

Integrating agricultural statistics to face increased data demands

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Abstract:

The need to monitor and report on progress made towards the achievement of the Sustainable Development Goals (SDGs) have presented new demands for more data and challenges in terms of integrating statistics. In countries with less developed national statistical systems (NSS), agricultural censuses (ACs) and sample surveys are not conducted regularly which is a serious impediment to report SDG indicators related to food and agriculture. This means that both structural data (sourced from censuses) and current statistics (sourced from sample surveys) are not readily available or up-to-date for reporting and informed decision-making on agricultural and rural development. In these countries, because of the increased data needs, when a census of agriculture is planned, the questionnaire tend to be burdened with non-structural data (atypical for a census), jeopardizing the quality of the census operation and the data.

An increasing number of countries make efforts towards better integrating statistical activities. The FAO World Programme for the Census of Agriculture 2020 (WCA 2020) advocates the development of an integrated multi-year programme of statistical operations involving AC, current surveys, administrative registers and other data collection operations. By integrating these operations, the AC can focus on collecting essential structural items, while other operations can focus on collecting non-structural data needed more frequently.

Keywords: Census of agriculture; World Programme for the Census of Agriculture; SDGs; data integration

1. Introduction:

The Sustainable Development Goals (SDGs) have presented higher demands for data to enable proper monitoring and reporting progress towards their achievement. To assume these challenges, countries must resort to cost-efficient methodologies, modern tools for data collection and better data integration. Progress has been made in the greater use of open and big data, but critical gaps on data production remain in many countries. One of the reasons is lack of adequate coordination of data collection operations and mapping of these operations against country data needs. An integrated agricultural statistics system involving surveys, registers and the census is of crucial importance.

In such system, structural agricultural data, such as size of holdings, land use, crop areas, livestock numbers and agricultural inputs are collected at the lowest geographical level through agricultural censuses. These structural data serve both as a benchmark for current statistics and as the frame for subsequent agricultural sample surveys (FAO, 2015). On the other hand, non-structural data such as crop and livestock production, food consumption, cost of production, production prices and production methods are collected through regular sample surveys and/or administrative reporting systems to meet the demands of in-depth and more frequent agricultural statistics. These current statistics are needed to monitor changing agricultural and food supply conditions and to support decision-making in the short term.

2. Frequency of agricultural census lags behind:

According to the WCA recommendations (FAO, 2015), a country should conduct an AC at least once every ten years, providing key structural items (23 essential items) and frame items for intercensal sample surveys. Country participation in the decennial census rounds has increased steadily since the

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1990s, growing from 90 countries and territories to 127 in the 2010 census round (2006-2015). However, this number remains relatively small. In contrast when compared to the 214 countries and territories that participated in the 2010 round of the population and housing census (PHC) (see Table 1).

Table 1. Countries and territories that participated in the 2010 census rounds

Region	Population and housing census	Agricultural census
Africa	49	22
North and Central America	36	17
South America	14	11
Asia	44	29
Europe	47	36
Oceania	24	12
TOTAL	214	127

Source: FAO and UNSD records, 2019.

Note: The 2010 PHC round covered the period 2005-2014, while the AC round covered 2006-2015.

This shows that there are many countries that do not have ACs, which could provide updated sampling frames for their regular agricultural surveys. This brings adverse impacts on the reliability of current statistics emanating from these surveys. When a new AC is finally conducted, the following is commonly seen:

- The census is overburdened with a wide range of items that may affect the quality of the census;
- Serious discrepancies are found between the dataset before the AC and that emanating from the new AC.

3. Integrating the system of census and surveys:

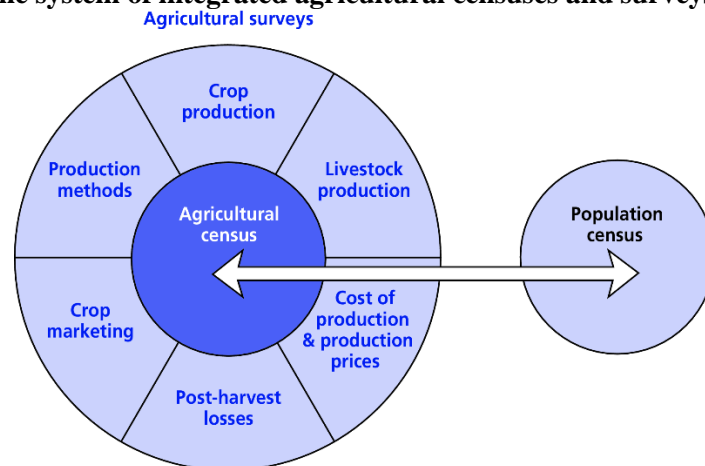
A good coordination between the AC and sample surveys results in:

- statistics based on standard concepts, definitions and classifications;
- preventing duplication of statistical activities;
- avoiding the release of conflicting statistics;
- reducing excessive response burden and waste of resources; and
- contributing to a better understanding and use of statistics by users.

In consequence, the census could be focused on key structural items, assuming that other (non-structural) items needed more frequently are available through regular agricultural sample surveys, administrative registers and other sources.

Figure 1 shows a schematic representation of the system of integrated ACs and surveys (FAO, 2015). It illustrates the links among agricultural surveys and the AC, and between the latter and the PHCs (for the household sector).

Figure 1. The system of integrated agricultural censuses and surveys



To achieve this integrated system, the WCA 2020 recommends some actions, no mutually exclusive:

- a. Identifying the specific role of the AC.
- b. Focusing the census of agriculture on structural items.
- c. Integrating the census with periodic rotating surveys.
- d. Using administrative registers.
- e. Better integrating the agricultural and population censuses.

a. Identifying the specific role of the census of agriculture

Identifying the specific role and objectives of the AC as a component of the system of integrated agricultural censuses and surveys is the first major step in preparation for an upcoming AC. A good strategic plan like the Strategic Plan for Agriculture and Rural Statistics (SPARS), mainstreamed into the National Strategy for the Development of Statistics (NSDS) is of crucial importance, especially in countries without a well-established agricultural statistics system. This plan ensures that both the AC and surveys complement each other and together generate the required statistics with the appropriate frequency (FAO, 2015).

b. Focusing the census on structural items

Identifying the content of the census and that of the sample survey programme must not be underestimated and should be done in strong cooperation with users of agricultural statistics. This activity might be difficult when statistical activities are undertaken by different government institutions. For instance, the NSO might be responsible for the AC, whereas ongoing sample surveys such as agricultural production surveys are conducted by the ministry of agriculture. Coordination between all agencies involved in the agricultural statistics' production is paramount (FAO, 2018).

The AC should focus only on structural items. In order to help countries to identify the census content tailored to the country's specifics while ensuring international comparison, the WCA 2020 classifies the census items into three categories:

- (i) essential items (23 items in total);
- (ii) frame items (15, of which 6 are also essential items); and
- (iii) additional items (96).

Essential items enable national and international comparison while frame items are for use in census modules or subsequent surveys¹. Overall, the WCA 2020 recommends up to 32 essential and frame items

¹ If a community survey is conducted together with the AC, countries can select from 34 community items recommended by the WCA to complement holding-level items.

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to be used as a starting point in defining the content of a nation AC. Nonetheless, the final list of country-specific census items should be agreed with the stakeholders. Streamlining the census questionnaire to focus on structural items not only improves census data quality but also results in significant cost efficiencies (Castano, 2019).

c. Integrating the census with periodic rotating surveys

Countries use different methodological modalities for carrying out the ACs, according to capacities and resources. In addition to the classical and modular census approaches, the WCA 2020 introduced two new alternative modalities for cost-efficient census, namely the *integrated census and survey modality* and the *use of registers as sources of census data*. This section discusses the former.

The *integrated census and survey modality* aims at producing a wide range and regular flow of data by rolling out the collection of thematic data over the period separating two ACs (usually ten years). An example of this is the FAO Agricultural Integrated Survey (AGRIS) programme (Global Strategy, 2017). AGRIS comprises: **i**) a census core module (which could be even lighter than that in the modular approach) on a complete enumeration basis; followed in the inter-census period by **ii**) an annual production module and several rotating thematic modules (such as “economy”, “labour”, “machinery and equipment”, and “production methods and environment”) on sample basis.

The AGRIS production module, covers crop and livestock production. Between two ACs, the AGRIS production module and one of the other rotating modules should be implemented each year. Table 2 illustrates a possible implementation of an AGRIS plan between two censuses.

Table 2. Example of implementing an integrated census and survey modality

		Years												
		0	1	2	3	4	5	6	7	8	9	10		
Agricultural Census (core module)		•												•
AGRIS annual production Module (AGRIS Core Module)	Crop and livestock production		•	•	•	•	•	•	•	•	•	•	•	•
Rotating Module 1	Economy		•		•		•		•		•		•	
Rotating Module 2	Labour			•				•						
Rotating Module 3	Production methods and environment					•					•			
Rotating Module 4	Machinery, equipment and assets		•				•							

The countries lacking a well-established census and survey programme may find this modality an important first step. This modality seeks to ensure a continuous flow of data instead of concentrating all resources on a one-off census operation.

d. Using administrative registers

A growing number of NSOs, particularly in developed countries, have been increasingly used administrative registers in the statistical data production process. This reduces the burden on respondents and generates more frequent data with reduced costs by not collecting data that are already available. An assessment made by Statistics Canada in 2012 concluded that while the AC remains relevant and necessary², there was a need to increase the use of administrative data and the utilization of remote sensing.

² The assessment used criteria such as relevance, accuracy, coherence, timeliness, interpretability, accessibility, respondent burden, cost and acceptability by user and respondent community.

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The WCA 2020 introduced the use of administrative registers as a source of census data as an alternative census modality. This modality is relevant for countries with well-developed administrative registers, suitable for statistical purposes and requires the access of statistical agencies to administrative data (individual records). The items to be sourced from available administrative registers should be excluded from the census field enumeration.

The tremendous revolution in technology (Castano, 2018) witnessed in the last years is facilitating the implementation of ACs. Recent technology allows linkages of records between various administrative registers' databases.

e. Integrating the censuses

The integration of the AC, the PHC and the economic census constitutes another important aspect of the integration of statistical operations in the NSS. The linkages between the AC and the PHC, for instance, are discussed in FAO and UNFPA technical guidelines (2012). The typical ways of coordinating these two censuses are (Castano, 2020):

- Coordinating the use of common concepts, definitions and classifications; sharing field materials; building enumeration areas which suit both censuses; organization of fieldwork.
- Using the listing of the PHC as a starting point for the household-sector frame of the AC;
- Collecting agriculture-related data in the PHC to screen households engaged in own-account agricultural production (either through few basic items or an agriculture module).

In the WCA 2010 round, about 60 countries included agriculture-related items in their PHCs. Sri Lanka conducted the census of the agricultural sector jointly with the Economic Census 2013/2014. Some Pacific island countries, particularly those composed of scattered atolls, have included or are planning to include an agriculture module in their PHCs to deal with high fieldwork costs and logistical challenges.

The use of mobile (CAPI) and online (CAWI) technology in census data collection is facilitating the linkages between the the AC and the PHC [4]. PHC data entry applications can be programmed to flag households reporting that they are engaged in own-account agricultural production and have land used for agricultural purposes, enabling a household frame for the subsequent AC. The frame is even more complete when GPS is used to geo-reference the households.

A better integration of the AC and PHC within the NSS requires the improvement of the legal and institutional framework and to build statistical capacity across the different institutions concerned, as well as the support of the government to optimize the data collections in line with statistical plans and programmes and secure budgetary allocations.

4. Discussion and Conclusion:

Growing user demands for relevant, reliable and coherent data, and the need to improve cost-efficiency, implies that many countries should strive for achieving better integration of their data collection operations within the NSS. The great data demands posed by the SDGs has underscored the need of better coordination and integration.

The AC, as the backbone of the system of integrated agricultural censuses and surveys, should not be burdened irrelevant items that could affect its quality, but rather focused on key structural items. Other (non-structural) data needed more frequently should be available in other data collection operations.

Alternative methodological approaches constitute important ways to better integrate and improve cost-effectiveness of data collections. The use of registers as source of census data could contribute to data harmonisation and reduced response burden. Other census approaches such as the integrated census and

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rotating surveys would assist countries with underdeveloped agricultural census and surveys programmes to move towards a more integrated approach.

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