



## Methodological, technical support to agricultural censuses

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### Abstract

Agriculture played an important role in the Hungarian economy in the past and the same can be said even today. Due to this fact Agricultural Statistics has the richest history in the development of independent Hungarian Statistics. During the 150 years of history of the independent Hungarian statistical office 11 (general) agricultural and 7 vineyard and orchard censuses have been carried out so far.

In view of the successful implementation of censuses and the timelier publication of the data, agricultural statisticians strive to use the possibilities offered by technical development, such as electronic data collection techniques. The determination of the census frame population is supported today by spot maps. New data processing techniques support the timely processing of census data.

The processing of agricultural census data has been implemented in the past ten years with the use of an electronic data processing system (called HOMBÁR), in which processing is governed by statisticians supported by IT experts. Data processing is quicker than previously, better documented and spares important human resources.

Last but not least I would like to share my experiences concerning the communication of census data. We elaborated 15 years ago a procedure allowing the publication of comprehensive analysis of census data already some months after the implementation. Nowadays dissemination uses tools like interactive graphs, applications using GIS data as well and new mapping techniques.

**Keywords:** agricultural census; spot maps; data processing system; communication of data

### 1. Introduction

Agriculture played an important role in the Hungarian economy in the past and the same can be said even today. Due to this fact Agricultural Statistics has the richest history in the development of independent Hungarian Statistics. During the 150 years of history of the independent Hungarian statistical office 11 (general) agricultural and 7 vineyard and orchard censuses were carried out. The first agricultural census took place in 1895 and the first vineyard and wine census in 1872. Both censuses had been designed and conducted by Károly Keleti, the first president of the statistical office. The importance of agricultural censuses does not need to be highlighted, they have always formed the backbone of agricultural statistics, serving as the basis for the compilation of regular agricultural statistics. At the same time we must not forget that - due to their important role in agricultural statistics - agricultural censuses need a constant renewal. The reasons are the continuous changes in agricultural policies, agricultural actors, the available data sources, while technical development is continuously offering new and new possibilities. Users of statistical data have growing data requirements, they need new



and updated information in the shortest possible time. The purpose of the presentation is to present how Hungarian agricultural statistics was able to cope with these challenges.

## **2. How Hungarian agricultural statistics followed the changes in agriculture**

Hungarian agriculture has since the 19<sup>th</sup> century to nowadays been characterized by the double presence of a small number of big farms and a high number of small holdings (households performing agricultural activity). The two groups of farms differing in their functions and structure allow different possibilities for statistical measurement which is also greatly influenced nowadays by quickly evolving technical development. The most beautiful example illustrating the continuous changes in agricultural statistics is the history of Hungarian agricultural statistics between 1950-2000. After the Second World War – in Hungary – the new big farms (State farms, agricultural cooperatives) were predominant in the Hungarian agriculture. At that time Hungarian politics, agricultural policy did not allow land use for private persons, households could only keep a few livestock for own consumption. This meant that during the first decades of that period of nearly 50 years agricultural statistics collected data on State farms and agricultural cooperatives. Private persons were only concerned with animal counting. From the beginning of the seventies-eighties – when the prohibition of land use for households was not so strict any more – the first land use and crop production household surveys appeared. It is worth to mention that the importance of household “small scale production” was highlighted by the Hungarian agricultural census of 1972. The turning point was the result of the radical change in economic policy at the end of the nineties when Hungarian agricultural statisticians created the currently functioning system of agricultural statistics. Nowadays censuses and surveys measure the performance of the two big sectors, statistical data are published for both sectors, including the macro-, satellite account related to agriculture.

## **3. Use of administrative and Other Data Sources**

In relation to agricultural censuses, the use of administrative data sources for statistical purposes has always been a key issue. At the beginning its most important function was to determine the sampling frame/survey population of the surveys and support the organisation of the data collections. During the past decades, administrative data sources acquired a growing importance in the validation of the collected data, which is valid still nowadays. In the past years the need to reduce respondent burden became a central issue, and as a consequence subject groups of the census questionnaires were increasingly replaced by administrative data. The greatest change was the vineyard census in 2009 when two third of the census data was based on administrative data sources (only one complementary sample was needed). The vineyard census of 2015 will be based in its entirety on administrative data sources.

Despite its importance, the use of administrative data is not yet unhampered even nowadays. The legal obstacles of the use of administrative data sources need to be removed. There are still several examples when the legal acts regulating certain registers do not allow the use of administrative data for statistical purposes. The definitions, concepts used by administrative registers differ frequently from those used in statistics which is a source of further problems



(the implementation of the 2009 and 2015 vineyard censuses are good examples of how to solve it).

The developments linked to Big Data can open new possibilities in the case of agricultural statistics as well. In this respect developments are only starting even if Hungarian agricultural statistics have been using remote sensing data for already 20 years now.

#### **4. Spot maps used in Vineyard and Orchard Census**

In Hungary the first vineyard census was carried out in 1872 and the first orchard census in 1895. After the plantation censuses of the 19<sup>th</sup> century, vineyard and orchard censuses were conducted in 1935 only and later in the fifties and sixties. Due to the importance of the sector in the Hungarian agriculture, the greatest challenge before EU accession was the implementation of the full-scope vineyard and orchard census (that was conducted in 2001).

The greatest problem originated from the fact that the census population could not be defined neither from administrative nor from reliable statistical sources. The solution was to design the so-called “spot maps”. This meant that with the use of remote sensing data the place of vineyard and orchard (and mixed) plantations could be marked on topographical maps. Spot maps were excellent tools both for organising enumeration and validating the data collected.

#### **5. Electronic Data Collection System**

In the case of agricultural censuses and surveys, data collection is even today carried out by enumerators using the face to face interview technique. This is the case despite the fact that the Hungarian Central Statistical Office (HCSO) has introduced in 2013 an electronic data collection system (called KSH-ELEKTRA). In the first phase of the introduction of the new system in 2013 the use of the electronic data collection system became compulsory for enterprises. For agricultural actors the HCSO had decided that due to the specificities of the questionnaires and the special scope of respondents, in the first years the use of the electronic data collection system would be optional. The assumption of the statistical Office proved to be right, during the first years of the use of the system only some percent of the farmers provided data through the KSH-ELEKTRA system. Statisticians have recourse to different communication tools in order to increase the number of respondents using the system.

#### **6. Data Processing System**

The processing of the great volume of census data has always been a great challenge for statisticians. Users expect increased timeliness and amount of accurate data. The data processing techniques that we used were relatively slow, in many cases they did not result in adequate data quality and the documentation of data processing was also poor. The solution was given by the new data processing system called “HOMBÁR” (meaning granary) introduced in agricultural statistics. The development of the HOMBÁR system was made possible – before the EU accession of Hungary – by an EU-project. The HOMBÁR is a META database based data processing system which reduces by nearly half the time of data processing and by 30-40 percent the human resources needed (mainly IT experts). Another advantage of the system is



that data processing is governed by statisticians which strengthens the professionalism of data processing. Based on the successful experiences with the utilisation of HOMBÁR, the HCSO decided in 2008 to extend the new data processing system to the whole statistical production of the office giving it the name of “Unified Data Processing System” – in Hungarian EAR.

## 7. Communication of Census Data

Users of statistical data expect more timely publication of a growing number of accurate, understandable statistical data. Speed is a great challenge especially in the case of censuses which compared to surveys have to publish the results of much more data collected and processed. The development of data processing techniques can accelerate the process, but this is not enough for the quick publication of census results.

In order to solve this dilemma, after the agricultural census of 2000 Hungarian agricultural statisticians elaborated a new solution. A 1 percent sample of the filled questionnaires was selected randomly. The questionnaires of the 1 percent sample were entered without delay in a separate database. The recording, quality control and processing of this “small amount” of questionnaires was possible within a short time and the 1 percent sample of the census questionnaires allowed to make estimations concerning the whole agriculture and all the farms. The “preliminary publication” answered all the important questions of the census, the preliminary results could be published within 6 months after the census in the form of a 40 page analysis and table series. Since 2000 Hungarian agricultural statistics has been preparing the preliminary publications of the general and of the plantation censuses with this method.

The form of the published results is also an important part of communication. Information and data concerning farms are expected nowadays to be published with geo-coordinates. For Hungary the first database with geo-coordinates was created for the data of the vineyard and orchard censuses of 2001. This had been supported by the use of spot maps and the enumeration by parcels. In the case of the member states of the European Union, databases with geo-coordinates can be produced for the Farm Structure Surveys (FSS), which is also a requirement of the current FSS regulations.

Thanks to the technical development that has taken place since that time we have now at our disposal very useful visualisation tools as well. Examples of these tools can be found on the homepage of the HCSO.

Last but not least, the broad dissemination of census data enhances statistical culture, improves the knowledge and responsiveness of respondents. Good examples are the two events that we organized after the last Agricultural Census in one of the open-air (village) museums of Hungary. We tried to make attractive to the visitors of the museum the world of numbers by showing them old books on the history of agriculture, colourful statistical publications and graphs, the statistical quizzes organized allowed also an interactive exchange between statisticians and visitors.



## 8. Conclusion

The importance of agricultural censuses does not need to be highlighted, they have always formed the backbone of agricultural statistics, serving as the basis for the compilation of regular agricultural statistics. We must not forget at the same time that – due to their role played in agricultural statistics – agricultural censuses need to be continuously renewed. This is driven by the fact that agricultural policies, agricultural actors, available data sources are changing, technical progress offers continuously expanding new possibilities. Users of statistical data demand also more and more timely data and information.

According to our experiences, the use of electronic solutions can help more than ever the work of agricultural statisticians starting from data collection (KSH ELEKTRA) to the use of new data processing techniques (HOMBÁR and EAR) and the new communication techniques (application of geo-coordinates, visualization, interactive graphs, etc.) which is especially important in the case of agricultural censuses. The developments and techniques used allow not only a quicker and better communication of the data but decrease the administrative burden of respondents and statisticians as well.

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