

## **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, giving an overall picture of the structure of agriculture in a given country, allowing wide range analysis of it and providing one of the most used means for setting up the sampling frames for agricultural statistical surveys. AC has 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 preparation and processing phase and problems and solutions in accordance with their use. The steps taken in order to assure data quality are also shown. The presentation contains information on data processing with special interest to work done to be able to disseminate preliminary data 6 month after the reference day. The conversion of information on 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 16<sup>th</sup> 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 is dated in 1868; the first plant cultivation survey is dated in 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 is dated in 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 Agricultural Institute (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 activities of the European Union distinct from other community activities.

The key objectives set forth in the Treaty of Rome include the boosting of the productivity of agriculture, improving the living standard of and continuity of supply for the agricultural population, stabilizing the market and maintaining 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 elevated to the level of community policies. The reform of CAP accepted 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 once every 10 years and connected with 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. Council 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;
- interplanted crops, successive crops, mushroom production, agrotechnique, 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 is the most advanced module of the statistical systems of the European Union;

The implementation, scope and dissemination of findings of the farm structure surveys, that is the key pillar of the Community's agricultural statistics, are regulated by Council Regulations and Commission Decisions, which are 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 was implemented in 2008.

Hungary joined the first time the farm structure surveys of the European Union at the implementation of agricultural census in 2000. Act XLVI/1999 decreeing the census also defined the statutory concept of the farm, the scope of indices 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 decreeing the census in addition to the mentioned before also gave authorization for using administrative sources and legal possibility to access them. The aim of the AC 2010 was to follow the structural changes in the agriculture since 2000

(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 the agricultural statistics over the next 10 years.

#### **4. Main changes and special topics**

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 is one hectare of utilised agricultural land. However, countries might use a different threshold, provided it ensures that the census covers at least 99 per cent of the national standard gross margin<sup>1</sup>. 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 a national level, and specifies that 98% of all utilised agricultural area (excluding common land) and 98% of all livestock units must be covered.

Location of the holding: Before 2010 an administrative approach was in force, it means the farm was there where the farmer lives. From 2010 onwards the real place of agricultural activity has to be taken into account, which means 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 'major' 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).

#### 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 may be a sample survey and may be undertaken shortly after the AC 2010, provided it has 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 for both the statistical institutions and the 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, using administrative data sources contribute to reduce costs.

Data from administrative sources can be used in different ways:

- directly integrated into the data base (instead of data collection);

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<sup>1</sup> The 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.

- 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 source has to fulfil some very important requirements. Only in this way can data be comparable with between 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 Hungarian case – the possibility to link the records from administrative data sources with the records in the statistical data base.

For the implementation of AC 2010 the combination of exhaustive and sample survey was used. All agricultural enterprises<sup>2</sup> 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 case of private holdings. The sample covered 3 475 from the total 13 897 enumeration districts of 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 send it back to the responsible unit of the statistical office. 9 367 agricultural enterprises reported agricultural activity in 2010. In 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

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;
  - data base of 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 data bases and the statistical one. In case of business units there was not 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 banned due to protection of personal data) we had to link all the records by using the combination of names and addresses.

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<sup>2</sup> Agricultural enterprises are business units included in the Business Register of HCSO.

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

We started the linking with an automatic procedure. Only very limited proportion of the records had full correspondance. In order to improve the rate we truncated the names and addresses, only family names and first part of denomination of places were used in the process. Using this method more records were possible to link. At the next step individual comparison was implemented. This way all the rest of the records were matched. Since during the data collection the farmer stated that he/she is the head of the holding while in IACS even several other family members could apply for subsidies. In many cases the holder of the private holding was not identical with the receiver of the subsidy but with identical family name because of this reason..

## **6. Ensuring data quality**

The data quality assurance was arranged 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 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, than every 8 to 12 supervisors were controlled by an area agent. They were supervised by the regional responsible unit of the statistical office. A quality assurance system were developed which main element was the list of the most important validation rules to be applied by supervisors during the assessment of the questionnaires. There was developed a quality system for remuneration.

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;
- integrated with other systems (e.g. Meta-Database. Survey Control System. XML system);
- ensuring flow control.

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 as well as 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 areas were 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 areas were 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 just after 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 is 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:

- Does agricultural production carried out within 5 km from the holdings' address?
- Does agricultural production concentrated more than one place but within 5 km from the farmers address?
- What is the most important activity or 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 is carried out (about 12 per cent of total number of holdings) the information was transformed into settlement coordinations. Due to lack of resources we were unable to order the service of IGCRS to produce more precise georeference codes. In case the farmer provided address we converted the exact address into coordinates based on the data base gathered for the purposes of Population census (georeference codes at house level for the entire country).

#### **References**

<http://www.ksh.hu>

[http://epp.eurostat.ec.europa.eu/portal/page/portal/farm\\_structure\\_survey/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/farm_structure_survey/introduction)

<http://eur-lex.europa.eu/en/index.htm>

Farm Structure Survey 2009/2010 & Survey on agricultural production methods 2009/2010, National Methodological Report, Hungary