

Census Innovations: Integrating the Population and Housing Census with the Agricultural Census

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Many national statistical systems in developing countries face problems in finding adequate resources for censuses and other data collections. There is also an increasing demand to reduce the cost of data collections and provide more frequent and timely data. Many countries in all regions, but particularly in small island developing states, already include some questions on agriculture in their population censuses. However, this is often ad hoc and does not provide adequate information about the structure of agriculture for use by the ministries of agriculture, nor realize other benefits of coordination such as reduced cost and development of a reliable sample frame for agricultural surveys are often not realized.

The paper will look at the recommendations of the FAO/UNFPA Guidelines for Linking Population and Housing Censuses with Agricultural Censuses and how integration has been achieved in practice during the 2010 round of population censuses, using case studies from countries. It will cover the areas of integration relevant to census data collection: items recommended, common definitions, development of a module for the population census questionnaire, approaches to integration and various considerations for the field work

Key words: questionnaire design, data collection, official statistics, agriculture

1. Introduction

Many countries in all regions, but particularly small island developing states already include some questions on agriculture in the population census. However, the items included are often ad hoc and do not provide the necessary information, such as for development of the sampling frame or to improve the efficiency of sample design, which would be useful for the agriculture census and related surveys conducted as part of an integrated statistical system. Properly integrated censuses would also allow for analysis, not previously possible, which takes into account the influence of agriculture and rural development in the household sector on a variety of issues relevant to policy makers, including poverty reduction and food security.

Recognizing already existing practice, integration of population and housing and agricultural censuses has been recommended both by the Food and Agriculture Organization of the United Nations, responsible for developing the World Programme for the Census of Agriculture (WCA) and the United Nations Population Fund (UNFPA), one of the leading international organizations supporting developing and low-income countries' to conduct their 2010 censuses; and by other regional UN bodies. These institutions' guidelines for the 2010 round of population censuses set out the scope for integration of the two censuses, which carefully considers what is possible without jeopardizing the quality of population and housing census data.

The FAO WCA 2010 (FAO, 2005); United Nations Statistics Division Principles and Recommendations for Population and Housing Censuses, Revision 2 (UNSD, 2008); United Nations Economic Commission for Africa 2010 Africa Round of Population and Housing Censuses: Draft Implementation Handbook (UNECA, 2008); and the Conference of European Statisticians Recommendations for the 2010 Censuses of Population and Housing (UNECE, 2006) contain recommendations for integration. These consistently recommend collecting, in either the listing or the population census

questionnaire, additional information which could be used to prepare the frame of holdings (in the household sector) for the agricultural census, as well as some sharing of field enumeration materials.

The paper explores the methodologies outlined in the FAO/UNFPA Guidelines for Linking Population and Housing Censuses with Agricultural Censuses (FAO and UNFPA, 2012) for collection of data in the population census and draws on lessons learned and feedback from countries during regional workshops held in 2012 for dissemination of the Guidelines. It will cover the areas of integration relevant to census data collection: items recommended, common definitions, development of a module for the population census questionnaire, approaches to integration and various considerations for the field work. It does not cover the uses of the linked data in design of the agricultural census or surveys, nor the analytical use of the data collected.

2. Concepts

It has long been argued that integration of population and housing censuses with agricultural censuses was not possible as the two do not share a common unit of enumeration. The unit of enumeration of the population and housing census being the household, while that of the agriculture census is the holding whose definition is based on the economic production unit of the agricultural holding.

The agricultural holding is defined by the management of agricultural production and not by ownership or legal form (WCA, 2005). A farm household is defined as a household where one or more members are engaged in own account agricultural production. This is conceptually distinct from households where members are engaged in agricultural activity such as farm labour but not own account production.

As a holding is defined by its activities (agricultural) and management arrangements, a household therefore relates to the holding in terms of the agricultural activities that the individuals within the household operate and manage. In many developing countries, management of agriculture production is undertaken by farm households. In these cases, the household and holding coincide and there is a common unit of enumeration.

Usually there is a single management of agricultural activities within a household, so there is a one to one match with the holding, but there may be instances in which individuals within the household manage separately agricultural activities. In these cases there would be one household managing two holdings. However, this is rare and may be difficult to distinguish in practice. For instance, where household members are responsible for cultivation of different crops, but share equipment, then operation and management is not deemed to be separate, and this is considered one holding.

Another deviation from the one to one correspondence between household and holding occurs when two households manage one holding. In these cases, the households usually manage a separate holding in addition to the joint holding. There are not as yet recommendations on how to deal with these cases. However, these exceptions rarely occur and many countries in practice opt to record only one holder. For example, in the case of Burkina Faso agricultural data was collected during the 2006 population and housing census. Every household forming part of the agricultural holding was given a code subsidiary to that of the household which was coordinating the agricultural activity of that holding. Households were grouped to form one "agricultural household" using this subsidiary code. The head of the household coordinating the agricultural activities of the group was considered to be the head of the agricultural household."

3. Data Collection Integrated Censuses

Given that there is a common unit of enumeration between the two types of censuses it is therefore possible to have linked or integrated censuses. One of the primary objectives of agricultural data items collected through the population and housing census is to identify agricultural households in order to develop the frame for agricultural censuses and surveys; and to collect data for improving sampling efficiency. The agricultural data obtained from the population census would provide a frame for holdings in the household sector. In order, to obtain a complete frame for the agricultural census and surveys, a separate listing of holdings in the non-household sector would be needed, such as using farm registers.

It has been argued that the data on main occupation, industry of main occupation and employment status in main occupation which are routinely collected in population and housing censuses is sufficient to identify the agricultural 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. However, in the population and housing census this is often based on the 'current status' of activity, rather than the 'usual status'. Reference persons are asked to identify their occupation and employment status over a short reference period (usually one week). This usually results in an underestimation of farm households. The seasonality of agricultural work means that at the time of enumeration the person may be involved in other activities, even if they are involved in own account agricultural production at other times of the year. In addition, if persons are asked to identify only one main job, farm households where members are involved in several activities may not report their agricultural activities.

Should a country decide to collect additional agricultural data the Guidelines (FAO, 2012) recommends a set of minimum core and supplementary questions. Care must be taken not to overburden the population census or to jeopardize the quality of data collected. Keeping this in mind, a flexible approach can be taken: with a core module to collect only those items necessary to develop a frame for the agricultural census and surveys and to optimize survey design. For countries wanting to collect more detailed information on agriculture, a more detailed supplementary module is proposed.

In the 2010 round of population censuses conducted thus far, analysis of country questionnaires shows that almost 50 countries collect some agricultural information in the population and housing census. This does not include agricultural data collected during the pre-census listing, which is often the case. However, although farm households are identified, there is no consistent approach to the data collected and the full benefits of integrated censuses are not realized.

The minimum **core data items** proposed identify the agricultural households and provide a measure of size (for sample design). The items are:

Item A1. Whether the household is engaged in any form of own-account agricultural production (including livestock, fishery, aquaculture or forestry). This identifies whether the household is a farm household. Item A2. The area of land (or number of plots) used for agricultural purposes, which provides a measure of farm size which can be used to improve the sample design and efficiency.

The **supplementary data items** cover the minimum core data items recommended for collection in **agricultural** censuses under the WCA 2010 programme. The WCA

2010 recommends a complete enumeration of the core module of basic data in the agriculture census, followed by supplementary module of more detailed thematic items carried out on a sample basis. Collection of the agricultural census core items in the population and housing census could result in efficiencies for the statistical system by reducing the extent of the agricultural census enumeration; enumeration being the main cost of the census. It should be noted that there are no recommendations to countries to include the entire supplementary module. Countries would select from the supplementary items according to need and the module for a country be anything from a few questions to a small-scale agricultural census.

Table 1: Mapping of suggested supplementary items to WCA 2010 agricultural census core data items

Data items for a SUPPLEMENTARY agricultural module in the Population and Housing Census	Corresponding AGRICULTURAL CENSUS CORE DATA item
Item S-A1: Identification of agricultural holders	
Item S-A2: Main purpose of production	0006 Main purpose of production from the holding Number of land parcels
Item S-A3: Area of agricultural land according to land use types	0007 Area of holding according to land use types 0008 Total area of holding, where possible (minimum question)
Item S-A4: Land tenure types	0009 Land tenure types on the holding
Item S-A5: Presence of irrigation	0010 Presence of irrigation on the holding
Item S-A6: Types of temporary crops grown	0011 Types of temporary crops on the holding
Item S-A7: Types of permanent crops grown and whether in compact plantations	0012 Types of permanent crops on the holding and whether in compact plantations
Item S-A8: Number of animals for each livestock type	0013 Number of animals on the holding for each livestock type
Item S-A9: Presence of aquaculture	0014 Presence of aquaculture on the holding
Item S-A10: Presence of forest and other wooded land	0015 Presence of forest and other wooded land on the holding

There are data items in the agricultural census core module not covered by the recommended data items, namely:

- 0001 Identification and location of agricultural holding (minimum question).
- 0002 Legal status of agricultural holder.
- 0016 Other economic activities of the holding's enterprise.

The following demographic data items recommended by WCA 2010 for inclusion in the core agricultural census module are also covered in all population and housing censuses:

- 0003 Sex of agricultural holder
- 0004 Age of agricultural holder. Sex of household members. Age of household members.
- 0005 Household size.

The development of these items into a questionnaire and question wording would be country specific but Annex 1 illustrates the standard questionnaire developed for the Pacific following discussions during the Regional Workshop for the Pacific on Linking Population and Housing with Agricultural Censuses held in 2012 (FAO, 2012). What can be noted is that the questions are designed to minimize burden on

enumerators and respondents. This is essential during a census where enumeration must be completed rapidly, and the information must be known and easily recalled by respondents. Questions that require consultation of records or return visits are therefore not suitable. In the agricultural census, data is often asked by parcel, but in the integrated module information is asked only for the holding. In the Pacific, area is often not known so information is asked on number of plants as a proxy. For the questions on temporary and permanent crops and livestock, a list of the most important items is provided rather than an open question to assist recall and ensure consistent coverage.

There are no specific recommendations on how to select items for the supplementary module nor the approach to be taken in terms of the balance between data obtained from the population and housing census and the agricultural census. This will vary depending on the nature and extent of agriculture in a country and the human and financial capacity for dedicated agricultural data collections. However, the efficiencies which can be obtained are illustrated using the approaches discussed during the regional workshop for the Pacific. It should be noted that no agreement was reached on the best approach for the countries.

The country situations in the Pacific to which each approach is most likely to apply tends to differ among the sub regional groups of Melanesia, and Micronesian and Polynesia, but also by size of country and between atolls and 'high' islands. For example, the larger, high islands, with more extensive agriculture will have more benefit from either a separate agriculture census (if funding is available) or a properly stratified agriculture survey (whereas atolls with more limited agriculture sector may find full integration more feasible).

The minimum core items could also be collected during the pre-census listing, which would create less risk to the quality of the population and housing census. Although data processing must be done quickly if the data is to be used successfully for preparation of the agricultural census. The approaches to incorporating agriculture into the population and housing census discussed were:

Approach One: The population and housing census collects the minimum core items to identify agricultural households for preparation of the sampling frame and collection of measures of size for improving sample design of agricultural surveys. This would be followed by a traditional agricultural census with a broad scope and would be suitable where agriculture is a substantial sector and farm households have more extensive production. Countries discussing this approach were, Fiji, Papua New Guinea, Solomon Islands, and Samoa.

This approach could be extended to collect items necessary to identify the agricultural households and which agricultural sub-sectors they are participating in. This would be followed by limited sample surveys for detailed sub-sectoral information for the most important sub-sectors. This approach is aligned to the modular approach recommended by the WCA 2010 programme, with the agricultural module of the population census replacing the core module of the agricultural census. During the agricultural census supplementary modules focusing on sub-sectoral information could be carried out as sample surveys, thus reducing the scope of the agricultural census.

Approach Two: The population and housing census is used to identify agricultural households over and under a minimum size. There would be collection of a full supplementary module for households under the minimum size, with limited items for those over the minimum size. This would be followed by a reduced agricultural

census which enumerates only households over the minimum size. In these situations, a substantial amount of agriculture is carried out by very small holdings, with larger holdings cultivating cash crops. Or the agricultural sector may not be very large. This was discussed by Cook Islands, Niue, Tonga, Vanuatu, Kiribati, Marshall Islands, Nauru, Palau, Tokelau, Tuvalu and Federated States of Micronesia.

The major benefit of these approaches would be in eliminating the need for a separate agricultural census or in reducing the coverage to a sample survey for more detailed items. It was pointed out that the major cost savings would come from reducing the scale of the enumeration of an agricultural census or reducing the need for one.

5. Conclusions

Based on country experiences integrating agriculture into the population and housing census can have significant advantages for the national statistical system. There are resulting efficiencies in the human and financial resources needed for data collection, resulting in greater availability of data for establishing the survey frame for agriculture censuses and surveys and optimization of sample design.

The concepts and data collection aspects, namely core and supplementary items for the questionnaire and an illustration of the approach for supplementary data collection are explored here. However, further work and discussion is possible on the details of developing the survey frame and survey optimization, and how to carry out linked analysis.

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