

Agricultural Census 2010 in Hungary

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Abstract. The agricultural censuses (AC) and farm structure surveys are the main data sources for designing, implementing and monitoring Common Agricultural Policy in the European Union. They have an important role in the system of agricultural statistics. They give an overall picture of the structure of agriculture in a given country, allowing its wide range analysis and provide one of the most used means for setting up the sampling frames for agricultural statistical surveys. Agricultural censuses have a long history in Hungary. The latest one was held in 2010. This presentation describes the legal background, the main differences compared to earlier censuses and some special topics as well. The use of administrative data sources is presented both during the preparation and processing phase together with the problems and solutions related to their use. The steps taken in order to assure data quality are also shown. The presentation contains information on data processing with special emphasis on the work done to be able to disseminate preliminary data 6 month after the reference day. The conversion of information on the location of the holding into geo-coordinates is presented in more detail.

Keywords: Agricultural census, administrative data sources, data quality, geo-coordinates

1. History of the agricultural surveys in Hungary

In Hungary agricultural surveys look back to long historical traditions. Production surveys implemented for taxation purposes were conducted in the early medieval centuries. Starting from the 16th century surveys of census type served the purpose of tax assessment. The data for the 1850 cadastre survey were collected by the administrative authorities for taxation purposes. The first harvest statistics dates back to 1868; the first plant cultivation survey to 1871; the first livestock survey was conducted in 1884; the first orchard survey took place in the years between 1956 and 1959, whereas the first vine survey dates back to 1961–63. The first agricultural census was conducted in 1895, followed by similar censuses in 1935, 1972, 1981, 1991 and 2000.

The comprehensive census of 1935 was implemented upon the recommendation of the predecessor of FAO, the International Institute of Agriculture (IIA) in Rome. The agricultural census of 2000 was the first to be linked with the farm structure survey of the European Union.

2. Farm structure surveys in the system of agricultural statistics of the European Union

The Common Agricultural Policy (CAP) created for the harmonization of agricultural economics in 1957 by the force of the Treaty of Rome forms a peculiar chapter of the activities of the European Union distinct from other community activities.

The key objectives set forth in the Treaty of Rome include the boosting of agricultural productivity, the improvement of the living standard of agricultural population and the continuity of its supply, market stabilisation and the maintenance at an acceptable price level of goods for consumers. The agricultural common market was created after the implementation of CAP in 1962, and the system of agricultural subsidies was raised to the level of community policies. The CAP reform adopted in 1992 extended the scope of agricultural responsibilities to the conservation of landscape and cultivation image. The amendment of 1999 made rural development the second pillar of CAP.

A well-known fact is that nearly 45% of the total budget of the European Union is allocated to agricultural expenses. This statement explains the extraordinary frequency and detail of reporting by the Member

States on the entire agricultural information system including agricultural statistics.

The system of farm structure surveys of the Community is built on the agricultural censuses conducted every 10 years and connected to the global censuses of FAO, and the structure surveys implemented at 2–3 year intervals. The farm structure surveys are designed to cover 99 per cent of the agricultural output of each Member State. EU regulations stipulate the types of questions in the survey questionnaire relating to the

- Geographic location of the farm;
- Management and legal status of the farm;
- Title of land use;
- Use of the arable land by crops i.e. by sowing area;
- Kitchen gardening, grassland farming;
- Plantations;
- Inter-planted crops, successive crops, mushroom production, agro-technology, uncultivated land and subsidized fallow;
- Livestock;
- Agricultural machines and equipment;
- Employment and characteristics of farm labour;
- Other activities such as forestry, fishing, rural tourism, food processing.

3. Legal background of the farm structure surveys in the European Union and in Hungary

Agricultural statistics forms the most advanced module of the statistical systems of the European Union.

The implementation, scope and dissemination of the findings of the farm structure surveys, that is the key pillar of the Community's agricultural statistics, were regulated by Council Regulations and Commission Decisions reviewed and updated for the needs of each subsequent survey. Agricultural surveys have been conducted at Community level since 1966/67. The first effective Council Regulation decreeing a comprehensive farm structure survey was issued in 1988 (Council Regulation No. 571/88/EEC), amended on a number of subsequent occasions. The currently effective Regulation No 1166/2008 of the European Parliament and of the Council on farm structure surveys and the survey on agricultural production methods and repealing Council Regulation (EEC) No 571/88 was adopted in 2008.

Hungary joined the system of the farm structure surveys of the European Union for the first time in 2000 with the implementation of the agricultural cen-

sus 2000 (AC 2000). Act XLVI/1999 decreeing the census defined also the statutory concept of the farm, the scope of indices to be surveyed and the entities responsible for and involved in the census. Hungary carried out the general agricultural census for the first time as a member of the European Union in 2010. Act XXIV/2010 on the agricultural census adopted in addition to the previously mentioned act allowed the use of administrative sources and created the legal possibility to access them. The aim of the AC 2010 was to follow the structural changes in the agriculture since the AC 2000, to provide an accurate and exact view for the Hungarian decision makers, the EU and the farmers, as well as to create a basis for agricultural statistics over the next 10 years.

4. Main changes and special topics

4.1. Coverage

Earlier legislation defined the coverage of the farm structure surveys in terms of both physical and economic size of the agricultural holding. The basic physical threshold for inclusion in the survey was one hectare of utilised agricultural land. However, countries could use a different threshold, provided it ensured that the census covered at least 99 per cent of the national standard gross margin.¹

In the current legislation Eurostat has defined two coverage rules based on physical characteristics. One rule is applied at the level of the agricultural holding, and defines thresholds for including holdings in the census. These thresholds are based on the amount of crops and livestock on the holding. The other rule is applied at national level, and specifies that 98% of all utilised agricultural area (excluding common land) and 98% of all livestock units must be covered.

4.2. Location of the holding

Before 2010 an administrative approach was in force meaning that the farm was the place where the farmer lived. From 2010 onwards the real place of agricultural

¹The Standard Gross Margin (SGM) expressed in monetary terms was introduced in the EU for the classification of farms. SGM is the value added per one unit of production (1 hectare, 1 head of livestock); it is calculated as the balance between the standard gross value of production and the standard value of certain specific variable costs.

activity has to be taken into account, which means that the farm has to be allocated to the place where the majority or the whole agricultural production takes place. When the activity involves more local units, the determination of the 'main unit' has to be based on the decision of the holder. The most important activity should be defined in a complex way (which is the most typical or economically the most important activity; where the largest area or biggest livestock is located).

4.3. Survey on agricultural production methods (SAPM)

New information is needed to carry out the impact assessments and prior evaluations of each proposal concerning the CAP, which contains a chapter dedicated to environmental issues. New information is also required for mid-term and subsequent evaluations of agricultural policy instruments and to evaluate the environmental impacts of the CAP. As a result, a satellite survey on agricultural production methods was linked to the 2010 agricultural census, with 2010 as the reference year. This survey allows structural information on crops, livestock, machinery, etc. to be cross-analysed with data on agricultural practices in different types of farms (e.g. small/large farms, specialised/mixed farms, young/old farmers, less favoured areas, regions, etc.).

The SAPM could be a sample survey undertaken shortly after the AC 2010, provided it had the same reference period.

The list of SAPM characteristics reflects the highest priorities of the users, relating to the methods used to maintain the agricultural land, the way livestock are grazed and housed, the use of nutrients, plant protection products and irrigation.

5. Use of administrative data sources

The agricultural censuses and farm structure surveys create a burden both for statistical institutes and data providers (i.e. the farmers) due to the extended list of characteristics. Moreover, similar – or even identical data – are requested for other statistical and administrative purposes during the same year. There is therefore an obvious need to reduce the unnecessary burden on both sides. Besides avoiding parallel data collection, the use of administrative data sources contributes to reduce costs.

Data from administrative sources can be used in different ways:

- Directly integrated into the database (instead of data collection);
- Cross-checking at individual or aggregate level against the collected data;
- Imputation of missing or erroneous data.

To serve any of these goals the administrative data sources have to fulfil some very important requirements. This is the only way to secure data comparability between data sources.

- Coverage – information is available in its entirety and suitable for further processing;
- Conformity – it is necessary to refer to the same analysis unit, definition, nomenclature, classification, etc. measured with identical criteria;
- Quality – consistent, reliable dataset;
- Timeliness – data availability in preferred time.

The most important criteria is – at least in the case of Hungary – the possibility to link the records from administrative data sources with the records in the statistical database.

For the implementation of AC 2010 the combination of exhaustive and sample survey was used. All agricultural enterprises² and private holdings were observed on full scope, however in compliance with the Regulation (EC) No 1166/2008 the SAPM was carried out on a sample basis in the case of private holdings. The sample covered 3 475 from the total number of 13 897 enumeration districts of the AC 2010. SAPM information was collected only in the selected enumeration districts parallel with the census questions.

All agricultural enterprises had received the questionnaire by mail, and after completion they sent it back to the responsible unit of the statistical office. 9 367 agricultural enterprises reported agricultural activity in 2010. In the case of private holdings enumerators made face-to-face interviews. They visited more than 2.3 million households and completed 567 629 questionnaires. The census covered 3 174 settlements of Hungary.

During AC 2010 the following administrative data sources were used in Hungary:

In the preparation phase

- Land users (land cadastre);
- Farmers receiving subsidy (Integrated Administration and Control System – IACS);
- Organic farming register.

²Agricultural enterprises are business units included in the Business Register of HCSO.

These data sources provided information about land users in urban areas to increase the coverage.

In the processing phase

- IACS was used to integrate directly the characteristics of area subject of subsidy payments as well as that of rural development measures;
- Organic farming register was used to integrate directly the characteristics of organic farming;
- The database of the National Council of Vineyard Communities was used to impute characteristic of vineyards producing quality vines;
- The System for the Identification and Registration of Bovine Animals was used to cross-check data collected.

The biggest challenge during data processing was the linking of the administrative and statistical databases. In the case of business units there was no difficulty as all of them possess a register code which is used widely in public administration (IACS, tax authority, organic farming register and statistics as well). Since there is no common identifier for private holdings (there was a personal identification code but its use was not allowed due to personal data protection considerations) we had to link all the records by using the combination of names and addresses.

During the linking many difficulties occurred. The main problem was originated from misspelling, either in the administrative database or during the process of data entry of the collected questionnaires.

We started the linking with an automatic procedure. Only very limited proportion of the records had full correspondence. In order to improve the rate we truncated the names and addresses, only family names and the first part of the denomination of places were used in the process. This method allowed the linkage of more records. The next step was to perform individual comparison. This made possible to match all the remaining records. While during the data collection the farmer stated that he/she was the head of the holding, in IACS even several other family members could apply for subsidies. For this reason in many cases, even with the same family name, the holder of the private holding was not identical with the receiver of the subsidy.

6. Ensuring data quality

Data quality assurance was managed in several ways. It started with the training of trainers, then the selection and training of surveyors and supervisors. Both central and local staff of the statistical office in-

involved in the census implementation took part in the training process.

During the implementation a multilevel quality assurance system was applied in which the upper levels controlled the levels below. Every 4 to 6 surveyors were controlled by a supervisor, then every 8 to 12 supervisors were controlled by an area agent. They were supervised by the responsible regional unit of the statistical office. A quality assurance system was developed which main element was the list of the most important validation rules to be applied by supervisors during the assessment of the questionnaires. A quality system for remuneration had been developed.

A survey monitoring system helped to control the survey progress; it provided information for project management.

Data entry was performed in a uniform Data Entry and Validation System which is run by the statistical office having the following main features:

- Application in ORACLE form;
- Data stored in the Central Database;
- Integration with other systems (e.g. Meta-Database. Survey Control System. XML system);
- Flow control assured.

The logical and arithmetical coherency within and between the tables was incorporated in the data entry program. Besides entering the data, the application could produce different check lists: number of entered questionnaires per counties per days, number of questionnaires entered with an error, list of errors, aggregated data per tables per counties, statistics about the staff keying the data. These lists helped to monitor the whole process of data entry carried out by the staff of the regional directorates and county representatives and the central staff of the statistical office.

7. Dissemination of preliminary data

Although AC 2010 was a full scope survey, sample selection was used in 2 fields. For the purpose of SAPM a 25 per cent sample was selected; each 4-th enumeration area was selected from the list of randomly ranked enumeration areas within counties (NUTS3 as a stratum). A similar selection was done in order to make a 'first release' as soon as possible after the reference day. To respond to this request a 12,5 per cent sample was selected; each 8-th enumeration area was selected from the list of randomly ranked enumeration areas within counties.

The questionnaires of these 1 738 enumeration areas selected for the purpose of preliminary data production were entered first. After editing the erroneous questionnaires and checking the data against the most important validation rules the main characteristics were extrapolated and the preliminary results were published exactly 6 months after the reference day of the census.

8. Determination of the location of the holding

Data regarding the location of the holding is based on the so called EOVS (Uniform National Projection System) which is maintained by the Institute of Geodesy Cartography and Remote Sensing (IGCRS) in Hungary. The EOVS coordinates of the statistical unit are created on the basis of the following questions included into the AC 2010 questionnaire:

- Topographical lot number or,
- IACS block identifier of the place where the main agricultural production is carried out, or
- Address of the holding.

The enumerators had to take into consideration the following steps in the determination of the location of the holding:

- Is agricultural production carried out within 5 km distance from the holding's address?
- Is agricultural production concentrated in more than one place but within 5 km distance from the farmer's address?
- If agricultural production was carried out at more than one place and at more than 5 km distance, the enumerator had to register the location of the most important activity (crop production, animal husbandry or agricultural service).

The transformation of EOVS coordinates into ETRS 89 coordinates is ensured by an application developed by IGCRS and available for the public on its website.

In case the farmer provided topographical lot number or IACS block identifier of the place where the main agricultural production was carried out (about 12 per cent of the total number of holdings) the information was transformed into settlement coordinates. Due to lack of resources we were not in a position to order the service of IGCRS to produce more precise geo-reference codes. In case the farmer provided address we converted the exact address into coordinates based on the database set up for the purposes of the Population census (geo-reference codes at house level for the entire country).

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