# Midterm review of the 2020 round of censuses of agriculture

## Jairo Castano<sup>a,\*</sup> and Adriana Neciu<sup>b</sup>

<sup>a</sup>Senior Statistician and Team Leader, Agricultural Censuses, Statistics Division, Food and Agricultural Organization of the United Nations (FAO), Rome, Italy<sup>1</sup>

<sup>b</sup>Statistician (Consultant), Agricultural Censuses, Statistics Division, Food and Agricultural Organization of the United Nations (FAO), Rome, Italy

**Abstract.** In early 2020, the Food and Agricultural Organization of the United Nations (FAO) conducted a mid-term review of the plans and progress of national censuses of agriculture in the 2020 round of the World Programme for the Census of Agriculture (WCA 2020). The round covers the period 2016–2025. A brief online survey was sent to all member countries. This paper presents the main findings of the mid-term review. The findings show that an increasing number of countries are shifting their census methodologies from classical to modular approach and combining field enumeration with the use of administrative registers. CAPI is overtaking PAPI as the main data collection mode and a growing number of countries are relying on the use of new technologies such as CAWI, CATI, GIS and interactive online databases. A large number of countries postponed their censuses at least once due to lack of funds. The situation was exacerbated later by the protracted impact of COVID-19 on most census operations.

Keywords: World Programme for the Census of Agriculture 2020 (WCA 2020), national censuses of agriculture, mid-term review, COVID-19

#### 1. Introduction

The Food and Agricultural Organization (FAO) is the United Nations agency responsible for providing methodological guidelines and technical support to member countries for the conduct of national censuses of agriculture. FAO recommends countries to conduct a census of agriculture at least once every ten years. The latest decennial programme is the World Programme for the Census of Agriculture 2020 (WCA 2020) [3]. This is a *de facto* international standard that provides the methodological basis for the implementation of national agricultural censuses in the 2016–2025 decade.

As part of the monitoring work on the worldwide implementation of national censuses of agriculture in the WCA 2020 round, FAO undertook a mid-term review of census activities in 2020. The organization sent an online 11-question survey to relevant national agencies (National Statistical Offices or Ministries of Agriculture) responsible for the conduct of agricultural censuses. The purpose of the survey was to collect country information on census plans, stage of census activities, and methodologies. The survey covered eleven topics, including status of the census activities, enumeration period, census scope, methodology, source of census frame, enumeration type and method, use of geographical information systems (GIS), data dissemination products, reasons for delays (if any), and challenges. This paper presents the main results based on replies received from 111 countries and territories.<sup>2</sup> The results provide an overview of the status of census taking at the midway point of the WCA 2020 round. Some territories

<sup>\*</sup>Corresponding author: Jairo Castano, Senior Statistician and Team Leader, Agricultural Censuses, Statistics Division, Food and Agricultural Organization of the United Nations (FAO), Rome, Italy. E-mail: Jairo.Castano@fao.org.

<sup>&</sup>lt;sup>1</sup>Marcillineous Anthonio assisted with descriptive analysis.

<sup>&</sup>lt;sup>2</sup>Annex 1 presents the list of countries that responded to the online mid-term survey in early 2020.

Table 1							
Status of censuses in 111 countries							
Region	Countries	Completed	Ongoing or planed	No plans			
	Number	Number (%)	Number (%)	Number (%)			
Africa	27	3 (11)	20 (74)	4 (15)			
Asia	28	9 (32)	18 (64)	1 (4)			
Americas	12	5 (42)	6 (50)	1 (8)			
Europe	36	7 (19)	28 (78)	1 (3)			
Oceania	8	5 (63)	3 (38)	0 (0)			
Total	111	29 (26)	75 (68)	7 (6)			
100							
80			72				
60							
40							
20	13			15			
0							
Begi	Beginning of the round (2016 - 2018)		f the round End o - 2022) (202	f the round 23 - 2025)			

Fig. 1. Timing of census enumerations in the WCA 2020 round (percentage of 104 countries).

that conduct stand-alone agricultural censuses are also treated as "countries" here, for statistical purposes.

The participation of FAO member countries in the WCA rounds has increased over the decades. It has grown from 53 countries and territories in the 1930 round (when the first WCA was launched) to 127 countries in the 2010 round.

The survey was sent to 200<sup>3</sup> countries in three languages (English, French and Spanish) in early 2020. However, only 111 countries responded to the survey, 104 of which with ongoing or completed censuses. Some countries that also had planned censuses of agriculture did not respond. The sections below discuss the findings drawn from these 111 countries at the time of the survey. A word of caution: the situation reported by some countries may have changed after the impact of the COVID-19 pandemic made itself felt.

## 2. Overview of the implementation of WCA 2020 round globally and by region

#### 2.1. Status of national censuses of agriculture

Table 1 shows that 26 percent of the 111 responding countries (i.e. 29 countries) already conducted an agri-

cultural census and 68 percent (i.e. 75 countries) are planning or had an ongoing census of agriculture in the WCA 2020 round. Most of these countries are located in Europe, Africa and Asia. Other seven countries (6 percent) informed that they did not have any census plans in the round.

### 2.2. Census enumeration period

The 104 countries that reported census activities were asked about the period of the census enumeration. Figure 1 illustrates the distribution of enumeration periods over the duration of the WCA 2020 round. The chart shows that nearly three-quarters of the countries are having the census enumeration in the middle of the round (2019–2022), in line with FAO recommendation to conduct the census close to the reference year of the round. A similar pattern was seen in the WCA 2010 round [5].

The reported enumeration periods may change due to budgetary constraints, technical issues, and political situations. Furthermore, censuses of agriculture, like other major national statistical operations, have been particularly affected by the COVID-19 pandemic. As many countries went into lockdown as a measure to contain the pandemic, census preparatory and field operations experienced disruptions. As discussed under challenges below, the level of disruption varied from delays to postponements depending on the stage of advancement of the respective censuses [1].

<sup>&</sup>lt;sup>3</sup>The survey was not sent to countries that do not conduct censuses of agriculture, such as Brunei Darussalam, Singapore, Monaco, San Marino, Tokelau and Faroe Islands.



Fig. 2. Agricultural census scope (percentage of 104 countries).



Fig. 3. Census methodology used or intended to be used (percentage of 104 countries).

## 2.3. Census scope

The WCA 2020 guidelines recommend countries to focus the scope of the census on crop and livestock production activities (agricultural holdings). However, in some countries, holdings are also engaged in other activities such as aquaculture, forestry and fisheries. Figure 2 shows that all countries focused the census scope on crop and livestock production activities. In addition, some countries covered as well aquaculture (48 percent of the countries), fisheries (40 percent) and forestry (36 percent). This reflects a greater widening of the census scope compared with the WCA 2010 round when only 20 percent of the countries added fisheries and/or aquaculture activities, and 19 percent added forestry activities to the scopes of their censuses [5].

#### 2.4. Methodological modalities

Countries use a variety of census methodological modalities. The most common modalities are: (i) classical census (one-off data collection); (ii) classical census jointly with other census(es); (iii) modular approach with an independent core module;<sup>4</sup> (iv) modular approach with a core module in the population census; and (v) combined census (administrative registers combined with field enumeration).

Figure 3 shows that the classical census is the predominant methodology in half of the countries, down from 65 percent in the WCA 2010 round. The classical census is carried out either alone (46 percent of the countries) or jointly with the population census<sup>5</sup> (4 percent). The combined census with administrative registers was the second most preferred methodology. It is being used by nearly a third of the countries, mainly in Europe, considerably up from 17 percent in the previous census round. Figure 3 also shows that the modular approach was third with 19 percent of the countries, mainly in Africa, up from 9 percent in the previous round. This approach is planned with a core mod-

<sup>&</sup>lt;sup>4</sup>The modular approach consists of a core module (on a complete enumeration basis) and some supplementary modules (on a sample basis).

<sup>&</sup>lt;sup>5</sup>Belarus, Cook Islands, Georgia and Moldova plan to conduct these two censuses together.



Household sector

Fig. 5. Sources of census frame (percentage of 104 countries).

ule either independent (11 percent of the countries) or included in the population census (8 percent).

#### 2.5. Complete or sample census enumeration

The type of enumeration, namely complete enumeration, sample enumeration or a combination of both, depends largely on the methodological modality. Figure 4 shows that complete enumeration is the main type of enumeration used in 82 percent of the countries, both in the classical census (55 percent of the countries) and the core module of the modular approach<sup>6</sup> (27 percent of the countries). This is substantially up from the 71

percent of countries using complete enumeration in the WCA 2010 round.

#### 2.6. Census frame

Non-household sector

Countries use different sources to prepare the frame for the agricultural census. When an exhaustive list of agricultural holdings is not available from a statistical farm register (land records, subsidy registers, etc.), countries use a recent census of population and housing (for the household sector), registers or undertake a cartography and/or listing operation. Figure 5 shows that the main source of census frame for the household sector is the last population census (46 percent of the countries, up from 25 percent in the 2010 round), followed by the last agricultural census (41 percent) and administrative registers (18 percent). For the non-

204

<sup>&</sup>lt;sup>6</sup>The supplementary modules of the modular approach are carried out on a sample basis.





Fig. 6. Methods of census data collection (percentage of 104 countries).

Fig. 7. Modes of census data collection by region (percentage).

household sector, the main sources of frame are registers and other administrative sources (32 percent of the countries), followed by the last agricultural census (15 percent) Only 13 percent of the countries plan a listing operation prior to the census enumeration to build the frame, up from 10 percent in the previous round.

#### 2.7. Data collection mode

Countries use a variety of census data collection modes, including paper and pen interviewing (PAPI), computer-assisted personal interviewing (CAPI), computer-assisted web-interview (CAWI), post,<sup>7</sup> and telephone Interviewing.<sup>8</sup> Figure 6 shows that the preferred data collection mode is CAPI using portable electronic devices (two-thirds of the countries, significantly up from 20 percent in the WCA 2010 round), followed by CAWI (just over a third of the countries, doubling the level of 17 percent seen in the previous round). PAPI came in a third place with 26 percent, a stark contrast to the WCA 2010 round when almost three-quarters of the countries used this data collection mode [5]. Telephone interviewing (CATI/PATI) rose from 9 percent to 22 percent while post (MO-MB/DO-PKE) increased from 20 percent to 28 percent. One country (United Arab Emirates) reported the use of drones for data collection.

Data collection modes vary notably among regions. Figure 7 shows that CAPI is the primary data collection mode in Africa (96 percent of the countries), Oceania and the Americas (75 and 73 percent, respectively) and Asia (56 percent). In contrast, self-enumeration online (CAWI) is the primary mode in Europe (74 percent). PAPI lost ground in all regions. Telephone interviewing (CATI/PATI) is popular in Europe while post (MO-MB/DO-PKE) is frequent in Oceania.

The results show a clear tendency in the WCA 2020 round of replacing PAPI with electronic data collection modes (CAPI and CAWI). Countries are increasingly reducing the reliance on face-to-face interviews and en-

<sup>&</sup>lt;sup>7</sup>Questionnaires dropped-off/picked-up by enumerators (DO-PKE) or mailed out/mailed back (MO-MB).

<sup>&</sup>lt;sup>8</sup>It could be computer-assisted telephone Interviewing (CATI) or paper-based telephone Interviewing (PATI).



Fig. 8. Collection of geographic coordinates (percentage of 104 countries).



Fig. 9. Main census dissemination products (percentage).

couraging alternative remote data collection modalities such as CAWI and CATI/PATI A recent study showed that during the pandemic several countries curtailed drastically face-to-face interviewing and widened the use of CAWI, CATI and post to comply with social distancing regulations [1,6]. It is expected that the increased use of electronic data collection methods would significantly improve census coverage and the quality and timeliness of census results. CAPI is often used with GPS which allows the identification of the geographic coordinates of holdings and parcels as well as area measurement.

Figure 8 shows that, 65 percent of the countries plan to collect geographical coordinates at the holding or housing unit level, up from a mere 14 percent in the WCA 2010 round. Furthermore, 14 percent of the countries plan to collect geographical coordinates of roads and other landmarks.

#### 2.8. Census dissemination products

Digital dissemination of products enhance accessibility and interactivity with census data. Online access to census databases could enhance the accessibility of agricultural census data to a large user base and unleash their analytical creativity. On-demand and direct access to census databases allows fast and relatively inexpensive production of tables and maps. Countries were asked to indicate the data products they intended to make available to users from the following list: (i) interactive online databases; (ii) anonymized microdata and (iii) geographic information systems (GIS) and web-based mapping tools.

Figure 9 shows that, in addition to the traditional census reports, two-thirds of the responding countries plan to disseminate census data through interactive online databases. The Americas and Europe lead other regions in using this dissemination product. Just over a half of the countries will provide users' access to anonymized census microdata, up from under a quarter of the countries in the WCA 2010 round. The Americas lead in the dissemination of anonymized census microdata. Under half of the countries will provide GIS and webbased mapping tools for data users, indicating an area for further development. However, three-quarters of the



Fig. 10. Reasons for postponement of the census (percentage of 42 countries reporting postponement).



Fig. 11. Challenges faced in the census.

countries in the Americas intend to make available GIS mapping tools.

#### 2.9. Reasons for census postponement (if postponed)

At the time of the survey, 42 countries reported that their censuses of agriculture had been postponed at least once. Figure 10 shows that the two main reasons were lack of funds (48 percent of these countries), and problems and delays during preparatory activities (38 percent).

As noted earlier, the survey took place before the impact of the COVID-19 pandemic. A subsequent review in late 2020 [1] found that nearly two-thirds of 130 countries and territories with ongoing census activities had been disrupted by the pandemic. The censuses in these countries were either delayed (32 percent

of countries), postponed (26 percent) or suspended (5 percent).

# 2.10. Challenges in planning and conducting the census

Censuses of agriculture are major operations that require immense efforts and resources. Therefore, it is likely that countries face challenges and obstacles when planning and conducting these operations. Figure. 11 shows how countries rated several challenges from "significant" to "moderate". It is important to note that at the time of the survey many countries were at very early preparatory stages and therefore may have not faced significant challenges yet.

Figure 11 shows that the top significant challenges were insufficient financial resources (38 percent of the countries), timeliness (25 percent) implementing new technologies (20 percent) and keeping to the budget (18 percent). The top moderate challenges were adequate technical staff and statistical capacity (51 percent), recruiting and training field staff (49 percent) and implementing new methodologies and improving coverage and data quality (47 percent each). Other challenges rated as moderate were improving data dissemination (45 percent) and managing public trust and perceptions about the census (43 percent).

#### 3. Main findings and conclusions

The FAO mid-term review has revealed interesting developments in the way countries conduct theirs censuses of agriculture in the WCA 2020 round when compared with the 2010 round. Some of the main findings are:

- More countries are widening the census scope from crop and livestock production activities to aquaculture (almost half the countries), fisheries (40 percent) and forestry (36 percent).
- The classical approach remains the leading methodology in just over half of the countries, but combined census with administrative registers and the modular approach are gaining ground.
- Complete census enumeration remains the preferred data collection strategy in over threequarters of the countries.
- The main source of census frame for holdings in the household sector is the last population census in almost half of the countries.
- CAPI overtook PAPI as the main data collection mode with two-thirds of the countries preferring this mode. It was followed by CAWI with just over a third of the countries. Other remote data collection modes such as telephone interviewing and post have also increased their shares.
- Almost two-thirds of the countries plan to collect geographical coordinates at the holding or housing unit level, a significant increase from the WCA 2010 round.
- Two-thirds of the countries plan to disseminate census results through interactive online databases and over a half of the countries will provide access to anonymized census microdata to users.
- Before the impact of the COVID-19 pandemic, around 4 percent of the countries reported that their censuses of agriculture had been postponed at least once. The two main reasons were lack of funds and delays during preparatory activities. A more

recent study [1] found that nearly two-thirds of the censuses had been disrupted by the pandemic, resulting in delays, postponement or suspension of census activities.

Regarding the challenges faced, the most significant ones were insufficient financial resources, timeliness, implementing new technologies and keeping to the budget. The key moderate challenges were adequate technical staff and statistical capacity, recruiting and training field staff, implementing new methodologies and improving coverage and data quality.

The above findings show that an increasing number of countries are shifting their census methodologies from classical to alternative methods such as the modular approach and combined census with administrative registers. The modular approach couples the use of complete enumeration for few core items and sample enumeration for supplementary items for which small-area estimates are not so important. Use of administrative data, in turn, is an efficient way of sourcing census data already available through the administrative process and, at the same time, reducing the burden on respondents and lowering fieldwork costs.

A growing number of countries are relying on the use of new technologies such as CAPI, CAWI CATI, GIS and interactive online databases seeking efficiency and timeliness in the collection, processing and dissemination of agricultural census data. In practice, countries use a combination of data collections modes. As physical distancing restrictions increased with the pandemic and face-to-face interviews became impossible, some countries promoted greater use of CAWI, CATI and mail interviews [1]. In other countries, CAPI is used in smallholdings while CAWI, CATI and mail might be applied in large holdings or in the non-household sector [2]. These innovations imply additional efforts on the part of these countries to ensure that planning and implementation of census activities are appropriately carried out.

The current review halfway the WCA 2020 round is merely a glimpse of the statuses of national censuses of agriculture. Censuses have been hardly hit by delays and postponements. Financial resources, as usual, is the most significant challenge faced by countries. The situation was exacerbated by the protracted impact of COVID-19, a once in a lifetime event. The ultimate effect of this event on the successful implementation of the WCA will not be known until the end of the round in 2025.

#### References

- [1] Castano J. Censuses of agriculture and COVID-19: Global situation and lessons. Statistical Journal of the IAOS. 2020; 36: 861-865. http://www.fao.org/3/cb2467en/CB2467EN.pdf.
- [2] Castano J. Technological Innovations in the Census of Agriculture. Statistika. 2018; 98(4): 377-384. https://www.czso.cz/ documents/10180/61266315/32019718q4377.pdf/5608417b-74b7-4746-90a7-ca510be91591?version=1.0.
- [3] FAO. World Programme for the Census of Agriculture 2020 Volume 1: Programme, concepts and definitions. FAO Statistical Development Series 15. Rome. 2015, http://www.fao.org/3/

i4913s/i4913s.pdf.

- [4] FAO. World Programme for the Census of Agriculture 2020 Volume 2: Operational guidelines. FAO Statistical Development Series 16. 2018, http://www.fao.org/3/CA1963EN/ca1963en.pdf.
- [5] FAO. Global review of agricultural census methodologies and results (2006-2015). World Programme for the Census of Agriculture 2010. FAO Statistical development series No. 18. Rome. 2021a, http://www.fao.org/3/cb2650en/cb2650en.pdf.
- [6] FAO. Impact of COVID-19 on national censuses of agriculture (Status overview). FAO Policy Brief, Rome. 2021b, http://www. fao.org/3/ca8984en/CA8984EN.pdf.

#### Annexes

List of countries that responded to the WCA 2020 online mid-term survey in early 2020								
Africa (27)	Asia (28)	Americas (12)	Europe (36)	Oceania (8)				
Angola	Afghanistan	Argentina	Austria	Australia				
Bénin	Armenia	Belize	Belarus	Cook Islands				
Botswana	Azerbaijan	Bolivia	Belgium	Fiji				
Burundi	Bhutan	Brasil	Bosnia and Herzegovina	Micronesia				
Cameroon	China	Canada	Bulgaria	New Zealand				
Comoros	Cyprus	Colombia	Croatia	Niue				
Congo	Georgia	Dominica	Czechia	Samoa				
Equatorial Guinea	India	Ecuador	Denmark	Solomon Islands				
Eritrea	Indonesia	México	Estonia					
Gabon	Iran	Paraguay	Finland					
Ghana	Israel	Saint Kitts and Nevis	France					
Guinea	Japan	Suriname	Germany					
Lesotho	Jordan		Greece					
Liberia	Kazakhstan		Hungary					
Libya	Kyrgyzstan		Iceland					
Madagascar	Maldives		Ireland					
Malawi	Mongolia		Italy					
Mali	Myanmar		Latvia					
Namibia	Nepal		Lithuania					
Niger	Palestine		Luxembourg					
Tchad	Philippines		Macedonia					
the Gambia	Republic of Korea (the)		Malta					
Tunisia	Sri Lanka		Moldova					
Tanzania	Thailand		Netherlands					
Togo	Timor-Leste		Norway					
Sierra Leone	United Arab Emirates (the)		Poland					
South Sudan	Viet Nam		Portugal					
	Iraq		Romania					
			Russian Federation (the)					
			Serbia					
			Slovakia					
			Slovenia					
			Spain					
			Sweden					
			Switzerland					
			Ukraine					

# Table 1A