and Internet service (each item)
- Availability of public transport: bus, train, or boat
- Whether electricity is connected

Category 03 Species Destination

This category describes the species culture, captured and processed as well as the destination of each species. Destinations such as 'household consumption' often are not captured through surveys or census that focus too heavily on economically important species and this valuable contribution to food security are often overlooked. Category 03 also offers an opportunity to enumerate which species have non-market destinations and allows for examinations in the (potentially) different focus on species depending on the destination, for example, household consumption vs. trade.

The basic indicators relating to type of species produced by the community are collected here and offer an interesting comparison to data reported through other formats (administrative, other surveys, industrial aquaculture production figures, etc.)

- 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. Further, if relevant for countries' policy objectives, social protection factors reflecting decent rural employment measures are proposed as supplemental items.

- Loan support programmes
- Tax preferences and insurance support
- Capital and infrastructure programs
- Marketing and price support programs

Do community members have access to:

- 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

In this category the regulations and licencing which the community is subject to / participates in are described. Which and what knowledge exists of regulations and management rules (legal, traditional and community)

- Are operations subject to licence 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 and activity to resources (fishing grounds, stocked lakes, etc)
- Which and what knowledge exists of fisheries management rules (legal, traditional and community)
- Are operations subject to licence or regulation requirements
- Is there a community-based or co-operative based organization

The governance aspects of decent rural employment are proposed below for inclusion by countries with a policy interest in this area. The existence and amounts (when known) for aspects of labour legislation.

- If contracts mandatory for wage labour, if not mandatory, what percent of the labour force has contracts.
- Is there a minimum working age? If so, what is it? Do any workers younger than this participate in the workforce?
- Is there a minimum wage? What is it?
- Are there maximum working hours? What are they?

B. 4.2 SUGGESTED TABULATIONS

Tabulations are provided in this section under each category. The tabulations are not intended to be the sole means of tabulating the proposed items under each category, but rather to provide a starting point. In the description for each tabulation a brief description of the data needs or policy interests, as relevant, are highlighted. Further, any supplementary items are included in a separate tabulation to ensure clarity.

Category 01 Work

Two tabulations tables are provided here for core data items with an additional two tables for supplemental data. The supplemental data may be used in complement to gain the most information on the seasonality of activities and how the primary focus of a community's work may shift throughout the year, in addition to the total population of the community.

Core Item Tabulations

In the Community:	**Number of Migrant Workers**	**Home Nation of Migrant Workers**	**Number Settled Households**	**Number Mobile Households**	**Number Homeless Households**

	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					

Supplemental Item Tabulations

Total Population of Community

Indicate activity during each month from various sectors	*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 area of the community used for aquaculture production and water body surface areas for fisheries are the focus of the core items in this category. This is followed by further queries on the tenure over water and relevant structures. Further items on development status of the community are then queried. The supplemental items include the total size of the community, whether the community is prone to natural disasters and further development-related questions regarding access to education and health institutions.

Core Item Tabulations

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

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,	Travel time to nearest urban center

Are there :	**yes / no**	**fee for access?**	**Is it community / co-op owned (not private ownership)**	**distance to travel to**
water bodies				
water access points				
hatchery / grow-out facilities				
irrigation services				
repair facilities				
gear storage				
processing facility				
cold storage				
market				

Primary Source of Marketing Information (private body, co-op, government, other))	
How Market Information is Accessed (not available, mobile device, computer, radio, middle-man)	

Supporting Resources for Aquaculture	Presence (yes / no)	If no, 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		

Supplemental Item Tabulations

Total Area of Community (ha)

Is the community prone to natural disasters?	
If yes, specify which type(s)	

Community Resources	Presence (yes / no)	If no, travel time to nearest available
Primary School		
Secondary School		
Higher-Education Institution		
Vocational School		
Hospital		

Medical Clinic		
Community Water Source		

Category 03 Species Destination

This category requests the primary species in the community for any of the applicable of aquaculture, fisheries and post-harvest processing. All points fall under core data items.

Core Item Tabulations

		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 within this category are core data items.

Core Item Tabulations

Which and what 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

In the community is there:	Available (yes or 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

The category of Governance is entirely a supplemental item. If an understanding of local governance and knowledge and the perception of national governance is desired, these items are recommended for inclusion in the community survey.

	explain:
Which and what knowledge exists of fisheries management rules (legal, traditional and community) (explain)	
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, ponds for aquaculture?	
Is there a community-based or co-operative based organization	

The following items address governance components of decent rural employment.

	Presence (yes/no)	Amount	Explain any details or occurrences of exceptions to the standards	Are there inspections on these labour conditions?
If contracts mandatory for wage				

labour, if not mandatory, what percent of the labour force has contracts.				
Is there a minimum working age? If so, what is it? Do any workers younger than this participate in the workforce?				
Is there a minimum wage? What is it?				
Are there maximum working hours? What are they?				

VII. Chapter 5

VIII. Module 3: Household Survey Items

Within communities selected for the community surveys (see guidance in section 2.1) these Guidelines further recommend that this survey for the household level is conducted in all households apart of the community.

The following module suggests potential items for inclusion in such a survey that would supplement the information collected as part of the community survey. More detailed information beyond structural data can be collected under the survey format. Here, the module combines questions that can either be directed at a household or at a company. Some questions are more relevant for either companies or households and countries are advised to choose the most suitable items. A large body of literature is available on worker-focused survey questionnaires and these materials allow for the addition of questions such as those suggested here that are complimentary with the data requested at the household, community and census level. As outlined in section 2.2, the unit of enumeration is the household rather than holding.

This module is split in two components. The first component covers activities at the household level while the second component addresses individuals within the household. The first component need only be answered by a single respondent, preferably the head of household. A response for each individual is requested for the second portion of the survey. **Within some of the categories that are identified as core minimum items are some non-core data items and these are items indicated with an asterisk (*).**

Category	Description (this category…)
Household Level	
01 Land and Water Use	seeks to define the area and type of both land and water used for aquaculture, fisheries and post-harvest processing activities
02 Species Destination	identifies the top 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 inputs to the operations such as fuel, feed, fertilizers, etc. Identifies resources input into the operations and equipment
05 Unexpected Losses	Describes any losses of species, gear or equipment that occur
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 basic reference points of food consumed in the household as well as quality of life when not requested through a frame census
Supplemental Items	
08 Governance	covers the support provided to the community from government for conducting aquaculture, fisheries and post-harvest processing as well as regulations or licencing requirements

A. 5.1 CATEGORIES

Household Questions

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

Category 01 Land and Water Use

Category 01 covers the basic indicators relating to the land and water resources on the household 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 physical location of the household.

In many cases, the land area is typically used for the siting and construction of rearing and water purification ponds, raceways, tanks, small farm dams, reservoirs and other man-made water impoundments. Further, aquatic organisms can be reared in net enclosures placed in the sea and in inland open waters. In such cases the total area obtained or allocated for such culture practice should be recorded. Tenure of and access to waterbodies is also queried in this section for both fisheries and aquaculture activities. In cases where land is used simultaneously for aquaculture and crop cultivation, such as artificially stocked rice paddies, the total area of such parcels of land should be recognized as land allocated to aquaculture. However, care should be taken to ensure that these lands are not double counted when the total household area is estimated and that rice paddies used for growing fish, which originate from flooding paddies are excluded from the

aquaculture household area total. It should be remembered that water bodies such as reservoirs, canals and other water impoundments may principally be used for irrigation of agricultural land and not for fisheries, but may be used for fisheries. These water bodies should, in that, case be included in the total water area used for fisheries.

The proposed items under this category are:

For 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*

- 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
- coastline / beach/ shore

Landing area / landing point and ownership (own, rent, lease, co-op, free access) and size in (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)*

<u>Category 02 Species Destination</u>

Within this category the species produced and the purposes for their production are requested. Destinations such as 'household consumption' often are not captured through surveys or census that focus too heavily on economically important species and this vital contribution to food security is often overlooked. Category 02 also offers an opportunity to enumerate which species are produced and allows for examinations of the (potentially) different focus on species depending on the destination, for example, household consumption vs. trade. It is important that each component be answered by activity. For example, if a household has members engaged in aquaculture, fisheries and post-harvest processing this category would be completed separately for each activity.

Primary and secondary activity source of income for the household.

If aquaculture, fisheries or post-harvest processing are a primary or secondary source of 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 in stock that is carryover from previous harvest
- 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

Equipment is divided into aquaculture, fisheries and post-harvest processing and should be completed for each activity the household engages in. The final section addresses Ancillary Facilities utilized by the household. This section does not require a connection with any activity exclusively, but rather the facilities could be used to support any of aquaculture, fisheries and post-harvest processing activities.

Aquaculture:

This category addresses the use of equipment and non-residential buildings the household uses to engage in aquaculture. Please see Appendix IV for an in-depth description of the types of aquaculture production facilities and systems.

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 gears used for fishing activities and what proportion of the total catch comes from the use of different types of gears.. See Appendix V for full listing of types of fishery gears.

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
- stupefying gear

Post-Harvest Processing

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

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 Activity or Facilities

For each, cost of access, if on or off site of household, ownership, size (square meters):

- Feed supply plant
- Broodstock or hatchery
- Net mending
- Vessel Repair
- Fuel Storage

Category 04 Inputs

Inputs are divided into types of inputs and these may be applicable to multiple activities. For example, fertilizers may be applied to support both enhanced aquaculture productivity or increased fisheries harvests.

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

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 provide an accounting of efficiency of the operations and to take into consideration losses throughout the year. Outside of the scope of this category are expected, operational losses (for example, mortality of fish within the range of expectations).

Losses of Species

- Total Losses (% or kg)
- Losses due to:
  - stock enhancement
  - disease death
  - disease cull
  - environmental conditions
  - no market cull

- spoiling during processing
- losses due to poaching (theft)
- any conflict with others for access to resource

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

The focus of this category is to describe the household members and external workers engaged in aquaculture, fisheries and post-harvest processing activities for the household. An emphasis is placed on gender and age of labour inputs as well as amount and form of salaries paid. The term work is used here to mean any form of work in the activities outlined. The definition of work follows that from the 2013 ILO resolution: 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).

Household Members

- Total number of householders engaged in aquaculture, fisheries and post-harvest activities

- Gender

- Country of birth

- Degree of engagement (occasional, part or 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, part or full time)

- Age in Completed Years

- Salary paid (and form of payment)

-If workers are Migrant Workers

Category 07 Food Consumption and Quality of Life

This indicator is included at the individual level rather than household to better capture each individual's access to food and consumption patterns.

Food

- 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

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
    - Season activities are conducted
    - Estimate of income level per activity
    - Estimate of time invested in activity

Supplemental Items

Category 08 Governance

The regulations or licencing requirements that household or company operations are subject to or participate in are identified in this category. This basic information on governance adds an important compliment to data available at an administrative level.

- licencing or registration of aquaculture production
- participation in a cooperative association
- for each of the above:
    - with what level of governance
    - is it required
    - is a fee paid
    - if yes, annual cost of fee
- are you licenced or registered for your fishery activity?
- are you part of a cooperative association?
- Are there limited or no fishing days?
- Are capture limits based on size, quantity, etc in place?
- Are discards banned or limited?

B. 5.2 SUGGESTED TABULATIONS

Tabulations are provided in this section under each category. The tabulations are not intended to be the sole means of tabulating the proposed items under each category, but rather to provide a starting point. In the description for each tabulation a brief description of the data needs or policy interests, as relevant, are highlighted. Further, any supplementary items are included in a separate tabulation to ensure clarity.

Household Level

Category 01 Land and Water Use

The total area of the household's land (if any) is not included in the core item tabulations, but could be added to the table on area of structures and water bodies accessed if relative size was deemed important by the country. All items on tenure are supplemental but would be important for inclusion if social justice issues were of policy concern to the country.

Core Item Tabulations

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

Total Size of Holding (ha)	

Tenure

	Indicate Ownership (own, rent, lease, co-op, free access)	**Indicate Fee (if any) Paid for Access**
Water Source Bodies		
lakes		
reservoirs		
rivers		
groundwater		
canals		
estuaries		
lagoons		

sea		

Category 02 Species Destination

The supplemental items are included if detailed information on all species captured or harvest / processed is desired. Further, in a fisheries specific context an item on discards is included. This item should only be included if countries have set catch limits in such a way that discards do occur in fishery operations.

Core Item Tabulations

Primary activity source of income for the household:	
Secondary activity source of income for the household:	

Do the following activities provide primary or secondary source of aquatic products consumed in household	Indicate if primary or secondary:
aquaculture	
fisheries	
post-harvest processing	

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

Supplemental Item Tabulations

List Species Produced by Name	Count or Weight of Discards

Category 03 Equipment

Within this category the tabulations are divided amongst aquaculture, fisheries and post-harvest processing activities and should be completed by the household for each of the activities any member of the household engages in. Under supplemental items, a tabulation is also presented on 'other facilities' and can be completed just once for the household, rather than under each activity.

Core Item Tabulations

Aquaculture

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

vessel (y/n)			
if yes, vessel then:	**length**	**power source**	**tonnage**

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

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

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

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

Species

Species Losses	**Total Losses (kg)**	
	lost 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	

Loss of 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

06 Work

The items in these tabulations are divided between household members and outside workers (hired by the household). One table is presented for each of aquaculture, fisheries and post-harvest processing and should be completed as appropriate when considering 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:

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working aquaculture (including partial days)				

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working fisheries (including partial days)				

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working post-harvest processing (including partial days)				

Outside Workers:

Do you hire outside workers	(yes/no)
	if yes complete below

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working aquaculture (including partial days)				

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working fisheries (including partial days)				

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 Engagement (occasional, part, full time)				
Permanent or Temporary				
Seasonal Hiring (yes / no)				
Days spent working post-harvest processing (including partial days)				

Category 07 Food Consumption and Quality of Life

Core Item Tabulations

Food consumption – Aquatic species	Source			
Amount of Fish (or aquatic species) consumed in average week	Self	Purchased	If purchased, Cost Paid per kg (or per indicated unit)	Bartered for in exchange of goods or services

Other Incomes

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 just once even per year)	
Has the number of income sources for your household increased, decreased or stayed the same over time? (describe the trend)	

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

Supplemental Items

Category 08 Governance

The category of Governance is entirely a supplemental item. If an understanding of local governance and knowledge and the perception of national governance is desired at the household level, these items are recommended for inclusion in the community survey.

Regulations / Licencing	**yes/ no**	**with what level of governance?**	**is this required?**	**do you pay a fee?**	**cost (annualy) if fee paid**
are you licenced or registered for your aquaculture production?					
are you part of a cooperative association?					

IX.

X. References

Allison, E., Franz, N., Fuentavilla, C., Westlund, L. and Willmann, R. 2012. Greening Small-Scale Fisheries and Aquaculture. In: Green Economy in a Blue World. UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center and GRIDArendal Report. ISBN: 978-82-7701-104-2.

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

CWP 2002. CWP Handbook of Fishery Statistical Standards. Section J: AQUACULTURE. CWP Data Collection. In: *FAO Fisheries and Aquaculture Department* [online]. Rome. Updated 10 January 2002. [Cited 18 September 2014]

CWP 2013. Final Draft of CWP Handbook of Fishery Statistical Standards, Aquaculture Component. Coordinating Working Party on Fishery Statistics, Twenty-Fourth Session, Rome, Italy, 05-08 February 2013.

EC 2008. Survey sampling reference guidelines. Introduction to sample design and estimation techniques. Eurostat Methodologies and Working Papers. ISSN 1977-0375

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

FAO. 1994. *Report of the Fifteenth Session of the Asia and Pacific Commission on Agricultural* Statistics, 24-28 October 1994, Manila, Philippines. Regional Office for Asia and the Pacific (RAPA), Food and Agriculture Organization of the United Nations, Bangkok, Thailand.

FAO. 1995. Coordinating Working Party on Fishery Statistics (CWP). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 27 September 2010. [Cited 26 September 2014]. url: http://www.fao.org/fishery/cwp/en

FAO. 2001. Fisheries and Aquaculture topics. Fisheries development. Topics Fact Sheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 22 October 2001. [Cited 26 September 2014]

FAO. 2010. Report of the Twenty-Third Session of the Coordinated Working Party on Fishery Statistics. Hobart Austrialia, 22-26 February 2010. FAO Fisheries and Aquaculture Report No. 942. ISSN 2070-6987.

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

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

FAO. 2014a. The State of World Fisheries and Aquaculture. url: http://www.fao.org/fishery/sofia/en [Cited September 17, 2014]. Rome: FAO.

FAO. 2014b. Aquaculture topics and activities. Ecosystem Approach to Aquaculture (EAA). In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated . [Cited 26 September 2014]. http://www.fao.org/fishery/topic/16035/en

FAO. 2014c. World Programme for the Census of Agriculture. Economic and Social Development Department. [cited September 19, 2014]. url: http://www.fao.org/economic/ess/ess-wca/it/

FAO. 2014d. FAO'S Programme of Work in Fisheries and Aquaculture under the Reviewed Strategic Framework. Committee on Fisheries. Thirty-first Session. COFI/2014/8. Rome, 9-13 June 2014.

FAO 2014e. Decent Employment for Agricultural and Rural Development and Poverty Reduction. Food, Agriculture & Decent Work. ILO & FAO. [cited December 12, 2014]. url: http://www.fao-ilo.org/ilo-dec-employ/en/

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

Geospace International. 2007. Census Mapping and Methodology Using Remote Sensing and GIS Technology. Prepared for The Seychelles National Statistics Bureau in Cooperation with The National Statistics Bureau. November 2007. [Cited September 25, 2014]. url: http://siteresources.worldbank.org/SCBEXTERNAL/Resources/Seychelles_Census_Mapping_Methodology.pdf

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

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

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

Nandeesha M.C., Heng N. and Yun K. 1994. Role of women in small-scale aquaculture development in Southeastern Cambodia. *NAGA,* The ICLARM Newsletter, October 1994.

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.

Satia, B. 1989. *A Regional Survey of the Aquaculture Sector in Africa, South of the Sahara* ADCP/REP/89/36. United Nations Development Programme, Food and Agriculture Organization of the United Nations, Rome, Italy, 1989. 60 pp.

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, Bangkok, Thailand. 86 pp.

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. 3-5 December, 2003. ESA/STAT/AC.93/3.

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

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

UN. 2006. Conference of European Statisticians Recommendations for the 2010 Censuses of Population and Housing. Prepared in cooperation with the Statistical Office of the European Communities (EUROSTAT). New York and Geneva. ISSN 0069-8458

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

Van der Mheen-Sluijer J. and Sen S. 1994. Meeting on the information needs on gender issues in aquaculture. In: *Report of the Aquaculture for Local Community Development Programme*. Food and Agriculture Organization of the United Nations, Harare, Zimbabwe, December 1994. 36 pp.

Welcomme R. 1996. Definitions of aquaculture and intensification of production from fisheries. *FAO Aquaculture Newsletter, Number 12, April 1996*. Food and Agriculture Organization of the United Nations, Rome, Italy.

Welcomme R. 1997. World Inland Fisheries and Aquaculture - Changing Attitudes to Management. World Fisheries Congress (2nd: 1996: Brisbane, Qld, Australia.) *Developing and Sustaining World Fisheries Resources: the state of science and management: Second World Fisheries Congress Proceedings* (eds. Hancock D.A., Smith D.C., Grant A. and Beumer J.P.). CSIRO, Australia. pp 443-451.

World Bank. 2010. Global Strategy to Improve Agricultural and Rural Statistics. Economic and Sector Work. Report No. 56719-GLB. The World Bank. Washington.

XI. 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

(from FAO Fisheries Glossary)

(or *bycatch*) Part of a catch of a fishing unit taken incidentally in addition to the target species towards which 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): Guidelines for the routine collection of capture fishery data. FAO Fisheries Technical Paper No. 382. Rome, FAO. 113p. and Australian Government Publishing Service (1991): Ecologically Sustainable Development Working Groups Final Report – Fisheries, Canberra, 202 p.

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.

Source: Principles and Recommendations for Population and Housing Censuses, Revision 1, United Nations, New York, 1998, para. 2.82

CWP

Coordinating Working Party on Fishery Statistics was established in 1959 and operation since 1960 (FAO 1995). The mission is to provide a mechanism to coordinate fishery statistical programmes of regional fishery odies and other inter-governmental organization with a remit for fishery statistics (*ibid*.) The three main functions listed are

- continually review fishery statistics requirements for research, policy-making and management;
- agree on standard concepts, definitions, classifications and methodologies for the collection and collation of fishery statistics;

- 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 either recreational or commercial fisheries.

Full-Time Work

Part-time is always defined vis-a-vis full time but the latter is often undefined. The definition depends on statutory standards or practice 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 best set by each country.

GIS (Geographic Information Systems)

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 multiples surveys on different content or in subsequent rounds of a periodic survey. Can also be the sampling frame that provides the basis 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.

Source: International Labour Organization (ILO) Resolutions Concerning International Classification of Status in Employment Adopted by the 15th International Conference of Labour Statisticians, January 1993, para. 10.

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 set in accordance with country norms.

Remote Sensing

Imagery obtained with a sensor other than, or in addition to, a conventional camera with specific analysis technicques then being applied to process and interpret the imagery (Iglesias Martínez 2013)

Sampling Frame

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

WCA

A programme established in the 1950 to facilitate counties conducting national agricultural census.

"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)

XII. Appendix I Core Data Items from the Global Strategy

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

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 Module/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,	B02, C04

		core forestry, core fishery, core aquaculture	
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/	B02

		railways in km/ communications	
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

XIII. Appendix II Community-level data section from the WCA-2010

WCA-2010

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 module 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 module is done on a sample basis. In a typical sample-based core module, 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

XIV. Appendix III the Census Frame

Section 3.53 -3.63 of the 2010 WCA

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

XV. Appendix IV Aquaculture Modes of Production

Classifications and definitions are from the CWP Handbook of Fishery Statistical Standards

(CWP 2013. Final Draft of CWP Handbook of Fishery Statistical Standards, Aquaculture Component. Coordinating Working Party on Fishery Statistics, Twenty-Fourth Session, Rome, Italy, 05-08 February 2013.)

For the following material with photographs &/or diagrammatic examples please follow the link: Appendix IV Aquaculture Modes of Production

Ponds

Ponds are natural and/or artificial structures, on land, that are capable of retaining water for rearing of 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 number of ponds, water surface area and water volume.

Tanks

Tanks are artificial units of structure capable of holding and interchanging water which 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 important parameter to collect.

Pens

Pens refer to areas of a water body (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 and information on setting environments (whether in flowing water, still water, or marine water) may be important.

Cages

Cages refer to open or covered enclosed structured 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, and information on setting environments (whether in flowing water, still water, or marine water) may be important.

Raceways

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

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

Enclosures

Enclosures refer to natural water areas (e.g. natural bay), where 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 and 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 the regular basis, the stocked animals are confined in the stocked water bodies with management interventions; the products are harvested exclusively within the people with entitled ownership of the stocked material. Stocked material should compose the 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 and information on setting environments (whether in flowing water, still water, or marine water) may be important.

Irrigation systems (channels and ditches)

Irrigation channels and ditches refers to water bodies that are used for fish aquaculture but their primary function was for converting 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 culture 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 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.

Off-bottom systems

Off-bottom systems are structures like 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.

On-bottom systems

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

Hatcheries refer to installations for housing facilities for breeding, nursing and rearing seed of fish, invertebrates or aquatic plants to fry, fingerlings or juvenile stages.

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

XVI. Appendix V Fisheries Gear Types

The classifications are from the CWP Handbook (*CWP 2013. Final Draft of CWP Handbook of Fishery Statistical Standards, Aquaculture Component. Coordinating Working Party on Fishery Statistics, Twenty-Fourth Session, Rome, Italy, 05-08 February 2013*.)

Definitions are taken from the publication on *Definition and classification of fishing gear categories (C. Nédélec and J. Prado 1990. Definition and classification of fishing gear categories. FAO Fisheries Technical Paper 222 Revision. Food and Agriculture Organization of the United Nations, Rome, Italy.)*

For the following material with photographs &/or diagrammatic examples please follow the link: Appendix VI Fisheries Gear Types

Surrounding nets

Sub categories include; purse seines, surrounding nets without purse lines, 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 floatline is supported by numerous floats.

Seine nets

Sub categories include; beach seine, boat seine, 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.

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, trawls

These are towed nets consisting of a cone-shaped body, closed by a bag or codend and extended at the opening by winds. 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).

Dredges

Sub categories include; towed dredges, hand dredges, mechanized dredges, 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.

Lift nets

Sub categories include; portable lift nets, boat-operated lift nets, shore-operated stationary lift nets, 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 parallelpiped, 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 which are above the net when hauling commenced are retained in it.

Falling gear

Sub categories include; cast nets, cover pots/ lantern nets, 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.

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, trammelnet combined with gillnet). These nets can be used either along or, as is more usual, in large numbers placed in line (‘fleets’ of nets). According to their design, ballasting and buoyance, these nets may be used to fish on the surface, in midwater or on the

Traps

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

These are usually large nets, anchored or fixed on stakes, open at the surface and provided with various types of fish herding and retaining devise. 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 referred to above).

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 a natural or artificial bait (lures) placed on a hook fixed to the end of a line or snood, on which they get caught. Hooks or metallic points (jigs) are also used to catch fish by ripping them when the pass near. This is in particular the case with the jigging lines for squids which are provided with artificial lures with multiple hooks. The line is given a jerky up-and-down movement which attracts and squid to the jig on which it is caught. Hook-and-line units may be used singly or in large numbers.

Miscellaneous gears

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

This heading covers a great variety of other fishing gear and methods, not specified elsewhere or 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 the gathering by hand and this category may include items gathered from a beach or shoreline or in the water such as shellfish or sea cucumbers, for example. This activity may be more likely to be conducted by women and may not readily be considered as a mainstream fishing activity, but it is important to query household members for engagement in this type of activity. This provides an example of the importance of questions around gear type, not only for providing structural statistics, but also for prompting respondents on their activities.

XVII. Appendix VI Categories of Fish, Shellfish, etc for Consideration in Reporting

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

For the following material with photographs &/or diagrammatic examples please follow the link: Appendix VI Categories of Fish, Shellfish, etc.

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

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

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	

Crustaceans

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	

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

Whales, seals and other aquatic mammals

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

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	

Miscellaneous aquatic animal products

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

Aquatic plants

Capture	***Aquaculture***
Green seaweeds	Green seaweeds
Brown seaweeds	Brown seaweeds
Miscellaneous aquatic plants	Miscellaneous aquatic plants
Red seaweeds	Red seaweeds

XVIII.Appendix VII Examples of processing

For the following material with photographs &/or diagrammatic examples please follow the link: Appendix VII Examples of processing

Smoking

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

Smoking fish (Photo: ©FAO/T. Fenyes)

Smoking fish (Photo: ©FAO/I. Balderi)

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)

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)