

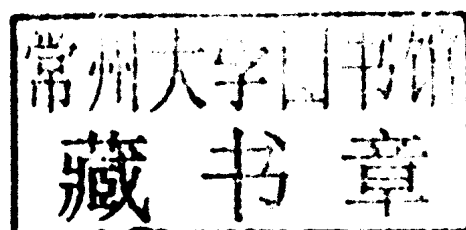
# Guidelines for Linking Population and Housing Censuses with Agricultural Censuses

*with selected country practices*



# **Guidelines for Linking Population and Housing Censuses with Agricultural Censuses**

*with selected country practices*





The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO.

ISBN 978-92-5-107192-2

All rights reserved. FAO encourages reproduction and dissemination of material in this information product. Non-commercial uses will be authorized free of charge, upon request. Reproduction for resale or other commercial purposes, including educational purposes, may incur fees. Applications for permission to reproduce or disseminate FAO copyright materials, and all queries concerning rights and licences, should be addressed by e-mail to [copyright@fao.org](mailto:copyright@fao.org) or to the Chief, Publishing Policy and Support Branch, Office of Knowledge Exchange, Research and Extension, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy.

© FAO 2012

# ACKNOWLEDGEMENT

This document was prepared by the FAO Statistics Division under the technical supervision and coordination of Naman Keita, Senior Statistician. Staff and consultants from FAO, PARIS21 and UNFPA also contributed.

The initial draft working paper was prepared by Jack Colwell, Senior Consultant, working under OECD/PARIS21 contract JADE 44069 within the International Household Survey Network (IHSN), under the technical supervision of Naman Keita (FAO) and François Fonteneau (PARIS21).

Naman Keita and Nancy Chin (FAO) drafted the guidelines from that working paper.

UNFPA reviewed the draft guidelines prepared by FAO and provided substantial further inputs to revise and finalize the guidelines.

The FAO team was composed of Naman Keita and Nancy Chin with contributions from Mukesh Srivastava, Giorgi Kvinikadze and Paul N’Goma-Kimbatsa. Dr Arun Srivastava provided input on the sampling aspects of the guidelines, and Adriana Neciu and Fabio Mozzilo provided support for some of the research reported in this document. Trang Nguyen assisted with the proof reading, design and formatting.

The UNFPA team was composed of Ricardo Neupert, Ralph Hakkert and Ann Pawliczko.

The team is grateful for comments received from the following peer reviewers: Miguel Galmes, Moussa Kabore, Ben Kiregyera, David Marshall, David Megill, Eloi Ouedraogo, Arun Srivastava and Michael Trant.

# PREFACE

The *FAO World Programme for the Census of Agriculture 2010* (WCA 2010) strongly recommends that countries consider the option of coordinating the agricultural census with the population and housing census, during the early stages of census planning, in line with the *Principles and Recommendations for Population and Housing Censuses, Revision 2* (UNSD, 2008).

FAO in collaboration with UNFPA and with initial support of PARIS21 have prepared this technical document in order to provide practical guidelines to countries on modalities for coordinating and linking the two censuses, which can be a key element in a cost-effective census strategy. These guidelines have been based on both WCA 2010 and a detailed review of the collection of agricultural data in the population and housing census in various countries around the world. FAO's extensive experience in providing support to agricultural censuses in all regions of the world is drawn on. It also takes into account UNFPA's experience in supporting population and housing censuses.

Integrating the population and housing census with the agricultural census is consistent with the *Global Strategy to Improve Agricultural and Rural Statistics* (World Bank *et al.*, 2011). One of the three pillars of the strategy is the integration of agricultural statistics into the national statistical system. At the operational level this integration is to be achieved through: (1) an integrated survey framework; (2) development of a master sample frame for agriculture; and (3) an integrated data management system. Experience shows that collecting limited and well-defined agricultural data during the population and housing census can substantially contribute to building an efficient master frame for agricultural censuses and surveys in many developing countries.

At the operational level, linking the population and housing census with the agricultural census is more suitable for countries where both censuses are carried out as a household enquiry. In countries where the agricultural census is based on other approaches, for instance an area frame survey or administrative records, linking population data with agricultural data -even after the censuses- may be a more appropriate option.

Our aim here is to provide practical guidance for population and housing census and agricultural census planners looking to implement a cost-effective census strategy by coordinating the population and housing census with the agricultural census.

**Pietro Gennari**

Director Statistics Division  
FAO

**Werner Haug**

Director Technical Division  
UNFPA

# ABBREVIATIONS

CPC	Central Product Classification
EA	Census Enumeration Area
FAO	Food and Agriculture Organization of the United Nations
GCA	General Census of Agriculture
GPS	Global Positioning System
IHSN	International Household Survey Network
ISIC	International Standard Industrial Classification of Economic Activities
ILO	International Labour Organization
PARIS21	Partnership in Statistics for Development in the 21 <sup>st</sup> Century
PPS	Probability Proportional to Size sampling
PSU	Primary Sampling Unit
RGPH	Recensement General de la Population et de l'Habitat
SNA	System of National Accounts
SSU	Secondary Sampling Unit
UNECA	United Nations Economic Commission for Africa
UNECE	United Nations Economic Commission for Europe
UNFPA	United Nations Population Fund
UNSD	United Nations Statistics Division
UNSC	United Nations Statistical Commission
WCA 2010	World Programme for the Census of Agriculture 2010

# CONTENTS

ACKNOWLEDGEMENT	vii
PREFACE	viii
ABBREVIATIONS	ix
Chapter 1: INTRODUCTION	1
Chapter 2: LIMITATIONS OF AGRICULTURAL DATA IN PAST POPULATION AND HOUSING CENSUSES	5
2.1 Data related to agriculture in past population and housing censuses	5
2.2 Limitations of agricultural data collected in past population and housing censuses	6
Chapter 3: RECOMMENDATIONS FOR THE 2010 ROUND OF POPULATION AND HOUSING, AND AGRICULTURAL CENSUSES	7
3.1 FAO recommendations	7
3.2 UN principles and recommendations	9
3.3 UNECE recommendations	9
3.4 UNECA recommendations	10
Chapter 4: REVIEW OF SELECTED COUNTRY PRACTICES IN LINKING THE POPULATION AND HOUSING CENSUS WITH THE AGRICULTURAL CENSUS	11
4.1 Country practices in collecting agricultural data in population and housing census	11
4.1.1 Approach: Inclusion of items in the population and housing census	11
4.1.2 Approach: Extended agricultural module in the population and housing census	13
4.1.3 Approach: Conducting the population and housing census jointly with the agricultural census	13
4.2 Assessment of country practices and suitability of the population and housing census for collecting agricultural data	15
Chapter 5: GUIDELINES FOR COORDINATING AND LINKING THE TWO CENSUSES	19
5.1 General coordination issues in developing population and housing, and agricultural censuses	19
5.2 Linking data from the population and housing census with the agricultural census	20
5.3 Collecting agricultural data in the population and housing census	22
5.3.1 Issues arising from collecting agricultural data through the population and housing census	22
5.3.2 Data collection methods	29
5.3.3 Agricultural data items and suggested standard questions for a population and housing census	30
Chapter 6: USE OF AGRICULTURAL DATA FROM THE POPULATION AND HOUSING CENSUSES TO BUILD SAMPLING FRAMES FOR AGRICULTURAL CENSUSES AND SURVEYS	37

<b>Chapter 7: IMPROVING EFFICIENCY OF AGRICULTURAL CENSUS AND SURVEY DESIGN</b>	<b>39</b>
7.1 Use of agricultural variable in survey design	39
7.2 Determining sample size (total size, size of PSUs and SSUs)	41
7.3 Number of holdings selected in each PSU and allocating SSUs (holdings) within PSUs	43
7.4 Allocating the sample of PSUs to different strata	44
7.5 Selecting PSUs with Probability Proportional to Size (PPS)	45
<b>Chapter 8: PRODUCING PRELIMINARY RESULTS FROM VARIABLES IN THE AGRICULTURAL CENSUS CORE MODULE</b>	<b>47</b>
8.1 Fertility in the farm household sector	47
8.2 Gender analysis in the farm household sector	49
8.3 The elderly in the farm household sector	50
<b>ANNEXES</b>	<b>51</b>
Annex 1 Standard questionnaire for potential inclusion in population and housing census	51
Annex 2 Instructions	59
Annex 3 Suggested tables	67
Annex 4 Case studies from selected country practices	71
<b>GLOSSARY</b>	<b>87</b>
<b>REFERENCES</b>	<b>89</b>



List of Tables

Table 1 Mapping of suggested supplementary items to WCA 2010 agricultural census core data items	31
Table 2 Optimum number of SSUs (Holdings) per PSU (Ward/EA)	44

List of Figures

Figure 1 The agricultural census as part of an integrated system of censuses and surveys	8
Figure 2 Household roster	25
Figure 3 Activities of households	26
Figure 4 Scenario 1 - One household managing one holding	26
Figure 5 Scenario 2 - One household managing more than one holding	27
Figure 6 Scenario 3 - More than one household managing one holding	28

List of Boxes

Box 1 Burkina Faso: Agricultural data items	13
Box 2 Canada: Jointly conducted agricultural and population censuses	14
Box 3 Burkina Faso: Mapping holdings in the agriculture census to households in the population and housing census	21
Box 4 Canada: Case study linking population and agriculture census	23
Box 5 Mozambique: Agricultural questions in 2007 Population and Housing Census	32
Box 6 Examples of building frame for the agricultural census: Nepal	38
Box 7 Mozambique: Survey design	40
Box 8 Uganda: Survey design	42
Box 9 Canada: Estimates using linked records from the agricultural and population censuses	48

# Chapter 1

## INTRODUCTION

*“While the population and housing censuses have a close relationship, their relationship with the agricultural census is less well defined. However, as the result of increasing integration within programmes of data collection, the relationship between the population and housing census and the agricultural census is now far closer than in the past, and countries are increasingly looking at new ways to strengthen this relationship”*

(UNSD, 2008, Paragraph 1.44)

The population and housing census has a key role to play in an integrated national statistical programme (including agricultural statistics) - as a source of information about human capital and as an instrument for providing a sample frame for subsequent surveys in many sectors. It has long been argued that the two censuses cannot be combined or linked very easily since the enumeration units are different. The population and housing census uses the household as its basic unit while the agricultural census uses the agricultural holding. On the other hand, in actual practice, the units are the same in many cases. A vast majority of agricultural holdings, particularly in developing countries, are managed by households or members of households, either singly or jointly. One illustration of this point comes from the 1997 agricultural census in China in which 193 million household holdings were recorded, in contrast with 358 000 – fewer than 0.25 percent - non-household holdings. This pattern is likely to be even more pronounced for urban and peri-urban agriculture increasingly found among urban populations.

The unit common to the agricultural census and the population and housing census is therefore the household engaged in agricultural activities or farm household, defined in the glossary and explained in detail below. The important thing to note is that it is this enumeration unit of the household which enables the two censuses to be linked. This provides considerable scope for carrying out the preliminary work for the agricultural census during the population and housing census. Integrating agricultural statistics with population statistics has obvious advantages for policy-making in enabling a wider range of analysis – including demography, education, migration, living standards and occupation with agriculture - thus enabling a more complete national picture to emerge. It is therefore important that a population and housing census include questions to identify farm households, and such examples are included in this guideline.

Experience shows that, in many countries, linking the population and housing census with the agricultural census can result in the advantages for the national statistical system listed below.

**Reducing the total cost of the two censuses:** Considerable economies can be made by adopting a coordinated approach for both censuses, when feasible, rather than conducting them entirely separately. Collecting basic agricultural data during the population and housing census means that the same infrastructure,

logistics, personnel and equipment can be used for both censuses. Some countries have experienced up to 50 percent reduction in the cost of the agricultural census by including basic questions in the population and housing census, which enables agricultural households to be identified for building the sample frame.

**Reducing the scope of the agricultural census:** FAO, in WCA 2010, lists the 16 data items required for complete enumeration in the agricultural census core module. There is the potential to collect a large proportion of these items during the population and housing census. Any separate agricultural census could then be reduced in scale - in some small island countries, this core information alone represents a substantial proportion of the data to be gathered from an agricultural census. Details about demography, livestock, fruit trees and -where possible- the area of temporary crops for all households are particularly useful additional data to gather.

**Enriching data analysis from the two censuses:** Collecting both sets of data at the same time, or consecutively, enables direct linkages to be made through the unique household identification number. The result is a much richer data set and analysis than is possible through two separate statistical exercises.

**Ensuring regular agricultural census operations:** Institutionalizing arrangements for conducting the two censuses as an integrated exercise helps to ensure that the census of agriculture is carried out regularly.

**Building a reliable sample frame for the agricultural census:** Access to an up-to-date and reliable frame of agricultural holdings – including both household and non-household operated holdings - is a major problem for the census of agriculture in many developing countries. Where the majority of the population do not rely on agriculture for their livelihood, the number of agricultural holdings is usually small and the frame can be fairly readily compiled from land and business registers, lists of large farms and other sources. Building a frame of household-operated agricultural holdings is a much larger and more complex task. It effectively means visiting all private households to establish the extent of agricultural activity in each, and how many separate holdings household members are engaged in. The population and housing census provides a unique opportunity for identifying all agricultural households, including in urban areas, for developing an up-to-date, reliable frame as a starting point for agricultural censuses and surveys.

**Optimizing the sampling design of the agricultural census:** In many developing countries, agricultural censuses are conducted using large samples to generate results at small administrative unit level. Agricultural information collected during the population and housing census can be used to improve sample design: including identifying optimal sample size, and to better stratify and allocate the sample -between strata and between different stages- when multi-stage cluster sampling is used. When probability proportional to size (PPS) is used, the data from the population and housing census can also be used to provide an up-to-date size measure.

**Better defining the agricultural census coverage:** Minimum size limits, on variables such as numbers of livestock, numbers of trees (tree crops), area of land (temporary crops), value of annual sales, and purpose of production (breeding livestock), are used in most countries to determine whether a household's agricultural activity qualifies as a holding or not. This basic information can be collected during the population and housing census through the standard visitation record or through a separate section in the household questionnaire. The information can also be collected as part of the pre-census cartography and fieldwork. In addition to providing a frame, this has advantages for the design of the agricultural census. For example, after an integrated population and housing census the minimum size criteria can be set at a higher level than has traditionally been the case, as information about the smallest holdings has already been collected and little additional data would be gleaned from administering a further questionnaire to such holdings. Efforts, and resources for data collection, could then be focused on the more productive holdings.

Several countries have successfully collected agricultural data during their population and housing censuses in past rounds. Given these successful country examples from around the world and the advantages indicated above, FAO and other UN agencies have recommended a closer relationship for the 2010 round between the population and housing census and the agricultural census.

The purpose of these guidelines is to provide information to census planners about practical ways of linking the two censuses. In particular, suitable agricultural data items to include in a population and housing census, and suggested questions to elicit those data, are proposed. The guidelines contain the following chapters:

**Chapter 2:** provides an overview of data related to agriculture in past population and housing census rounds - and their limitations.

**Chapter 3:** reviews recommendations made by FAO and other UN agencies for coordinating and linking the two censuses.

**Chapter 4:** looks at best practice from around the world to see how the two censuses have been successfully linked.

**Chapter 5:** provides suitable agricultural data items and suggests standard questions to be collected in a population and housing census, according to a country's specific context. A standard questionnaire and corresponding instructions are provided in Annex 1.

**Chapter 6:** illustrates how to build an effective sampling frame for agricultural censuses and surveys, using the agricultural data collected during the population and housing census.

**Chapter 7:** examines how to improve the efficiency of sampling design for (sample based) agricultural censuses and surveys, using agricultural data collected during the population and housing census.

**Chapter 8:** provides example tables that can be compiled using agricultural data from the population and housing census.





# Chapter 2

## LIMITATIONS OF AGRICULTURAL DATA IN PAST POPULATION AND HOUSING CENSUSES

### 2.1 Data related to agriculture in past population and housing censuses

In most countries, population and housing censuses are based on guidelines issued by the United Nations for each decennial round. Those UN guidelines do not cover agricultural data, although they include items that can be used as a proxy for agricultural labour.

The guidelines in the *2010 World Programme on Population and Housing Censuses* (UNSD, 2008), recommends collection of the following items on labour - based on International Labour Organization (ILO) recommendations:

- Main occupation
- Industry of main occupation
- Employment status in main occupation

Most countries systematically include these items in their population and housing census. The data are collected for each economically active person, defined in terms of either current status or usual status. The current status is based on the activity status of individuals over a short reference period, such as the seven days preceding the survey. Although commonly used, this status has limited use for building a reliable frame for the agricultural census, as discussed below. The usual status is based on the activity status of individuals, based on their main activity over a long reference period.

The occupation of main job and industry of main job can be used, to some extent, to identify persons in agricultural occupations and industries, based on national occupation and industry classifications. While countries such as Indonesia provide a detailed industry breakdown into food crops, plantation crops, fisheries, animal husbandry, and other agricultural activities, in most countries only broad occupation and industry groupings are available.

Status in employment of main job refers to whether the person is an employee, own-account worker, and so on. Individual responses about occupation and industry can be analysed alongside status in employment so as to classify agricultural workers broadly as farmers or agricultural employees. It can also be used as a proxy to identify farm households. A household in which any member has both an agricultural main activity and a status of "own account worker" would be classified as a farm household.

The data collected in this way can be useful in their own right. They also provide proxy information that is useful in designing agricultural censuses and surveys and in creation of a frame. Data gathered about the number of farm households in each Enumeration Area (EA) can serve as a starting point for the listing exercise of sampled EAs, although it usually underestimates the number of agricultural households, and therefore would not provide an entirely accurate list frame. Ways in which the data can be used in census tabulations are discussed in Chapter 7.

However, this traditional way of producing agricultural data has serious limitations when preparing and conducting an agricultural census, as explained below.

## 2.2 Limitations of agricultural data collected in past population and housing censuses

Population and housing censuses have traditionally focused on basic demographic, social and labour force data. The farm household data obtained indirectly through labour force data usually underestimate the number of agricultural households and produce an inaccurate frame for the agricultural census.

As indicated above, the data are collected for each economically active person, commonly defined using the current status approach, based on a short reference period such as the seven days preceding the survey. This approach is not suited for measuring agricultural labour because of the seasonality of agricultural work. At the time of enumeration, the person may not be engaged in agricultural work even if this is their main activity at other times of the year, resulting in the high probability that some persons working in agriculture may not be identified.

Depending on the criteria used to define the main job, this concept may also exclude farm households in which members are engaged in several activities. This is more likely in urban areas, or in rural households engaged in other activities such as fishing.

A lack of coordination in planning the two census operations may further limit the usefulness of the data for the agricultural census, especially if there is a significant time gap between the two operations, or if the agricultural census precedes the population and housing census. The overall cost for the national statistical system of conducting these two most comprehensive statistical undertakings independently will be far higher than when planning is coordinated.

Countries National Strategies for Development of Statistics and the *Global Strategy to Improve Agricultural and Rural Statistics*, adopted by the international statistical community, both promote an integrated approach to data collection within the national statistical system. The Global Strategy considers that linking the population and housing census with the agricultural census serves to integrate agriculture into the national system, and it recommends building a master sampling frame to conduct integrated agriculture and rural censuses and surveys.

FAO and other UN agencies are therefore encouraging countries to establish a closer relationship between the population and housing census, and the agricultural census. To this end, specific recommendations have been included in the 2010 round.

## Chapter 3

# RECOMMENDATIONS FOR THE 2010 ROUND OF POPULATION AND HOUSING, AND AGRICULTURAL CENSUSES

In many countries, agriculture is one of the most important sectors of the national economy, and in some places the majority of households are engaged in agricultural production activities such as cultivating crops, raising livestock or growing vegetables on small plots surrounding the house. The importance of these activities to household income and food security should not be underestimated. The close relationship between such agricultural activities and the various population characteristics recorded in the population and housing census means that, in many countries, a strong case can be made for including agricultural items in the population and housing census.

Past recommendations about agricultural data in the population and housing census have been limited. However, the increasing need to integrate data collection programmes (producing more cost-effective data for the national statistical system), and successful experiences of many countries in linking the population and housing census with the census of agriculture, have led FAO and UN agencies to recommend strengthening links between these two types of census in the 2010 round. Their recommendations are summarized below.

### 3.1 FAO recommendations

In 2005, FAO published guidelines for the 2010 round of agricultural censuses covering the period 2006 to 2015 (FAO, 2005). A new modular approach was adopted (see Figure 1), with a core census module based on complete or large sample enumeration providing a limited range of key structural data, and one or more supplementary sample-based census modules providing more in-depth data.

The programme has several new features, including strong recommendations for coordinating the agricultural census with the population and housing census.

FAO encourages countries to examine all aspects of coordinating the planning of both population and housing, and agricultural, censuses. Seven key aspects of coordination are considered below.

**Use of common concepts, definitions and classifications.** This has been a feature of previous agricultural census programmes and is again strongly recommended in WCA 2010.

**Sharing field materials.** The field systems for the two censuses can usually be coordinated, for instance by using the same enumeration areas (EAs) and maps for field work. It is recommended that countries fully explore these possibilities in planning their census operations.

Using the data from the population and housing census as a frame for the agricultural census. FAO encourages countries to use the household lists from the population and housing census as a frame for the agricultural census, where this is suitable. Problems with lists becoming out-of-date and differences in the statistical units for the two censuses (*households*, *farm households* and *agricultural holdings*) are discussed below.

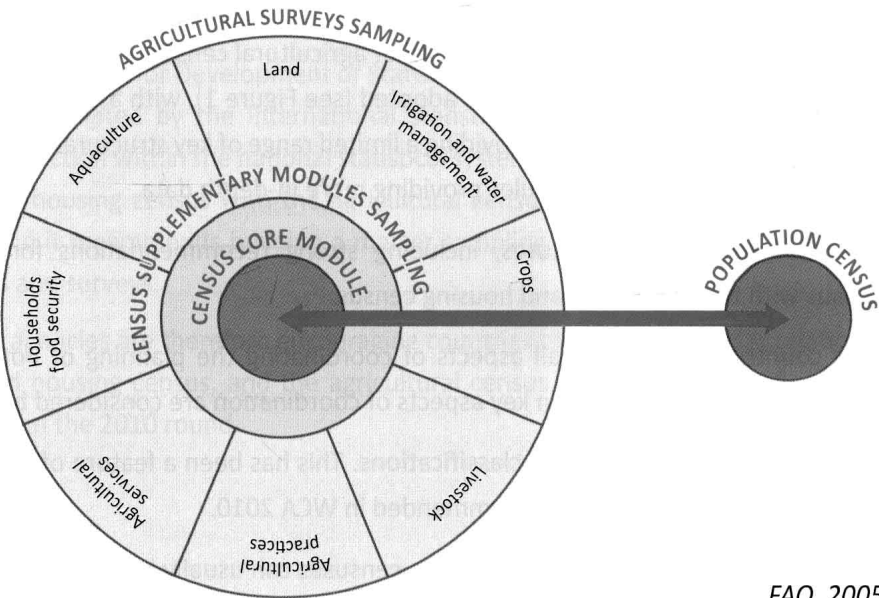
**Data related to agriculture to be found in the population and housing census, and their possible use in the agricultural census.** FAO demonstrates how standard population and housing census data relating to occupation, industry and status in employment can be used to identify *farm households*. The conceptual shortcomings are highlighted, and countries are advised to consider the extent to which these data are useful in the agricultural context.

**Collecting additional agricultural data in the population and housing census.** It is suggested that countries consider including additional agricultural topics in the population and housing census, to enable development of frames or compilation of tables.

**Linking data from the agricultural census with the population and housing census.** FAO encourages countries to link data from the population and housing census with those from the agricultural census, where possible. The benefits in widening the scope of census tabulation are highlighted. The resulting cost savings in data collection are also noted. A list of agricultural census items that might not need to be collected under these circumstances is provided. How to link agricultural census and housing census data is also discussed.

**Conducting the two censuses as a joint field operation.** FAO guidelines outline how data collection for the population and housing, and agricultural censuses could be carried out as a joint field operation. The statistical and operational benefits and problems are discussed. Countries are encouraged to consider whether a joint field operation would be suitable for their censuses.

**FIGURE 1:**  
The agricultural census as part of an integrated system of censuses and surveys



FAO, 2005.