FARM STRUCTURE SURVEY 2007

NATIONAL METHODOLOGICAL REPORT

MEMBER STATE: **POLAND**

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CONTENTS

SUMMARY

This report describes the methodology of the Farm Structure Survey (FSS) carried out in Poland according to the calendar and requirements of the European Union in June 2007. The scope of the survey took into consideration the needs of both the EU and the national users. The Central Statistical Office (CSO) was the institution responsible for conducting the survey.

The works related to the implementation of the Farm Structure Survey were performed in major stages including:

- preparation of the sampling frame,
- drawing the sample units,
- programming work,
- development of survey materials, their printing and distribution,
- recruitment and training of interviewers,
- implementation of the survey in the field,
- compilation of the results and their dissemination (including sending data to Eurostat).

The survey was carried out on a sample of ca. 200 thousand natural persons' holdings and in all legal persons' holdings (ca. 5 thousand). The Statistical Farm Register was used as the sampling frame.

The field survey was carried out between 1 and 30 June 2007, with the application of the following data collection methods:

- interview on paper questionnaires,
- self-enumeration on the Internet with the use of the electronic questionnaire placed on the CSO website,
- telephone interview (the CATI – Computer Assisted Telephone Interviewing method),
- postal survey.

Over 3,600 interviewers and ca. 740 telephone interviewers conducted the interviews.

The same R-SGR questionnaire (*Farm Structure Survey in June 2007*) was used in the survey for all agricultural holders.

Participation in the survey was obligatory, which meant that users were obliged to provide comprehensive and true answers to the questions contained in the questionnaire.

The data concerning land use, agricultural land ownership structure, the characteristics defining holder/manager, sown area, livestock and the number of tractors were collected as of 1 June 2007. The remaining data referred to the period of the past 12 months prior to the survey.

The results of the Farm Structure Survey 2007 were compiled at the national, regional and voivodship level. The data are available on paper publication, on CDs and on the website of the CSO.

For the purposes of the Eurofarm database, 188 871 records were transmitted to Eurostat in the format compliant with Eurostat's *Manual for data suppliers, survey 2007*.

1. INTRODUCTION

1.1 History, scope

In Poland, the survey corresponding to some extent to the farm structure surveys carried out in the European Union were the annual farm censuses (covering the whole population of agricultural holdings), which used to be carried out in June until 1988. Since 1989, they were substituted with sample surveys conducted in June (except for the years 1996 and 2002, when agricultural censuses took place). The discussed surveys were a source of data concerning the number of holdings, their size, sown area and livestock, thus the basic elements of the structure of agricultural holdings. The surveys satisfied in particular national needs, though their results were passed to international organizations as well.

The FAO recommendations specified in the document *Agricultural Census 2000* and some of the Eurostat's requirements were taken into consideration when preparing the agricultural census of 1996. Cooperation with the Institute of Agricultural and Food Economy with regard to the typology of holdings was commenced as well. Owing to the above, it was possible to send to Eurostat a compilation of data on the structure of holdings, in a form largely harmonized with EU standards.

Another step was the sample survey carried out in 2000, concerning land use, livestock and holding characteristics. The survey covered about 3% of all natural persons' holdings and all legal persons' holdings, and it involved for the first time a range of characteristics required in the EU farm structure surveys not being surveyed in Poland before.

In the Agricultural Census 2002 carried out in Poland, the list of characteristics and their definitions were already compliant with the EU requirements concerning the Farm Structure Survey 1999/2000, while the scope of the census considered the needs of national users too. The census 2002 was carried out along with the Population and Housing Census, based on the same organizational assumptions and using the same census system. The results of the Agricultural Census 2002 were compiled for particular levels of the territorial division of the country, and the non-identifiable individual data from the census were transmitted to Eurostat along with the methodological report from the survey.

Because of having conducted the agricultural census 2002 instead of a farm structure survey, there was carried out the regular sample survey of land use, sown area and livestock in 2003.

In 2005, Poland carried out the farm structure survey as a Member State in compliance with the requirements and the calendar of the European Union. The list of characteristics and definitions were fully compliant with the EU requirements while the scope of the survey providing for the needs of national users too.

The data from the survey 2005 were passed to Eurostat along with the methodological report in March 2006. In June 2007, a farm structure survey was carried out in compliance with the EU requirements.

1.2 Legislation

The following EU and national legal acts were the legal basis of the survey on the structure of agricultural holdings in Poland in 2007:

EU legislation:

- ✓ Council Regulation (EEC) No 571/88 of 29 February 1988 on the organization of Community surveys on the structure of agricultural holdings between 1988 and 1997, or where applicable the most recent legislation,
- ✓ Commission Decision No 2000/115/EC of 24 November 1999 relating to the definitions of the characteristics, the list of agricultural products, the exceptions to the definitions and the regions and districts regarding the surveys on the structure of agricultural holdings, or where applicable the most recent legislation.

National legislation:

- ✓ Act on Official Statistics (Journal of Laws of 1995, No. 88, item 439, as amended),
- ✓ Annex to the Regulation of the Council of Ministers of 5 September 2006 on the statistical survey programme of official statistics for 2007 (Journal of Laws of 2006, No. 170, item 1219).

Pursuant to the provisions of the Act on Official Statistics, all collected and compiled individual data and personal data are subject to statistical confidentiality as laid down in Article 10 of the Act on Official Statistics. The data obtained under the farm structure survey can be used only for the purposes of statistical studies, compilations and analyses, and by official statistics for preparing a frame for the surveys carried out by the statistical services. Disclosing or using the data obtained under the farm structure survey for other purposes is prohibited, under pain of criminal liability.

The statistical survey programme of official statistics includes information about the institution responsible for the survey, the scope and coverage, sample size, costs and ways of financing, obligation to provide information, as well as kinds of output statistical information and terms of its dissemination.

2. CONTENT

2.1 Characteristics

The list of characteristics included in the survey and their definitions were compliant with the EU requirements concerning the Farm Structure Survey 2007 (Commission Regulation (EC) No 204/2006 of 6 February 2006 adapting Council Regulation (EEC) No 571/88 and amending Commission Decision No 2000/115/EC with a view to the organization of Community surveys on the structure of agricultural holdings in 2007), while the scope of the survey provided for the needs of the national users as well.

Some characteristics were not collected, as they were deemed as either non-existent or having minor economic significance in Poland.

List of non-existent characteristics (NE)

- agricultural area with environmental restrictions (A03),
- durum wheat (D02),
- rice (D07),
- cotton (D25),
- other textile crops (D33),
- fruit and berry species of temperate climate zones (G01b),
- citrus plantations (G02),
- olive plantations (G03,G03a,G03b),
- vineyards – quality wine, table grapes, raisins (G04a, G04c, G04d),
- set-aside areas used for the production of agricultural raw material for non-food purposes (I08b),
- set-aside areas converted into permanent pasture (I08c),
- other set-aside areas (I08e).

List of non-significant characteristics (NS)

- legal personality and management of the holding – group holding (B01b),
- lentils, chick peas and vetches (D09f),
- hops (D24),
- sunflower (D27),
- soya (D28),
- linseed (D29),
- other oil seed crops (D30),
- flax (D31),
- hemp (D32),
- vineyards, vineyards – other wines (G04, G04b),
- permanent crops under glass (G07).

List of characteristics collected solely for national purposes:

- Holder's name and surname, PESEL
- Name of entity, REGON
- Address of the holder
- Area of crops in kitchen gardens
- Structure of income of the household of the holder
- Crop area of fast-growing shrubs and trees
- Number of persons living with the holder
- Level of general and agricultural education of the holder
- Working time by seasons
- Number of working days worked under mutual aid arrangements
- Total number of tractors in the holding
- Use of mineral and/or lime and organic fertilizers
- Purchase/sale and tenancy prices of agricultural land intended for agricultural activity

The data concerning land use, ownership structure of agricultural land, holders/manager's characteristics, sown area, livestock and number of tractors were collected as of 1 June 2007. The remaining data referred to the period of the past 12 months prior to the reference day of the survey. As compared to the previous Farm Structure Survey, the reference day was slightly shifted from 12 June in 2005 to 1 June in 2007.

In relation to introduction of F03 characteristic and different interpretation of definitions of F01 and F02, these characteristics are not fully comparable between the years 2005 and 2007. In 2005, F02 included area of meadows and pastures extensively used, and in 2007 only rough grazing pastures were included. A part of F02 became F01 and F03.

Included in 2005 as separate items, the crop areas of hop (D24), flax (D31) and hemp (D32) were included under industrial plants not mentioned elsewhere (D35) and the area of sunflower (D27) was included into the area of other oil seed crops (D30) in 2007. The area of permanent crops under glass (G07) was included into the area of other permanent crops (G06) in 2007.

2.2 Questionnaire

The same R-SGR questionnaire (*Farm Structure Survey in June 2007*) was used to enumerate all agricultural holders. The scope of the questionnaire was consulted with the major users, including in particular the Ministry of Agriculture and Rural Development.

The survey questionnaire counted of 12 pages. The front page of the questionnaire contained the number of the agricultural holding from the Statistical Farm Register, interviewer's number, holder's personal data, holder's address and the address of the

headquarter of the holding. The subsequent pages included the collected characteristics grouped into ten sections:

I. Land use;
II. Economic activity (including information on other, non-agricultural activity);
III. Income structure;
IV. Organic farming;
V. Sown area;
VI. Farm labour force;
VII. Livestock;
VIII. Tractors;
IX. Use of fertilizers;
X. Purchase/sale and tenancy prices of agricultural land intended for agricultural activity in 2Q 2007.

Sections VIII, IX and X included additional information describing the characteristics collected for national purposes only. An English copy of the R-SGR questionnaire is attached as an annex to the report.

3. SURVEY METHODOLOGY

3.1 Survey organisation

In February 2007, the Central Statistical Office, as the institution responsible for the implementation of the survey, established the Group for the Farm Structure Survey. The works were led by the Group Leader, while particular tasks by the leaders of working subgroups created by the Group Leader. The works on the territory of each voivodship were headed by the directors of regional statistical offices. Particular tasks were implemented by the staff of:

- CSO divisions (Agriculture and Food Economy Division, Labour and Living Conditions Division, Programming and Coordination of Statistical Surveys Division, Administrative and Budgetary Division),
- 16 regional statistical offices,
- Central Statistical Computing Centre (COIS) in Warsaw and its branch in Radom,
- Centre for Projecting and Databases at the regional statistical office in Olsztyn.

The substantive works concerning questionnaire preparation, manual for interviewers and legal entities, preparing assumptions for the Optical Character Recognition (OCR) control and logical and arithmetic control, as well as preparing output table models with relevant assumptions were carried out in the Agriculture and Food Economy Division and

the Labour and Living Conditions Division of the CSO.

The sampling scheme was prepared by the team of mathematicians from the Methodology, Standards and Registers Division of the CSO.

The application for Internet self-completion and the CATI method was developed by the COIS in Warsaw, while the programmes for registering and controlling questionnaires in the OCR system were developed by the COIS, branch in Radom. The programmes for logical and arithmetic control and for data compilation (control tables, output tables) were developed by the Centre for Projecting and Databases at the regional statistical office in Olsztyn. Before the survey, the assumptions for logical and arithmetic control and output table models were submitted for consultation to all regional statistical offices.

The issues related to recruiting and training of interviewers and telephone interviewers, as well as controlling their work during the survey, collecting and checking completed questionnaires were in the responsibility of regional statistical offices (there were people appointed to supervise the work of interviewers in each regional statistical office and its branches). In their work, the regional statistical offices operated by the guidelines received from the Central Statistical Office.

The interviewers were mainly the persons experienced in carrying out statistical surveys in the field of agriculture. Those were mainly the employees of commune offices and Agricultural Consulting Centres, farmers and students. The interviews in the natural persons' agricultural holdings were carried out by 3656 interviewers and 743 telephone interviewers. The legal persons were surveyed by postal survey.

For the purposes of making financial settlements with interviewers, the COIS in Radom especially developed the *Rachmistrz* software. The software enabled generating contracts, invoices and relevant documents for the Social Insurance Institution and tax offices.

Completed questionnaires were collected from interviewers in regional statistical offices or their branches (subject to work organisation in a given regional statistical office). Regional statistical offices received from the Central Statistical Office (well in advance) detailed guidelines concerning the terms and conditions of receiving and controlling questionnaires and the way and procedure of conduct at the stage of compilation of the survey output.

The questionnaire registration was taking place in 17 locations (16 regional statistical offices and one additional location for the largest voivodship – the Mazowieckie Voivodship).

In the course of the survey and compilation of results, staff of the Central Statistical Office was all the time available for the interviewers, employees of the regional statistical offices and the Centre for Projecting and Databases at the Statistical Office in Olsztyn.
The staff also provided all necessary explanations and answered inquiries over the phone and via electronic mail.

3.2 Work process

The first works related to the preparation and implementation of the Farm Structure Survey 2007 started in 2006. A series of consultations were carried out at that time in order to develop the scope of the questionnaire for national purposes and the scope and forms of publication of the survey results. In relation to the decision on the introduction of the two new methods of data collection (Internet, CATI) in the structure survey, it was necessary to undertake additional (in comparison to 2005) works determining the possibility of implementation of the survey with those methods.

In 4Q 2006, the development of methodological manual (for interviewers and for legal persons) and organisational manual started. Preparation of software for interviewing with particular method and then for consolidation of the collections coming from the applied methods (paper form – OCR, electronic form – Internet, the CATI method) required a separate mode. One of the stages of preparations was development of assumptions for OCR control and logical and arithmetic control for the paper form questionnaire, as well as assumptions for control of the electronic form and the form in the CATI method, and finally for the output tables.

Completed questionnaires for natural person's holdings were collected in stages. At the first stage, the data obtained via the Internet were collected. Incorrect questionnaires were destined for repeated enumeration by a telephone interviewer or interviewer. Then, there were collected data obtained by means of the CATI method. Incorrect questionnaires were destined for repeated enumeration by interviewers. Questionnaires collected via Internet or via CATI were controlled at regional statistical offices.

Collection of the paper form questionnaires from interviewers was taking place in the regional statistical offices or their regional branches successively from the moment of completing implementation of interviews in agricultural holdings until 9 July 2007. Collection of materials consisted in controlling each questionnaire by supervisors in terms of completeness of records and logical connection of answers to particular questions.

The terms and scopes of the works related to the implementation of the Farm Structure Survey 2007 are presented in the schedule below.

Schedule of major works related to preparation and implementation of the Farm Structure Survey 2007

No.	Task	Date
1.	**Works related to drawing the sample of entities for the survey and their selection for particular data collection methods**	from 30 April 2007
2.	**Programming works, of which:**	
	preparation of software for OCR	from 25 May 2007
	preparation of software for interviewing with the CATI method	from 25 May 2007

No.	Task	Date
	preparation of software for the electronic questionnaire (Internet)	from 18 May 2007
	preparation of software for consolidation of sets from the OCR, CATI method and electronic questionnaire	from 25 May 2007
	preparation of software for control and correction of sets	from 25 May 2007
	preparation of software for calculating the control and output tables	from September 2007
3.	**Works related to development of materials for the survey and their printing and dissemination, of which:**	from 13 April 2007
	development of a survey questionnaire in the form intended for enumeration by means of the CATI method	from December 2006
4.	**Preparation of the survey in regional offices, of which:**	until 1 June 2007
	recruitment: telephone interviewers	November 2006
	interviewers	until 7 May 2007
5.	**Trainings, of which:**	
	central	19-21 March 2007
	for telephone interviewers	January–May 2007
	for interviewers	7 May-31 May 2007
6.	**Implementation of the survey (as at 1 June 2007), of which:**	1 June–9 July 2007
	completion of electronic questionnaires (Internet) in natural persons' holdings	1-5 June 2007
	collection of information by telephone interviewers – from holders of natural persons' holdings	1-13 June 2007
	collection of information by interviewers – from holders of natural persons' holdings	16-30 June 2007
	receipt and control of completed questionnaires from interviewers	until 9 July 2007
	completion of electronic questionnaires (Internet) by legal persons	until 30 June 2007
	sending back by post paper questionnaires by legal persons	until 30 June 2007
7.	**Compilation of survey results, of which:**	6 June–31 October 2007
	collection of data for natural persons' holdings obtained via the Internet and their control	6 June 2007
	collection of data for natural persons' holdings obtained via the CATI method and their control	14 June 2007
	registration of paper questionnaires and their control	until 10 August 2007
	control and correction of voivodship collections, calculation of control tables	until 10 August 2007
	calculation of output tables	until 31 October 2007
8.	**Publication of the final results by the CSO and regional offices**	4Q 2007–1Q 2008
9.	**Validation for Eurostat and transmission of final micro-data and methodological report to Eurostat**	until 31 March 2008

3.3 Preparing the survey operations

3.3.1 Population and frame

The surveyed population were all agricultural holdings with 0.1 ha and more of total agricultural area or less than 0.1 ha of total agricultural area if they were rearing livestock above the specified physical thresholds (defined below). For the national purposes, the survey covered also the holdings, which had not been engaged in agricultural activities in the reference year.

The Statistical Farm Register was used as the frame. The register was established based on the results of the Agricultural Census 2002. Information about agricultural holdings entered in the register is updated with the results of subsequent agricultural sample surveys and the data from administrative sources (such as IACS).

Each agricultural holding entered in the Statistical Farm Register has a record containing such information as the address and information concerning the total agricultural area, sown area and livestock. Moreover, the frame contained the type of agricultural holding according to the EU typology and the Standard Gross Margin (SGM) value.

To maintain explicitness of definitions, in particular with regard to the range of definitions functioning in geodetic registers and administrative systems, as well as comparability with data obtained from other statistical surveys, the following definitions were adopted for application in the farm structure survey:

- an **agricultural holding** is considered to consist of total agricultural area including forest, buildings or parts of buildings, machinery and livestock, if they make up or can make up an organized economic entity with the rights and obligations related to running an agricultural holding.
- a **natural person's agricultural holding** is considered to be an agricultural holding with the total agricultural area over 0.1 ha, owned or used by a natural person or a group of persons, and an agricultural holding of a person who does not own total agricultural area or who owns total agricultural area not exceeding 0.1 ha and has at least: 1 head of cattle and/or 5 heads of pigs or 1 sow and/or 3 heads of sheep or goats and/or 1 horse and/or 30 heads of poultry and/or 1 ostrich and/or 5 heads of female rabbits and/or 5 heads of other female fur animals and/or 3 heads of other animals kept for slaughter and/or 1 beehive.

According to the national definition, an agricultural holding does not have to conduct an agricultural activity but must consist of total agricultural area of 0.1 ha or more. For the purposes of the Eurostat, this definition was modified to specify that the above-mentioned agricultural holding must conduct an agricultural activity.

The surveyed population accounted to 2,8 million holdings that fulfilled the national definition, while ca. 2.2 million holdings fulfilled the EU definition.

3.3.2 Survey design

Natural persons' holdings and legal persons' holdings comprised the population covered by the survey. Natural persons' holdings were enumerated on the base of a stratified random sample, while legal persons' holdings were fully enumerated.

The sample of natural persons' holdings was fully based on probabilistic sampling. It was a new sample, drawn specifically for the purpose of the Farm Structure Survey 2007. The sample contained of 199 782 holdings. The size of the sample was determined by the financial and organisational possibilities, as well as the analysis of the precision of results of the Farm Structure Survey 2005.

The sample for the survey was drawn using the scheme of stratified random sampling, where some strata were fully enumerated (take-all-strata). There emerged, however, difficulties related to the use of the same stratification variables for various types of farms. Therefore, before the stratification, the population of agricultural holdings in Poland was divided into the following categories:

I. agricultural holdings of natural persons engaged in agricultural activity (not classified under categories II, III, IV), of which:
   I.1. holdings that, according to the data in the frame had at least:
      - 20 heads of sheep, or
      - 20 goats, or
      - 5000 heads of hens, or
      - 500 heads of turkeys, or
      - 500 heads of geese, or
      - 500 heads of ducks, or
      - 50 beehives,
   I.2. horticultural holdings with the exception of those classified under category I.1,
   I.3. agricultural holdings engaged in agricultural activity below the established threshold (ESU less or equal 0,5) and with total agricultural area not exceeding 1 ha with the exception of those classified in category I.1,
   I.4. the basic category of holdings engaged in agricultural activity excluding holdings classified under categories I.1 or I.2 or I.3,
II. agricultural holdings of natural persons not engaged in agricultural activity in the reference year,
III. newly established agricultural holdings and holdings for which the type of holding and the value of the SGM were not established,
IV. organic farms of natural persons,
V. legal persons' holdings (including organic farms).

Agricultural holdings classified under categories I.1 and IV and V were fully enumerated. Samples of holdings were drawn from the remaining categories. Sampling was preceded with allocation between voivodships (NUTS 2), separately for each category, adopted arbitrarily for a given sample size, creating strata in particular categories and sample allocation between strata.

Depending on the group of holdings, different variables were assumed as the basis for stratification and sample allocation. In accordance with the experiences of the countries of the European Union, the value of the SGM of the agricultural holding was one of the stratification criteria.

Stratification and sample allocation between voivodships and strata was carried out separately for each of the above-mentioned holding categories.

Agricultural holdings classified under category I.1 constituted stratum 01 in each voivodship. The holdings were not sampled. 100% of the population were enumerated, i.e. 7113 holdings.

Agricultural holdings under category I.2 (horticultural holdings) were stratified in each voivodship into 5 strata (h = 02, 03, 04, 05, 06). The SGM value was adopted as the criterion of division of the population into strata and sample allocation between voivodeships and strata. It was assumed that the expected precision of results, i.e. the coefficient of variation of the SGM value, would equal 0.57%. The division of the population of holdings into strata and sample allocation were carried out with the application of the numerical optimisation method[1] (the method was use also in relation to the remaining categories of agricultural holdings, in which a sample was drawn). In stratum 06, the sample covered 100% farms. That is the stratum, in which the SGM value for particular holdings exceeds the established threshold. Eventually, the 9,933 holdings were selected to the sample under the category.

Agricultural holdings classified under category I.3 are farms, for which the value of the SGM does not exceed 0.5 ESU, while the total agricultural area is not higher than 1 ha. The category covered about 327,000 farms. The stratification variable for the holdings included in that group was total area of the holding, which for some of the farms significantly exceeded the total agricultural area. It was assumed that the coefficient of variation for that variable should equal 1.95%. In some agricultural holdings from that group, there were considerable areas of forests. Holdings included in that group were divided into three strata, i.e. h = 07, 08, 09. The division of the population of those holdings into strata and sample allocation was made with the application of the numerical optimization method. Holdings included in stratum 09 were completely enumerated. In all voivodships, 5,139 holdings under that category were selected to the sample.

Agricultural holdings classified under category I.4 in the number of about 1,546,000 sampling units were stratified, separately in each voivodship, into 7 strata. From that part of population, 158,752 holdings were sampled.

[1] see references

Two variables were adopted as stratification criteria: total agricultural area and the SGM value. The following assumptions were adopted before selecting the sample from that category:

(1) the size of sample n is established for the population of agricultural holdings in the country, not for particular voivodships, while n equals about 158,000 sampling units,

(2) in particular voivodships the sample is drawn following the sampling scheme of the Neymann-optimum stratification sampling,

(3) in each voivodship, population is divided into 7 strata (h = 10, 11, ... , 16) at the same time sample is allocated between strata,

(4) in each voivodship, stratum 16 (i.e. h = 16) includes holdings, which for at least one variable adopted as the basis for stratification have a value exceeding an established threshold. The so-called upper stratum formed in this way includes holdings which are not sampled, but are all included in the sample,

(5) it was assumed that the expected precision of survey results, measured by means of the coefficient of variation of agricultural land area and the SGM value for that group of agricultural holdings will be identical for each voivodship and equal approximately 0.25%.

Holdings classified under category II are agricultural holdings of natural persons not engaged in agricultural activity in the reference year. Farms from that group of about 627,000 holdings were covered by the survey to satisfy national needs to make it possible to balance the area of land at the voivodship level. Therefore, the holdings were classified into one of five strata, i.e. h = 17, 18..., 21. Total area of holding was the criterion for the development of strata and sample allocation between voivodships. It was assumed that the coefficient of variation for that variable should equal 1.53% for each voivodship. 6,254 farms were selected to the sample. All holdings from strata 21 were included in the sample.

Category III was constituted by newly established agricultural holdings and such holdings for which there was no information concerning the type of holding and the value of the SGM. About 252,000 such holdings were entered into the sampling frame. The farms, in each voivodship, were divided into 6 strata (h = 22, 23,…,27). A stratum 27 was constituted by holdings containing, according to the frame, at least 20 heads of cattle or 50 heads of pigs. 5,752 holdings under that category were selected to the sample.

Category IV (stratum h = 28) was constituted by organic farms of natural persons, which, counting 6,839 farms, were fully enumerated.

As mentioned, legal persons' holdings were fully enumerated. This group contained 5,155 holdings and constituting category V (stratum h = 29).

The number of agricultural holdings in the population and the sample is provided in the table below.

Number of agricultural holdings in the population and the sample

Category	Population	Sample
Total	2 862 265	204 937
I1	7 113	7 113
I2	90 820	9 933
I3	327 027	5 139
I4	1 546 005	158 752
II	627 407	6 254
III	251 899	5 752
IV	6 839	6 839
V	5 155	5 155

3.3.3 Pilot survey

Pilot survey was not carried out for substantive and financial reasons. It was assumed that the experiences gathered during the Farm Structure Survey 2005 would enable efficient implementation of the survey both in terms of its substance and in terms of organization.

3.3.4 Informing and training the staff and respondents

Popularization of the survey was based on several information channels. A letter of the President of the CSO to agricultural holders participating in the survey was one of them. The letter contained information concerning the aim of the survey, its territorial scope, obligation to participate, and assurance of absolute observance of the rule of statistical confidentiality. Moreover, each letter contained information about possibility of self-enumeration on the Internet, while agricultural holders sampled for interviewing with the CATI method were additionally notified about that fact.

The letter of the CSO President was transmitted to agricultural holders by means of post. Transmission of the letter and (in the case of an interview directly realized in the agricultural holding) an identity card with a photo issued by the statistical office and showed by the interviewer before interview took place ensured the respondent that the data transmitted to the interviewer would be treated as confidential and subject to the rules of observance of statistical confidentiality.

On the website of the CSO, respondents could find all information related to the survey.

Articles about the survey were placed in national agricultural magazines. Information about the survey was transmitted also via public television and local television and radio channels. Local offices were notified by means of a separate letter of the President of the CSO about implementation of the survey on their territory. Additionally they received a poster related to the survey to be placed somewhere visible for the enquirer.

Regardless of the central actions with their nationwide range, the heads of particular regional statistical offices addressed self-government authorities with the information on the survey and a request to provide assistance during the implementation of the survey and to promote favourable environment for the survey.

To obtain reliable and high quality results of the survey, it was very important to have well-trained telephone interviewers and interviewers. To achieve that:

- the survey supervisors in regional statistical offices recruited telephone interviewers, who, pursuant to the recommendations of the CSO, were employees of statistical offices, had appropriate professional and technical skills, that is the knowledge in the field of agricultural statistics and ability to use the computer; moreover, psychophysical and interpersonal skills necessary while implementing that kind of survey were taken into account,
- the survey supervisors in regional statistical offices recruited interviewers by first engaging the people who regularly cooperated with the regional statistical offices in implementing a range of projects concerned with agriculture,
- all telephone interviewers and interviewers participated in a training, where they attended a lecture and completed questionnaires with data from case studies prepared specifically for the training; moreover, telephone interviewers participated in training workshops, which consisted in practising the skill of conducting a telephone interview and skilful registration of obtained answers.

The trainings for the Farm Structure Survey 2007 were carried out in several stages. First, in December 2006, employees of regional offices who were supervisors of telephone interviewers were trained (by the staff of the Agriculture and Food Economy Division and the Labour and Living Conditions Division of the CSO). It was then in their responsibility to train telephone interviewers and taking care for proper course of the workshops for telephone interviewers.

In March 2007, other employees of the regional offices – supervisors of the survey on the territory of operations of their offices – were trained centrally.

Interviewers took part in courses delivered by the personnel of the regional statistical offices and branches. Trainings for interviewers were implemented as close to the survey dates as possible (07 – 31 May 2007).

Special attention was also paid not to train a too high number of persons at the same time, which would be a significant burden and would lower the effectiveness of the course on the part of both the trainers and the trainees.

3.4 Sampling, data collection and data entry

3.4.1 Drawing the sample

The sample was drawn using standard drawing procedures used in the SAS system (The SURVEYSELECT Procedure).

3.4.2 Data collection

In the holdings of natural persons, information was gathered by means of self-enumeration on Internet, by means of the CATI method and face-to-face interviews. The holdings of legal persons could submit data via the Internet or to send completed questionnaires by post to regional statistical offices relevant for the seat of a given entity.

Each of the participants of the survey received a letter from the President of the CSO, which provided the ID number of the agricultural holding in the Statistical Farm Register (the number was the login for Internet access) and information about the planned method of data collection. That approach made it possible, in particular in the case of classification of a farm into the CATI method, to confirm the reliability of the person calling the farmer.

Making use of the Internet application was possible for all users. The application was prepared by the Central Statistical Computing Centre in Warsaw (COIS) and it enabled registration of data by the respondent and their current control to ensure that the outcome is a completely correct questionnaire. Links to glossaries and definitions under particular fields of the form were an additional support for the respondent. The electronic questionnaire fully corresponded to the paper questionnaire in terms of its layout.

Another data collection method was the CATI. The method was used for collecting data for farmers who had small agricultural holdings and for whom it was expected that the scope of collected characteristics would be narrow. Application of that method was also prepared by the COIS in Warsaw.

Just like in the previous years, direct interview was the basic form of the data collection for natural persons' holdings, while for legal persons the data collection was carried out by postal survey. Data entered on the paper questionnaire were registered with the use of the OCR technology.

To ensure adequate completeness of the survey with the use of so many data collection methods, it was necessary to develop appropriate software enabling supervision over the works and data control. Such software was created in the Centre for Projecting and Databases at the regional office in Olsztyn, based on assumptions prepared by the

Agriculture and Food Economy Division of the CSO. The application made it possible to assign particular agricultural holdings to a particular data collection method, as well as to a specific telephone interviewer or interviewer. After the end of data collection with a particular method, the application allowed to control the obtained data and modification of lists prepared for particular methods. The software would guarantee that none of the holdings would be skipped or enumerated twice. The application made it possible to control paper questionnaires registered with the OCR method.

After the data were controlled and approved, the voivodship databases were divided into two parts. Part one consisted of the personal data of the holder of given holding (such as the name and surname, company name, headquarter address) and it was forwarded to the Central Statistical Computing Centre in Warsaw in order to update the Statistical Farm Register.

Part two of the data (agricultural data without personal data) was forwarded to the Centre for Projecting and Databases at the regional statistical office in Olsztyn. After the voivodship's databases were consolidated and a series of controls were carried out, the compilation was prepared to supply the Data Warehouse of the CSO (forwarded to the COIS in Warsaw) and to calculate output tables.

The data submitted to the Data Warehouse of the CSO were used to prepare the data in the format of the EUROFARM database to be passed to Eurostat and to calculate the typology of agricultural holdings.

Output tables were grouped into 6 thematic files:

- S1 – Land use,
- S2 – Sown area,
- S3 – Livestock,
- S4 – Farm characteristics,
- S5 – Farm labour force,
- S6 – Tractors and fertilizers.

As the result of the implementation of the Farm Structure Survey 2007, the data for 192,526 agricultural holdings were collected.

For the needs of the Eurofarm database, 188,871 records for holdings fulfilling the EU definition were transmitted in the form on anonymous micro-data data to Eurostat. The data format was compliant with the *Manual for data suppliers, survey 2007*.

3.4.3 Utilization of administrative data sources

Administrative data sources were not used.

3.4.4 Control of the data

Because of the introduction of several data collection methods in the survey, control of the data was taking place both in the course of data collection and after completion of particular stages of processing.

The assumptions for control of completeness and logical and arithmetic control were common for all methods of data collection, while they were appropriately modified depending on the method.

In the course of data collection in the form of electronic questionnaires, after the end of registration of answers to a given group of questions, logical and arithmetic control was carried out. It was assumed that questionnaires correctly completed on the Internet would be automatically transmitted for further processing. Incomplete questionnaires, on the other hand, would be automatically corrected or removed from the database.

In the case of questionnaires completed with the application of the CATI method, it was assumed that only correct questionnaires would be further processed. Logical and arithmetic controls consisted in reporting possible errors to the telephone interviewer during the interview, which could then be immediately removed (in agreement with the respondent). For those questionnaires, no automatic corrections were planned.

In the course of and after completion of collecting data on electronic questionnaires, the use of supervision and data control software was an important element of the control of the data. It was particularly vital that only holdings not enumerated with the above-mentioned methods were reached by the interviewer (the most expensive data collection method).

Paper questionnaires, just like in the previous years, were controlled already at the stage of collecting them from the interviewers. Persons who collected the materials controlled the questionnaires thoroughly with regard to completeness of the entries and logical correlation between the answers to particular questions. The questionnaires, after registration of data at the OCR, underwent logical and arithmetic control.

The application for logical and arithmetic control of the paper questionnaire consisted of several modules linked to the control module. Each module, covering control of selected portion of the data, returned to the control module an indicator whether a given module had detected an error or not. If no errors were detected, the indicator showed whether automatic corrections had taken place or not. If an error occurred, error symbol was recorded in the error table, automatic controls were cancelled, and the module proceeded to control the next questionnaire. If an error was not revealed, and automatic controls were performed, the control module recorded the corrections in the database and proceeded to control the next questionnaire. The decision as to which modules were to be activated for a given questionnaire was made by the control module according to the system of indicators attributed to each record. Owing to the system of indicators, the records and questionnaires deemed as correct were skipped in the successive control cycles, which greatly limited

processing time. A questionnaire deemed as correct after all control stages was blocked and could not be corrected further. Due to the links and complex relations between the sections of holding area, ownership structure of agricultural land and sowing area, these sections were controlled in the first place.

Development of the control tables for each voivodship was the last stage of control. The tables were analyzed and approved by regional offices as well as by the Agriculture and Food Economy Division, and Labour and Living Standards Division of the CSO.

3.4.5 Non response

Non-responses, which occurred during the survey, included:

- liquidation of a holding,
- lack of contact,
- refusal to participate in the survey.

A major part of non-responses resulted from over-coverage in the frame, where the liquidated holdings were located.

The non-response rate amounted to 6%. A range of actions was taken to reduce the non-response rate. Dissemination of information on the survey among farmers was an important part of the actions. A significant labour input from regional offices in updating and complementing holders' addresses and telephone numbers made it possible to enumerate a larger number of holdings.

Reducing the rate of non-responses was also influenced by adequate preparation of telephone interviewers and interviewers who knew how to make the respondents positive about the survey. When the holder was absent, the telephone interviewer/interviewer could interview any adult member of the holder's household.

Preparation of an appropriate application for supervision over the course of the survey and control of the data enabled obtaining high completeness. The introduction of electronic questionnaires made it possible, already at the data collection stage, to verify possible errors, including lacks of response. In the case of paper questionnaires, there were only taking place occasional lacks of response to some questions, caused by the respondent's refusal or interviewer's omission.

3.5 Data processing, analysis and estimation

3.5.1 Methods for handling missing or incorrect data items

In 2007, there was no imputation of data for holdings, whose holders refused to participate in the survey or who could not have been contacted, whereas appropriate procedures described in detail in Section 3.5.2 were applied.

The imputation of data was carried out only for enumerated holdings in case of the questions, which required putting an "X" in the relevant position on the questionnaire. When

an adequate number of answers were not made, such answer was selected within the automated logical control, which was more often occurring in the population. The information from previous surveys and experts' opinions were applied in the assessment.

3.5.2 Estimation and sampling errors

The applied estimation method takes into account the following elements:

- weights resulting from sampling,
- existence of non-responses,
- existence of non-typical holdings for a given stratum (the so-called outliers).

The basic weights were appropriately adjusted. Adequate formulas are provided in Annex no. 1.

Weight adjustment caused the necessity to modify the standard method of variance estimation. The rules applied in the SAS and SPSS packages were used. Appropriate software was developed. Description of the method is provided in Annex no. 1. The values of the estimated standard errors for selected variables are provided in the table below.

Values *cv(* $\hat{x}$ *)* for selected variables

Code	Variable	CV %
D-G	agricultural land	0.3
D	sown area	0.3
D/01	winter wheat	0.7
D/03	rye	0.8
D/04	winter barley	1.8
D/05	oats	1.0
D/10	potatoes	0.9
D/11	sugar beet	1.2
J/02-J/08	cattle	0.3
J/11-J/13	pigs	0.4

3.5.3 Non-sampling errors

Due to the difficulties in updating the Statistical Farm Register, which was the survey frame, a problem of under-coverage by the frame of the entire population of agricultural holdings occurred in Poland. The Register was developed on the base of the Agricultural Census 2002, and was updated by deleting the liquidated holdings (according to statistical surveys), while there was not any relevant source which would enable recording all the

newly established holdings. Out datedness of the frame resulted also in the errors of over-coverage, meaning that the frame covered holdings, which were not engaged in agricultural activities in the reference year (apart from the holdings, which were included in the frame for the purposes of carrying out land balance).

In order to minimize the number of errors made by interviewers, a detailed manual for completing questionnaires was prepared (intended for both interviewers and self-survey by legal persons) and detailed trainings for telephone interviewers and interviewers were organized as well.

It was also attempted to limit the errors in completing questionnaires by appropriate training of the supervisors who collected completed questionnaires from interviewers and developing specific guidelines for that stage of the works. Introducing a range of validations, both at the stage of registering questionnaires and of the logical and arithmetic control, enabled to obtain a coherent and correct material.

3.5.4 Evaluation of estimates

Comparison of the results of the Farm Structure Survey 2007 to the results of current statistical surveys concerning land use, crop production, animal production and farm labour force, as well as the Farm Structure Survey 2005, revealed coherence between the observed and expected trends for the main characteristics.

Differences between the data obtained from the farm structure surveys of 2005 and 2007 resulted in particular from:

- changes in Polish agriculture caused by the impact of national and EU agricultural policy, the economic situation on agriculture, as well as agro-meteorological factors,
- problems with full updating of the frame built on the basis of the census 2002 (in particular for small farms),
- change of the sample (sample was not composed of the same holdings as in 2005),
- changes in definitions (Amendments to Annex No 1 to the Decision 2000/115/EC; see chapter 2.1).

4. Publication and dissemination

Five basic forms of the data dissemination of the Farm Structure Survey 2007 results were adopted:

i. books;
ii. CD-ROM:
iii. availability of basic data on the Internet (tables for the country and voivodships);
iv. availability of data through the Regional Data Bank (BDR);
v. realization of orders placed by scientific and research institutions, public administration, territorial self-governments etc., as well as individual users.

Survey results were presented in two statistical publications:

- *"Land use, sown area and livestock in 2007"* – preliminary, basic data from the survey,
- *"Characteristics of agricultural holdings in 2007"* – final survey results.

The data from the Farm Structure Survey will also be published along with other statistical data in compilations published by the CSO (such as the *Statistical Yearbook of the Republic of Poland* and the *Statistical Yearbook of Agriculture and Rural Areas*).

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ANNEXES

1. Method of estimation of parameters and sampling errors
2. R-SGR Questionnaire

Annex no. 1

Method of estimation of parameters and sampling errors

The basic parameter estimated in the survey is the total of the values of variable X, such as number of heads of pigs or total agricultural area.

The parameter for the w-th voivodship (NUTS 2) takes the form:

(1) $\hat{x}_w = \sum_h \sum_i M1_{whi} * x_{whi}$, (i = 1, 2, ... , n_{wh}; h = 1, 2, ... , 28)

where:

x_{whi} – value of variable *X* in the i-th holding selected from the h-th stratum in the w-th voivodship,

$M1_{whi}$ – weight assigned to the i-th holding selected from the h-th stratum in the w-th voivodship.

n_{wh} – number of holdings selected for the sample from the h-th stratum in the w-th voivodship,

Evaluation of the total of variable *X* for Poland is the total of the values estimated for voivodships, i.e.:

(2) $\widehat{X} = \sum_w \hat{X}_w$,

Weights $M1_{whi}$ are equal to the reciprocal of the sampling fraction in the h-th stratum in the w-th voivodship, i.e.

(3) $M1_{whi} = \frac{N_{wh}}{n_{wh}}$,

where:

N_{wh} – number of holdings in the h-th stratum in the w-th voivodship,

Because of the occurrence of non-responses (refusal, lack of contact with the sampled holding, as well as liquidation of the holding), basic weights resulting from the sampling were appropriately adjusted. Information included in the completeness reports (symbol RA) were used for that purpose.

The weight for the i-th holding in the h-th stratum in the w-th voivodship was adjusted by means of and adjustment factor r_{whi}, which was calculated in the following way:

(4) $r_{whi} = \frac{\hat{n}_{1wh} + \hat{n}_{2wh} + \hat{n}_{3wh} \frac{\hat{n}_{1wh} + \hat{n}_{2wh}}{\hat{n}_{wh} - \hat{n}_{3wh}}}{\hat{n}_{1wh}}$,

where:

$\hat{n}_{wh}$ - generalized (weighted) size of the sample selected in the h-th stratum in the w-th voivodship,

$\hat{n}_{1wh}$ - generalized size of the sample enumerated in the h-th stratum in the w-th voivodship (RA = 01),

$\hat{n}_{2wh}$ - generalized number of holdings which refused to participate in the survey in the h-th stratum in the w-th voivodship,

$\hat{n}_{3wh}$ - generalized number of holdings in the h-th stratum in the w-th voivodship, with which contact was not established.

The above values were estimated with the application of the weights calculated with formula (3), after which adjusted weights $M2_{whi}$ were calculated according to the following formula:

(5) $M2_{whi} = r_{whi} * M1_{whi}$,

Adjustment factor r_{whi} is an estimate of the proportion of the number of units, which should be enumerated to the number of enumerated units in a given stratum. Units that should be enumerated include all cases of refusals and an appropriate proportion of cases of lack of contact.

The weight calculated according to formula (5) was adjusted in the situation when it was established that a sampled holding was a non-typical case (the so-called outlier). It concerned holdings, for which relatively low values of total agricultural area or livestock numbers were entered in the frame. Maintaining weights (5) for that kind of farms would lead to a significant over-estimation of the total agricultural area or the number of heads of pigs or cattle. Therefore, weight $M3_{whi}$ was introduced, which takes the following values:

(6) $M3_{whi} = 1$ for non-typical cases,

(7) $M3_{whi} = M2_{whi} \dfrac{\sum_{i} M2_{whi} - n^{*}_{1wh}}{\sum_{i:typical} M2_{whi}}$, for other (typical) holdings.

where:

n_{1wh} – number of enumerated holdings in the h-th stratum in the w-th voivodship,

n^{*}_{1wh} - number of non-standard holdings in the h-th stratum in the w-th voivodship.

Eventually, weights $M1_{wh}$ provided in formula (1) above are substituted with weights $M3_{whi}$.

Precision of estimating the total of the values of variable *X* is estimated as follows:

(8) $\hat{N}_{wh} = \sum_i M3_{whi}$, (*i = 1, 2, … ,* n^1_{1wh}),

(9) $s^2_{wh}(x) = \frac{1}{n^1_{1wh} - 1}\left[\sum_i x^2_{whi} - \frac{1}{n^1_{wh}}\left(\sum_i x_{whi}\right)^2\right]$,

(10) $d^2(\hat{x}_w) = \sum_h \hat{N}^2_{wh}\left(\frac{1}{n^1_{1wh}} - \frac{1}{\hat{N}_{wh}}\right)s^2_{wh}(x)$

where:

n^1_{1wh} – number of holdings with weight $M3_{whi} > 1$,

$\hat{N}_{wh}$ - estimating number of holdings (excl. non-typical holdings) in the h-th stratum in the w-th voivodship.

(11) $cv\ (\hat{x}_w) = \frac{\sqrt{d^2(\hat{x}_w)}}{\hat{x}_w}100$.

Value $cv\ (\hat{x}_w)$ is the relative standard error of estimation of the total of the values of variable *X* in the w-th voivodship. For Poland, the value would be:

(12) $cv\ (\hat{x}\ ) = \frac{\sqrt{\sum_w d^2(\hat{x}_w)}}{\hat{x}}100.$