



BRAZIL – AGRICULTURAL CENSUS 2017 – METADATA REVIEW

1. Historical outline

The first Agricultural Census (AC) in Brazil was conducted in 1920. Since 1940, ACs have been conducted on a decennial basis¹ until 1970, and quinquennially² thereafter, until 1985. The following censuses were conducted in 1996 and 2006. The 2017 census was its 11th edition.

2. Legal basis and organization

Legal framework

The AC legislation included:

- Law No. 5878 of 11 May 1973, Article 2 (Items I and II), with reference to the basic objective of the Brazilian Institute of Geography and Statistics (IBGE);³ and
- Decree 74084 of 20 May 1974, which approved the General Plan of Statistical and Geographical Information.

Institutional framework and international collaboration

IBGE was responsible for planning, conducting, and coordinating the operation of the AC 2017 in Brazil. The Directorate of Surveys (DPE), the Operational Coordination of the Census (COC) and the Technical Office for the Census of Agriculture (GTA) of IBGE were directly responsible for the census. The fieldwork was coordinated by IBGE territorial units. Municipal Geography and Statistics Commissions (CMGES) were implemented to strengthen communication and alliance with the municipalities, their local administrators, and the communities.

Census staff

Approximately 29 240 people were trained for the fieldwork, out of which 24 894 were hired as field enumerators and field supervisors. Field supervision was also provided by the GTA team. The following temporary staff participated in AC 2017: 18 census office staff, 18 755 enumerators, 4 867 fieldwork supervisors, 1 272 municipal census staff, 350 regional census staff, 174 IT and data processing specialists, 171 subject matter specialists, and 344 administrative census staff. Permanent staff were involved in IT, geography, administrative, and dissemination activities.

3. Reference date and period

Reference day: 30 September 2017, for items on total area of the holding, land tenure, livestock, machinery, among other structural data.

Reference period: the crop year 2016 (from 1 October 2016 to 30 September 2017), for items on crop and animal production, investments, inputs, etc.

4. Enumeration period

The census enumeration was conducted from October 2017 to February 2018.

5. Scope of the census and definition of the statistical unit

The **census scope** covered agricultural (crop and livestock production) activities, as well as forestry and aquaculture activities.

The **statistical unit** was the agricultural holding, defined as any production unit dedicated wholly or partially to agricultural, forestry and aquaculture activities, subject to a single management, with the objective of producing for sale or subsistence, regardless of size, legal form (own, partnership, lease, etc.) or location (rural or urban). The agricultural holdings were classified according to the legal status

¹ Census years: 1940, 1950, 1960 and 1970.

² Census years: 1975, 1980 and 1985.

³ To ensure information and studies of a statistical, geographic, cartographic, and demographic nature necessary for the knowledge of the physical, economic, and social reality of the country, specifically aimed at economic and social planning and national security.

of the producer as: individual holder, condominium, consortium, or partnership; cooperative; incorporated or limited liability company; public utility institutions (church, NGO, hospital), or government. Household gardens and leisure farms were not considered census units.

Community-level data

There were no community-level data collected along with the census.

6. Census coverage

Geographical coverage

The census covered the entire country, including urban areas with agricultural holdings previously identified by IBGE.

Cut-off threshold and other exclusions

No cut-off thresholds were used for agricultural holdings.

7. Methodology

Methodological modality for conducting the census

The classical approach was used in the AC 2017.

Relation to other censuses

In the AC 2007, a list of agricultural holdings was created, in an integrated operation to build the National List of Addresses for Statistical Purposes (CNEFE). This list was updated by the Population and Housing Census 2010 (PHC) and by update operations between April 2014 and March 2017. The Enumeration Area Frame from the PHC 2010 was updated prior to 2017 census operation. Both frames will be used in PHC 2022.

Frame

The AC 2017 used list and area frames. Two list frames were used, a previous list and a special collect list. The previous list consisted of a list of all agricultural holdings from AC 2007, about five million, partially updated in subsequent field operations, and integrated in the smartphones with georeferenced addresses. The special collect list consisted of 30 000 large agricultural holdings whose data collection required an off-farm interview. Units belonging to the special collect list were marked as blocked to prevent enumerators from collecting them. Regarding the area frame, the sources were the PHC 2010 and the cartographic documentation and was updated prior to the AC 2017 fieldwork. The area frame consisted of census sectors, which were assigned to each enumerator who thoroughly explored the area to identify all agricultural holdings, regardless of whether they exist in the lists. The lists were updated confirming, including, and excluding agricultural holdings.

Complete and/or sample enumeration methods

The AC 2017 was a complete enumeration operation of all agricultural holdings in the country.

Sample design (if sampling was used)

No sampling design was used.

Data collection method(s)

Data collection was undertaken through face-to-face interviews using CAPI with smartphones. CAWI method was used to collect data from less than 1 000 large holdings that voluntarily agreed to use this method. The electronic questionnaire was structured to allow gathering more details on specific production issues on all holdings with the following thresholds: (i) 50 head of cattle; (ii) 50 head of pigs; (iii) 200 head of poultry; or (iv) 50 trees of permanent crops.

Questionnaire(s) and items covered

An electronic questionnaire was used for data collection. The AC 2017 covered all 23 essential items and all recommended frame items recommended for the WCA 2020 round⁴.

8. Use of technology

An electronic questionnaire was used to collect data through the CAPI and CAWI method. IBGE introduced electronic questionnaires into approximately 27 500 customized smartphones integrated with GPS to obtain georeferenced information on all agricultural holdings in the country. The devices were able to store and transmit (via wi-fi, depending on signal availability) the data collected. All devices were loaded with high resolution satellite imagery for field orientation. Built-in cameras were used by enumerators to take pictures of reference points to facilitate field orientation and were stored into the CNEFE database. Enumerators route were continuously tracked to provide area coverage data to supervisory staff.

9. Data processing

Data editing was done in real time in the devices and then transmitted to the data collection stations and to the state and central offices, where other data editing was done by supervisors. In the electronic questionnaire developed by IBGE staff, verifications and predefined jumps were introduced by the Technical Office for the Census of Agriculture. The verifications corresponded to the analysis and check of internal and external consistency of the answers. Wrong, suspicious, and non-completed answers were flagged and needed review by the respondent. Collected data was stored daily in an Oracle database after validation called Banco de Metadados Estatísticos (BME). Most of the software used for data capture, processing, analysis, and tabulation was developed by IBGE. The main tabulation system was the SIDRA (IBGE Automatic Recovery System), used for the dissemination of disaggregated data on the web. SAS was used to manipulate microdata to build special queries and tabulations. Imputation was applied to inconsistent data and to prices of self-consumption products, using the nearest neighbour imputation method within classes defined by activities engaged by agricultural holdings. The Canadian Census Edit and Imputation System software (Canceis) was used for imputation.

10. Quality assurance

Devices used for data collection included an automatic monitoring system of the enumerators' field work and visualization of their movements. Questionnaire software was designed with automated skipping, which avoided some expected inconsistencies and saved time during the interview. Data editing was done automatically in real time on smartphones to avoid serious errors in microdata, through alert messages and record marking for supervision. A supervision system (SIG-C) developed by IBGE was used in the local and central offices that provided several reports to verify the quality and coverage of the data based on the results of the AC 2006 and the management indicators of the collection, generated in line with the AC. Total area of agricultural holdings was compared to municipal area. Data from previous IBGE's agricultural surveys were compared with municipal level census data, allowing supervisors to obtain early information to check for inconsistencies. For some cases of data collected via CAWI, a help centre was provided to assist respondents and ensure questionnaire completeness. Doubtful data were rechecked with the respondent where possible. The data collection period was extended in some cases to ensure a complete enumeration of the area. Larger holdings and companies were collected by supervisors and permanent staff, using the Special Collect List. High resolution satellite images of the entire country were included with previous census data to find the georeferenced and new agricultural holdings, and the roads and pathways to reach them.

11. Data and metadata archiving

Census data was stored in an Oracle database. Microdata anonymization was performed automatically by IBGE's tabulation system, Sistema IBGE de Recuperação Automática (SIDRA, available at <https://sidra.ibge.gov.br/pesquisa/censo-agropecuario/censo-agropecuario-2017>). For each geographic level, every variable value with less than three registers was omitted and replaced by an "X" in the diffusion tables. Metadata can be found in the IBGE metadata database

⁴ The questionnaire also covered agricultural, forestry and natural forest productions, quantity and prices of products sold, incomes, expenses, grain storage capacity, financing, loans, services for agriculture, access to internet, water availability and irrigation. Specific items used for family farm classification, according to national legal definitions, were included.

(<https://metadados.ibge.gov.br/consulta/estatisticos/operacoes-estatisticas/CA>). API's are available in the IBGE API Data Service (<https://servicodados.ibge.gov.br/api/docs>) and in the Brazilian Open Data portal (<https://dados.gov.br/dados/conjuntos-dados/ca-censo-agropecuario>), in JSON, XML and ODS formats. IBGE staff performed special tabulations using SAS and E-Data software (developed by IBGE) in the Oracle database.

12. Data reconciliation

Census data were used to revise some estimates from IBGE annual surveys on agriculture (Produção Agrícola Municipal – PAM⁵), livestock (Pesquisa da Pecuária Municipal – PPM⁶), and forestry (Pesquisa da Extração Vegetal e da Silvicultura – PEVS⁷). At the municipal level, in a complementary manner, cultivated land, the existence and yield of various products, as well livestock, agricultural and forestry production were reviewed. The revised data was published in 2018 and 2019 editions, which cover the 2016-2018 data period.

13. Dissemination of census results and microdata

The preliminary census results were published in 2017. The final results were released in 2019 through a printed volume and online (Banco de Dados Agregados - SIDRA, Publicação Digital, available at) and by means of infographics (available at <https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=73096>). The census results were disseminated at the national and subnational levels (country, state, and municipality) and are available online on the AC website. An Atlas of Brazilian Rural Space is available at <https://www.ibge.gov.br/apps/atlasrural/#/home/> and interactive maps at <https://mapasinterativos.ibge.gov.br/agrocompara/>. Microdata is not available to the external user due to the confidentiality policy. It can only be accessed in the Restricted Data Access Room in Rio de Janeiro.

14. Data sources

Instituto Brasileiro de Geografia e Estatística (IBGE). 2019. Censo Agropecuário, 2017. In *IBGE* [online]. Rio de Janeiro, Brazil. <https://censoagro2017.ibge.gov.br/>

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⁵<https://www.ibge.gov.br/en/statistics/economic/agriculture-forestry-and-fishing/16773-municipal-agricultural-production-temporary-and-permanent-crops.html?=&t=destaques>

⁶<https://www.ibge.gov.br/en/statistics/economic/agriculture-forestry-and-fishing/17353-municipal-livestock-production.html?=&t=destaques>

⁷<https://www.ibge.gov.br/en/statistics/economic/agriculture-forestry-and-fishing/18374-forestry-activities.html?=&t=destaques>