

The background of the entire page is a solid teal color. Overlaid on this is a complex pattern of numerous thin, semi-transparent teal lines. These lines are oriented diagonally, running from the top-left towards the bottom-right. They vary in length and opacity, creating a sense of depth and movement, similar to a digital glitch or a stylized representation of data flow.

PART ONE

Report on the 2000 World Census of Agriculture



CHAPTER I

Introduction

1.1 Background

1.1.1 The first Programme for the World Census of Agriculture (WCA) was developed for the years 1929-1930 by the International Institute of Agriculture (IIA) and implemented in about 60 countries. The IIA intended to conduct a second Programme for 1940 with much wider coverage, but the Second World War interfered with its full implementation.

1.1.2 FAO, having succeeded the IIA, took over the task of organizing the World Census of Agriculture and continued with the preparation and advocacy of successive decennial programmes. Each Programme benefitted from the experience of the previous ones, both from the methodological and the operational point of view. The 1950 programme restricted the scope of those relating to 1930 and 1940. The next programmes, however, re-expanded the scope of the census and introduced some methodological improvements, whilst keeping the structure of agriculture as the central theme.

1.1.3 The Programme for the 2000 WCA round was the eighth decennial international census programme. It defined a Census of Agriculture as *“a large-scale, periodic, statistical operation for the collection of quantitative information on the structure of agriculture”* and continued to elaborate: *“the word ‘census’ implies a complete enumeration of all agricultural holdings. However, by extension, it can be conducted by a sample enumeration, provided the sample is large enough to generate sub-national data”*.

1.1.4 This publication is part of the series of reports and reviews prepared at the end of each WCA round. However, bearing in mind the coverage of countries and the available data in this round, the traditional contents of the reports on the WCA rounds have been divided into two publications. The individual country results and the metadata on the country censuses are presented in the accompanying publication *“2000 World Census of Agriculture: Main results and Metadata by Country (1996 – 2005)”* (FAO, 2010). Besides the key statistical information on the structure of agriculture in each country, the publication provides one page of metadata on the census of the country including Historical outline, Institutional arrangements, Enumeration period, Reference date, Definitions, Coverage, Sampling frame, Methods, Data source, Mailing address of responsible organization and Website etc. These pages can also be accessed from the website of FAO Statistics Division¹.

1.1.5 A separate volume *“2000 World Census of Agriculture: Methodological Review”* (FAO, 2013) will present an analysis of the methodological aspects of the censuses carried out during the 2000 WCA round, which covered the censuses undertaken by countries during the decade: January 1st, 1996 – December 31st, 2005. The publication will present a review of main data collected, methods and techniques for collection, processing and dissemination of census data, and selected country examples to highlight the best practices. The publication has been written principally for planners of agricultural censuses.

1.1.6 This publication presents a comparison of data (not without limitations) received from different countries. It provides selected data on number and area of holdings (classified by land-size of holding, if available), gender of the holder, farm population, employment, land tenure, land use, main crops, livestock, irrigation and machinery and equipment. In addition to thematic tables presented in PART TWO of the publication, the key findings are presented in Chapter 4. Maps and charts are used to highlight the key conclusions.

1 FAO Statistics Division: <http://www.fao.org/economic/ess/en/>

1.1.7 Census data at the national level are available in diverse forms and language. Effort was made by the FAO Statistics Division to collect, validate and standardize to present these in a comparable format using the terminology and classifications of the *FAO Programme for the WCA 2000, to the best extent possible*. Users are, nonetheless, advised to carefully use the data bearing in mind the limitations and warnings mentioned in Chapter 3 of the publication.

1.1.8 The data presented here relates to the 2000 WCA round. As per information available at the time of preparation of the report, some 122 countries had conducted an agricultural census during the period (including those which collected similar information in their population censuses); nevertheless this report has been prepared on the basis of the results from the 114 countries and territories for which census reports were made available to FAO.

1.2 General characteristics of the 2000 World Census of Agriculture

1.2.1 The 2000 Programme (FAO, 1995. § 1.17) had three main features:

- Uniformity in concepts, definitions and classifications with those of other data sources was promoted. To the extent possible concepts and definitions proposed for the census were compatible with those recommended by other UN organisations. For example, definitions adopted for the concepts such as “household” and “occupation” conformed to those recommended by the United Nations Statistics Division (UNSD).
- It was recommended to limit the data coverage within the census. Given the scale, resources requirement, field management, enumeration skills and data processing implications, this limitation was considered essential to ensure the success of the census.
- In relation to the previous WCA Programme, changes had been kept to a minimum. Some changes were necessary to reflect changing priorities and to improve the presentation and analysis of data. In the 2000 WCA basic data items to address “gender” and “environmental” dimension of agriculture were introduced. The need for geo-referenced data was also realized.

1.2.2 In a broad sense “census of agriculture” refers to a nationwide large scale operation for collecting, processing, analysing and disseminating agricultural structural information. In that sense an agricultural census may be conducted through complete enumeration or sampling or a combination of both. When a large sample survey is conducted to generate sub-national data, the FAO Programme refers to it as “sample enumeration”. However, for the purpose of reaching an extensive international comparison, the present publication covers information from censuses carried out both through complete enumeration and sampling. Information on the design of censuses adopted in specific countries could be obtained in FAO, 2010 and FAO, 2011a.

1.2.3 The Programme for the WCA 2000 established three basic objectives of a census (FAO, 1995. § 4.1):

- To provide aggregate totals for fundamental agricultural data to use as benchmarks for inter-census estimates.
- To provide a frame for other agricultural sample surveys.
- To provide data for small administrative units and detailed cross-classifications of farm structural attributes.

1.2.4 Regarding the census scope (the data items on which information is to be collected), the Programme for the WCA 2000 identified eight broad items (FAO, 1995. § 4.8): 1) Location of holding; 2) Legal status of holder; 3) Purpose of production; 4) Integration of holding with other enterprises engaged in other economic activity (ies); 5) Basic demographic characteristics of the holder and the household; 6) Inventory of production factors; 7) Tenure arrangements for production factors; 8) Other features.

1.2.5 The data item on “Inventory of production factors” was further enumerated as covering:

- source of manpower used on the holding (family workers, hired agricultural workers);
- number and area of land parcels;
- area by land use;
- area harvested, by crop;
- number of cultivated trees by crop;

- number of livestock by type;
- type of machinery and equipment used;
- number of forest trees on the holding; and
- agricultural buildings.

1.2.6 The “tenure arrangements” for production factors referred to land tenure and source of machinery and equipment used. The other features on which data was proposed to be collected included: (1) Shifting cultivation, (2) Use of irrigation, drainage, fertilizers, pesticides and high yielding variety seeds, (3) Fishery or forestry activities, if carried out on the holding, and (4) Livestock system.

1.2.7 The above mentioned scope has been maintained from the previous census Programme. Whilst the Programme advocates to not include in the census many aspects relevant to agriculture not suitable for collection in a multi-purpose single enumeration, such as production, yields, etc, some countries did take advantage of the census exercise to produce information on non-structural items of practical consideration. On the other hand, some subjects included in the census scope according to the FAO Programme were sometimes disregarded by countries because they were not relevant to them.

1.3 Regional groupings and availability of data from censuses

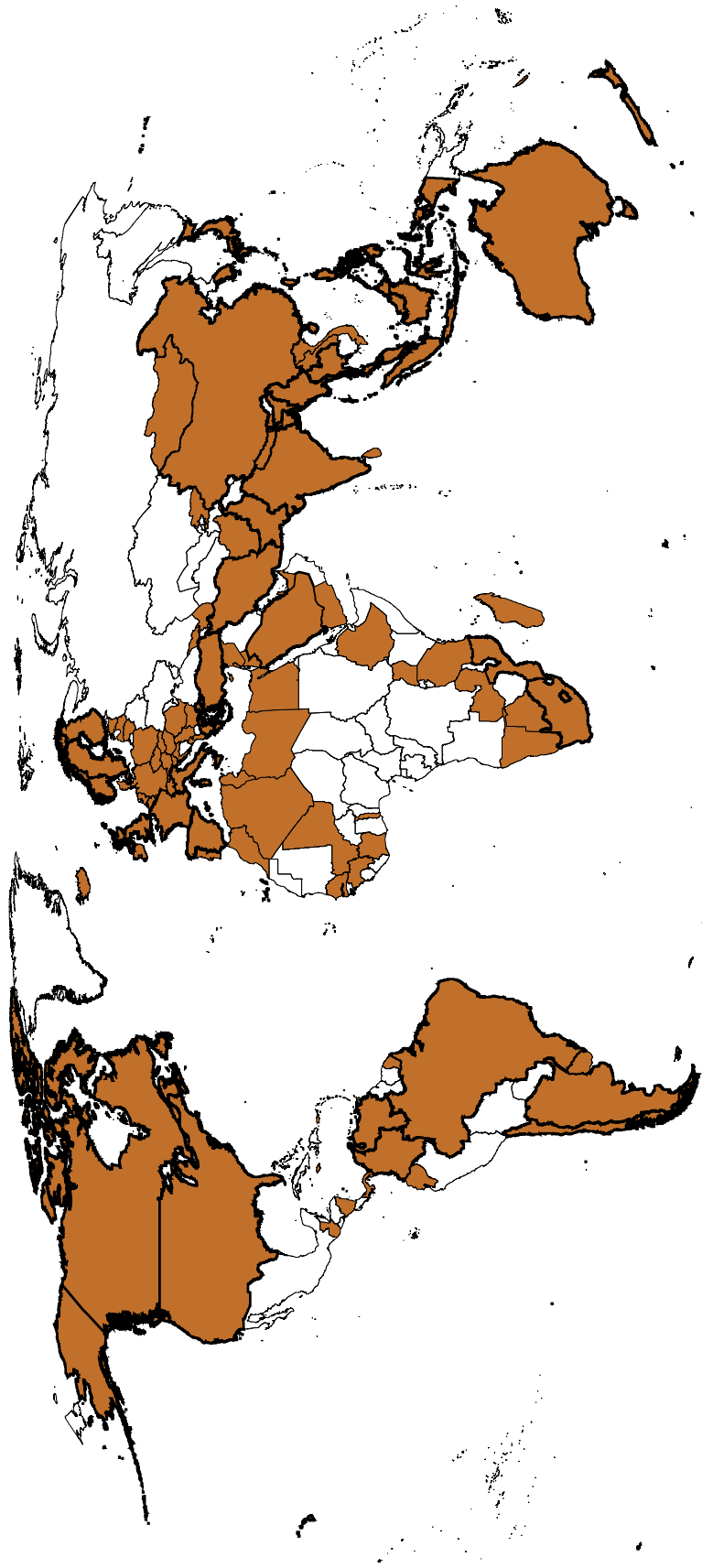
1.3.1 In order to capture the broad structural tendencies in different regions the data collected from the census reports of the countries has been grouped in regions. The grouping of countries in different regions has been done in conformity with that used in earlier publications in the FAO Statistical Development Series. This country grouping by regions follows UNSD standards on composition of macro geographical (continental) regions viz. Africa, Americas, Asia, Europe, and Oceania. However, to be able to draw meaningful conclusions from the analysis of country practices, the countries in Americas have been classified into two groups: “America, North and Central (including Caribbean countries)” and “America, South” which is consistent with the division into sub-regions proposed by UNSD. Bearing in mind the membership of FAO, the location of territories and their identity, the countries and territories have been classified into the region of their location. Purely for statistical purposes, no distinction has been made between “countries” and “territories” in this publication and both are referred to as “countries”.

1.3.2 A review of the data collected by countries indicates that most countries include the data items on land, crops, livestock taken from their agricultural censuses. While 83 out of 114 countries included in the review have collected information on the demography of the household managing the holding, only 57 countries are reported to have collected information on legal status of the holdings. The information on number of holdings managed by civil persons is available for a bigger number of countries than the area managed by these holdings. The area of holdings by legal status is not tabulated and published in many reports even in some European countries, even though most countries collect data on legal status of the holding. The information on the legal status of the holder is conspicuously scanty in the censuses carried out in Africa.

1.3.3 There is a lack of availability of information on forms of land tenure in Africa, perhaps due to a variety of conventional land tenure types which are often not precisely defined in legal terms. Some 76 countries out of 114 countries collected data on employment on holdings but less than half of these countries collected information on “household members engaged in agriculture”. Although countries collect information on existence of building and structure on the holdings, no comparison is possible at international level due to lack of information on area under the farm buildings. Most censuses focus on estimating area allocated to crops, and the area under buildings etc. is grouped together with other areas including ponds.

1.3.4 Only a third of countries collected information on farm machinery. Attempts were made to prepare comparable data on “number of tractors” held by the agricultural holding. It was observed that countries often do not distinguish between the types of tractors (e.g. *4 wheeled tractors and track laying tractors*) and their capacity. The availability of data from agricultural censuses on “water and irrigation” is very poor. Only some 15 countries collected information on “holding area that received irrigation” and even a smaller number of countries report on “number of holdings receiving irrigation”. The information on “other non-agricultural activities of the holding” was collected in less than one quarter of the censuses under review. As these activities are of local importance, no international comparison of the data was carried out.

Map 1.
Countries that conducted an agricultural census during the WCA 2000 round (1996-2005)



■ Agricultural census conducted (122 countries)
□ No census or no information

Map produced by: ESS Division - FAO
Data sources: WCA 2000 and GAUL
The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

CHAPTER 2

Participation of Countries in the 2000 WCA Round

2.1 Increasing participation of the countries

2.1.1 This publication summarizes and compares information from 114 countries and territories² whose reports were made available to FAO till the time of finalization of this publication. This includes 25 countries in Africa, 29 countries each in Asia and Europe, 14 countries of North and Central America, 8 countries in South America, and 9 countries in Oceania region. In order to enhance the scope of comparison of structure of agriculture among the FAO member countries, the publication has also included the data from 6 countries which did not carry out an agricultural census, in the strict sense of the term, but have instead used alternative methods for obtaining data normally collected through agricultural censuses. The countries like Serbia³³, Seychelles, Uganda and Zambia used their population censuses to collect structural data on agriculture. Afghanistan and Mongolia carried out a livestock census. The annual livestock census of Mongolia is not strictly a census or a survey as it is based on a reporting system. However, given the importance of a large population of livestock in the country, it was considered appropriate to include the country in the related comparison tables.

2.1.2. Table 1.2 in PART TWO of the publication lists participation of countries in different rounds of the WCA beginning with 1930. Summary Table 1 below depicts the trends in the number of countries participating in the different rounds in different regions since the first round in 1930.

Table 1. Number of countries participating in the WCA rounds

Region	WCA round						
	1930	1950	1960	1970	1980	1990	2000
Total number of FAO members as the end of each round	–	70	109	132	154	173	189
Total number of participating countries	55	81	100	111	103	90	114
Africa	8	17	28	25	23	20	25
America, North and Central	10	18	19	23	18	16	14
America, South	5	8	11	10	7	7	8
Asia	5	10	19	19	21	14	29
Europe	23	20	17	24	22	20	29
Oceania	4	8	6	10	12	13	9

2.1.3. Global coverage of the 2000 WCA (1996-2005), is depicted geographically in Map 1. The shaded area of the map also covers the 8 countries for which the data was not available but were it was reported that the country undertook an agricultural census during the 2000 WCA.

2.1.4 A record number of 122 countries covered in the 2000 WCA also includes 8 that undertook their first agricultural census during the decade. These include China, Comoros, Kyrgyzstan, Lao People's Democratic Republic and Mozambique. The censuses of agriculture of Croatia, Czech Republic, Estonia, Latvia, Lithuania, Serbia and Slovakia were the first as independent countries.

² For statistical purposes both "countries" and "territories" are hereinafter referred to as "countries"

³ Figures for Serbia reported here are extracted from a booklet on Census of Population, Households and Dwellings 2002. As per Communication number 295 dated December 24, 2002, the results relate to Central Serbia and AP Vojvodina.

2.1.5 The success of this round as compared to the previous 1990 WCA round is also due to the fact that about 41 countries which had undertaken a census before but missed the 1990 WCA round for a variety of reasons, did undertake a census in the 2000 WCA round. There were some 15 such countries in Asia and 12 in Africa.

2.1.6. An in-depth study of Table 1.2 of PART TWO shows that there are some 73 countries which carried out an agricultural census during both the 1990 WCA and the 2000 WCA rounds. This number includes 21 countries in Europe, 14 in Asia, 13 in Africa, 17 in North, Central and South America, and 8 countries in Oceania. It seems that a mandatory requirement of EUROSTAT is to conduct a Farm Structure Survey and/or Census, which is also linked to some incentives for the member countries. This has contributed to the establishment of a regular periodicity of agricultural censuses in Europe. Despite the absence of any such incentives, a tendency towards a regular agricultural census among Asian countries, particularly those occupying large agricultural areas, is also noted. Map 2 indicates the importance of agriculture in a country using the indicator "area of agricultural holdings as percentage of total area of the country"; see Column 8 of Table 1.3 in PART TWO for information on individual countries. It is encouraging to note that most major agricultural countries of the world are covered by this round of the WCA.

2.2 Coverage of the 2000 WCA round by population and area

2.2.1 Table 1.3 in PART TWO provides information on the geographical area of countries, the area managed by agricultural holdings, and the population for the 114 countries covered in this report. These results are summarized in Table 2 below to assess the global coverage of the 2000 WCA round, and depicted in Chart 1.

Table 2. Global coverage of the 2000 WCA round

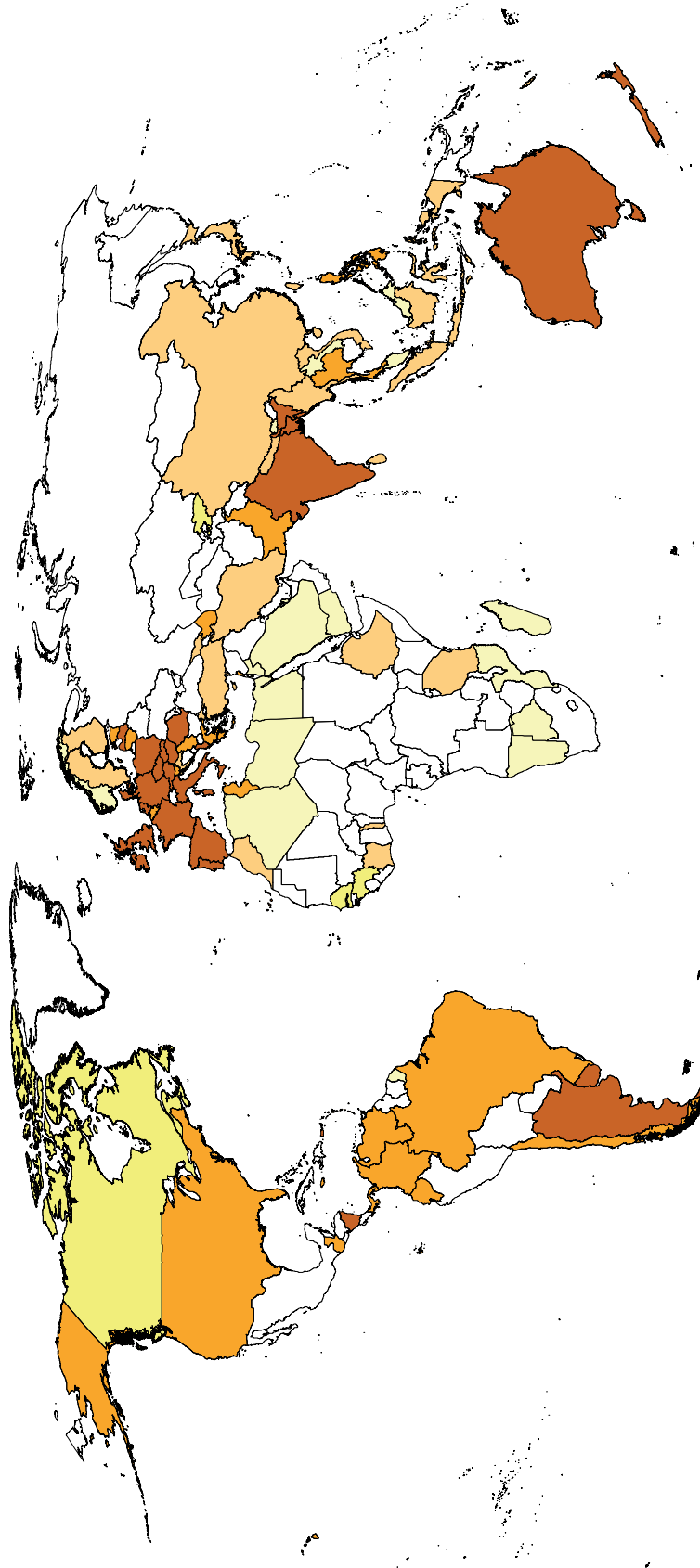
Region	World			Coverage of the 2000 WCA by					
	Total number of countries#	Total population (millions)	Total area of countries (million ha)	Countries		Population		Physical area	
				(number)	(% of total)	(millions)	(% of world)	(million ha)	(% of world)
TOTAL	222	6 115	13 407	114	51.3	5 067	82.9	8 598	64.1
Africa	56	819	3 014	25	44.6	413	50.4	1 461	48.5
America, North and Central	36	484	2 284	14	38.9	344	71.1	1 859	82.7
America, South	14	356	1 782	8	57.1	307	86.2	1 440	80.8
Asia	51	3 698	3 176	29	56.9	3 484	94.2	2 585	81.4
Europe	39	727	2 297	29	74.4	496	68.2	456	19.8
Oceania	26	31	854	9	34.6	24	76.8	797	93.3

Source: Population (refers to year 2000-01) (FAO,2006); Total area of the countries (FAO, 1997).

#The number of countries has been kept the same as those in the 1990 WCA round to facilitate comparison. This minor inaccuracy is not likely to affect the broad conclusions.

2.2.2 The size, population and structure of agriculture in the 114 countries covered in the report differ considerably. The report includes small countries like American Samoa with a country area of 20 thousand hectares to big countries like China with 932.7 million hectares. The total population of countries vary from 20 thousand inhabitants in Cook Islands to over 1,282 million in China. Together these 114 countries represent more than half of the total number of countries, and about 65 percent of the total geographical area in the world. The highest coverage of countries is observed in Europe which is followed by South America and Asia. The participation rate of countries in Africa, Central America and Oceania is among the lowest. Nonetheless, in Oceania, the area covered by agricultural censuses was over 93 percent, which was even better than the area coverage of about 81 percent in the Americas and Asia.

Map 2.
Area of agricultural holdings as percentage of total country area

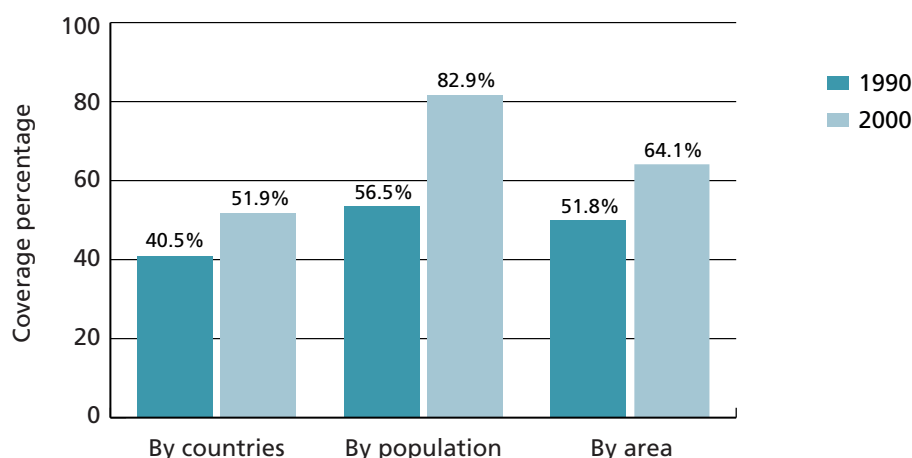


Countries covered: 105

- Less than 5 % (21 countries)
- 5 - 10 % (4 countries)
- 10 - 25 % (26 countries)
- 25 - 50 % (28 countries)
- 50 % or more (26 countries)
- No Data

Map produced by: ESS Division - FAO
 Data sources: WCA 2000 and GAUL
 The boundaries and names shown and the designations used in this map do not imply official endorsement or acceptance by the United Nations.

Chart 1. Coverage of agricultural censuses in the 1990 and 2000 WCA rounds



2.2.3 Chart 1 and Table 3 present a broad picture of coverage during the 2000 WCA round as compared to the previous round. The remarkable success of the 2000 WCA round is demonstrated by the number of countries covered, the world area covered (area of the countries which conducted a census) and the population covered (population of countries which have done the census). In 1990 WCA round only 40 percent of the total countries were covered and 50 percent in 2000 WCA round. The population of countries conducting an agricultural census during the 2000 WCA round was about 83 percent of the world population as compared to the corresponding figure of only 56.5 percent in the 1990 WCA round. In terms of area, the 2000 WCA round covered 65 percent of the world area against about 52 percent covered in the 1990 WCA. The low rates of area coverage for Europe is largely on account of absence of Russian Federation and other neighbouring countries in both the 1990 and 2000 rounds.

2.2.4 The entry of China in the list of countries undertaking a census explains a large part of the observed increase in area and population covered by agricultural censuses. The first ever census of China during this round (1997) implied the inclusion of 130 million hectares of holding land in international comparisons. Also without considering China the increase would have been 39 percent in terms of area (from 5.6 thousand million hectares in 1990 to 7.8 thousand million hectares in 2000) and of 56 percent in terms of population (from 2.4 thousand million people in 1990 to 3.8 thousand million people in 2000). The large increase in area covered is due to the increased coverage in Asia (mainly due to China), North, Central and South America.

Table 3. Comparison of coverage in the 1990 and the 2000 WCA rounds

Region	By country				By population				By physical area			
	(number)		(% of total)		(number in millions)		(% of world population)		(millions of Ha.)		(% of world area)	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
TOTAL	90	114	40.5	51.3	2 989	5 067	56.5	82.9	6 942	8 598	51.8	64.1
Africa	20	25	35.7	44.6	237	413	37.3	50.4	1 053	1 461	34.9	48.5
America, North and Central	16	14	44.4	38.9	375	344	88.4	71.1	2 196	1 859	96.1	82.7
America, South	7	8	50.0	57.1	242	307	82.6	86.2	1 437	1 440	80.6	80.8
Asia	14	29	27.5	56.9	1 686	3 484	52.9	94.2	1 088	2 585	34.3	81.4
Europe	20	29	51.3	74.4	427	496	59.1	68.2	364	456	15.8	19.8
Oceania	13	9	50.0	34.6	22	24	84.6	76.8	804	797	94.1	93.3

Source: Population (refers to year 2000-01) (FAO,2006); Total area of the countries (FAO, 1997).

CHAPTER 3

Methodological Considerations and Limitations

3.1 Scope and coverage of the report

3.1.1 The items proposed to the countries for inclusion in their agricultural census as part of the Programme for the World Census of Agriculture 2000 and the related definitions and concepts can be found in Chapter 5 of the Programme document (FAO, 1995). The metadata on agricultural censuses of individual countries and the main results for the countries participating in the 2000 WCA round have been published (FAO, 2010). The publications and the related information can be downloaded from the website of the FAO Statistics Division which has a dedicated section on the WCA.

Incompleteness of the 2000 WCA round

3.1.2 This report on the 2000 WCA round relates to only 114 countries out of the 222 countries and territories in the World, of which 189 were FAO members at the end of the round⁴. The main countries (in terms of population) not covered in this round, by continent, are:

- **Africa:** Nigeria
- **North and Central America:** Dominican Republic, El Salvador, Haiti and Mexico
- **South America:** Peru
- **Asia:** Iraq, Israel and Syrian Arab Republic
- **Europe:** Belarus, Russian Federation and Ukraine
- **Oceania:** none.

3.1.3 This publication was conceived with the objective of providing comparable data on the key structural aspects of agriculture practiced in different countries around the world. The international comparison tables included in PART TWO includes data for all countries which have provided their reports to FAO. However, due to the varying scope and coverage of country censuses, it has not always been possible to cover all the reporting countries in all the tables. It was considered useful to prepare and publish specific tables even if only a few countries could be included in them. It can be noted from the 36 comparison tables included in this publication that the number of countries covered in a table varies from 15 in Table 10.1 on irrigation to 114 in Table 1.2 on number and area of holdings. The countries not covered in a table were either those whose reports were not available to FAO, or comparable data on the relevant item could not be found in their reports.

Caution in reading the tables

3.1.4 The information in the tables has been arranged by regions as described in Chapter 1. However, as not all countries in a region are covered in a table, *it has not been possible to come up with complete regional totals*. Also, the number of countries from a specific region covered in the tables varies, depending upon the availability of data on the theme of the table. Despite incomplete regional coverage, it may be possible to draw some meaningful conclusions from the tables included here. In many places the report provides regional totals or averages. These refer only to the countries included in the specific table. Averages in many places could be taken as representative of the countries in the region for comparing the situation with other regions. *Whenever using summary statistics (total or average) for a region the user is advised to see the corresponding list of countries covered in preparing such indicators*.

3.1.5 The report, despite its limitations, is not only a ready reference source for data from individual countries, but also enables users to draw valid cross-country conclusions such as: country A had the largest area under wheat around year 2000; country B raises about twice as many cattle than country C, etc. *It is*

⁴ The FAO member countries in 2011 were 194, including 2 associate members.

noted that for most important tables most of the important countries contributing influential figures have been covered by and large. But when affirming “country A had the largest area under wheat around year 2000”, the user should pay attention to the possibility that a big wheat producing country might not have reported census results to FAO (or has not taken any census at all). Since most of the largest countries in the world have reported census data in the 2000 round, it is likely that most of the time such affirmations would be correct. However, if this affirmation is intended to serve as the basis for important decisions, users should conduct a second investigation on possible missing countries and take the necessary effort to add complementary data to the table from alternative sources. Users are also advised to recheck the other possible limitations on data before making assertions based on the data presented in the publication. Some of the possible limitations in the data in this publication may render some logical assertions approximate, or even wrong.

3.2 Limitations of the data reported

3.2.1 No data is without limitations. Apart from those arising from scope and coverage of this publication, the users should also be aware of other limitations of the data presented in the publication. These limitations are very often rooted in the technical decisions taken at country level while selecting an appropriate and feasible methodology for the agricultural census. Such decisions and consequential limitations span over a variety of issues, including operational definition of agricultural holding used, geographical coverage of the census, deviation in concepts and definition (agricultural land, for instance), sampling error, imperfect sampling frame, non-sampling errors due to measurement in a specific unit and reclassification of data in another unit after a change in the unit. It is not the purpose of this publication to discuss at length these factors. The publication on Methodological Review of the 2000 WCA (FAO, 2013) will deal with such issues in detail. Nonetheless, keeping in view the need to make the data users aware of the implications of these limitations for comparability of the data, a brief review of the nature of limitations present in the census data is provided here with some examples of their existence.

Geographical coverage

3.2.2 Of practical consideration is the fact that some countries decide to exclude some parts of the country from their census investigation, e.g., urban and peri-urban areas, desert and semi-desert regions, remote areas with difficult access, disputed territories or area affected by civil disturbance. These conscious geographic exclusions in census taking are not uncommon. Some 20 countries out of 114 countries have adopted such practices. For instance, Mozambique had excluded some districts due to adverse natural events; in the case of Georgia uncontrolled territories in Abkazia and Tskhinvali regions excluded from the census. In Afghanistan and Guatemala some regions of the country were excluded for security reasons. Other countries like Saint Lucia and Sri Lanka excluded commercial areas. Non-agricultural zones were excluded in Argentina and India. Chile, whilst covering the whole country, excluded some regions for collecting particular agricultural information.

The most common type of exclusion relate to “urban and peri-urban area”. Due to evolutionary changes in the structure of agriculture, backyard gardens⁵ or poultry raising in these areas may become important in some countries, and ignoring these activities or these regions as a matter of convention might result in under coverage of the census. The details of exclusions made by individual countries are given in Table 1.1 of PART TWO.

Exclusion of some holdings

Exclusions are also made on the basis of holding characteristics. A review of census coverage by holding types indicated common use of basically three types of restricting criteria and their possible combinations, viz., a) exclusions based on minimum size of holding; b) exclusions by legal status of holding, and c) exclusions based on type and purpose of production on holding. Table 1.1 presents the exclusion criteria used in the countries covered in the report. The table shows that 72 out of 114 countries used some kind of criteria to restrict the definition of an agricultural holding for coverage in the census; 25 countries used a combination of minimum size of land and livestock, 23 of them used a more complex combination (for instance land,

5 EUROSTAT guidelines recommend countries to include area under Kitchen gardens under Utilized Agricultural Area.

livestock but also minimum value of sales during census year), and the others used only one of these criteria e.g. land, livestock or value of sale.

Some exclusion of agricultural holdings from the purview of agricultural census was also noted on the basis of their legal status. For example, Cook Islands excluded all lands operated by institutions, communities and government. Iran did not cover the modern poultry farms. Serbia excluded agricultural enterprises and co-operatives, perhaps because the data on agriculture were collected during the Census of Population only from the holdings managed by households. In Uganda, the private large scale and the institutional farm sector was not investigated. In these cases it is not clear whether the data from the excluded section is included in the reported figures or not. These exclusions of special types of holdings need complementary data from alternative sources to complete the picture of the agriculture sector. One such important source could be an economic census, which also covers how enterprises engage in agriculture.

The most common type of exclusion practiced in the censuses are based on the size of the productive assets of the holding or scale of operation. Some thresholds linked to land size and/or livestock herd size are established, and the agricultural activities on the holdings below the threshold are not enumerated in the agricultural census.

Table 4. Geographical exclusions and use of thresholds

Countries by region	Number of countries	Number of countries with geographical exclusions	Number of countries using thresholds
1	2	3	4
WORLD	114	20	72
Africa	25	6	7
America north and Central	14	1	11
America, South	8	3	7
Asia	29	9	16
Europe	29	1	24
Oceania	9	0	7

Note: Based on Table 1.1 in PART TWO

Operational modifications to definition of agricultural holding

3.2.3 The 2000 WCA Programme defines an agricultural holding as:

"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 a household, jointly by two or more individuals or household, by a clan or tribe, or by a juridical person such as a corporation or a 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 building, machinery or drought animals."

This is the theoretical definition of an agricultural holding. For the purpose of keeping the workload of censuses and surveys to a manageable limit, an operational definition of the survey unit is needed. This operational definition of an agricultural holding of the survey unit is often decided on the basis of holding characteristics to capture the contribution of units which are engaged in agriculture at a significant scale. The level of significance is determined by establishing a threshold. Over 60 percent of the countries covered in this report established some type of threshold for coverage of holdings in the census. This practice is more common in the Americas and Europe. About 50 percent of countries in Asia also use it. Incidentally, only 7 out of 25 census reports received from Africa report use of thresholds.

The thresholds for an agricultural holding to be covered in the census are usually established by means of criteria: i) minimum area dedicated to agriculture, like in Uruguay; ii) a combination of minimum in area, livestock and number of trees, like in the Caribbean countries (Jamaica, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Trinidad and Tobago) or Cyprus, Chile, Iran Islamic Republic of, Jordan, Lao People's Democratic Republic, Lebanon; iii) minimum amount of sales or value of output, as in United

States of America, Puerto Rico, Virgin Islands (USA), Guam, almost all European countries and Australia, and iv) a combination of some of the above mentioned criteria like in Republic of Korea and Vietnam. The thresholds used in individual countries is presented in Table 1.1 in PART TWO.

In Europe, the common thresholds are established by EUROSTAT definitions and EC legislation⁶. The Table 5 presents the EU regulation on the thresholds. The regulation requires that all units reaching at least one of the threshold criteria should be covered. It also suggests that in the case that countries modify this definition they have to ensure that no more than 2 percent of agricultural output is left out from the census coverage. Considering the total contribution of holdings below the threshold, countries like Spain and Italy have adopted a lower threshold for coverage of holdings in the census. This while ensuring complete coverage of the agriculture sector of the country, provides facility to produce data comparable with other EU countries. Having covered a broader set of holdings one could always generate estimates for holdings operating at different scales.

Table 5. EUROSTAT thresholds for the farm structure surveys and the survey on agricultural production methods

	Characteristics	Threshold
Utilized agricultural area	Arable land, kitchen gardens, permanent meadow and pasture, permanent crops	5 ha
Permanent outdoor crops	Fruit, berry, citrus and olive plantations, vineyards and nurseries	1 ha
Other intensive production	Fresh vegetables, melons, strawberries, which are outdoors or under low (not accessible) protective cover	0.5 ha
	Tobacco	0.5 ha
	Hops	0.5 ha
	Cotton	0.5 ha
Crops under glass or other (accessible) protective cover	Fresh vegetables, melons, strawberries	0.1 ha
	Flowers and ornamental plants (excluding nurseries)	0.1 ha
Bovine animals	All	10 heads
Pigs	All	50 heads
	Breeding sows	10 heads
Sheep	All	20 heads
Goats	All	20 heads
Poultry	All	1 000 heads

3.2.4 Excluding some types of holdings from the census coverage, whatever is the chosen exclusion process, leads obviously to an underestimation of the agricultural activity and related production in the country. But if for example, country A did not proceed with exactly the same exclusion process as country B, underestimation may not be of the same order of magnitude, rendering, therefore, the figures slightly incomparable. However, it is expected that when deciding the exclusion criteria, countries are vigilant to keep these underestimations to a minimum level, perhaps of the same order of magnitude as observation errors⁷. For instance, Denmark excluded from the 1999 census farms with less than 5 hectares of agricultural area or less than a specified economic size (4000 euros of Standard Gross Margin); though the holdings below the threshold are about 8 percent of total holdings, their contribution to the agricultural production is estimated to be less than 0.5 percent. In such case, complete enumeration would have lead to a waste of resource. *One negative aspect of varying thresholds in different countries is that indicators such as “average size of holding” compiled on the basis of census data are not strictly comparable as they are not based on the information for the complete distribution of holding by size.*

⁶ 88/571/ECC Council Regulation, Article 5 and 6.

⁷ Observation error means any kind of factor, which results in reality not being correctly recorded at the end of the process. A wrong declaration, a misunderstanding between holder and enumerator, a mistake in data processing etc. are possible instances of something which creates a difference between recorded value and the true value; these are typical observational errors in census and surveys.

In Denmark and in other EU Member States the decision of using a higher threshold was based on studies using data from previous agriculture censuses. The EU countries that adopted a particular threshold committed themselves to fixing the threshold at a level *excluding only the smallest holdings which all together contribute 1 percent or less to the total standard gross margin (SGM)* at country level, as per the Decision 85/377/EEC, applicable to each of the EU Member State concerned. This case is a good example of a prudent and conscious decision based on full knowledge of the complete distribution of scale of operations of agricultural holdings. Nevertheless, when adopting a specific threshold, at country level, it is recommended to analyse the previous data series to be sure that the population of holdings that are subject to the agricultural census will provide relevant information for an accurate estimation of the total agricultural production. In some countries the total contribution of tiny household holdings practicing homestead cultivation may be up to 30 percent of total output, particularly for items such as pigs and poultry. The information on these tiny subsistence holdings may be important for handling food security and livelihood related issues.

Imperfect frame

3.2.5 The enumeration of agricultural holdings is normally based upon a list of holdings or other similar instruments called "frame". If the frame is not accurate enough, or not recently updated, there may be omission or duplication in enumeration of holdings, resulting in inaccuracy in the results, rendering comparisons approximate. There is very little information on inaccuracy due to such imperfect frames in the national reports. Some countries like Nicaragua report extensively on coverage checking through a Post Enumeration Survey (PES) but it is not a common practice.

Complete versus sample enumeration

3.2.6 Due to various reasons, mainly budget constraints, not all countries are able to conduct their census through a complete enumeration of all agricultural holdings. It is then carried out on a sample basis involving collecting information from only a predetermined number of holdings, as legitimated in the Programme for the World Census of Agriculture 2000 (FAO, 1995. § 4.20). Results are then extrapolated from the sample enumeration to the complete population. Such extrapolations provide only the confidence intervals containing the true values, which are based on the estimates and the associated 'sampling error'. Therefore, users should keep in mind this additional margin of uncertainty when comparing figures derived on one hand from complete enumeration and, on the other hand, from expansion of sample results. The practice of reporting sampling error of estimates is not very common, particularly in developing countries.

3.2.7 About 11 countries carried out their census with sample enumeration in the 2000 WCA round, mostly African and Asian countries, while 13 countries carried out their census by combining complete enumeration with sampling, for instance for some specific crops. Readers will find more information on this in the Methodological Review (FAO, 2013).

Units used for measurement of area

3.2.8 Countries use their own units to express measurement of area, and it is not always hectares (ha). For instance China used mu (1 mu = 6.666 are), Guatemala used caballeria (1 caballeria = 0.4516 ha) and so on. Another related problem refers to the measure of size used for classification. It was observed that some countries did not classify data by size of total area, as suggested in the FAO Programme. Instead they used the size of agricultural land or cropland within holding as the classification variable. This makes the distribution of holdings by size class intervals in a strict sense incomparable. Readers should pay particular attention to footnotes in the tables on this point.

Incomparable classifications of holding-size and interpolation

3.2.9 The Programme for the World Census of Agriculture 2000 recommended that countries reported results with detailed classifications (FAO, 1995. §6.19) of total operated area of holdings so that the international data could be presented in comparable land size classes, and full distribution of holdings by size classes was known. Table 1.4 of this publication uses the FAO recommended classification for land size of the holding, viz.

- Under 1 ha.
- 1 and under 2 ha.
- 2 and under 5 ha.

5 and under 10 ha.
10 and under 20 ha.
20 and under 50 ha.
50 and under 100 ha.
100 and under 200 ha.
200 and under 500 ha.
500 and under 1000 ha.
1000 ha and over.

3.2.10 Unfortunately not all countries have supplied data in these size class intervals and a few national reports used national classifications to suit their requirements, not conforming to FAO recommendations. Some countries have used classifications which are apparently similar to FAO classification but differ in the use of units, e.g. 1 – 2 acres is not the same as 1 – 2 ha. When the former is converted to hectares for international comparison it becomes 0.404 – 0.809 ha. This class does not correspond to any of the FAO recommended classes, thus posing difficulties in comparison and creating room for interpolation. Such a problem was noted in some 30 out of 114 countries covered by the report. For example, Guatemala and all US territories used acres, while Nicaragua uses Manzanas, for reporting the land distribution of holdings. About 15 other countries used hectares as the measurement unit but did not present results in the recommended classification, although some size class interval may match. In this case interpolation was limited to a part of the complete distribution only. For instance, Morocco and Cote d'Ivoire presented results for classes 0 to 1 ha, 1 to 3 ha and 3 to 5 ha, etc. Therefore, figures had to be interpolated for the classes 1 to 2 and 2 to 5.

Interpolation method

3.2.11 The interpolation method used for standardizing the land size classes is based on the empirical fact that, usually, the distribution of holdings by size follows a log-normal pattern⁸. The number and area of holdings in the new classes is therefore estimated by a linear interpolation on a probity scale. See Table 1.4 for results. The table presents the interpolated results in bold. Users should note that these interpolated figures are not official figures (not available in official national reports, if any), and that, moreover, they probably encompass a certain margin of error due to interpolation, which makes any comparison further fragile. In all cases the particular situation of countries is presented as footnotes to the tables to facilitate their interpretation. The users are advised to refer to national methodologies for further details. (FAO, 2010)

3.2.12 The interpolation procedure for presenting data in FAO classes was not used in the case of open-ended intervals, such as "less than 5" or "more than 50" because the reliability of such estimates would be difficult to check. This affects vertical totals, because the figure available for the interval such as "more than 50" is added as if it were intended for the interval "50 and less than 100". The figures in shaded cell refer to size classes represented by the continuum of shaded cells.

3.3 Comparison with other data sources

3.3.1 One of the purposes of an agriculture census is to establish benchmark data which is used to correct data from sample surveys. Users may thus be tempted to compare census figures with the figures derived from other national and international sources like FAOSTAT and AQUASTAT. This is often recommended in order to validate the quality of the data from a specific source. However, it is to be noted that the census

⁸ From the analysis of the data on number and area of holdings for about 70 countries participating in the 1970 WCA, it was concluded that "The lognormal hypothesis appear to be satisfactory for the distribution of number of holdings, and of area of holdings, for African countries"; "The results for countries in North and Central America generally appear consistent with the log-normal hypothesis"; there is no general conclusion for South America; "The distribution of holdings of Asian countries is generally close to the lognormal distribution"; "Some European countries use practices in tabulating data which yield results unsatisfactory for the application of the lognormal law. When the criterion for classification used and the type of area reported are the same, the distribution of agricultural holdings is close to lognormal for most European countries" and finally: "The difference in size of holdings among countries in the Southwest Pacific renders classification of these countries difficult" (FAO, 1984, page 13).

data may slightly differ from the data from alternative sources, though looking similar. This is mainly on account of conceptual and definitional differences of the data or differences in the methodology used for collection. The data in international data bases, though sourced from the same country, may come from diverse data sources such as administrative records, annual surveys or ad hoc assessment.

Table 6. Information on irrigation in agricultural censuses, FAOSTAT and AQUASTAT

Countries	Census Year	Agriculture Censuses			FAOSTAT	AQUASTAT
		Total number of holdings (units)	Total area of holdings (ha)	Holding area receiving irrigation (ha)	Agricultural area irrigated (ha)	Area irrigated (ha)
Egypt	1999-2000	4 541 884	3 750 699	2 879 566	N.A	3 422 178
Tanzania	2002-2003	4 901 837	11 997 071	168 430	N.A	184 330
Guadeloupe	2000	12 160	41 700	5 500	2 300	N.A
United States of America	2002	2 128 982	379 712 151	22 383 904	N.A	69 069 778
India	2000-2001	119 894 000	159 394 000	51 610 000	55 866 000	57 286 407
Myanmar	2003	3 464 769	8 721 115	1 460 415	2 508 000	1 841 320
Nepal	2002	3 364 139	2 654 037	1 168 345	1 168 000	1 168 349
Philippines	2002	4 822 739	9 670 793	2 930 029	N.A	1 550 000
Saudi Arabia	1999	242 267	4 046 446	1 191 351	N.A	1 730 767
Turkey	2001	3 076 649	18 434 822	3 505 749	5 215 000	4 185 910

N.A: not available on FAOSTAT/AQUASTAT

3.3.2 Table 6 presents the data on irrigation (area irrigated) for 10 countries from three sources viz, agriculture censuses, FAOSTAT and AQUASTAT for the census year of the country. It can be seen that except for Nepal, which probably has reported FAOSTAT and AQUASTAT on the basis of census results, none of the countries has similar figures for the same data item, though by and large differences may not be unbearable for most countries. Most of the differences are rooted in the conceptual approach and the observing method. In the census, the question normally refers to the physical area, which was irrigated during the enumeration period (strongly linked to the weather during agricultural period). AQUASTAT instead refers to the area equipped for irrigation (therefore greater than census results except, surprisingly, in Philippines), whilst FAOSTAT may refer to the area potentially irrigable. See Table 10.1, PART TWO, based on agricultural censuses.

3.3.3 One further point of interest, it may be interesting to attempt a comparison of figures from, for example, an agricultural census and some other survey. In the Seychelles an agricultural survey (substitute of agricultural census) was carried out in 1998. A comparison of results from this survey with the figures derived from the 2002 Population and Housing census, led to a conclusion that the 1998 frame was probably incomplete and the survey did not carry out an exhaustive enumeration (301 holdings were enumerated in the survey whilst the population census showed, four years later, that at least 4685 households were engaged in some agricultural activities). Therefore, the results for the Seychelles in this publication are taken from the 2002 population census rather than the 1998 agricultural survey. Such difference in numbers may be due to differences in the definition of agricultural holdings in the two surveys.

3.3.4 Users are thus advised to take particular care in comparing figures with other sources, and the potential effects of difference in concepts, definitions and observing methods on the data.