THE 7TH GENERAL CENSUS OF AGRICULTURE: TRADITION AND INNOVATION IN DATA COLLECTION

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1. Introduction

In the last decade the demand for statistical data has grown in terms of territoriality, timeliness and comparability. This represented a challenge, especially for the National Institute of Statistics (Istat) which has renewed and expanded the processes and the information offer. The Covid-19 pandemic represented a moment of crisis in all sectors, but it did not interrupt the statistical production and the dissemination of official statistics data. Indeed, not only Istat has given greater importance to the "numbers" of the Covid-19 and its repercussions in the socio-economic context - thanks to ad hoc surveys[2] - but it has also continued the statistical production. In particular, the 7th General Census of Agriculture has been the first Census carried out in full pandemic. The Census of Agriculture provides a detailed reading of agricultural and livestock farms at national, regional and local level. Besides, it collects information on the territorial geolocation of the various production activities; it analyses the phenomena of rural development and environmental sustainability; it focuses on important patterns, as generational change, computerization, innovation and associationism (Grillotti Di Giacomo *et al*., 2021). The 2020 edition it was characterized by several novelties, some of which were implemented during the sudden and unexpected outbreak of the Covid-19 pandemic. In this research trend of data collection and its working methods will be analysed at regional and provincial level, throughout the period of the survey.

[1] The paper is the result of the common work of the authors. In particular, paragraph 1 is attributed to Rosalia Coniglio, 1.1 is attributed to Barbara Boninfante, 1.2. to Domenico Tucci, paragraphs 2 - 2.1 to Lorella Sicuro, paragraph 2.2 to Sabrina Angiona and paragraph 3 to Lucia Mongelli. Roberto Antonello Palumbo developed tables, graphs and cartograms.

[2] During and after pandemic Istat had carried out some surveys: “SARS-CoV-2 seroprevalence survey”, “Situation and prospects of companies after the Covid-19 health emergency”, “The holiday prospects of Italians in the Covid era”, “Diary of the day and activities at the time of the coronavirus”, “Survey on secondary school students - Children and the pandemic: daily life "at a distance".

1.1. Innovations

The 2020 edition, initially scheduled for October 2020, has been postponed due to the health emergency (FAO, 2020a). It took place from 7 January to 30 July 2021. The information collected referred to the 2019-2020 agricultural year, i.e. the period from 1st November 2019 to 31st October 2020.

It was the last decennial data collection involving all Italian farms (about 1,700,000) as the traditional methodology, but it was also characterized by some innovations in view of the transition to permanent census - conforming to the other censuses (Population and Housing, Companies, Non-Profit Institutions and Public Institutions) - and to adapt the activities planned with the ongoing pandemic (Eurostat, 2021). The introduced innovation has contributed to create new opportunities to modernize and optimize the data collection process and the working methods:

- use of IT processing systems (called Sistema di Gestione Indagine - SGI) to support the data acquisition and monitoring (FAO, 2020b). This was a fundamental tool developed before Covid-19 and useful when the health emergency isolated the Country reducing intra-territorial mobility;
- the questionnaire was available exclusively in digital format;
- involvement of Centres for Agricultural Assistance (CAA) in the survey network. The timely acquisition of quality data was allowed, thanks to the CAA's widespread presence on the territory and their specific knowledge and familiarity with the companies in the agricultural sector;
- organization of distance learning for all the people involved in various ways in the survey.

Regarding the questionnaire in digital format, it was possible to choose among three different interview techniques:

- CAWI (Computer-Aided Web Interviewing), the online self-compilation by the respondent who was able to connect to Istat site dedicated to the Agricultural Census through the credentials received in the information letter;
- CATI (Computer-Assisted Telephone Interviewing), the telephone interview, a technique that has been implemented in progress during the sudden and unexpected Covid-19 pandemic. This kind of interview could be carried out in two ways: Inbound, the respondent contacted Istat toll-free number during the survey period and requested an interview; Outbound, the respondent was contacted by an operator to do the interview by telephone; moreover, video-interviews by Skype were done in order to avoid personal contact with the respondents;
- CAPI (Computer-Assisted Personal Interviewing), the face-to-face interview with CAA operators: the assignment of farms to CAA was made

on the basis of territorial proximity and/or the presence of the company Dossier.

The Covid-19 health emergency led to adoption of a new training model course for Census' operators: on one hand, by the use of online Moodle platform, with slides in e-learning mode, audio contents, tutorials, manuals, guides and test; on the other, training in virtual classroom on Microsoft Teams, with the objective to resume the more complex concepts of the survey, provided an overview of the survey tools (SGI, questionnaire) through exercises, guaranteeing collaboration and communication in real time (Castano, 2020). Approximately 6,500 CAA's operators were involved in about 150 training days.

1.2. The census list and the organization

The survey unit of the Agricultural Census is the farm, in particular it is identified by all technical economic units with unitary management and that carry out agricultural and/or livestock activities. The Italian regional distribution of farms of the census list is visible in Table 1.

A unit is defined as eligible if it reaches at least one of the following thresholds:

- 20 ares (2,000 m^2) of Utilized Agricultural Area;
- 10 ares (1,000 m^2) planted with vines;
- 10 ares (1,000 m^2) of greenhouses;
- 10 ares (1,000 m^2) of mushrooms;
- the presence of at least one animal for reproduction or slaughter (not intended for self-consumption) of the following species: cattle, buffaloes, horses, sheep and goats, pigs, poultry, rabbits;
- the presence of at least 3 hives.

Regarding the organization of the Census, the network was composed by Istat at a national level that deal with the methodological, organizational and technical aspects (through the General Census Plan). In each territorial office, through the Territorial Supervisors, Istat has carried out support, training, and supervision tasks. Besides, the Ministry of Agricultural, Food and Forestry Policies (MIPAAF) provided strategic support. In particular, with respect to the organizational model, it made available to Istat the data from administrative sources useful for census purposes. The Agency for disbursements in agriculture (AGEA) has carried out support activities for Istat in relations with the survey network and has made data from administrative sources available.

The Regions have prepared the Regional Census Plans In some cases they have established the Regional Technical Commission (CTR) and have monitored the survey, carrying out macro checks on reports, considering particular domains agreed between Istat and Regions (basic models, and high participation).

As previously mentioned, CAA collected basic data by contacting the survey unit and carrying out the interviews. An external company managed the telephone interviews and provided support for the compilation through the toll-free number.

2. Trend of data collection

The census list consisted of 1,699,942 farms (Table 1).

Table 1 – *Italian regional distributions of total, multi-localized and relevant farms in the list of 7th General Census of Agriculture - absolute values – Year 2020.*

Region	Number of farms in the census list	of which multi-localized	of which relevant
Piemonte	78,492	5,970	778
Valle d'Aosta/Vallée d'Aoste	4,265	116	62
Lombardia	75,205	7,031	1,122
Trentino-Alto Adige/Südtirol	46,724	1,048	699
Bolzano	*27,350*	*564*	*410*
Trento	*19,374*	*484*	*289*
Veneto	112,562	7,899	1,689
Friuli-Venezia Giulia	27,050	1,457	404
Liguria	23,765	1,297	349
Emilia-Romagna	78,642	3,753	1,171
Toscana	81,350	3,713	1,216
Umbria	41,897	1,433	624
Marche	51,219	2,006	770
Lazio	117,963	4,789	1,767
Abruzzo	66,212	1,494	991
Molise	28,600	1,095	429
Campania	134,413	6,121	2,015
Puglia	266,195	13,353	3,990
Basilicata	49,766	1,522	744
Calabria	132,553	2,384	1,981
Sicilia	211,179	10,306	3,165
Sardegna	71,890	2,987	1,077
Italia	**1,699,942**	**79,774**	**25,043**

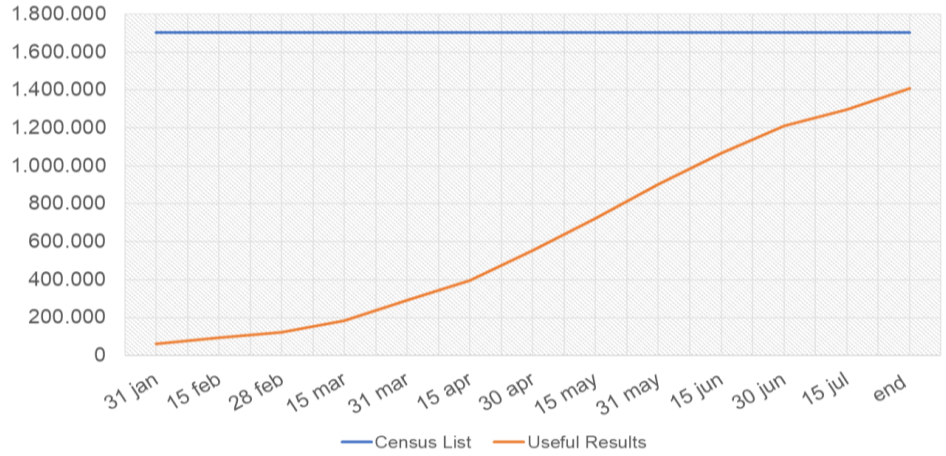
Source: Istat.

2.1. Useful results and complete interviews

At the end of survey, the 91.5% of the most important agricultural farms in terms of agricultural area and livestock was measured. In addition, 82.6% of final useful

outcomes - referred to completed interviews (59%), out of target (19.5%), discontinued company (3.2%) and temporarily inactive farm (0.9%) - were recorded. The cumulative frequency of useful results[3] from January to the end of the survey is visible in Figure 1.

Figure 1 – *Cumulative frequency of useful results from January to the end of 7th General Census of Agriculture - absolute values – Year 2021.*



Source: Istat.

In particular, at regional level (Figure 2), geographical gradient from North to South of Italy was observed. The Italian average was equal to 82.3%: the North-West and North-East were above the national value (respectively 84.1% and 87.7%), the Centre was in line (82.8%), while the South and Islands were below the national average (80.4%). Specifically, the highest values were found in Veneto (89.8%), Emilia Romagna (87.9%) and Marche (86.9%), while the lowest ones were in Liguria (78.3%), Sicilia (77.6%) and Calabria (76.1%).

At the provincial level (Figure 3), the 56.1% of the Italian provinces recorded a percentage of useful results on the census list higher than the national average value (82.3%): the 78.3% of these were provinces of the North and Centre. The highest values were reported in five provinces of the North-East: Ferrara (94.5%), Trento (91.9%), Rovigo (91.7%), Venezia (91.6%) and Padova (91.5%). At the other extreme were the provinces of Napoli (71.8%), Cosenza (71.9%), Messina (72.1%), Genoa (72.8%) and Catanzaro (74.2%).

[3] The useful results are completed interviews and companies that are off target, shut down and temporarily inactive.

Figure 2 – *Useful results of census list, percentage values, by region. Year 2021.*

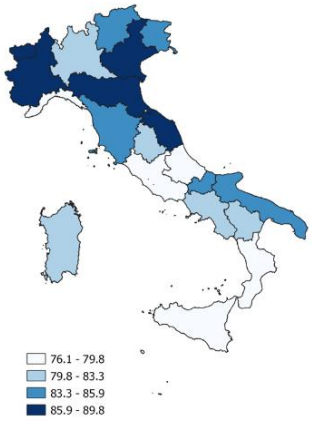
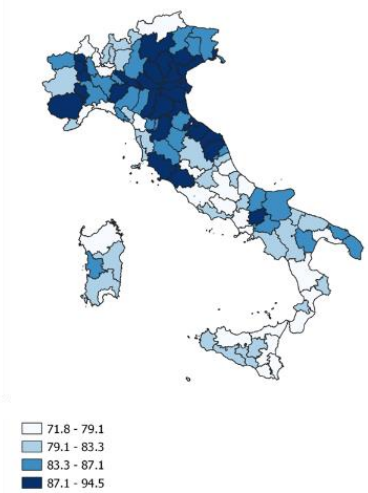
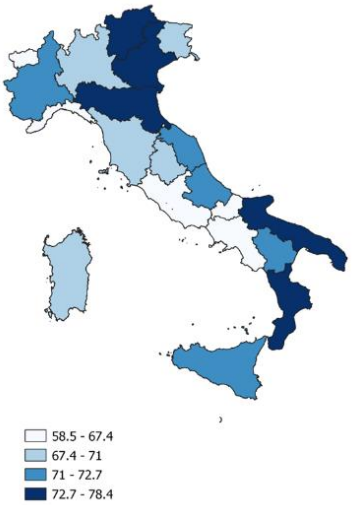


Figure 3 – *Useful results of census list, percentage values, by province. Year 2021.*



The national percentage of complete interviews on the total useful outcomes was equal to 71.4%. The average of these interviews in the South and Islands (71.9%) exceeded that of the North-West (69.6%) and the Centre of Italy (67.3%). In particular, the highest values were recorded in Trentino - Alto Adige (78.4%), Veneto (77.5%) and Calabria (74.8%). On the contrary, Valle d'Aosta (64.8%), Lazio (62.9%) and Liguria (58.5%) were the regions with the lowest values. (Figure 4).

Figure 4 – *Complete interviews on the total useful outcomes, percentage values, by region. Year 2021.*



At the provincial level (Figure 5), there were fifty-one (47.7%) Italian provinces that presented a percentage of complete interviews on the total useful results which is higher than the national average value (71.4%) and were concentrated, above all, in the North-West, in the South and in the Islands.

2.2. The multichannel data collection technique

The questionnaire was in digital format and the CAWI response mode (Figure 6) showed a North-South geographical gradient. The highest values were recorded in Trentino-Alto Adige (25.3%), Friuli-Venezia Giulia (17.4%) and Lombardia (17.3%), the lowest ones in Sardegna, Campania (both 8.1%) and Calabria (7.7%).

For the CAPI technique (Figure 7) high values in the South and in the Islands were observed. Furthermore, higher percentages were found in Campania (62.1%), Molise (61.7%) and Basilicata (61.5%), while the lowest ones in Trentino-Alto Adige (49.1%), Liguria (47.6%) and Lombardia (47.2%).

Figure 5 – *Complete interviews on the total useful outcomes, percentage values by province. Year 2021.*

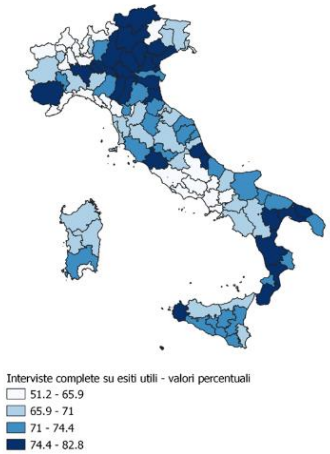


Figure 6 – *CAWI (Computer Assisted Web Interviewing) response rate, percentage values, by region. Year 2021.*

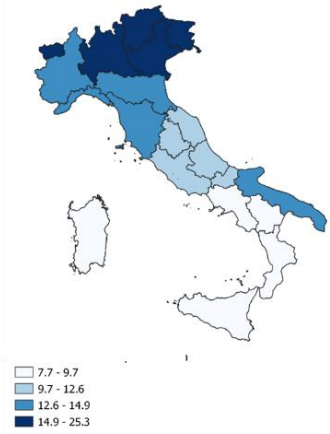
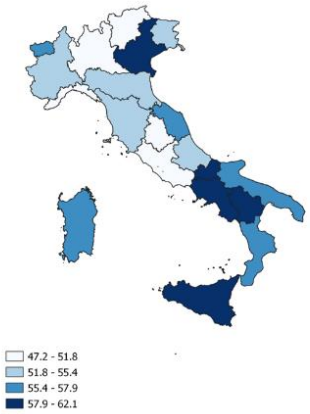


Figure 7 – *CAPI (Computer Assisted Personal Interviewing) response rate, percentage values by region. Year 2021.*



The CATI technique (Figure 8) was mostly used in the North-West and in the Centre of Italy. The highest values were registered in Piemonte (19.8%), Marche (18.9%) and Umbria (18.7%), while the lowest ones in Puglia (11.5%), Sicilia (10.7%) and Trentino-Alto Adige (9.1%).

Figure 8 – *CATI (Computer Assisted Telephone Interviewing) response rate, percentage values, by region. Year 2021.*

3. Conclusion

The aim of this work is to analyse the innovation aspects of the techniques adopted in the implemented processes. Besides, we have also examined the progress of the 7th General Census of Agriculture in Italy at territorial level, considering the

new national organization of the survey and the contribution provided by the territorial network in the management of activities. The data show the full success of the strategy implemented by ISTAT whose main innovations are: three different survey techniques, the use of the administrative data, the online acquisition system for multi-channel management, a specific and adequately trained detection network, monitoring through a web application (Castano, 2020). In addition, the online acquisition of data has allowed the use of an immediate control system of formal correctness through hard and soft rules.

The analysis of the territorial trend of data collection highlights some interesting geographical characteristics. For example, the Italian Northern regions and a part of Centre regions register the highest percentage of useful results on the census list. At the contrary, no geographical gradient emerges as regards the values of the complete interviews on the useful results. In fact, at the regional level both North and South record high values of complete interviews, at the provincial level, apart from the particularly virtuous behaviour of the Northeast, greater homogeneity between North and South and different trends within the same region are observed.

Concerning to the survey techniques, Italy is clearly divided into two parts: on the one hand the CAWI technique, relating to the online self-compilation of the questionnaire, on the other the CAPI technique, the face-to-face interview with the operator. In fact, higher frequency of CAWI in the North and CAPI in the South of Italy is observed. This evidence highlights the problem of lower digital literacy of the farmers in the South.

For the first time the CATI technique, by telephone, was introduced with the purpose to stimulate the respondent who was unable to complete the questionnaire independently or for the interviewer who did not want the CAPI interview - given the ongoing Covid-19 pandemic. Although the use of this interview method was lower than expected, it is nevertheless interesting that the regions of the North and the Centre of Italy record the highest values.

To assess the quality of the data collected, ISTAT conducted a "Coverage and Measurement Control Survey" from January to April 2022.

It is a sample survey which estimates, for the whole national territory, the number of farms existing at the reference date of the 7th Census of Agriculture and its coverage rate, defined as the ratio between the number of farms recorded in the Census and the number of farms existing.

The purpose of the Control Survey, conducted on a random sample of farms (about 135,000), was also the estimation of the measurement error for the main aggregates observed as the macro types of crops for the Utilized Agricultural Area (UAA) and livestock consistency. (Bernardini *et al*., 2012).

In conclusion, despite the Covid-19 pandemic, data collection of 7th General Census of Agriculture was a real success thanks to the innovations adopted. Some

innovations were established a priori, such as the use of the electronic questionnaire, the adoption of registers and administrative archives and the involvement of the CAA. Other innovations were adopted in itinere to face the sudden challenge imposed by the pandemic from Covid-19, such as the CATI survey technique and virtual classroom training.

Italy is one of the European Country that has adapted to the difficulties imposed by the pandemic and has proven capable of adhering to new challenges and adoption of good practices. These new opportunities have allowed to accelerate the pace of innovation and modernize the data collection process (Eurostat, 2021). Therefore, the success achieved by the 7th General Census of Agriculture in Italy represents a promising starting point for the transition to the future Permanent Census of Agriculture.

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SUMMARY

The economic censuses give a complete picture of the size and characteristics of the national economic system. In particular, the General Census of Agriculture provides a detailed reading of agricultural and livestock farms at national, regional and local level. The 2020 edition was the last decennial data collection involving all Italian farms (about 1,700,000), as the traditional methodology. Therefore, although traditional, it leaded innovation and has been characterized by several novelties, some of which were implemented during the sudden and unexpected outbreak of the Covid-19 pandemic. In fact, despite the obvious criticalities, it has been possible to adapt the activities planned with the ongoing pandemic, creating new opportunities to modernize and optimize the data collection process and the working methods. The questionnaire was available exclusively in digital format: it was possible to choose among three different interview techniques (CAWI - Computer- Assisted Web Interviewing, CATI - Computer-Assisted Telephone Interviewing and CAPI - Computer-Assisted Personal Interviewing).

The Centres for Agricultural Assistance (CAA), the Regions, the Autonomous Provinces and the Agency for Agricultural Disbursements (AGEA) had the opportunity to be involved in the survey network with the ISTAT. They collaborated according to different levels of participation. Another novelty of the Census was the organization of distance learning for all the people involved in the survey. The information collected referred to the 2019-2020 agricultural year, i.e. the period from 1st November 2019 to 31st October 2020. The multichannel data collection technique and the many actors involved had been very important for the success of the survey.

They allowed to produce detailed statistical information on numerous agricultural, rural development and environmental sustainability phenomena, that will have an important impact on the planning and evaluation of European, national, regional and local agricultural policies.

In this research the trend of data collection and its working methods will be analyzed at regional and provincial level, throughout the period of the survey.

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