

# Guidelines on the collection of structural aquaculture statistics

Supplement  
to the Programme for the  
World Census of Agriculture 2000



Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

# Guidelines on the collection of structural aquaculture statistics

Supplement  
to the Programme for the  
World Census of Agriculture 2000

**K.J. Rana**

Fishery Information, Data and Statistics Unit  
FAO Fisheries Department

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-78  
ISBN 92-5-104054-0

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Information Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1997

## FOREWORD

The FAO has promoted the national Census of Agriculture since the 1950s. The next Programme for the World Census of Agriculture 2000 (WCA 2000) proposes only very few questions for non-agricultural activities, particularly for aquaculture. Given the increasing importance of aquaculture, particularly in Asia and the close link between aquaculture and agriculture, FAO is promoting the collection of structural and other data on the aquaculture sector as part of WCA 2000 Programme. The guidelines for aquaculture are provided in this Supplement.

The Supplement on Aquaculture is intended to assisted countries to improve their current surveys of aquaculture and to provide a framework for those countries intending to develop databases on aquaculture information. The supplement provides definitions, concepts, standards and guidelines for collecting internationally comparable data on aspects such as location and size of the farms, types of aquacultural activity, employment structure, resource use and other aquacultural inputs. Although the relevant sections of the main WCA 2000 Programme are annexed in this Supplement, the Supplement should be read in conjunction with the main programme.

L. Kabat  
Director, ESS

D. Ardill  
Chief, FIDI

## PREPARATION OF THIS DOCUMENT

This Supplement provides guidelines for countries which would like to expand the scope and coverage of their Census of Agriculture to include the collection of structural information on aquaculture. The Supplement was prepared by Dr K. J. Rana of FAO's Fishery Information, Data and Statistics Unit (FIDI) in collaboration with FAO's Statistics Division (ESSS) from working documents prepared by *Ms Virgilia T. Sulit*, SEAFDEC Aquaculture Department, Iloilo, Philippines.

Earlier drafts of this document were discussed with regional aquacultural and agricultural experts and at international meetings. FAO is grateful to all who have participated in producing this Supplement. Valuable advice and comments on the final draft were received from Mr David Ardill, Mr Odell Larson, Mr Jean Viseur, Dr Richard Grainger, Ms Virgilia Sulit, Dr Matthias Halwart and Mr Anton Immink.

This is the first version of this Supplement. FAO invites comments and suggestions in order to improve the second version.

Rana, K. J.

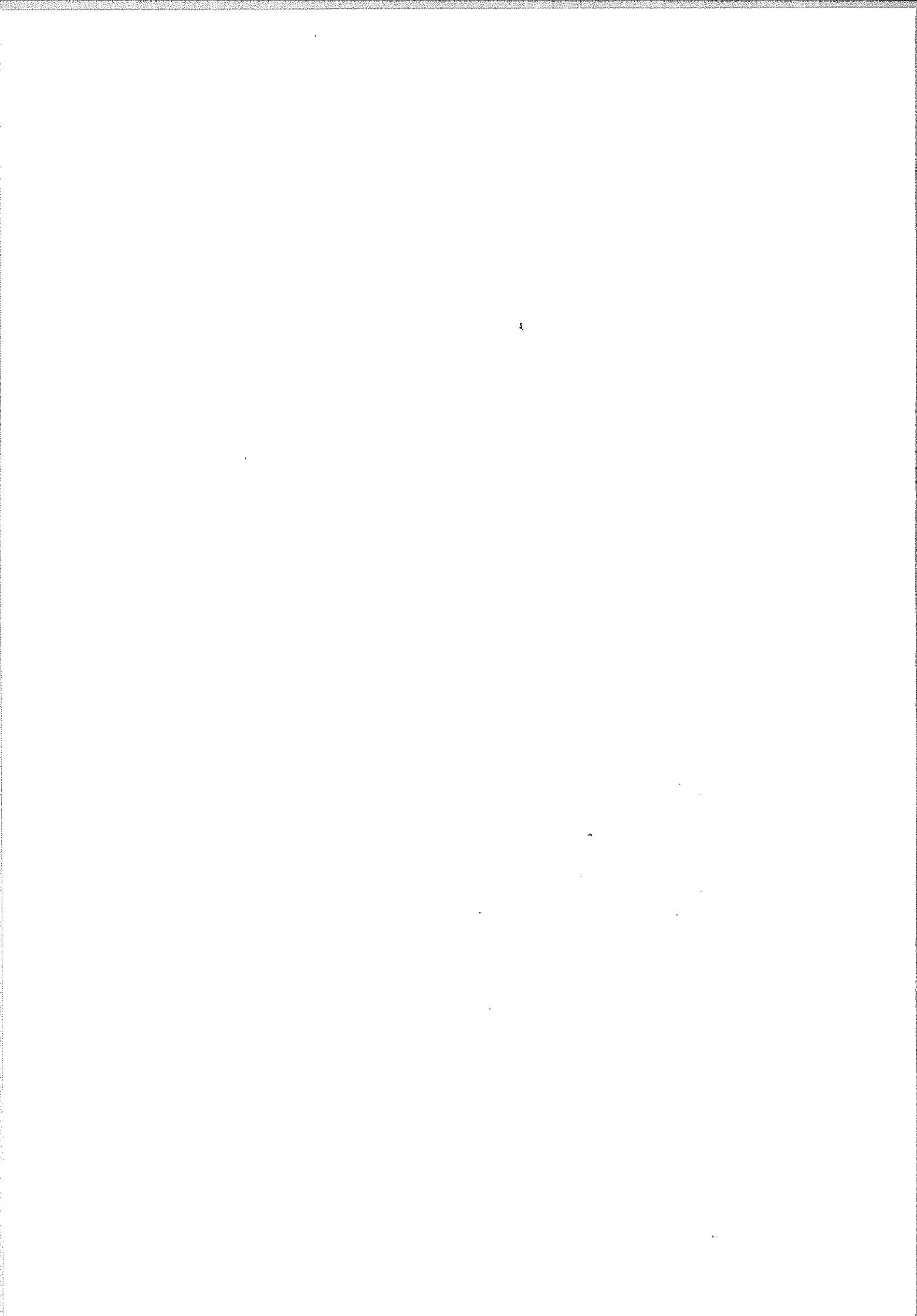
Guidelines on the collection of structural aquaculture statistics. Supplement to the Programme for the World Census of Agriculture 2000.

*FAO Statistical Development Series*. No. 5b. Rome, FAO. 1997.

56p.

### ABSTRACT

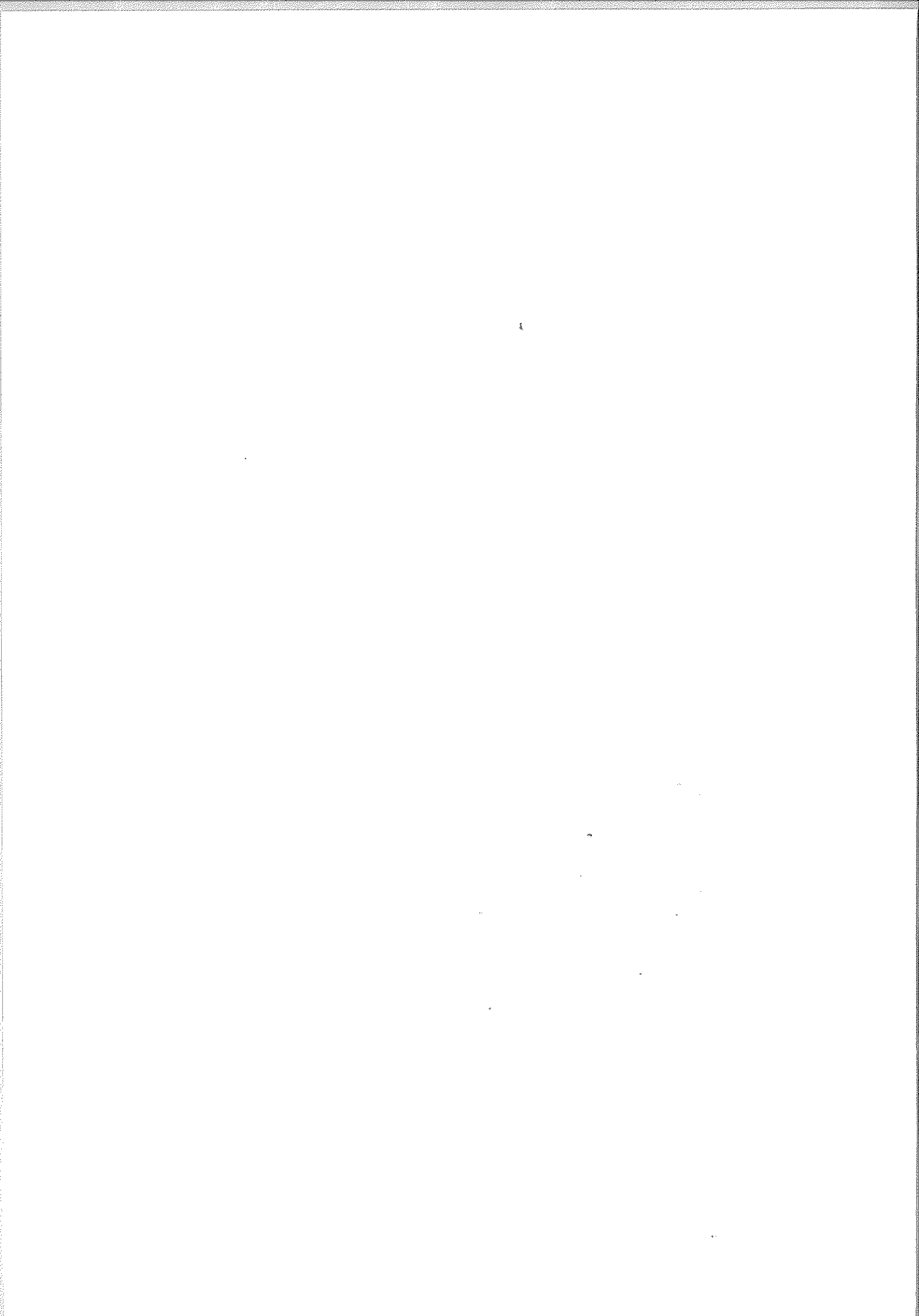
The Census of Agriculture is a large scale national statistical operation for collecting quantitative information on the structure of the countries food production sector. The new Programme for the World Census of Agriculture 2000 (WCA 2000 Programme) recommends extending the scope of the programme to include aquaculture. This Supplement on aquaculture is intended to assist countries to improve their current surveys of aquaculture and to provide a framework for those countries intending to develop databases on aquaculture information. Its four chapters provide background information on the need for the Supplement and definitions, concepts, standards and guidelines for collecting internationally comparable data on aspects such as location and size of the farms, types of aquacultural activity, employment structure, resource use and other aquacultural inputs. The items proposed for collection address issues related to natural resource utilization and sustainable aquaculture developmental issues. The Supplement also provides examples of summary tables which could be used to develop a questionnaire. Also included are relevant notes from the main WCA 2000 Programme and the species classification list for farmed aquatic species used by FAO.



## CONTENTS

	Page
<b>CHAPTER 1 INTRODUCTION</b>	
<b>The Need for Guidelines on Collecting Quantitative Structural Data on Aquaculture</b>	1
1.1 Background	1
1.2 Types of aquaculture activity under consideration for the Supplement on Aquaculture	2
1.3 Objectives	3
<b>CHAPTER 2 INTRODUCTION OF BASIC CONCEPTS AND METHODOLOGY</b>	
<b>Identification of Aquacultural Activity and Scope</b>	5
2.1 Identification of agricultural holdings conducting aquaculture activities	5
2.2 Definition of aquaculture	5
2.3 Definition of culture environment	6
2.4 Census scope	7
2.5 Training	7
2.6 Census frame	7
2.7 Role of women and children	8
<b>CHAPTER 3 PROPOSED CENSUS ITEMS FOR HOLDINGS CONDUCTING AQUACULTURE</b>	9
3.1 Introduction	9
Category 01 (Identification of aquacultural operation)	9
Category 02 (Employment)	10
Category 03 (Land and water use)	11
Category 04 (Purpose of aquaculture production)	14
Category 05 (Production facilities used in aquaculture)	14
Category 06 (Aquaculture species and nutrition)	25
Category 07 (Machinery and equipment)	26
Category 08 (Buildings and structures)	28
<b>CHAPTER 4 TABULATIONS</b>	29
<b>REFERENCES</b>	37
<b>APPENDIX 1</b> Relevant extracts from the main WCA 2000 Programme	38
<b>APPENDIX 2</b> Classification proposed for various aquaculture and capture fisheries practices	44
<b>APPENDIX 3</b> List of scientific and trilingual names of cultured aquatic species	45





## CHAPTER 1

### INTRODUCTION

#### The Need for Guidelines on Collecting Quantitative Structural Data on Aquaculture

#### 1.1 Background

- 1.1.1 FAO has been promoting decennial world census of agriculture since 1950, after assuming the responsibilities of the former International Institute of Agriculture which co-ordinated the programme in 1930 and 1940. The Programme for the World Census of Agriculture 2000 (WCA) is the eighth decennial programme and will cover the period from 1996 until 2005.
- 1.1.2 The agricultural census focuses on the collection of structural information on traditional agricultural activities. As with its predecessors, the Programme for WCA 2000 proposes only a few questions limited to the presence or absence of non-agricultural activities. For aquaculture, only three items are proposed. The need for structural information on aquaculture, however, is acute and has been addressed by the various regional statutory bodies of FAO (FAO, 1994) and other organisations (SEAFDEC 1994).
- 1.1.3 Aquaculture is one of the fastest growing food producing sectors, growing at an average annual rate of about 10% since 1984. In 1995, a record 27.7 million tonnes of finfish, shellfish and aquatic plants originated from aquaculture, accounting for around one-quarter of the fish produced for consumption. The result of increased competition of aquaculture with traditional farming for land and aquatic resources and energy in the way of feeds and fertilisers has focused the attention of governments in many countries on the need to collect reliable quantitative data on the structure, performance and outputs of the aquaculture sector.

One consequence of the rapid rate of development of this relatively new sector is that much aquaculture activity is inadequately recorded because most countries have been unable to establish the necessary institutions and tools for monitoring the structure of the aquaculture sector and, at best, present efforts are limited to sample surveys for the collection of production data.

- 1.1.4 In acknowledging the similarities between agriculture and aquaculture, such as farm management practices, the widespread agricultural practice of integrating rice, livestock and poultry with the culture of aquatic organisms and use in common of both renewable and non-renewable resources, the Fifteenth Session of the Asia and Pacific Commission on Agricultural Statistics (APCAS) recommended that FAO give consideration to including aquaculture in the Agricultural Census Programme (FAO, 1994). The inclusion of aquaculture by countries in the agricultural census will also provide structural information on small scale aquaculture producers who may not be on any national aquaculture listings or may otherwise not be accessible through conventional surveys.

- 1.1.5 In recognising the need of member countries, particularly in Asia, to collect quantitative structural and other information on the aquaculture sector for policy formulation, development, planning and resource management purposes, FAO advocates extending the scope and coverage of the agricultural census to include aquaculture.

Even though most countries may wish to monitor all of the aquaculture sector or to conduct an independent census on aquaculture, this may not at present be feasible due to financial and human resource and institutional constraints. In considering the need to collect structural information on aquaculture, countries should recall the evolutionary development of the agricultural census programme since its conception in 1930. The inclusion of aquaculture within the WCA 2000 Programme may be the first step towards monitoring this emerging food production sector. In assessing the coverage of their agricultural census, countries should take into consideration the economic significance of aquaculture to the country as a whole, its importance in resource utilization and in rural and socio-economic development.

It is recommended that the questions added on aquaculture should strengthen national objectives of monitoring food security. If the aquaculture component of the questionnaire is likely to unduly burden the agricultural census, appropriate resources should be made available to ensure that the enumeration process is not compromised. In some countries structural information on aquaculture may be obtained through other mechanisms such as the live-stock or fisheries census.

## 1.2 Types of aquaculture activity under consideration for the Supplement on Aquaculture

- 1.2.1 An **agricultural holding** is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production. The holdings may consist of geographically separate land parcels. The need to share the **same** production means (i.e. labour, farm-buildings, machinery or draught animals) is a prerequisite for the parcels to be considered as one economic unit or one agricultural holding. (Appendix 1a)
- 1.2.2 Given the geographical coverage of the agricultural census, FAO recommends that countries should attempt to record **at a minimum** a listing of those agricultural holdings that also engage in aquacultural activities using the same production means. Some countries may wish to broaden the scope and/or coverage to collect quantitative structural information on aquacultural activities beyond those conducted on an agricultural holding, for example in households having more than one type of holding, each using different production means. To accommodate this expansion in coverage and given that the household rather than the holding may be used as a entry point for the national census (Appendix 1b), these guidelines identify two types of aquacultural activity: aquaculture within and part of, and aquaculture outside or separate from the agriculture holding

The enumerators must be aware that it is possible for a household to have more than one agricultural holding (Appendix 1a) or more than one type of holding, since the

key factor distinguishing the number of holdings is the economic unit of production which shares the same means of production. Therefore, enumerators must inquire if more than one type of holding exists in the household to ensure that appropriate questions be directed to the respondents.

#### i) Agri-aqua holding

An **agri-aqua holding** is defined as an agricultural holding engaged in traditional agriculture as well as aquaculture or aquafarming. On this type of **economic unit**, the aquafarming activity may be physically conducted alongside traditional farming and integrated with agriculture such as fish combined with rice, aquatic plants, livestock. The specific terms used to describe the various combinations are given later.

Aquaculture may also be practised as an activity on a separate site **belonging** to the **same** economic unit. Typically, this may be another land parcel of the holding which utilizes the same labour, buildings, machinery and draught animals. Typical examples would include pond culture of aquatic organisms.

Agri-aqua holding may also include those economic units which extend their activities to culturing aquatic organisms in natural and artificial water bodies such as seas, lakes, reservoirs, estuaries lagoons or rivers. If, however, the means of production are not the same, it should not be considered as an agri-aqua holding and treated as an aquaculture holding.

#### ii) Aquaculture holding

An **aquaculture holding** is defined as an economic unit which is predominately or solely engaged in aquafarming. For an economic unit to be considered an aquaculture holding, the means of production must be the same. Enumerators should be made aware that such holdings could also be "landless", for example, houseboats in which cages are suspended below the floor boards may be an integral part of the of the dwelling and aquafarming on water bodies such as the sea, estuaries, lagoons, lakes, reservoirs, rivers etc.

### 1.3 Objectives

This supplement on aquaculture aims to provide guidelines for the collection of quantitative structural information on aquaculture for those countries intending to widen their census of agriculture to include aquaculture or even conduct a separate aquaculture census. It extends harmonised definitions and methodologies for the conduct of aquaculture surveys. The implementation of these guidelines will ensure global comparability of definitions and results. Specifically, the objectives of the Supplement on Aquaculture are to provide guidelines for:

- i. establishing the basis to categorise aquaculture activities such as culture systems, species cultured, yield, production, etc., and various inputs used such as type and quantity of fertilisers, pesticides, seed, labour, source of water, etc.

- ii. establishing an inventory of aquaculture data such as numbers of holdings practising aquaculture, facilities, labour, economics, etc. which can be used as sampling frames for aquaculture statistical sample surveys.

## CHAPTER 2

### INTRODUCTION OF BASIC CONCEPTS AND METHODOLOGY

#### Identification of Aquacultural Activity and Scope

The basic objective of the agricultural census and description of general problems likely to be encountered during the design of a census and implementation are stated in the Programme for the World Census of Agriculture 2000. This Chapter presents those broad elements which are considered specific to aquaculture, such as the definition of aquaculture, culture environments, census scope, etc.

#### 2.1 Identification of agricultural holdings conducting aquaculture activities

2.1.1 The collection of structural information on aquaculture within the WCA 2000 Programme requires a clear and unambiguous definition of aquaculture and of aquacultural activities to enable the enumerator to identify an agriculture holding as an agri-aqua holding. The definition of aquaculture and its culture environment will be covered in this introductory Chapter and the description expanded in Chapter 3.

#### 2.2 Definition of aquaculture

2.2.1 Historically, the growing of aquatic organisms has evolved from capture fisheries or fishing in oceans, coastal or inland waters. In recent years, however, culture practices have changed rapidly and the distinction between capture fisheries and aquaculture has become blurred, making the necessity for a clear working definition of aquaculture more critical.

2.2.2 Unfortunately, unlike many other economic activities, aquaculture is not currently recognised or defined under the International Standard Industrial Classification of all Economic Activities (ISIC) as a separate economic activity. Instead, elements of aquaculture are categorised under "Fishing" (UN, 1990: division 05, 005) which covers "fishing, operations of fish hatcheries and farming and service activities incidental to fishing". Moreover, this category specifically excludes some activities such as frog culture and is clearly unsuitable for defining aquaculture practices. In the absence of clear guidance from ISIC, FAO has formulated its own working definition of aquaculture for statistical purposes which itself is undergoing modification to accommodate recent changes in the culture practices within the sector.

In addition to being able to separate aquaculture from agriculture, aquaculture needs to be appropriately defined in order to separate capture fisheries from aquaculture activities, both of which are within the coverage of the WCA 2000 Programme and may be practised on an agri-aquaculture holding.

2.2.3 There have been various definitions of aquaculture depending on where it is applied, causing confusion and difficulty in the classification of fisheries data. The current FAO definition states "...Farming implies *some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from*

*predators, etc. ...Farming also implies some sort of individual or corporate ownership of the stock being cultivated.....”.*

This definition, however has resulted in the inclusion of production from some capture fisheries as aquaculture (New & Crispoldi-Hotta, 1992). In recent years it has been increasingly recognized that, for capture fisheries, the exploitable stock biomass and, consequently, catches, can be greatly increased through varying forms of intervention such as stocking fingerlings, fertilisation, environmental engineering, etc. (see Welcomme, 1996 for review). Therefore, under the current FAO definition of aquaculture, capture fisheries and in some situations recreational fisheries can, with only minimal inputs into the rearing process be considered as aquaculture (Welcomme, 1996). The above practices have lead to an ever-increasing confusion in the distinction between capture fisheries and aquaculture. To accommodate these changes FAO is continuing to refine and standardise the definition of aquaculture, not only for statistical purposes but also for general application. Recent changes proposed for the definition to limit aquaculture to “rearing for most of the lifecycle” (Welcomme, 1997) is also unsatisfactory as it excludes aquatic seed production as an aquacultural activity.

2.2.4 For the WCA 2000 Programme, the following working definition of Aquaculture could be utilised:

*“Aquaculture is the farming of aquatic organisms including crocodiles, alligators , turtles amphibians, finfish, molluscs, crustaceans and plants where farming refers to their rearing up to their juvenile and/or adult phase under captive conditions . Aquaculture also encompasses individual, corporate or state ownership of the organism being reared and harvested in contrast to capture fisheries in which aquatic organisms are exploited as a common property source, irrespective of whether harvest is undertaken with or without exploitation rights.”*

The above definition encompasses three components:

- the cultured organism,
- the practice, and
- ownership of cultured organism

All three components must be fulfilled for an activity to be classified as aquaculture.

To improve categorisation between aquaculture and capture fisheries, the designation of various fishery activities is given in Appendix 2. Since the description and interpretation of these facilities is crucial to correct classification, they must be included in training or briefing programmes that are designed and implemented for enumerators and statisticians.

## 2.3 Definition of culture environment

2.3.1 Aquatic organisms may be cultured in three different environments, namely fresh, brackish and marine or sea water. As such information will be invaluable in establishing resource utilization, FAO recommends that the culture environment be considered within the scope of the census.

### *Definitions of the environments*

- **Freshwater** - water bodies such as reservoirs, rivers, lakes, canals and groundwater, in which the salinity does not normally exceed 0.5 ‰
- **Brackish water** - water bodies such as estuaries, coves, bays, lagoons and fjords, in which salinity may lie or generally fluctuate between 0.5 ‰ and full strength seawater.
- **Seawater** - water bodies such as fjords, inshore and open waters and inland seas in which the salinity generally exceeds 20 ‰

## 2.4 Census scope

These guidelines for the collection of structural information on aquaculture refer to the two types of aquacultural activity: an agri-aqua holding on a agricultural holding and an aquaculture holding. It is stressed that a relevant list of 10-20 items can be chosen within the scope of the census supplement given below, depending on national resources and priorities. Countries may choose a different combination of items, therefore a large pool is presented to facilitate the adoption of harmonised definitions and terminology for international comparability. These items are considered in Chapter 3 of this Supplement.

## 2.5 Training

Adding even a minimum number of questions on aquaculture, as recommended in the Programme of the WCA 2000, will require due consideration in the training of statisticians and enumerators with respect of definitions, etc. Such training may require the revision of instruction manuals and modifying training courses on the census. Countries should consider the possibility that the domain of aquaculture may be relatively new to enumerators more accustomed to dealing with agricultural topics. It is therefore recommended that countries including aquaculture in the agricultural census programme consider involving their national experts on aquaculture and fisheries statistics in the planning and execution phases of the agricultural census.

## 2.6 Census frame

Ideally, the frame should cover all relevant agri-aqua and aquaculture holdings across the country. If the agricultural census places priority on setting up frames or areas for complete enumeration, the added part on aquaculture should also be frame-oriented. If this is limited to a sample survey, the aquaculture component should also be limited to a sample survey. The development and or updating of such frames can then be used for future aquacultural surveys.

Listings or registers of holdings or farm registers which are well established in some countries should be considered in establishing the frame. In addition, fisheries co-operatives in Asian countries such as India, China, Indonesia, Nepal, Pakistan, Philippines and Thailand could be used to supplement sampling frames. Examples of



other frames such as maps, satellite imagery and aerial photographs stated in the Programme for the WCA 2000 are given in (Appendix 1c ).

## 2.7 Role of women and children

The participation of women in aquaculture activities is not always accurately reported. It is important to note that women may contribute more labour time to aquaculture than men. 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).

To collect credible data on the women labour force, Van der Mheen-Sluijer and Sen (1994) recommended that new calculations should be adopted for female and child labour, giving full units to these labour forces as equivalent to "man-units." The present calculation gives a woman only two-thirds of a man-equivalent unit and a child, only one-third (Van der Mheen-Sluijer and Sen, 1994). The result is an underestimation of work done by women and children to only a fraction of the "man-unit" even if they work full time.

An example of this is the women in Cambodia who contribute more time than men in almost all activities in small-scale aquaculture (Nandeesha et. al., 1994). The wives manage most routine daily operations while the men are busy with work outside of the holding. In Africa, women are involved directly as owners or operators of fishponds (Satia, 1989).

FAO strives to treat women equitably in fishery statistics. Thus, for this census, the role of women in aquaculture should be given special attention in order to collect accurate information on the number of female-headed households.

## CHAPTER 3

PROPOSED CENSUS ITEMS FOR HOLDINGS CONDUCTING  
AQUACULTURE

## 3.1 Introduction

This chapter contains the proposed census items, the information to be collected and their definitions and explanatory remarks. Census items refer to specific information on certain characteristics of a holding having an aquaculture activity, irrespective of whether aquaculture is conducted with or independent of traditional farming activities. The items are arranged in eight categories and those recommended as essential are marked with an asterisk (\*).

<u>Category</u>	<u>Title</u>
01	Identification of an Aquacultural Operation
02	Employment
03	Land and Water Use
04	Purpose of Production
05	Aquaculture Production Facilities
06	Aquaculture Species and Nutrition
07	Machinery and Equipment
08	Buildings and Structure

The following are definitions and explanatory notes referring to the above categories.

Category 01 (**Identification of aquacultural operation**)

This category identifies reference points of aquacultural interest in the census within an economic management unit. The existence of aquacultural activity within the economic management unit should be determined first. In this regard **two** types of aquacultural operations have been identified (i) **agri-aqua holdings** and (ii) **aquaculture holdings**. For the purposes of the WCA 2000 Programme these have been defined under 1.3 in Chapter 1 of this Supplement. The type of holding should not be confused with the type of aquaculture practice. Aquafarming in which aquatic organisms are cultured with terrestrial animals or plants is an example of a type of aquaculture practice.

Additional points, references and their definitions as indicated in the Programme for WCA 2000 ( see Appendix 1a of this Supplement) should be considered in the identification of the holding under consideration: these include the holding address, the holder, the legal status of the holder and the concept of hired manager.

In cases where the location of an aquacultural activity is different to that of agriculture, the location should be described in accordance with the most common practice in each country.

## Category 02 (Employment)

This category describes, the holder, the holder's household members and external workers and labourers engaged in aquacultural activities. The emphasis is placed on the type and number of labour inputs.

The proposed items under Category 02 are as follows:

- 021     Household<sup>\*</sup>
  - Number of householders engaged in aquaculture activities
  
- 022     Household Members Engaged in Aquaculture<sup>\*</sup>
  - Name
  - Age
  - Gender
  - Education
  
- 023     Aquaculture Workers and Labourers other than Members of Holder's Household<sup>\*</sup>
  - Whether permanent workers/labourers employed during the year
  - Whether occasional workers/ labourers employed during the year
  - Number of permanent workers/ labourers - male (skilled or not)
  - Number or permanent workers/ labourers - female (skilled or not)

The time reference for these items is a culture year or season, as the case may be. A long reference period may be necessary as work on a holding may be depend on the cultural cycle, with uneven demands within the season, particularly during harvesting.

The description of the household, head of household, age, sex, education and marital status of the household members should conform to that stated in the main WCA 2000 Programme.

Non-household members employed in aquaculture activities should be classified according to the International Standard Classification of Occupations (ILO, 1990). Under this structure, workers engaged in aquaculture are classified under the group of Skilled Agricultural and Fishery Workers (Major Group 6, Unit Group 6151 ) and labourers under Fishery, Hunting and Trapping Labourers (Major Group 9, unit group 9213). The full ISCO major occupation structure is given in Appendix 1d.

Employees should be classified as skilled workers if they have at least secondary level of education and their tasks require knowledge and experience necessary for rearing aquatic organisms. Such tasks could include breeding and rearing, culling and processing and marketing of cultured organisms, construction and maintenance of building, equipment and rearing facilities. Examples of occupations include farmers for aquatic plants, pearls, finfish, invertebrates such as crabs, oysters, mussels, scallops etc.

Employees, who generally have only a primary level of education, should be classified as labourers if their tasks relate mainly to simple routine farm operations requiring simple, often hand-held, equipment but very often requiring considerable physical effort. Tasks could include feeding, loading, application of fertilisers, general cleaning and maintenance of equipment and installations, digging and pond preparation. Supervision of other employers may be included.

Permanent employees are those whose services are utilised regularly and continuously for aquaculture work on the holding. The total number of days worked in an aquaculture activity distinguishes a permanent from an occasional worker. A permanent worker may actually work less than six months during the aquaculture year. Countries should determine the minimum number of working days or months in accordance with their particular agricultural, aquacultural and other relevant conditions. Permanent aquaculture workers on the holding may engage in other work, especially during periods when no significant aquaculture work is undertaken. An occasional worker is a person working one or more times during the year and is not expected to work regularly or continuously on the holding.

### Category 03 (Land and water use)

This component covers the basic indicators relating to the land and water resources on the holding that are or can be used for aquacultural 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 aquaculture could be practised or expanded.

The proposed items under this category are:

- 031     For Entire Holding <sup>\*</sup>  
           Total area (ha)
- 032     Type of aquaculture site <sup>\*</sup>  
           Land-based e.g. ponds, tanks, raceways  
           Inland open water e.g. pens, cages, and hapas in dams, reservoirs, lakes  
           and rivers  
           Coastal and sea-based e.g. cages, pens, rafts, ropes, stakes and bags in  
           lagoons, estuaries, shallow and open seas, bays, coves etc.

For each type, the site address should be given if different from the holding address.

- 033     Tenure  
           - Land area owned or held in owner-like possession  
           - Land area rented from others (total)  
           - Duration of lease/licence for seabed, reservoir etc.  
           - Other

For each area used for aquaculture

- 034    Total land area (ha) used \*
- 0341    Total area of land designated for hatcheries, ponds, tanks, raceways \*
- 0342    Type and source of land \*
- Area of arable lands
- Area of non-arable lands e.g, saline-alkaline lands, wetlands
- 035    Total open water area (ha) used \*
- 0341    Area of water or seabed (including inter-tidal mudflats) surface designated for cage and pen sites, shell fish culture \*
- 036    Type and source of water \*
- 0361    Type of water
- Freshwater
- Brackish water
- Sea water
- 0362    Source of water \*
- Rainfed
- Ground water
- River
- Lake
- Reservoir
- Dam
- Canal
- Lagoon/estuary
- Bay/cove
- Sea
- 0363    Principal use of water supply
- multiple use (yes/no)

The following is a descriptions of the various types of land and waters uses.

Gross Land and water area (ha) used for aquaculture

This category seeks to establish the **Gross total** land and open water surface area in **hectares** of the holding used for aquaculture. The location of land for aquatic production may form part of the same parcel of land used for traditional agriculture practices or may be physically independent. In view of possible multiple use of land, care should be exercised to ensure land is not double counted when the overall size of the holding is estimated. 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. 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 practise should be recorded. It should be remembered that, in such practices, land may be allocated for related land-based activities such as hatcheries, storage of feed and equipment, offices, laboratories, fish processing etc. and these must be included in the total land area used for aquaculture.

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 recognised as land allocated to aquaculture. However, care should be taken to ensure that these lands are not double counted when the total holding area is estimated and that rice paddies used for growing fish which originate from flooding paddies are excluded from the aquaculture holding area total.

In addition to the total area, the previous use of the land allocated for aquaculture should be described. This could include, for example, land of the holding which was used for agriculture or unproductive land developed for aquaculture due to poor soil quality e.g. saline-alkaline soils, poor drainage or land with a high water table i.e. swamps and marshes.

Soil degradation usually occurs when one or more of its potential ecological functions is harmed, and this reduces the current and/or future capacity of the resource to produce. Amongst other reasons, this may occur from the use of saline waters for irrigation. In these cases, only saline-alkaline lands are recommended for consideration for aquaculture. The use of saline groundwater for agriculture may gradually increase the salinity of the soil and such water may also be unsuitable for the farming of some freshwater species, but suitable for brackish water species such as milkfish, mullets etc.

#### Net land or water area (ha) used for aquaculture

In contrast with the above, this section addresses the **actual** or **net** area of land under water i.e. pond surface area, or in the case of seas, lagoons, bays, estuaries, coves, reservoirs, drainage and irrigation canals and lakes, the **net** total water surface area used for aquaculture. The net water area estimate should include supporting structures such as pond banks, floating structures of cages etc. Both the total land and water areas should be reported in hectares.

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 aquaculture, but may be used for aquaculture. They should in that case be included in the total water area used for aquaculture.

In some instances, coastal lands may be used for salt production. Such salt pans simultaneously used for the production of *Artemia*, a high value larval feed, should be recorded.

Water bodies used for aquaculture may also be polluted by effluents from nearby industries and agro-industrial processes. Such contamination is likely to reduce the productivity of aquaculture and should be noted.

#### Category 04 (Purpose of aquaculture production)

- 041 Purpose of Aquaculture Production in a Holding \*
- mainly for household consumption
  - mainly for sale
  - Seed and fingerling production
  - Ongrowing
  - Recreation (game fishing)
  - Ornamental purposes (aquarium fishes and plants)
  - Live feed for aquaculture
  - Industrial purposes (e.g. gelatine)

("Mainly" indicates more than half the production of aquatic organisms from the holding.)

#### Category 05 (Production facilities used in aquaculture)

For the Supplement, production is taken to mean primary output of the reared aquatic organisms which can include any life stage from stocking material to end-product for consumption and/or processing.

This section covers the structural detail and types of culture facilities used for aquaculture production and can include intermediate products such as duck weed *Artemia* and *Moina*, which are used as live feeds in aquaculture, as well aquatic animals and plants produced for human consumption or ornamental purposes. Some farmers' sole contribution to aquaculture may be the production of live animal feeds such as *Moina* (e.g. pig farmers). Aquaculture production facilities should include all those used for producing the fry or seed, the intermediate phases of rearing the fry to juveniles, fattening the juveniles to marketable size and any processing, or packaging and distribution of the final produce for market or consumption.

The proposed items in this category shall include:

#### Seed and juvenile production of aquatic animals and plants

- 051 Fish Hatcheries and Nursery areas \*
- indoor or outdoor \*
  - total area of rearing units (m<sup>2</sup>) \*
  - type of building construction
  - types of rearing units \*
    - tanks (total area in m<sup>2</sup> and depth in m)
    - raceways (total area in m<sup>2</sup> and depth in m)
    - pens, cages and hapas (total area in m<sup>2</sup> and depth in m)
    - net fenced coves (total area in hectares and depth in m)
    - ponds (total area in hectares and depth in m)
  - capacity (number of seed)

## Ongrowing facilities for aquatic animals and plants

- 052 Rice Paddies used for rearing aquatic organisms (rice-cum-fish culture): \*  
 - number of fields/land parcels  
 - total area (ha) \*
- 053 Ponds  
 Total area (ha) and number \*  
 Average depth (m)  
 - Constructed in:  
     wetland areas e.g. swamps and marshes,  
     arable lands  
     non-arable land  
 - As mining/quarry pools \*
- 054 Pens \*  
 - Number of pens \*  
 - Total area (ha) \*  
 - Constructed in:  
     flowing water (i.e., rivers, canals)  
     still water (i.e. reservoirs, lakes)
- 055 Cages and hapas \*  
 - Number of units \*  
 - Total area (m<sup>2</sup>) of enclosures \*  
 - Average water depth (m)  
 - Constructed in  
     flowing freshwater (i.e., rivers, canals)-  
     still freshwater (i.e., reservoirs, lakes,)  
     brackish water (i.e., lagoons, estuaries, bays) or  
     marine water (i.e., bays, coves and seas)
- 056 Floating rafts, lines, ropes, bags and stakes \*  
 - Number of units  
 - Total area in m<sup>2</sup> \*  
 - Water depth in (m) for:  
     seaweed culture  
     shellfish culture
- 057 Tanks and Raceways \*  
 - Number  
 - Area (m<sup>2</sup>) \*



The following are definitions and explanatory terms of facilities and culture practices.

The above features are expanded here to help enumerators identify the existence of aquacultural activities on the holding. Therefore, in addition to defining the above features, photographs of typical aquaculture facilities and equipment used are also included in this section.

## **Seed and juvenile production of aquatic animals and plants**

### Seed and juvenile

The enumerators should be made aware that different local names may be used to describe the same life stages of aquatic organisms.

In aquaculture, "seed" is taken to mean eggs, spawn, offspring, progeny or brood of the aquatic organism (including aquatic plants) being cultured. At this infantile phase, seed may also be referred to or known as fry, larvae, post-larvae, spat, and fingerlings. In addition to English names, seed may also be referred to by specific local names. For example, in Bihar, India, *dim* is used to refer to eggs, *dimpona* for fry and *dhanipona* for fingerlings up to 4 cm. It is therefore important to establish the use of local terms that may be used to describe seed and juveniles. For fish, the term "juveniles" may also be used for describing young fish. Generally, juveniles are young fish that have not reached sexual maturation and local names may be used to describe this stage. In Bihar, India, for example, the word *chara* is used to define 10-23 cm juveniles. Seed may originate from two principal sources: from captive breeding programmes, using natural spawning methods and chemical therapy, or caught from the wild using various types of nets and traps.

In both cases, the offspring may be conditioned or reared in hatcheries or nursery installations using incubators tanks, raceways, cages or ponds prior to being distributed for ongrowing.

In several countries, animal and plant seed stock is collected from the wild for aquacultural purposes. For fish, such practices will require special collecting nets, often funnel shaped, traps made from timber, bamboo, reed etc. In addition, for the farming of species such as mussels and oysters, the spat are collected from the wild on ropes and stakes. This is achieved by suspending clean ropes and staking the substrate in areas where the seed are known to naturally occur. In such species, the seed settle by attaching themselves to the ropes and stakes in random clusters. These are then either left in place for ongrowing, or transplanted to new grounds.

For plants, similar procedures may be used, but typically segments of seaweeds are transplanted for ongrowing in ponds, on the seabed, or on rafts, netting and ropes.

### Hatcheries

It is now possible to artificially breed or propagate many species of aquatic animals and plants under captive conditions and enumerators should be made aware of equipment used in such practices. These may include, hatching jars, often conical in shape, made of glass, plastic, fabric, special tanks for collecting egg spawns, syringes,

plastic tubes or bags for algal cultures. In some countries the seedstock for seaweed culture is also propagated artificially. This process can be complex and varies between species and in the initial phases generally requires indoor facilities, where the plantlets are propagated on substrate such as plastic sheets, fine rope and netting and shells suspended in tanks.

Hatcheries generally refer to installations for housing facilities for breeding, nursing and rearing seed of fish, invertebrates or aquatic plants to fry, fingerlings or juvenile stages. Although hatcheries are generally taken to mean indoor facilities, a range of structures with varying degrees of sophistication can be found. Although hatcheries could be a series of rearing units of varying types and sizes exposed to the elements of the weather, most hatcheries tend to be under some form of shade to minimise diurnal temperature fluctuations and improve security. At its simplest, such hatcheries are open sided permanent or temporary thatched sheds or building. In general, hatcheries comprise enclosed indoor facilities using a combination of natural and artificial lighting and contain tanks and raceways.

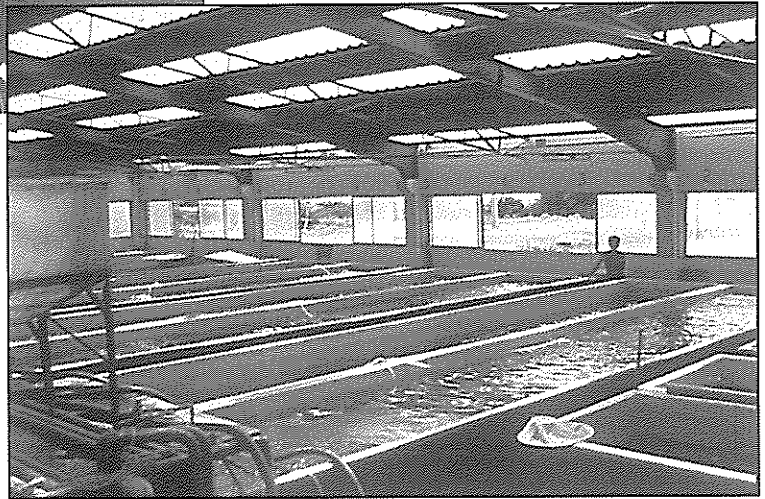


Photographs by Krishen Rana

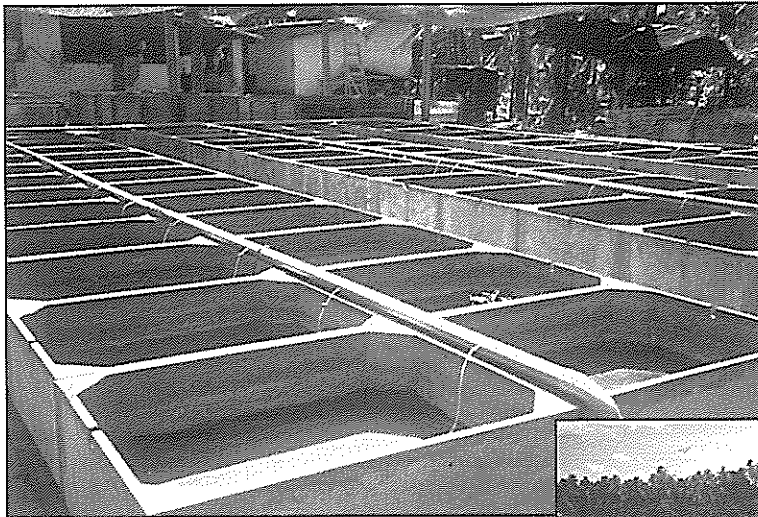
Left: Open sided hatchery facilities with larger breeding, and smaller circular rearing tanks.

Inset: Hatchery (Zoug) jars, made of glass or plastic, fibreglass, fine meshed cotton or nylon, used for hatching tilapia and carp eggs.

Right: Fibreglass hatchery raceways in an enclosed building.



Photograph by Krishen Rana



Left: Outdoor concrete hatchery tanks for nurturing seed.

Photograph by Anton Immink

Right: Small fine-mesh net pens (hapas) suspended in a raceway, pond or lake for the rearing of fry. The fry may be removed to other ponds or released into this raceway when they are large enough.

Photograph by Krishen Rana



Plate 1. Hatchery facilities. Tanks can be made of brick, cement, glass, fibreglass, timber, plastic etc. and be either round or four-sided.

## Nurseries

Nurseries are generally the second phase in the rearing process of aquatic organisms and refer to small, mainly outdoor ponds and tanks which are used to rear and condition fry during their early stages of their feeding life. Such facilities are well prepared with fertilisers prior to stocking to raise the natural food levels and with lime and other chemicals to eliminate predators and minimise other losses. Nursery ponds may also have several suspended hapas or cages (see below for definitions) to increase protection of seed from predators and to facilitate their handling and harvesting.

Rice paddy fields may also be used to rear fingerlings or juveniles mainly of carp species.

## **Ongrowing facilities for aquatic animals and plants**

### Tanks and raceways

Tanks and raceways are structures of varying sizes which are generally built above ground level and can be made of various materials such as bricks, cement, concrete, fibreglass, plastic, timber, asbestos and metal.

Tanks can be round, oval ("D" ended tanks) or four-sided and vary in size from 1 to 25m. Raceways are long and narrow rectangular tanks usually constructed with brick and concrete. Both tanks and raceways are usually stocked at high density with fish and usually have an inlet pipe for clean oxygenated water and a waste outflow pipe and, depending on size, may also have paddle wheels or other types of aerators to supplement oxygenation.

### Pens, cages and hapas

Pen and cage culture involves the rearing of aquatic animals or plants within fixed (pens) or floating (cages) net enclosures. The pens and cages may be set in lakes, rivers, reservoirs, canal systems, mining pools, bays, coves, estuaries, or in the open sea. The enclosures are usually supported by frameworks made of metal, plastic, bamboo or wood. The side, base and sometimes the top of the enclosures may be made using a combination of bamboo, polyethylene netting, wire, wire mesh or wood. In many countries simple net enclosures between 1-40m<sup>2</sup>, called hapas, are commonly used to breed or raise fish. Hapas usually do not have a frame; the fine mesh is normally suspended by stakes at its four corners in open water bodies or in ponds.

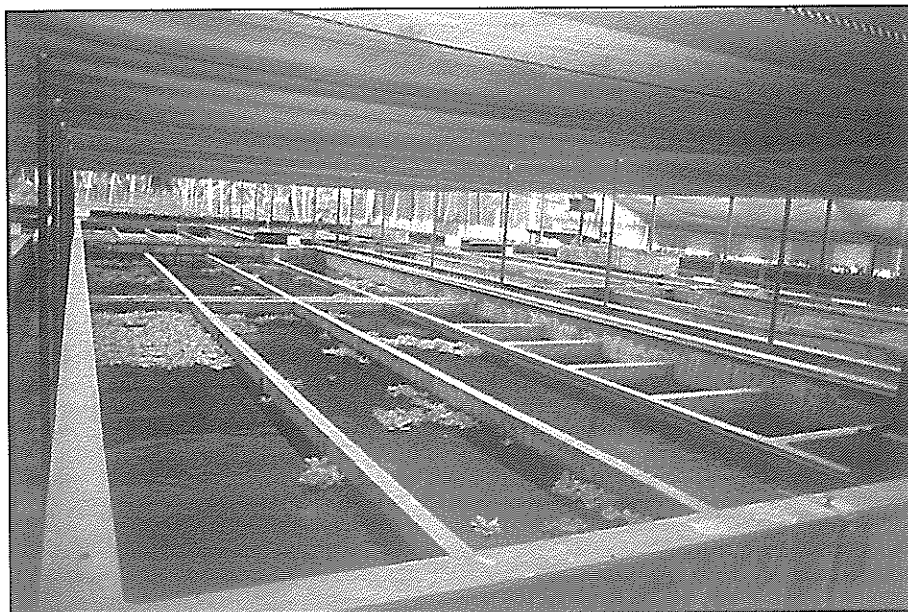
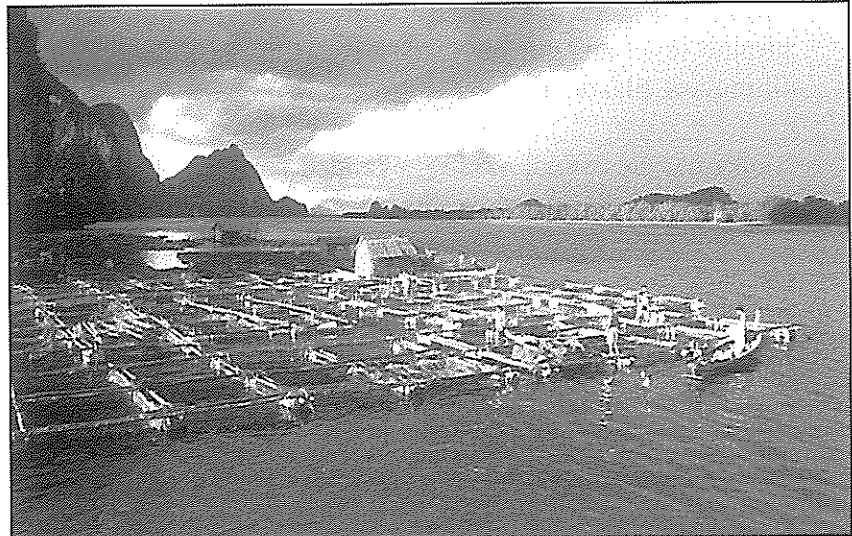


Left: Harvesting a pond. A pond usually being a four-sided structure made of earth (but could be lined with concrete, plastic or rubber). Harvesting using a net with floats.  
 Inset: Electrically operated paddle wheel aerator on floats in a pond.

Photographs by Krishen Rana

Right: Assemblage of cages in a bay. Cages are net enclosures of varying mesh sizes (depending on fish size) which are held open by floating structures. This can simply be a walkway attached to metal or plastic floats or a highly engineered floating platform in which all cages are inter-linked by common gangways with storage sheds and general work areas.

Photograph courtesy of FAO photo-library



Left: Covered concrete raceway constructed above ground. Could be uncovered and partly sunken (constructed in the ground). Can also be constructed of bricks, plastic or fibreglass. Usually water flows continuously through raceways.

Photograph by Krishen Rana

## Ponds

Pond culture includes the breeding or rearing of fish in natural or artificial fresh, brackish and sea water enclosures in which at least one, but usually all, surfaces are constructed from soil. They may be used for rearing seed or on-growing for final consumption. The culture method, which often involves using fertilisers, feeds and medication is practised all over the world and is used for a variety of aquatic plants and animals.

Pond culture is usually carried out in stagnant waters with periodic water exchange or water flushing is done through the pond inlets and outlets. Culture may also be conducted in running waters or irrigation canals where there is an abundant supply of dissolved oxygen for the fish. In some cases, large ponds may also be used to site cages and hapas for seed and on-growing production. Ponds are typically outdoor facilities, but in some countries ponds may be housed under long domed polythene tunnels.

To increase production and make better use of water resources, ponds may be managed to grow aquatic organism along with plants, livestock and poultry (integrated aquaculture).

Ponds may be stocked with fish or aquatic plants and with vegetables or fruit (fish-cum-vegetable or fruit), poultry (fish-cum-poultry husbandry) or livestock (fish-cum-animal husbandry) raised nearby or above the ponds. Items such as total area, number of fish and animals stocked should be recorded. Ponds may also be managed only for rearing aquatic organisms. In this case, items such as total area, water depth, species, number and size of fish or aquatic plants stocked should be included.

In some countries old open cast mines filled with water (quarries and mining pools) may also be used for aquaculture.

## Rice-cum-fish paddies

In rice producing countries, paddy fields may be used for the culture of rice and aquatic organisms. Enumerators should be aware that fish are produced in paddy fields using two methods. Fish may enter paddy fields from the **wild** during flooding and these are harvested when the paddies are drained. This, practice, however, is **not** considered as aquaculture and as such should not be recorded under aquaculture but under the capture fisheries section of the agricultural questionnaire. The practice of stocking rice paddies with seed and rearing them to any marketable size (including fingerling or juvenile size) is aquaculture and is termed **rice-cum-fish culture** and should be recorded.



Photograph courtesy of FAO photo-library

Left. Rice-fish-azolla culture: paddy with clear ridge and ditch. Here rice is grown on the raised ridges and the ditch will be planted with azolla and stocked with fish.



Photograph courtesy of FAO photo-library

Right: Rice paddy in which the central area is deepened to rear fish. This hollowed-out area could be anywhere in the pond, in the middle or at the edges.



Photograph courtesy of FAO photo-library

Rice-fish paddy in which the peripheral ditch is deliberately widened and deepened to breed/spawn (below) or raise (left) fish. Note the presence of coconut matting used as a spawning substrate for carp (below).



Photograph by Matthias Halwart

Plate 3. Rice paddies showing different ways in which paddies may be used for culturing aquatic organisms.

To achieve higher production of fish, the second and more favoured practice is the deliberate introduction of broodstock or seed into flooded normal and modified paddy fields for culture purposes. This practice may also include modification of the paddy field by widening the peripheral drainage channels and providing additional vegetation as feed for the fish. Enumerators should also be made aware of rotational rice and fish crop cultivation in paddy fields. In such practices, fish are grown in alternate seasons or alternatively with the rice crop and therefore enumerators should inquire of the use of paddy field for aquaculture, even if no aquaculture activity is evident at the time.

#### Rafts, ropes, stakes

The culture of shellfish, notably mussels, and seaweeds is usually conducted in open waters using rafts, long lines or stakes. Molluscs are also cultured using the broadcast (dispersal) method. On the other hand, seaweeds are cultured using ropes or lines. Seaweeds are also cultured in tanks, ponds, and meshed nets. For shellfish, ropes and stakes are seeded with juvenile shellfish called spat. The stakes are impaled in the seabed in inter-tidal areas and ropes are suspended in deeper waters from rafts or buoys.





Photograph courtesy of FAO photo-library

Spat are seeded on ropes and suspended from fixed rafts in inter-tidal zones for rearing. Ropes or bags may also be suspended from floats (right, in picture).



Photograph courtesy of FAO photo-library

Trays and bags containing oysters may also be placed on the seabed. Individual rafts can be assembled together to form larger platforms housing sheds and watch towers for storage and surveillance.

### Category 06 (Aquaculture species and nutrition)

This section addresses the composition of species bred or farmed. Such data will provide information on the diversification of the sector. The proposed items include:

- 061 Broodstock animals used \*
- Species \*
  - Number of breeders
  - Source of broodstock \*
    - culture
    - wild
- 062 Seed (fry, fingerlings, juveniles) \*
- Source of seed
    - species
    - culture
    - wild
- 063 Aquatic animals or plants cultured for final consumption \*
- Species cultured \*
    - number stocked  - Culture system
    - monoculture
    - polyculture  - Area harvested
- 064 Aquafeeds \*
- whether used (yes/no) \*
  - natural or formulated feed \*
  - source
    - made on holding
    - external
- 065 Fertilisers \*
- Whether used (yes/no) \*
    - Whether inorganic, organic manure or other fertilisers applied
    - Source - on or off holding
- 066 Biocides /medication \*
- Whether any biocides /medication applied during the year (yes/no)

The above ongrowing facilities may be used to rear only one species of aquatic organism (monoculture), or more commonly, several species may be reared in the same facility (polyculture). For international comparison, FAO recommends that species cultured should be described and recorded using the FAO classification code in both the local language and scientific names. The FAO list of species used for aquaculture is given in Appendix 3.

## Category 07 (Machinery and equipment)

The culture of aquatic organisms encompasses a series of processes which may include handling, loading, transporting, feeding, harvesting, processing and packing. Each of these stages may require different types of equipment and machinery.

To aid the enumerator to identify aquacultural activity on a holding, this category provides a short description of common types of equipment and machinery that may be used on the holding conducting aquaculture.

### Incubators

Receptacles of various sizes, usually conical in shape, made from fine meshed cotton, nylon, glass, fibreglass, metal used for hatching and nurturing hatchlings prior to first feeding. These may be free standing (glass, fibreglass, metal) or suspended (cotton and nylon), in tanks. Long shallow ( usually 5-30cm deep) troughs and trays made of fibreglass, asbestos, aluminium, metal, wood are also used to hatch eggs such as salmonids, catfishes etc.

### Nets

Nets can be made of various types of non-rigid material such as nylon, cotton etc. They are used for handling, concentrating, collecting and harvesting fish. Nets can be of varying sizes depending on their use. Hand nets for handling fry can be as small as 10 cm x 5 cm and harvesting seine nets could be several metres long. Net frames are usually constructed from timber or metal and fabric of varying mesh sizes are used to retain the animals. In the case of seine nets, lead weights are often attached to the bottom edge of nets and the upper edge is lined with floats to facilitate collection of fish.

### Generators

Equipment which converts physical or chemical energy into electrical energy and used for powering pumps etc., especially in cases of electric power failure or in remote areas.

### Pumps

Electrical devices for moving water, usually against gravity.

### Tractors

Tractor with two axles and four wheels.

### Aerators

Electrical devices used for introducing air into the water. These may be attached to floating structures on ponds e.g. paddle wheels or low pressure blowers and high pressure air-compressors linked to individual rearing facilities via pipes and air dispersants such as air stones and finely perforated hose pipes.

### Filters and screens

Mechanical devices often using fine rigid or flexible mesh to physically remove particles from the water prior to reuse or release to waste. These devices may be operated manually or driven by an electric motor.

### Fish transporters

Large waterproof containers or tanks for transporting fish. Fish transporters may be motorised and for long journeys containers may be equipped with aerators or portable oxygen cylinders. Boats may also be used for transportation of fish and general distribution of supplies.

### Fish processing equipment

Mechanical or electrically operated equipment used for gutting, skinning and/or filleting fish.

### Feed mills

Electric devices for mincing, mixing and extruding ingredients for making aquafeeds.

### Feed dispensers

Waterproof conical-bottomed containers of varying sizes for the storage and dispensing of fish feed. Dispensers may be made of fibreglass, metal or timber.

### Graders

Screened hand or electrically driven mechanical devices used for separating fish into different sizes.

### Water quality monitoring equipment

Devices commonly used for estimating physico-chemical parameters of water, may include oxygen, pH and conductivity meters. Items could also include non-electrical devices such as a Secchi disc (a disc, usually in metal, with each quarter painted alternatively in black and white used for estimating water clarity).

**Category 08 (Buildings and structures)**

This category addresses the use of non-residential buildings on the holdings engaged in aquaculture. The time reference is the day of the enumeration. The proposed items include:

**081 non-residential Buildings**

- Number of non-residential buildings are used for aquacultural activity
- Total area (m<sup>2</sup>) \*
  - for rearing fish seed <sup>4</sup>
  - for storage of aquaculture supplies and products
  - for keeping machinery and equipment used for aquaculture
  - as office
  - for post-harvest processing and/or packaging
  - for mixed or other purposes

## CHAPTER 4

### TABULATIONS

Chapter 6 of the WCA 2000 Programme (pages 48-61) presents a detailed outline of considerations to be made when planning for the tabulation of census results and can apply to any census activity. Presented in this Chapter of the Aquaculture Supplement are suggested tables that might be prepared using the recommended items for which data should be collected from the holdings. Of course it would be expected that each country would adapt these suggestions to meet its specific needs. It should be noted that the tables presented would be duplicated for each level of aggregation, i.e. Village, Province, Nation, etc.

**Total Area of Land<sup>1</sup> and Water<sup>2</sup> Area Allocated for Aquaculture in Different Environments  
in Different Size Categories of Holdings**

	Culture Environment			Total Area (ha)	Culture System	
	Freshwater	Brackishwater	Seawater		Monoculture	Polyculture
<b>Size category of holding (ha)</b>						
0-2						
2-5						
5-10						
10-20						
20-50						
50-100						
100-200						
200-500						
500-1000						
>1000						
<b>Type of aquaculture activity</b>						
Agri-aqua						
Aquaculture only						
<b>Species Groups</b>						
Finfish						
Molluscs						
Crustaceans						
Aquatic Plants						
Others						

<sup>1</sup> Land refers total surface area of land which may include ponds.

<sup>2</sup> Water refers to water surface area only in reservoirs, lakes, seas, estuaries, lagoons, etc., used for aquacultural purposes.





**Total Land and Water Area in Hectares Allocated for Varying Types of Aquaculture  
by Environment and Facilities**

Type of Farming Practice	Type of Rearing Facility in Hectares							Total
	Ponds	Cages	Pens	Tanks/Raceways	Ropes/Stakes Rafts/bags			
<b>Hatcheries/Nurseries</b>								
Indoor								
- Freshwater								
- Brackishwater								
- Seawater								
Outdoor								
- Freshwater								
- Brackishwater								
- Seawater								
<b>Ongrowing</b>								
Aquaculture with Rice								
Aquaculture with animals /plants								
no. of animals								
<b>Only Aquaculture</b>								
<b>Environment of culture</b>								
Freshwater								
Brackishwater								
Seawater								
<b>Ownership</b>								
Owned								
Rented <sup>1</sup>								

Here the total area of land which includes land used for ponds

Total Water Area L in m<sup>2</sup> Using Varying Categories of Input

Culture Facility	INTENSIFICATION INDICATORS							Total Production (tonnes)
	Fertilizer			Aquafeeds	Aerators	Water Pumps	Medication	
	Inorganic	Organic	Total					
Ongrowing								
ponds								
cages								
pens								
hapas								
tanks								
raceways								
Species Cultured								
Species of:								
finfish								
molluscs								
crustaceans								
plants								
others								

Water area refers to actual surface of water, including supporting structures, such as pond banks.

**Total Surface Area in m<sup>2</sup> of Non-Residential Buildings  
Used for Aquaculture Purposes**

Type Class	Tenure (Area in m <sup>2</sup> )				Total	Structure Type		Labour (in Nos.)	
	Owned	Rented	Leased	Total		Permanent	Temporary	Male	Female
Hatcheries									
Indoor:									
see									
Total									
Offices									
Store:									
equipment									
aquafed									
machiner									
Total									
Laboratories									
Fish Processing:									
conditionin									
cold storag									
packin									
filleting/processin									
Total									
Mixed Purposes									

Generally taken to mean actual land area on which above classes of structures are built. If within each type class more than one level in a building is used, the total floor area should be recorded.





## REFERENCES

- CWP (1992) Aquaculture. In Proceedings of the 15th Session of the Co-ordinating Working Party on Atlantic Fishery Statistics, Dartmouth, Nova Scotia, Canada, 8 - 14 July 1992. CWP-15/8B. pp.
- 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.
- ILO. 1990. *International Standard Classification of Occupations: ISCO-88*. International Labour Office, Geneva, 1990.
- Nandeesh 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.
- UN. 1990. *International standard industrial classification of all economic activities*, Series M, No. 4, Rev. 3. 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. P443-451.

## APPENDIX 1

## Relevant Extracts from the Main WCA 2000 Programme

*Appendix 1a The holding (pages 25-26 of the main programme)*

Holding - The holding definition is basically the same as used in previous Programmes. An agricultural holding is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan or tribe, or by a juridical person such as a corporation, co-operative or government agency. The holding's land may consist of one or more parcels, located in one or more separate areas or in one or more territorial or administrative divisions, providing the parcels share the same production means utilized by the holding, such as labour, farm buildings, machinery or draught animals. The requirement of sharing the same production means utilized by the holding is necessary if the various parcels are to be considered as components of one economic unit. Definition of classes of agricultural activities (UN 1990, pp. 71-72) and explanatory notes are given in Appendix 2 of the main programme.

5.8 Economic units engaged **solely** in the following economic activities are not considered agricultural holdings are therefore excluded from the census:

- hunting, trapping and game propagation
- forestry and logging
- fishing
- agricultural services

5.9 The following additional points relate to the identification of a holding:

- (a) Holding may have no significant land area, e.g. poultry hatcheries or holdings keeping livestock for which land is not an indispensable input for production.
- (b) Holdings may be operated by persons who do not have any rights to agricultural use of the land except for the products from the trees grown on it (free holdings).
- (c) Various economic agricultural production units under the same ownership, or under the same general management, may be considered separate holdings if they are operated by different persons.
- (d) There may be more than one holding in a household.
- (e) There may be holding operated jointly by two or more individuals.
- (f) If a member of a co-operative, religious organisation, government agency, clan or tribe is assigned a separate unit for agricultural production that is operated under the member's management, and over which the member has general, technical and economic responsibility, then this unit represents a holding.
- (g) There may be holdings operated by holders having other occupation(s) in addition to being a holder.
- (h) Open rangeland (such as land open to communal grazing) is not normally considered a holding. A specified area delimited by fencing, or any other form of boundary demarcation may be an exception if its use is supervised. Such land qualifies as a communal grazing land holding and may be included as a special category.

Otherwise common grazing land should not be considered a holding. If a decision is made to distinguish communal grazing land from open rangeland the criteria used should be indicated. Data collected for communal grazing land holdings should include only the following items: location and holding area; holder's legal status (government, tribe and/or clan, etc.); and if possible, the number of livestock holders having access to this holding. This information should be tabulated separately from the tabulations regarding other holdings.

5.10 Holding address - The holding location should be given in detail on the census questionnaire. If the holding is located in a village or hamlet, the village or hamlet name and administrative area should be recorded. This is essential for tabulating results by administrative units or agro-ecological zones. It will also facilitate enumeration control, subsequent verification, follow-up sample surveys, etc. If the holding comprises two or more parcels, special care is required in describing the holding location. Generally, the location of the parcel containing the farm buildings or other farm structures and the main machinery or equipment may be designated as the holding location. In many cases, the holder's residence may be suitable as the holding location description. If resources are available, it is becoming most important to geo-reference holdings with use of Global Positioning Systems (GPS); it is advisable to begin to move in this direction to enable further uses of census data, mainly through Geographic Information Systems (GIS).

5.11 Holder - The holder is a civil or juridical person who makes major decisions regarding resource use and exercises management control over the agricultural holding operation. The holder has technical and economic responsibility for the holding and may undertake all responsibilities directly, or delegate responsibilities related to day-to-day work management to a hired manager. See legal status of holder (paragraph 5.16) and hired manager (paragraph 5.22 for further explanation.)

5.12 Enumerators must be trained to be aware that the holder is not always the legal owner of the land nor, necessarily, the oldest male in a household. The person making the major decisions regarding resource use - deciding what and when to plant, what animals to breed, when to cultivate crops and when to harvest crop or livestock items - may be a junior or female member of the household. Identifying the holder based on the custom of the area, administrative records, or age and sex may distort the final results and lead to incorrect analysis, particularly with regard to holders by sex and age.

5.13 Respondent - The respondent is the person from whom data are collected about the statistical unit.

***Appendix 1b The household (pages 29-30 of the main programme)***

5.28 Household - The household concept is one of the basic elements of a national statistics system. According to the United Nations:

"The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either (a) a one-person household, that is, a person who makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multiperson household, or (b) a multiperson household, that is, a group of two or more persons



living together who make common provision for food or other essentials for living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons or a combination of both. Households usually occupy the whole, part of, or more than one housing unit but they may also be found living in camps, boarding houses or hotels or as administrative personnel in institutions, or they may be homeless. Households consisting of extended families that make common provision for food or of potentially separate households with a common head, resulting from polygamous unions, or households with vacation or other second homes may occupy more than one housing unit. Homeless households are defined as those households without a shelter that would fall within the scope of living quarters." (UN 1980, p.50)

5.29 Various household types must be explained, particularly the extended household, due to the possibility of more than one holding per household. The United Nations recommends a household classification based on the family nucleus. The family refers to "those members of the household who are related, to a specified degree, through blood, adoption or marriage". (UN 1980, p.72) A household may contain more than one family. A family nucleus consists of one of the following types (each of which must consist of persons living in the same household): (a) a married couple without children; (b) a married couple with one or more never-married children; (c) a father with one or more never-married children; or (d) a mother with one or more never-married children.

5.30 The following household types are identified:

- (a) One-person household.
- (b) Nuclear household, defined as a household consisting entirely of a single family nucleus.
- (c) Extended household, defined as a household consisting of either:
  - (i) a single family nucleus and other persons related to the nucleus;
  - (ii) two or more family nuclei related to each other;
  - (iii) two or more family nuclei related to each other, plus other persons related to at least one of the nuclei; or
  - (iv) two or more persons related to each other but none of whom comprises a family nucleus.
- (d) Composite household, defined as a household consisting of either:
  - (i) a single family nucleus plus other persons, some of whom are related to the nucleus and some of whom are not;
  - (ii) a single family nucleus plus other persons, none of whom is related to the nucleus;
  - (iii) two or more family nuclei related to each other plus other persons, some of whom are related to at least one of the nuclei;
  - (iv) two or more family nuclei related to each other plus other persons, none of whom is related to any of the nuclei;
  - (v) two or more family nuclei not related to each other, with or without any other persons;
  - (vi) two or more persons related to each other but none of whom comprises a family nucleus, plus other unrelated persons; or,
  - (vii) non-related persons only. (UN 1980, pp. 73-74)

5.31 In rural areas, particularly in developing countries, a one-to-one correspondence between a household and a holding is quite common. Thus households serve to identify holdings. This is the case particularly in developing countries. The number of households whose members operate separate holdings, or the number of holdings operated by two or more persons belonging to different households is few but nevertheless exists. When considering the relationship between a household and a holding it is important to remember that the former is a complex socio-economic unit, while the latter is a simple economic unit. As such, when studying the holding related to a rural household, whose head is the holder with some household members participating in the work of the holding, it is recommended to consider:

- (a) The holding as the economic unit engaged in agricultural production.
- (b) Household members participating in the work of the holding as members of the labour force used by the holding.
- (c) Members of the household not participating in the work of the holding as not directly related to the holding.

5.32 Head of household - The head of household is the person (male or female) in the household acknowledged as head by the other members. The head has primary authority and responsibility for household affairs. However, in cases where such authority and responsibility are not vested in one person, special rules may be needed to identify the head of household (UN 1980, p.70).

5.33 Age - Age is the time interval between birth date and census date, expressed in completed calendar years.

5.34 Education - Education can be classified as follows:

- illiterate
- literate with no regular schooling
- elementary school
- secondary school
- high school
- university
- agricultural vocational training
- other vocational training

5.35 Marital status - Marital status can be classified as follows:

- single (never married)
- married
- in consensual union
- in polygamous union
- separated
- divorced
- widowed

*Appendix 1c The census frame (pages 22-23 of the main programme)*

4.25 A frame provides the means of identification of the population of interest (i.e. agricultural holdings) and can be either a set of lists or maps identifying the holdings. The frame for an agricultural census should cover all holdings in the country and is needed whether a complete or sample enumeration is to be undertaken.

4.26 An ideal census frame is a complete list of all holdings. In such a frame, each holding is shown without omissions or duplications and does not include any units other than holdings.

4.27 A register of holdings (farm registers) which is well established in some countries may be close to an ideal frame. These registers contain regularly updated information which takes account of continuity of holdings over time, as well as their appearance and disappearance. A farm register has a fixed reference number for each holding and basic information on its characteristics is entered periodically. The register is particularly useful when combined with an adequate computer storage information system, thus facilitating data retrieval, tabulation and analysis. If a complete farm register is developed independently of an agricultural census, then the second census objective (providing a frame for specialized sample surveys, as described in paragraph 4.3) can be omitted. Under such conditions, the census scope can be expanded, and can more rationally become a sample enumeration. However, the work volume and difficulties in establishing a farm register with basic information for each holding and its subsequent updating, in particular, is so great that even in statistically developed countries only a few basic items can be maintained in the register. Accordingly, while the possibilities of building up computerized farm registers and keeping them updated should be considered by all countries with the necessary facilities and regulations, the need for a census will continue.

4.28 One form of partial farm register may exist in the form of records of state, cooperative and institutional holdings, or list of parties contracting to the state, in countries with centrally planned economies. Almost inevitably there will be holdings which do not appear on such a register and other means of completing the frame will be necessary.

4.29 Most countries do not have a farm register of any sort and, therefore, need a frame constructed for the census purpose. One such frame can be obtained from a population census, if it is carried out prior to the agricultural census, and if relevant questions for identifying holders are included in the questionnaire. Such a source is useful, even in countries where a farm register is maintained, in order to update or complement the register, particularly in cases where the register does not include holdings of holders having other occupation(s). It is important to note, however, that a frame obtained from a population census may be outdated if the time lag between the population and agricultural censuses is too long. Countries are strongly recommended to coordinate the programme for these censuses. Such coordination is, in fact, necessary within the general framework of a national statistical programme for food and agriculture, where all data collection activities are interrelated not only with respect to scope but also with respect to operations, including timing, personnel, equipment, etc.

4.30 Other possible frames for an agricultural census include a list of enumeration areas prepared for the population census, a list of localities (villages), aerial photographs and maps. A population census enumeration area has clearly identified limits so that, while all national territory is covered, there is no overlapping. In rural areas, one enumeration area may be a village but larger villages are

sometimes divided into several enumeration areas. In some rural areas the population live well dispersed on their holdings and great care is needed to ensure that enumeration areas are well defined.

4.31 If a complete enumeration is carried out, all holdings in each enumeration area or locality have first to be identified by means of an interview with the local authorities and a visit to each household. Identifying all holdings is tedious. If the census is to be conducted using sample enumeration a sample of enumeration areas or localities is selected as the first-stage sampling units within which the process of identifying the holdings is carried out. For an efficient sampling scheme, prior information relevant to holdings is needed on each enumeration area or locality. In cases where information such as number of holdings, main types of crops grown and number of livestock is not available, one may have to be satisfied with the total population of the enumeration area or locality. The more information that is available the better the sample designs can be.

4.32 Maps, satellite imagery and aerial photographs can also be used for construction of a frame, particularly for sample surveys. In this case, a sample of well-defined areas is chosen for collecting data. In area sampling, rules are developed to associate data collected on sample areas with holders operating land in those sample areas. If aerial photographs and maps are not readily available, their cost should be compared to the cost of other frames when deciding upon the frame to be used, taking into account that an area sample frame is often believed to be superior to other frames because it requires less frequent up-dating. Satellite imagery has been used increasingly for construction of sample census/survey frames and its use is recommended, particularly for improving sampling design, through better stratification and for improvement of cartography.

#### *Appendix 1d Occupations (page 32 of the main programme)*

5.47 Occupations are classified in the International Standard Classification of Occupations (ISCO-88), issued by the International Labour Office (ILO 1990), into the following Major Groups:

1. Legislators, senior officials and managers
2. Professionals
3. Technicians and associate professionals
4. Clerks
5. Service workers and shop and market sales workers
6. Skilled agricultural and fishery workers
7. Craft and related trade workers
8. Plant and machinery operators and assemblers
9. Elementary occupations
10. Armed forces

## APPENDIX 2

Classification proposed for various aquaculture and capture fisheries practices (Modified from CWP 1992)

PRODUCTION FROM	DESIGNATION		
	AQUACULTURE	CAPTURE FISHERIES	
		Enhanced	Traditional
Hatcheries	*		
Ponds	*		
Tanks	*		
Raceways	*		
Cages	*		
Pens	*		
Barrages	*		
Integrated vallicoltura production	*		
Private, tidal ponds (tambaks)	*		
Stocked lakes, reservoirs and rivers			
- with other enhancement (predator control and/or fertilisation)		*	
- modification with "exploitation rights"		*	
- no other intervention without "exploitation rights"			*
Unstocked lakes, reservoirs and rivers			
- with enhancement (fertilization and/or predator control habitat modification), with "exploitation rights"		*	
Rice-fish culture:			
- from stocked rice-paddy	*		
- from unstocked rice-paddy			*
Finfish and other animals harvested from brush parks:			
- managed over time and with other enhancement rights		*	
- harvested on an install and harvest basis			*
Fish and other animals harvested from:			
- fish aggregating devices			*
Molluscs			
- from managed grow-out site (e.g. poles, ropes, net bags)	*		
- subject to open fisheries			*
Aquatic plants			
- harvest of planted and suspended seaweed	*		
- harvest of natural seaweed beds			*
Aquatic organisms caught in open waters			*
Privately owned recreational fisheries			*
Ranching		*	
Fish and other animals harvested from artificial reefs "with exploitation rights"		*	

## APPENDIX 3

## List of scientific and trilingual names of cultured aquatic species

Aquaculture: List of Scientific and Trilingual Names (A)					
Aquaculture: Liste de noms scientifiques et des noms utilisés dans les trois langues (B)					
Acuicultura: Lista de los nombres científicos y trilingües (C)					
(...A, ...B and ...C in respective columns = names unavailable)					
Alpha code	Scientific name	English name	Nom français	Nombre español	Local / vernacular name
FCY	Cyprinidae	Cyprinids nei	Cyprinidés nca	Ciprínidos nep	
FBM	Abramis brama	Freshwater bream	Brème d'eau douce	Brema común	
FCP	Cyprinus carpio	Common carp	Carpe commune	Carpa	
FTE	Tinca tinca	Tench	Tanche	Tenca	
PTB	Barbus barbus	Barbel	Barbeau fluviatile	Barbo común	
FCC	Carassius carassius	Crucian carp	Carassin(=Cyprin)	Carpin	
CGO	Carassius auratus	Goldfish	Poisson rouge(=Cyprin doré)	Pez rojo	
FRX	Rutilus spp	Roaches	Gardons	Rutilos	
FRO	Rutilus rutilus	Roach	Gardon	Rutilo	
RHI	Labeo spp	Rhinofishes	Labéos	Labeos	
LCB	Labeo calbasu	Orangefin labeo	...B	...C	
LRH	Labeo rohita	Roho labeo	...B	...C	
MUC	Cirrhinus molitorella	Mud carp	Carpe de vase	Carpa de fango	
CMG	Cirrhinus mrigala	Mrigal carp	...B	...C	
BIC	Hypophthalmichthys nobilis	Bighead carp	Carpe à grosse tête	Carpa cabezona	
CTT	Catla catla	Catla	...B	...C	
FCG	Ctenopharyngodon idellus	Grass carp(=White amur)	Carpe herbivore(=chinoise)	Carpa china	
HXP	Hypophthalmichthys spp	...A	...B	...C	
SVC	Hypophthalmichthys molitrix	Silver carp	Carpe argentée	Carpa plateada	
NMC	Notemigonus crysoleucas	Golden shiner	...B	...C	
FCN	Osteochilus hasselti	Nilem carp	...B	...C	
PRJ	Probarbus jullieni	Isok barb	...B	...C	
WAB	Parabramis pekinensis	White amur bream	Brème de Pékin	Brema de Pekín	
ASS	Aspius spp	Asps	Aspes	Aspios	
ASU	Aspius aspius	Asp	Aspe	Aspio	
FCH	Leptobarbus hoeveni	Hoven's carp	Barbus d'Hoven	Barbo de Hoven	
BKC	Mylopharyngodon piceus	Black carp	Carpe noire	Carpa negra	
WUB	Megalobrama amblycephala	Wuchang bream	Carpe de Wuchang	Carpa de Wuchang	
FAB	Puntius spp	Asian barbs	Barbeaux d'Asie	Barbos de Asia	

PTG	<i>Puntius gonionotus</i>	Thai silver barb	Barbeau argenté de Thaïlande	Barbo plateado de Tailandia
FJB	<i>Puntius javanicus</i>	Java barb	Barbeau de Java	Barbo de Java
PTP	<i>Puntius (=Tor) putitora</i>	...A	...B	...C
PIT	<i>Puntius (=Tor) tor</i>	Tor barb	Barbeau tor	Barbo tor
KUR	<i>Misgurnus anguillicaudatus</i>	Pond loach	Loche d'étang	Misgurno
CIX	Cichlidae	Cichlids nei	Cichlids nca	Ciclidos nep
TLP	<i>Oreochromis (=Tilapia) spp</i>	Tilapias nei	Tilapias nca	Tilapias nep
TLM	<i>Oreochromis mossambicus</i>	Mozambique tilapia	Tilapia du Mozambique	Tilapia del Mozambique
TLN	<i>Oreochromis niloticus</i>	Nile tilapia	Tilapia du Nil	Tilapia del Nilo
OEA	<i>Oreochromis aureus</i>	Blue tilapia	...B	...C
TLL	<i>Oreochromis spilurus</i>	...A	...B	...C
ORM	<i>Oreochromis macrochir</i>	Longfin tilapia	...B	...C
ORU	<i>Oreochromis urolepis</i>	Wami tilapia	...B	...C
STA	<i>Oreochromis andersonii</i>	Three spotted tilapia	...B	...C
SAR	<i>Sarotherodon galliaeus</i>	...A	...B	...C
SAH	<i>Sarotherodon melanothron</i>	Blackchin tilapia	...B	...C
CHX	<i>Cichlasoma spp</i>	...A	...B	...C
CHL	<i>Cichlasoma managuense</i>	Jaguar guapote	...B	Guapote tigre
CHK	<i>Cichlasoma maculicauda</i>	Blackbelt cichlid	...B	...C
CHH	<i>Cichlasoma urophthalmus</i>	Mexican mojarra	...B	Mojarra del México
CLO	<i>Cichla ocellaris</i>	Peacock cichlid	...B	Sargento
TLZ	<i>Tilapia zillii</i>	Redbelly tilapia	...B	...C
TLs	<i>Tilapia sparrmanii</i>	Banded tilapia	...B	...C
TLR	<i>Tilapia rendalli</i>	Redbreast tilapia	...B	...C
TLG	<i>Tilapia guineensis</i>	...A	...B	...C
ETS	<i>Etiopius suratensis</i>	Pearlsport	...B	...C
AST	<i>Astronotus spp</i>	...A	...B	Acarahuazu
AER	<i>Aeguidens rivulatus</i>	Green terror	...B	...C
FPI	<i>Esox lucius</i>	Northern pike	Brochet du nord	Lucio
FKN	<i>Notopterus spp</i>	Knifefishes	...B	...C
ARP	<i>Arapaima gigas</i>	Arapaima	...B	Paiche
HTT	<i>Heterotis spp</i>	...A	...B	...C
HTN	<i>Heterotis niloticus</i>	African bonytongue	...B	...C
CSY	<i>Synodontis spp</i>	Upsidedown catfishes	...B	...C
CHA	Characidae	Characins	Characinidés	Carácidos
PLL	<i>Prochilodus lineatus</i>	...A	...B	Sábalo
PLR	<i>Prochilodus reticulatus</i>	...A	...B	Boquichico
ICH	<i>Ichthyoelephas humeralis</i>	...A	...B	Bocachico
BCM	<i>Brycon moorei</i>	Dorada	...B	...C
CSM	<i>Colossoma macropomum</i>	Cachama	...B	Cachama
CSD	<i>Piaractus brachypomus</i>	...A	...B	Cachama blanca

CSO	<i>Piaractus mesopotamicus</i>	...A	...B	Paco	
BUF	<i>Ictiobus</i> spp	Buffalofishes	Poissons-taureau	...C	
BUB	<i>Ictiobus cyprinellus</i>	Bigmouth buffalo	...B	...C	
FSI	Siluroidei	Freshwater siluroideis, etc	Silurides d'eau douce, etc	Siluroideos de agua dulce, etc	
TDT	<i>Tandanus tandanus</i>	Tandan catfish	...B	...C	
SOM	<i>Silurus glanis</i>	Wels(=Som)catfish	Silure glane	Siluro	
MYN	<i>Mystus nemurus</i>	Asian redtail catfish	...B	...C	
CST	<i>Chrysichthys</i> spp	Black catfishes	...B	...C	
CSR	<i>Chrysichthys nigrodigitatus</i>	Bagrid catfish	...B	...C	
CAN	<i>Bagrus</i> spp	Naked catfishes	...B	...C	
CAF	<i>Ictalurus</i> spp	Catfishes, nei	Barbottes, nca	Bagres, nep	
ITP	<i>Ictalurus punctatus</i>	Channel catfish	...B	...C	
ITC	<i>Ictalurus catus</i>	White catfish	...B	...C	
ITF	<i>Ictalurus furcatus</i>	Blue catfish	...B	...C	
ITM	<i>Ictalurus melas</i>	Black bullhead	Poisson-chat	...C	
ITN	<i>Ictalurus natalis</i>	Yellow bullhead	...B	...C	
ITE	<i>Ictalurus nebulosus</i>	Brown bullhead	...B	...C	
PGZ	<i>Pangasius</i> spp	Pangas catfishes nei	...B	...C	
PGP	<i>Pangasius pangasius</i>	Pangas catfish	...B	...C	
PGS	<i>Pangasius sutchi</i>	Striped catfish	...B	...C	
CTO	<i>Clarias</i> spp	Torpedo-shaped catfishes	...B	...C	
CBT	<i>Clarias batrachus</i>	Philippine catfish	...B	...C	
CFS	<i>Clarias fuscus</i>	Hong Kong catfish	...B	...C	
CLZ	<i>Clarias gariepinus</i>	North African catfish	Poisson-chat nord-africain	Pez-gato	
CMC	<i>Clarias macrocephalus</i>	Bighead catfish	...B	...C	
CLN	<i>Clarias anguillaris</i>	Mudfish	...B	...C	
HEB	<i>Heterobranchius bidorsalis</i>	African catfish	Poisson-chat africain	Pez-gato africano	
HEL	<i>Heterobranchius longifiliis</i>	Sampa	...B	...C	
RHS	<i>Rhamdia sapo</i>	South American catfish	...B	...C	
HSR	<i>Hoplosternum littorale</i>	Atipa	...B	...C	
BCB	<i>Odontesthes bonariensis</i>	...A	...B	Pejerrey	
FSN	<i>Channa (Ophicephalus) spp</i>	Snakeheads(=Murrels)	Poissons tête de serpent	Cabezas de serpiente	
CNA	<i>Channa (=Ophicephalus) argus</i>	Snakehead	...B	...C	
CNP	<i>Channa (=Ophicephalus)punctat</i>	Spotted snakehead	...B	...C	
FSS	<i>Channa striata</i>	Striped snakehead	Tête de serpent strié	Cabeza de serpiente cabrio	
FIS	<i>Channa micropeltes</i>	Indonesian snakehead	Tête de serpent d'Indonésie	Cabeza de serpiente rojo	
FLT	<i>Monopterus albus</i>	Lai	...B	...C	
BYB	<i>Bigyanus bidyanus</i>	Silver perch	...B	...C	
MPS	<i>Micropterus salmoides</i>	Largemouth black bass	...B	Perca atruchada	
FPE	<i>Perca fluviatilis</i>	European perch	Perche européenne	Perca	



STP	Stizostedion spp	Walleyes, nei	..B	..C
STV	Stizostedion vitreum	Walleye	Sandre américain	Lucioperca americana
FPP	Stizostedion lucioperca	Pike-perch	Sandre	Lucioperca
FPC	Anabas testudineus	Climbing perch	Anabas	Perca trepadora
FGG	Osphronemus goramy	Giant gourami	Gourami géant	Gourami gigante
GOM	Trichogaster spp	Gouramis nei	..B	..C
FGS	Trichogaster pectoralis	Snakeskin gourami	Gourami peau de serpent	Gourami piel de serpiente
FGO	Helostoma temmincki	Kissing gourami	..B	Gourami besador
FGB	Eleotridae	Gudgeons, sleepers	..B	..C
DOM	Dorimitor latifrons	Pacific fat sleeper	..B	..C
GBM	Oxyeleotris marmorata	Marble goby	..B	..C
FGX	Gobiidae	Freshwater gobies	Gobies d'eau douce	Góbidos de agua dulce
FRF	Osteichthyes	Freshwater fishes nei	Poissons d'eau douce nca	Peces de agua dulce nep
STU	Acipenseridae	Sturgeons nei	Esturgeons nca	Esturiones nep
APU	Acipenser sturio	Sturgeon	Esturgeon commun	Esturión
APG	Acipenser gueldenstaedti	Danube sturgeon(=Osetr)	Esturgeon du Danube	Esturión del Danube
APR	Acipenser ruthenus	Sterlet sturgeon	Sterlet	Esterlete
APE	Acipenser stellatus	Starry sturgeon	Esturgeon étoilé	Esturión estrellado
APN	Acipenser transmontanus	White sturgeon	Esturgeon blanc	Esturión blanco
APB	Acipenser baeri	Siberian sturgeon	Esturgeon de Sibérie	Esturión de Siberia
HUH	Huso huso	Beluga	Beluga	Esturión beluga
ELX	Anguilla spp	River eels nei	Anguilles nca	Anguilas nep
ELE	Anguilla anguilla	European eel	Anguille d'Europe	Anguilla europea
ELJ	Anguilla japonica	Japanese eel	Anguille du Japon	Anguilla japonesa
ELA	Anguilla rostrata	American eel	Anguille d'Amérique	Anguilla americana
ELU	Anguilla australis	Short-finned eel	Anguille d'Australie	Anguilla australiana
SLX	Salmonoidei	Salmonoids nei	Salmonoïdés nca	Salmonoideos nep
TRO	Salmo spp	Trouts nei	Tuites nca	Truchas nep
SAL	Salmo salar	Atlantic salmon	Saumon de l'Atlantique	Salmón del Atlántico
TRS	Salmo trutta	Sea trout	Truite de mer	Trucha marina
ORC	Oncorhynchus spp	Pacific salmon, nei	Saumons du Pacifique, nca	Salmones del Pacifico, nep
PIN	Oncorhynchus gorbusha	Pink(=Humpback)salmon	Saumon rose	Salmón rosado
CHU	Oncorhynchus keta	Chum(=Keta=Dog)salmon	Saumon chien	Keta
CHE	Oncorhynchus masou	Masu(=cherry) salmon	Saumon du Japon	Salmón japonés
SOC	Oncorhynchus nerka	Sockeye(=Red)salmon	Saumon rouge	Salmón rojo
CHI	Oncorhynchus tshawytscha	Chinook(=Spring=King)salmon	Saumon royal	Salmón real
COH	Oncorhynchus kisutch	Coho(=Silver)salmon	Saumon argenté	Salmón plateado
TRR	Oncorhynchus mykiss	Rainbow trout	Truite arc-en-ciel	Trucha arco iris
CHR	Salvelinus spp	Chars nei	Ombles nca	Salvelinos nep
SVF	Salvelinus fontinalis	Brook trout	Saumon de fontaine	Trucha de arroyo
ACH	Salvelinus alpinus	Arctic char	Omble-chevalier	Trucha alpina

LAT	Salvelinus namaycush	Lake trout(=Char)	Touladi (=Ombie du Canada)	Trucha lacustre
TLV	Thymallus thymallus	Grayling	Ombre commun	Tímalo
TLA	Thymallus arcticus	Baykal grayling	...B	...C
PCA	Plecoglossus altivelis	Ayu sweetfish	...B	...C
WHF	Coregonus spp	Whitefishes nei	Corégones nca	Coregonos nep
SDL	Stenodus leucichthys	Sheefish	...B	...C
DCX	Clupeoidel	Diadromous clupeoids nei	Clupeoídes diadromes nca	Clupeoideos diádtromos nep
DAG	Stolothrissa, Limnothrissa spp	Dagaas	Dagaas	Dagaas
LTM	Limnothrissa miodon	Lake Tanganyika sardine	...B	...C
DIA	Osteichthyes	Diadromous fishes nei	Poissons diadromes nca	Peces diádtromos nep
MIL	Chanos chanos	Milkfish	Chano	Chano
GIP	Lates calcarifer	Barramundi(=Giant seaperch)	Perche barramundi	Perca gigante
NIP	Lates niloticus	Nile perch	Perche du Nil	Perca del Nilo
FLX	Pleuronectiformes	Flatfishes nei	Poissons plats nca	Peces planos nep
LEF	Bothidae	Leifeye flounders	...B	Rodaballos, rombos, etc.
BAH	Paralichthys olivaceus	Bastard halibut	Cardeau hirame	Falso halibut del Japón
SOX	Soleidae	Soles nei	Soles nca	Lenguados nep
SOL	Solea vulgaris	Common sole	Sole commune	Lenguado común
TUR	Psetta maxima	Turbot	Turbot	Rodaballo
COD	Gadus morhua	Atlantic cod	Morue de l'Atlantique	Bacalao del Atlántico
ORY	Hoplostethus atlanticus	Orange roughy	Hoplostète orange	Relej anaranjado
PRC	Percoidel	Percoids nei	Percoides nca	Percoides nep
SNO	Centropomus undecimalis	Common snook	Crossie blanc	Róbalo blanco
BSX	Serranidae	Groupers, seabasses nei	Serranidés nca	Meros, chernas, nep
GPX	Epinephelus spp	Groupers nei	Mérous nca	Meros nep
EPA	Epinephelus akaara	Hong Kong grouper	Mérou rouge tacheté	Mero de pintas rojas
EPT	Epinephelus tauvina	Greasy grouper	Mérou loutre	Mero lutria
EPR	Epinephelus areolatus	Areolate grouper	Mérou areolé	Mero areolado
MCP	Maccullochella peelfi	Murray cod	...B	...C
PLM	Plectropomus maculatus	Spotted coral grouper	Vieille Saint-Silac	Mero con pintas
SIN	Siniperca chuatsi	Mandarin fish	...B	...C
PPA	Plectroplites ambiguus	...A	...B	...C
BSE	Dicentrarchus spp	Seabasses	Bars	Lubinas
BSS	Dicentrarchus labrax	European seabass	Bar européen	Lubina
SBH	Morone chrysops x M.saxatilis	Striped bass, hybrid	Bar d'Amérique, hybride	Lubina estriada, híbrida
STB	Morone saxatilis	Striped bass	Bar d'Amérique	Lubina estriada
SNX	Lutjanidae	Snappers, jobfishes, nei	Lutjanidés nca	Lutjánidos nep
SNA	Lutjanus spp	Snappers nei	Vivaneaux nca	Pargos nep
RES	Lutjanus argentimaculatus	Mangrove red snapper	Vivaneau des mangroves	Pargo de manglar
GRX	Haemulidae (=Pomadasyidae)	Grunts, sweetlips, nei	Grondeurs, diagrammes, nca	Burros, roncós, nep
MOA	Macquaria australasica	Australian bass	...B	...C

MCA	Macquaria ambigua	Golden perch	...B	...C
CDX	Sciaenidae	Croakers, drums nei	Sciaenidés nca	Esciéndidos nep
WXX	Cynoscion spp	Weakfishes nei	Acoupas nca	Corvinatas nep
RDM	Sciaenops ocellatus	Red drum	Tambour rouge	Corvinón ocelado
SBX	Sparidae	Porgies, seabreams, nei	Dentés, spares, nca	Dentones, sargos, nep
SBR	Pagellus bogaraveo	Blackspot(=red) seabream	Dorade rose	Besugo
SRG	Diplodus spp	Sargo breams, nei	Sars, sparailons, nca	Sargos, raspallones, nep
SWA	Diplodus sargus	White seabream	Sar commun	Sargo
RPG	Pagrus pagrus	Red porgy	Pagre rouge	Pargo
SIS	Pagrus major	Japanese seabream	Dorade du Japon	Dorada del Japón
RSS	Rhabdosargus sarba	Goldlined seabream	Sargue doré	Sargo dorado
SBG	Sparus aurata	Gilthead seabream	Dorade royale	Dorada
SLL	Chrysolephus puniceus	Slinger seabream	Spare élégant	Sargo elegante
ENJ	Eynniss japonica	Crimson seabream	...B	...C
MLB	Acanthopagrus berda	...A	...B	...C
MILM	Acanthopagrus schlegeli	Blackhead seabream	...B	...C
MUM	Mullidae	Goatfishes, red mullets nei	Rougets nca	Salmonetes nep
MUT	Mullus barbatus	Striped mullet	Rouget de vase	Salmonete de fango
SCT	Scatophagus spp	Scats	...B	...C
MOJ	Gerres spp	Mojarras(=Silver-biddies)	Blanches	Mojarras
SPI	Siganus spp	Spinefeet(=Rabbitfishes)	Sigans	Siganos
SRI	Siganus rivulatus	Marbled spinefoot	Poisson-lapin	Siguro
SCN	Siganus canaliculatus	White-spotted spinefoot	Sigan pintado	Sigano pintado
SGU	Siganus guttatus	Goldlined spinefoot	...B	...C
TRI	Balistidae	Triggerfishes, durgons	Balistes	Peces-ballesta
FLF	Cantherines(=Navodon)spp	Filefishes	...B	...C
PUX	Tetraodontidae	Puffers nei	Compères nca	Tamboriles nep
MUL	Mugilidae	Mulletts nei	Mulets nca	Lizas nep
MUF	Mugil cephalus	Fiathead grey mullet	Mulet à grosse tête	Pardele
MGU	Mugil curema	White mullet	Mulet blanc	Lisa blanca
MGI	Mugil incilis	Parassi mullet	Mulet parassi	Lisa rayada
MGC	Liza ramada	Thinlip grey mullet	Mulet porc	Morrague
MGA	Liza aurata	Golden grey mullet	Mulet doré	Galupe
LZS	Liza saliens	Leaping mullet	Mulet sauteur	Gaita
LZP	Liza parsia	Gold-spot mullet	Mulet joue d'or	Lisa mejilla dorada
LZT	Liza tade	Tade gray mullet	Mulet tade	Lisa tade
LZM	Liza macrolepis	Largescale mullet	Mulet à grandes écailles	Lisa godeya
SIL	Atherinidae	Silversides(=Sand smelts)	Atherinidés	Pejerreyes
BLU	Pomatomus saltatrix	Bluefish	Tassergal	Anjova
CGX	Carangidae	Carangids nei	Carangidés nca	Carángidos nep
JAX	Trachurus spp	Jack and horse mackerels nei	Chinchards noirs nca	Jureles nep

JJM	<i>Trachurus japonicus</i>	Japanese jack mackerel	Chinchard du Japon	Jurel japonés
SDX	<i>Decapterus spp</i>	Scads	Comètes	Macarelas
TRE	<i>Caranx spp</i>	Jacks, crevalles, nei	Chinchards, carangues, nca	Jureles, pámpanos, nep
POO	<i>Trachinotus blochii</i>	Snubnose pompano	Pompaneau lune	Pámpano lunero
PPL	<i>Trachinotus goodei</i>	Palometa pompano	...B	Palometa
AMB	<i>Seriola dumerili</i>	Greater amberjack	Sériole couronnée	Pez de limón
AMJ	<i>Seriola quinqueradiata</i>	Japanese amberjack	Sériole du Japon	Medregal del Japón
DOL	<i>Coryphaena hippurus</i>	Common dolphinfish	Coryphène commune	Lampuga
CLU	<i>Clupeoides nei</i>	Clupeoids nei	Clupeoidés nca	Clupeoideos nep
TAR	<i>Tarpon atlanticus</i>	Tarpon	Tarpon argenté	Tarpón
BFT	<i>Thunnus thynnus</i>	Northern bluefin tuna	Thon rouge du nord	Atún común(Cimarrón)
SBF	<i>Thunnus maccoyii</i>	Southern bluefin tuna	Thon rouge du Sud	Atún del Sur
GRO	<i>Osteichthyes</i>	Groundfishes nei	Poissons de fond nca	Peces de fondo nep
FIN	<i>Osteichthyes</i>	Finfishes nei	Poissons téléostéens nca	Peces de escama nep
MZZ	<i>Osteichthyes</i>	Marine fishes nei	Poissons marins nca	Peces marinos nep
PPZ	<i>Palaemonidae</i>	Freshwater prawns and shrimps	Crevettes d'eau douce	Gambas, camarones(agua dulce)
PPF	<i>Macrobrachium spp</i>	River prawns	Bouquets d'eau douce	Camarones de agua dulce
PRF	<i>Macrobrachium rosenbergii</i>	Giant river prawn	Bouquet géant	Langostino de río
MBA	<i>Macrobrachium amazonicus</i>	Amazonian river prawn	Bouquet d'Amazonie	Camarón amazónico
MBM	<i>Macrobrachium malcolmsonii</i>	Monsoon river prawn	...B	...C
AYS	<i>Astacus spp, Cambarus spp</i>	Crayfishes	Ecrevisses	Cangrejos de río
RCW	<i>Procambarus clarkii</i>	Red swamp crayfish	Ecrevisse rouge de marais	Cangrejo de las marismas
PCC	<i>Procambarus acutus</i>	White crayfish	...B	...C
CRD	<i>Astacus leptodactylus</i>	Danube crayfish	Ecrevisse du Danube	Cangrejo de patas punteadas
AAS	<i>Astacus astacus</i>	Noble crayfish	Ecrevisse commune	Cangrejo de río de patas rojas
PCL	<i>Pacifastacus leniusculus</i>	Signal crayfish	...B	...C
CRT	<i>Cherax tenuimanus</i>	Marron crayfish	...B	...C
CDT	<i>Cherax destructor</i>	Yabby crayfish	...B	...C
CRP	<i>Cherax quadricarinatus</i>	Red claw crayfish	...B	...C
FCX	<i>Crustacea</i>	Freshwater crustaceans nei	Crustacés d'eau douce nca	Crustáceos de agua dulce nep
CRE	<i>Cancer pagurus</i>	Edible crab	Tourteau	Buey de mar
SWM	<i>Portunidae</i>	Swimming crabs nei	Crabes, étrilles nca	Jaibas nep
CRS	<i>Portunus spp</i>	Swimcrabs	Crabes	Jaibas
GAZ	<i>Portunus trituberculatus</i>	Gazami crab	Crabe gazami	Jaiba gazami
MUD	<i>Scylla serrata</i>	Indo-Pacific swamp crab	Crabe de palétuviers	Cangrejo de manglares
ERS	<i>Eriocheir sinensis</i>	Chinese river crab	Crabe chinois	Cangrejo chino
SCR	<i>Maja squinado</i>	Spinous spider crab	Araignée européenne	Centolla europea
CRA	<i>Reptantia</i>	Marine crabs nei	Crabes de mer nca	Cangrejos de mar nep
VLO	<i>Palinuridae</i>	Spiny lobsters, nei	Langoustes diverses	Langostas diversas
SLV	<i>Panulirus spp</i>	Tropical spiny lobsters nei	Langoustes tropicales nca	Langostas tropicales nep

LOJ	Panulirus longipes	Longlegged spiny lobster	Langouste diablofin	Langosta duende
CRW	Palinurus spp	Palinurid spiny lobsters nei	Langoustes 'Palinurus' nca	Langostas 'Palinurus' nep
LBA	Homarus americanus	American lobster	Homard américain	Bogavante americano
LBE	Homarus gammarus	European lobster	Homard européen	Bogavante
DCP	Natantia	Natantian decapods nei	Décapodes natantia nca	Decápodos natantia nep
PEZ	Penaeidae	Penaeid shrimps	Crevettes pénidéés	...C
PEN	Penaeus spp	Penaeus shrimps nei	Crevettes 'Penaeus', nca	Langostinos 'Penaeus', nep
ABS	Penaeus aztecus	Northern brown shrimp	Crevette royale grise	Camarón café norteño
PBA	Penaeus merguensis	Banana prawn	Crevette banane	Langostino banana
YPS	Penaeus californiensis	Yellowleg shrimp	Crevette pattes jaunes	Camarón patiamarillo
APS	Penaeus duorarum	Northern pink shrimp	Crevette rodché du nord	Camarón rosado norteño
PNT	Penaeus schmitti	Southern white shrimp	Crevette ligubam du Sud	Langostino blanco sureño
KUP	Penaeus japonicus	Kuruma prawn	Crevette kuruma	Langostino japonés
PNS	Penaeus stylirostris	Blue shrimp	Crevette bleue	Camarón azul
PNV	Penaeus vannamei	Whiteleg shrimp	Crevette pattes blanches	Camarón patiblanco
GIT	Penaeus monodon	Giant tiger prawn	Crevette géante tigrée	Langostino jumbo
PNP	Penaeus plebejus	Eastern king prawn	Crevette royale orientale	Langostino real oriental
FLP	Penaeus chinensis	Fleshy prawn	Crevette charnue	Langostino carnosos
TGS	Penaeus kerathurus	Caramote prawn	Caramote	Langostino
PNB	Penaeus brasiliensis	Redspotted shrimp	Crevette royale rose	Camarón rosado con manchas
TIP	Penaeus semisulcatus	Green tiger prawn	Crevette tigrée verte	Langostino tigre verde
PRB	Penaeus esculentus	Brown tiger prawn	Crevette tigrée sombre	Langostino tigre marrón
PST	Penaeus setiferus	Northern white shrimp	Crevette ligubam du nord	Camarón blanco norteño
PNI	Penaeus indicus	Indian white prawn	Crevette blanche des Indes	Langostino blanco de la India
REP	Penaeus penicillatus	Redtail prawn	Crevette queue rouge	Langostino colorado
PPS	Penaeus paulensis	Sao Paulo shrimp	Crevette de Sao Paulo	Langostino de Sao Paulo
PNU	Penaeus subtilis	Southern brown shrimp	Crevette grise du Sud	Camarón café sureño
MET	Metapenaeus spp	Metapenaeus shrimps nei	Crevette 'Metapenaeus' nca	Camarones 'Metapenaeus' nep
MPN	Metapenaeus monoceros	Speckled shrimp	...B	...C
MPB	Metapenaeus brevicornis	Yellow shrimp	Crevette jaune	Camarón amarillo
MPM	Metapenaeus macleayi	Eastern school shrimp	Crevette de maclay	Camarón maclayo
ENS	Metapenaeus endeaouuri	Endeaouur shrimp	Crevette devo	Camarón devo
MPD	Metapenaeus dobsoni	Kadal shrimp	...B	...C
MPE	Metapenaeus ensis	Greasyback shrimp	...B	...C
BOB	Xiphopenaeus kroyeri	Atlantic seabob	Crevette seabob(Atlantique)	Camarón siete barbas
ASH	Artemesia longinaris	Argentine stiletto shrimp	Crevette stylet d'Argentine	Camarón estilete argentino
AKS	Acetes japonicus	Akiami paste shrimp	Chevette akiami	Camaroncillo akiami
CPR	Palaemon serratus	Common prawn	Bouquet commun	Camarón común
LAA	Pleoticus muelleri	Argentine red shrimp	Salicoque rouge d'Argentine	Camarón langostin argentino
AMS	Artemia salina	Brine shrimp	Crevette de salines	Artemia
CRU	Crustacea	Marine crustaceans nei	Crustacés marins nca	Crustáceos marinos nep

CMJ	Corbicula japonica	Japanese corbicula	Cyrene japonaise	Corbicula japonesa
CMA	Corbicula fluminea	Asian clam	...B	...C
MOF	Mollusca	Freshwater molluscs nei	Mollusques d'eau douce nca	Moluscos de agua dulce nep
ABX	Haliotis spp	Abalones nei	Ormeaux nca	Orejas de mar nep
ABF	Haliotis rufescens	Red abalone	...B	...C
ABJ	Haliotis discus	Japanese abalone	...B	...C
ABP	Haliotis midae	Perlemoen abalone	Ormeau de Mida	Oreja de mar
ABR	Haliotis rubra	Blacklip abalone	Ormeau à lèvres noires	Oreja de mar de labios negros
HLT	Haliotis tuberculata	European abalone	Ormeau d'Europe	Oreja de mar de Europa
ABM	Haliotis diversicolor	Small abalone	...B	...C
PER	Littorina spp	Periwinkles nei	Bigorneaux nca	Bígaros nep
CON	Strombus spp	Stromboid conchs	Strombes	Cobos
COO	Strombus gigas	Pink conch	...B	...C
OST	Ostreidae	Flat and cupped oysters, nei	Huîtres plates et creuses, nca	Ostras y ostiones, nep
OYX	Ostrea spp	Flat oysters nei	Huîtres plates nca	Ostras nep
OCH	Ostrea chilensis	Chilean flat oyster	Huître plate chilienne	Ostra chilena
OYF	Ostrea edulis	European flat oyster	Huître plate européenne	Ostra europea
OFO	Ostrea lurida	Olympia flat oyster	Huître plate indigène	Ostra plegata
DRY	Ostrea lutaria	New Zealand dredge oyster	Huître plate néo-zélandaise	Ostra de Nueva Zelandia
OYC	Crassostrea spp	Cupped oysters nei	Huîtres creuses nca	Ostiones nep
OYG	Crassostrea gigas	Pacific cupped oyster	Huître creuse du Pacifique	Ostión japonés
OYM	Crassostrea rhizophorae	Mangrove cupped oyster	Huître creuse des Caraïbes	Ostión de mangle
OYA	Crassostrea virginica	American cupped oyster	Huître creuse américaine	Ostión virginico
OYP	Crassostrea angulata	Portuguese cupped oyster	Huître portugaise	Ostión
CSC	Saccostrea cucullata	Hooded oyster	Huître-capuchon	Ostión capuchón
OYI	Crassostrea madrasensis	Indian backwater oyster	...B	...C
OYS	Crassostrea commercialis	Sydney cupped oyster	Huître creuse d'Australie	Ostra australiana
CSI	Crassostrea iredalei	Slipper cupped oyster	...B	...C
OYL	Crassostrea belcheri	Lugubrious cupped oyster	...B	...C
OYR	Crassostrea corteziensis	Cortez oyster	Huître creuse de Cortez	Ostra de Cortez
OYU	Crassostrea rivularis	Suminoe oyster	...B	...C
OYN	Saccostrea echinata	Spiny oyster	...B	...C
MSX	Mytilidae	Sea mussels nei	Moules nca	Mejillones nep
MUK	Mytilus coruscus	Korean mussel	Moule coréenne	Mejillón coreano
MUJ	Mytilus californianus	Californian mussel	...B	...C
MYC	Mytilus chilensis	Chilean mussel	Moule chilienne	Chorito
MUS	Mytilus edulis	Blue mussel	Moule commune	Mejillón común
MUG	Mytilus smaragdinus	Green mussel	Moule verte	Mejillón verde
MSM	Mytilus galloprovincialis	Mediterranean mussel	Moule méditerranéenne	Mejillón mediterráneo
MYA	Mytilus planulatus	Australian mussel	Moule d'Australie	Mejillón de Australia
CHC	Choromytilus chorus	Choro mussel	Moute choro	Choro

MOD	Modiolus spp	Horse mussels	Modiolas	Modiolos
MSL	<i>Perna perna</i>	South American rock mussel	Moule de roche sudaméricaine	Mejillón de roca sudamericano
MSV	<i>Perna viridis</i>	Brown mussel	...B	...C
MUZ	<i>Perna canaliculus</i>	New Zealand mussel	Moule de la Nouvelle Zélande	Mejillón de Nueva Zelândia
MSI	<i>Perna indica</i>	Indian brown mussel	...B	...C
MSC	<i>Aulacomya ater</i>	Cholga mussel	Moule cholga	Cholga
SCX	Pectinidae	Scallops nei	Peignes nca	Peines nep
JSC	<i>Pecten yessoensis</i>	Yesso scallop	Pétoncle du Japon	Vieira japonesa
SCE	<i>Pecten maximus</i>	Great Atlantic scallop	Coquille St-Jacques atlantique	Vieira
SCZ	<i>Pecten novaezelandiae</i>	New Zealand scallop	Pecten de la Nouvelle Zélande	Vieira de Nueva Zelândia
SSC	<i>Pecten fumatus</i>	Australian Southern scallop	Pecten de l'Australie du Sud	Vieira australiana del Sur
SCA	<i>Placopecten magellanicus</i>	American sea scallop	Pecten d'Amérique	Vieira americana
SCQ	<i>Argopecten purpuratus</i>	Peruvian calico scallop	Peigne éventail	Concha de abanico
SCH	<i>Argopecten circularis</i>	Pacific calico scallop	...B	Almeja catarina
GMP	<i>Chlamys purpurata</i>	Purple scallop	Peigne mauve	Peine purpureo
QSC	<i>Chlamys opercularis</i>	Queen scallop	Vanneau	Volandeira
CMF	<i>Chlamys faireri</i>	Farrer's scallop	...B	...C
CMN	<i>Chlamys nobilis</i>	Noble scallop	...B	...C
ARK	<i>Arca spp</i>	Ark clams	Arches	Arcas
ACB	<i>Scapharca broughtonii</i>	Inflated ark	...B	...C
MCL	<i>Scapharca subcrenata</i>	Half-crenated ark	Arche crenelée	Arca japonesa
BLS	<i>Anadara spp</i>	Blood cockles	...B	Arcas
BLC	<i>Anadara granosa</i>	Blood cockle	Arche granuleuse	Arca del Pacífico occidental
CLQ	<i>Arctica islandica</i>	Ocean quahog	Cyprine d'Islande	Almeja de Islandia
COZ	Cardidae	Cockles nei	Coques nca	Berberechos(=Cárdidos)nep
COC	<i>Cardium edule</i>	Common edible cockle	Coque commune	Berberecho común
MTV	<i>Macra veneriformis</i>	Globose clam	...B	...C
MAG	<i>Macra glabrata</i>	Smooth macra	Macre lisse	Almeja lisa
CLV	Veneridae	Venus clams	Petites praires	Almejas(=Venáidos)
SVE	<i>Venus(=Chamelea) gallina</i>	Striped venus	Petite praire	Chirla
HCJ	<i>Meretrix lusoria</i>	Japanese hard clam	Cythérée du Japon	Mercenaria japonesa
HCA	<i>Meretrix meretrix</i>	Asiatic hard clam	...B	...C
CTG	<i>Ruditapes decussatus</i>	Grooved carpet shell	Palourde croisée d'Europe	Almeja fina
CLJ	<i>Ruditapes philippinarum</i>	Japanese carpet shell	Clam japonais	Almeja japonesa
TPS	<i>Tapes spp</i>	Carpet shells nei	Cloisses nca	Almejas nep
CTS	<i>Tapes pullastra</i>	Pullet carpet shell	Palourde bleue	Almeja babosa
BCL	<i>Saxidomus giganteus</i>	Butter clam	Coque jaune	Almeja amarilla
PAU	<i>Paphia undulata</i>	Undulate venus	...B	...C
PTS	<i>Protothaca staminea</i>	Pacific littleneck clam	Amande de mer	...C
CLH	<i>Mercenaria mercenaria</i>	Northern quahog(=Hard clam)	Praire	Chirla mercenaria
DON	<i>Donax spp</i>	Donax clams	Olives de mer	Coquinas

RAZ	Solen spp	Razor clams	Couteaux	Navajas(=Solénidos)
CLS	Mya arenaria	Sand gaper	Mye des sables	Almeja de can
GEC	Panopea abrupta	Pacific geoduck	Panopée du Pacific	...C
TDG	Tridacna gigas	Giant clam	...B	...C
TDD	Tridacna derasa	Smooth giant clam	...B	...C
TDS	Tridacna squamosa	Fluted giant clam	...B	...C
HIP	Hipposus hipposus	Bear pow clam	...B	...C
CLX	Bivalvia	Clams nei	Clams nca	Almejas nep
CTC	Sepia officinalis	Common cuttlefish	Seiche commune	Sepia común
OCT	Octopodidae	Octopuses, nei	Pieuvres, poulpes, nca	Pulpos, pulpos, nep
OCZ	Octopus spp	Octopuses	...B	...C
MOL	Mollusca	Marine molluscs nei	Mollusques marins nca	Moluscos marinos nep
FRG	Rana spp	Frogs	Grenouilles	Ranas
TTX	Testudinata	Marine turtles nei	Tortues de mer nca	Tortugas de mar nep
TUL	Testudinata	River and lake turtles nei	Tortues d'eau douce nca	Galápagos nep
TUG	Chelonia mydas	Green turtle	Tortue verte	Tortuga verde
CRO	Crocodylidae	Crocodiles and alligators	Crocodiles et alligators	Cocodrilos y alligatores
AGM	Alligator mississippiensis	American alligator	Alligator américain	Caimán americano
CDP	Crocodylus porosus	Estuarine crocodile	...B	...C
CDS	Crocodylus siamensis	Siamese crocodile	Crocodile du Siam	Cocodrilo del Siam
CRH	Crocodylus johnstoni	Australian crocodile	Crocodile australien	Cocodrilo de Australia
SSX	Asciacea	Sea squirts nei	Ascidians nca	Ascidias nep
SSR	Pyura stolonifera	Red bait	...B	...C
INV	Invertebrata	Aquatic invertebrates nei	Invertébrés aquatiques nca	Invertebrados acuáticos nep
OSH	Ex Pinctada spp	Pearl oyster shells	Coquilles d'huîtres perlières	Conchas de ostras perleras
PNM	Pinctada margaritifera	Black-lip pearl oyster	...B	...C
PNX	Pinctada maxima	Silver-lip pearl oyster	...B	...C
PNF	Pinctada fucata	Japanese pearl oyster	...B	...C
PTE	Pteria penguin	Penguin wing oyster	...B	...C
SPO	Spongidae	Sponges nei	Eponges nca	Esponjas nep
SWB	Phaeophyceae	Brown seaweeds	Algues brunes	Algas pardas
KEL	Laminariales	Kelps	Varechs	Laminarias
LNJ	Laminaria japonica	Kelp	...B	...C
UDS	Undaria spp	Wakame nei	...B	...C
UDP	Undaria pinnatifida	Wakame	...B	...C
SWR	Rhodophyceae	Red seaweeds	Algues rouges	Algas rojas
PRT	Porphyra tenera	Laver(=Nori)	...B	...C
PRH	Porphyra haitonensis	...A	...B	...C
GEL	Gelidium spp	Gelidium	...B	...C
EMX	Eucheuma spp	...A	...B	...C
EMA	Eucheuma alvarezii	...A	...B	...C



EMC	Eucheuma cottoni	...A	...B	...C
EMI	Eucheuma spinosum	...A	...B	...C
GLS	Gracilaria spp	...A	...B	...C
SWG	Chlorophyceae	Green seaweeds	Algues vertes	Algas verdes
MTN	Monostroma nitidum	Green laver	...B	...C
CAU	Caulerpa spp	...A	...B	...C
APL	Algae	Aquatic plants nei	Plantes aquatiques nca	Plantas acuáticas nep

A census of agriculture is a large-scale national statistical operation for collecting quantitative information on the structure of a country's food production sector. The *Programme for the World Census of Agriculture 2000* recommends extending the scope of the programme to include aquaculture. This supplement is intended to assist countries in improving their current surveys of aquaculture and to provide a framework for those countries planning to develop databases on aquaculture. Its four chapters provide background information on the need for the supplement as well as definitions, concepts, standards and guidelines for collecting internationally comparable data on aspects such as the location and size of farms, types of aquacultural activity, employment structure, resource use and inputs. The items proposed for collection address issues related to natural resource utilization and sustainable aquaculture developmental issues. In addition, the supplement provides examples of summary tables which could be used to develop a questionnaire. Also included are relevant notes from the main *Programme for the World Census of Agriculture 2000* and the species classification list used by FAO for farmed aquatic species.

ISBN 92-5-104054-0 ISSN 1014-3378



9 789251 040546

M-78

W7208E/1/11.97/2700