



FARM STRUCTURE SURVEY 1999/2000
NATIONAL METHODOLOGICAL REPORT

Member State: SWEDEN

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SUMMARY

Agricultural censuses were carried out by Statistics Sweden every fifth year during the period 1927 to 1968. In 1968 a Farm Register was compiled and thereafter Farm Structure Surveys (FSS) were conducted annually. In 1999 the FSS was carried out by SCB on behalf of the Swedish Board of Agriculture, which is responsible for the main part of agricultural statistics.

New demands from the European Union were incorporated into the Farm Register in 1995.

In 1999, it was decided that the FSS for Sweden should be conducted as a census. All the farms were required to submit figures on all farming activities in accordance with EU requirements. For 1999, Sweden had agreed to deliver complete characteristics to Eurostat from all holdings, i.e. more than 81 000.

At the end of May 1999, SCB sent forms and instructions to all those required to provide information. The completed forms were to be returned to SCB on 17 June at the latest. SCB then checked the data to see that it was complete and legible.

To reduce non-responses, various types of reminders were sent to farmers.

Data collection and data processing started in June. The processing work was divided roughly into two parts. The first part involved processing data on crops and livestock compiled mainly in the second half of 1999.

The second part of the processing concentrated on remaining characteristics “employment etc.”. This work was done mainly in spring 2000, when the first part was finished.

The incoming forms were PC-recorded and subjected to extensive control processing. Certain data were corrected by computer in the course of processing. If the data were not accepted during the checking process, a control statement was printed out for use in the manual correction routines.

In March 2000, a supplementary form with instructions was sent to more than 20 000 farmers who had not supplied any figures on employment. Of those, more than 12 000 also had figures missing for machinery. At the end of the completion period, some special arrangements were made to complete the remaining non-response. Most of these holdings were very small and had a very limited impact on the overall result.

1. INTRODUCTION

1.1. Background, scope

Sweden's experience of farm statistics dates back a long time. Statistics on holdings, area, crops, livestock, employment etc were introduced in the first half of the twentieth century, compiled by the Central Statistical Office (SCB) as the main body responsible.

The establishment of a farm register (lantbruksregister - LBR) in 1968 led to improved coordination of agricultural statistics. There were later additions to the register, one being the inclusion of horticultural holdings in 1970. From 1968 to 1994 the farm register also served various administrative purposes, e.g. harvest damage protection and national aid payments. Total surveys were conducted every year employing a variety of characteristics.

Since Sweden's accession to the EU in 1995, the statistics and the collected data have been adapted to EU rules. EU requirements meant that the surveys in 1995, 1997 and 1999 were more extensive than in 1996 and 1998, when they primarily met national requirements. Since a sampling procedure was used for the years 1996 and 1998, the supply of data was restricted in those years. However, to maintain the quality of the register, all holdings were asked to provide certain holding data annually, e.g. name, address and real estate data.

For the 1999 farm structure survey, which was a total survey, data were collected on holdings, holders, related real estate, areas of arable land and forest, crop areas, a breakdown of crop areas by parish, areas set-aside under the EU programme, areas under ecological cultivation, labour force employed in the holding, numbers of livestock, machinery, horticulture, rural development, irrigation and client number in the administrative register for aid applications. The reference date for the survey was 10 June 1999. The 1999 survey, which was a particularly large-scale survey, was conducted in stages, and processed in 1999 and 2000. The results were reported in 2000.

Farm register data were used to compile farm structure statistics and also as a basis for reporting structural statistics to the EU. The farm register was also used as a sampling frame for a number of other surveys, e.g. harvest estimates and economic statistics for agriculture.

Since 1 January 1999, the Swedish Board of Agriculture is the authority responsible for the major part of agricultural statistics in Sweden.

1.2. Legal basis

Responsibility, scope and coverage

Special legislation regulates responsibility and content, and gives the Board of Agriculture and the producer SCB a mandate to conduct the surveys required to meet statistical requirements at national and EU level. See below under 'statistical obligation'.

Survey periodicity and reporting period

Up to 1999 inclusive the surveys were conducted every year. The reporting reference date was a day between 8 and 15 June.

Statistical obligation

Pursuant to the Law on statistical obligation in the field of agriculture, SFS 1992:888, Regulation SFS 1992:1032 and SCBs provisions SCB-FS 1999:7, there is an obligation to provide information for the Farm Register. Also EU Regulation (EEC) No. 571/88 lays down rules on the requirement to provide information.

Where data are not provided, a penalty can be imposed under the above laws. Alternatively there is scope for court action, a course which the SCB has had occasion to resort to in the past, after consulting the Board of Agriculture.

Secrecy legislation

Secrecy legislation imposes certain restrictions on the principle of open government with a view to protecting the individual. The current secrecy legislation came into force on 1 January 1981 (SFS 1980:100). The Law contains common rules on document secrecy and confidentiality. The rule of secrecy covering certain data means that information may not be disclosed orally or released in another form as data in the public domain. The Law does not apply solely to individuals, but also to other authorities.

The central provision on statistical secrecy is contained in Chapter 9, Section 4, of the Secrecy Law, which reads as follows:

"Secrecy shall apply to any specific activity of an authority designed to compile statistics and, where the government so decrees, to any other comparable survey conducted by an authority, where these involve data on an individual's personal or economic circumstances and which can be linked to the individual. However, data in company registers, death statistics, data required for research and statistical purposes, data on labour and wage statistics and data which cannot be directly related to an individual either by name, other identifier or comparable circumstance, may be released if it is clear that the information can be disclosed without causing harm or injury to the person concerned or to a closely related person.

In the case of data in the public domain, the secrecy shall apply for a maximum of 70 years if the data relates to an individual's personal circumstances, and otherwise for a maximum of 20 years."

Chapter 9, Section 4 of the Secrecy Law provides protection for data used for statistical purposes. The data may also (pursuant to Law SFS 1992:888 and Regulation SFS 1992:1032) be used in certain administrative areas. When used in this way secrecy protection is provided under other provisions of Chapter 8 of the Secrecy Law.

Pursuant to Regulation SFS 1992:1032, the Board of Agriculture and any agricultural unit or unit with an equivalent function within a county administrative board can have access to the register for its work within agriculture. The regulation also permits the disclosure of e.g. address labels

and lists to the agricultural units (or equivalent) as required for their activity, without special checks.

New rules from 1 April 2001

The law on the obligation to provide information in the field of agriculture was repealed with effect from 1 April 2001. The obligation to provide information for statistical purposes in the field of agriculture was then incorporated into the general law on statistics (latest version SFS 2001:99).

The Secrecy Law was also tightened up on 1 April 2001 so that the disclosure of data, after application of a "harm test", was only possible for research and statistical purposes and for data, which cannot be linked to an individual person or company. This tightening means that the law is brought into line with the law applicable in the EU as a whole, the Regulation on Community Statistics.

1.3. Main developments during the 1990s

The structural changes in agriculture in the 1990s followed the same pattern as in previous decades. The number of agricultural and horticultural holdings declined from approximately 100 000 in 1989 to 81 400 in 1999, or a drop of 19%. For the most part there was a drop in the number of small holdings and an increase in those with over 100 hectares of arable land. Throughout the 1990s utilised arable area and livestock numbers changed relatively little.

From 1989 to 1999, numbers employed in agriculture expressed in man-work units fell by about one quarter.

Up to July 1993, SCB had total responsibility for statistics on a contract basis. Statistical reform meant that from 1993 to 1994 certain authorities took over statistical responsibility in their sectors. The Food Industry authorities took over formal responsibility for statistics in agriculture up to 1999, when responsibility passed to the National Board of Agriculture. SCB retained its role as producer and conducted the structural surveys on behalf of the authorities with statistical responsibility.

Certain methodological changes were introduced during the 1990s on administrative and budgetary grounds. The two most important of these were the transition from total surveys to sample surveys and the technical changes involved in the changeover from mainframes to compiling statistics in the client server environment (PC-environment). The previous mainframe production meant that some data recording took place outside SCB. Both changes led to a reduction in the costs of compiling statistics. However, the sampling procedure means there is slightly less precision and also that statistics cannot be compiled in equal detail for counties, municipalities and parishes.

1995 was the first year samples were drawn as part of the annual structure surveys. A sampling procedure was applied to the new characteristics "employment etc." introduced under EU rules.

The transition from mainframe processing was initiated in the 1998 survey when processing was carried out in a PC-environment. From 1999 the

transition took place for structural statistics. Indeed the entire SCB changed over from mainframes to a PC-environment in the second half of the 1990s.

As mentioned in the section Background 1.1 above, EU accession in 1995 meant a change in the statistical requirements, as EU rules were complied with. The following is a brief overview of the scope of the structural surveys throughout the 1990s:

1990-94	total survey for national requirements
1995	total survey for all characteristics apart from "employment etc", where a sample was drawn
1996	sample survey for national requirements
1997	sample survey for national and EU requirements
1998	sample survey for national requirements
1999	total survey for national and EU requirements

In 1999 a sample was drawn to supply early preliminary statistics

Holding data were updated every year, even for holdings not included in the sample.

To describe briefly how the sampling procedure was carried out, let us take 1997 as an example. A sample of about 32 000 holdings was drawn from the total frame of about 92 000 holdings. These received a statistical form on which to record all the survey characteristics. The sample was divided into 34 strata broken down by size and county groups and by type of farming according to the Swedish classification. Certain strata, with holdings over a certain size, were included in full.

About 60 000 other holdings received a simplified form (register form) on which data on the holder, property included in the holding and the total area were recorded, as well as any changes to these.

2. CONTENT OF THE 1999 STRUCTURE SURVEY

2.1. Holdings and characteristics 1999

Holdings included

The 1999 Structure Survey included the following types of holding from the farm register (LBR):

- holdings with at least 2.1 ha arable land.
- holdings with a large number of livestock, including one of the following: cattle, sheep, pigs or poultry (irrespective of whether there is any arable area).
- holdings and other units (institutes, institutions, etc) engaged in horticulture comprising at least 200 m² area under glass or at least 2 500 m² open field. Cultivation in homestead gardens or for own consumption is excluded.

Characteristics included

The 1999 Structure Survey included the following data and characteristics:

- a) the holder's name, address, personal number, telephone number, client number in the aid register
- b) properties included in the holding, their area of arable land and forests, owners of leased arable land, tenants of leased land
- c) the reasons for changes in the arable area
- d) the area of different types of land broken down by each parish in which the holding has acreage
- e) the area of different crops broken down by each parish in which the holding has acreage
- f) area set aside under the EU programme
- g) area devoted to ecological crops
- h) labour force employed in the holding
- i) number of livestock
- j) machinery
- k) horticulture
- l) rural development
- m) irrigation

2.2. Forms

The main collection of data, in June 1999, involved the use of a 4-page form in duplicate with an 8-page information booklet. The form for recording data and the information booklet were drawn up by SCB in consultation with the Board of Agriculture. See Annex 1 and 2. There was also consultation with the Commerce and Industry Regulatory Body (NNR), which includes farmers' representatives.

There was a special property annex for companies using arable land in more than six properties and there was a special parish annex for those with arable land in more than three parishes.

The main form was divided into 18 sections for recording data. If there were any changes in pre-printed data since 1998, they should be corrected.

First page, with a special ID number in the top right-hand corner:

1. Holder, name, personal/organisation number, telephone number and address (pre-printed)
2. Any transfer of the holding, with information on the party to whom it was transferred
3. Centre of operations (pre-printed)
4. Properties included in the holding and their areas (pre-printed)
5. Record of areas assigned to different types of farming, broken down by parish (pre-printed)

Second page

- 6 Utilisation of arable area in hectares by parish
- 7 Area set-aside under the EU programme - in hectares
- 8 Area assigned to ecological farming - in hectares

Third page

- 9 Employees in the holding over the past 12 months, broken down by categories
- 10 Number of livestock: cattle, sheep, horses, pigs and poultry, broken down by category

Fourth page

- 11 Machinery, tractors and combine harvesters
- 12 Any other holders
- 13 Horticulture
- 14 Any change in the arable area - increase or decrease
- 15 Rural development
- 16 Irrigation, hectares and type of equipment
- 17 Information on EU aid and if so client number
- 18 Signature

In addition to the main form, special forms are distributed at a later stage to supplement employment and machinery data, which have not been supplied.

With the main form and the 8-page information booklet the holder has all the necessary information. Instructions on how to fill out the form are included. The information booklet gives an example of a completed form with comments. To provide feedback to the farmers, the Farm Register statistical results are also recorded in the booklet, showing developments within agriculture in the period 1988 to 1998.

3. SURVEY METHODOLOGY

3.1. Organisation of the survey

The farm structure (LS) programme within SCB's department for environmental and regional statistics was responsible for conducting the 1999 survey. The staff in LS unit have many years' experience of agricultural statistics. In 1999 they numbered about 20 persons, who also work on other surveys in SCB. During the most intensive collection and checking phase almost the entire staff complement was involved in the survey, particularly in the second half of 1999. Since the 1999 survey was a total survey with a greater number of characteristics, the work input for this survey was substantially greater than for the corresponding survey in 1997. For this reason, SCB chose to carry out the entire 1999-year survey over a longer period.

The head of the unit and the deputy had overall responsibility for production and for client contacts, with the Board of Agriculture as contractor. The staff include several statistical experts and a group of persons with special IT and specialist qualifications, including some with an agricultural degree. All those involved in the survey worked on PCs, but dealt with slightly different parts of the survey.

A steering group of five persons monitored and coordinated the work. Each week the work situation was evaluated and followed up with information to the entire group.

In advance of the 1998 National Structure Survey, a PC-based data recording and search programme was developed, primarily by the unit's own IT staff. Based on experience gained in 1998, the programme was improved and completed with the additional characteristics applicable to 1999.

For the most part, the survey was planned and conducted using resources within the unit. The booklets and forms were mainly printed outside SCB. SCBs dispatch unit was responsible for the automatic preparation of envelopes and delivery to Posten (the post office). To reduce non-responses for data on employment and machinery, in the final phase of the survey SCBs interview unit was given the task of collecting certain data via telephone.

3.2. Operations

In advance of the 1999 survey, there was a review of processing routines in the farm register. Such a review had already been carried out for the 1998 survey and documented in a special report. This document and the experience of processing the 1998 farm register as well as the special conditions applicable to the 1999 farm register formed the basis for a project: a review of the processing routines of the 1999 farm register. An important element of this review was to improve the application for updating register data in a PC environment.

The 1999 processing was divided roughly into two periods. During the first period, mainly in the first half of 1999, data on holdings, crops and livestock were collected and processed.

The second period was devoted to collecting and processing the remaining characteristics on "employment etc.". This work started in earnest in spring 2000 when the first part was completed.

The entire 1999 survey operations were carried out in stages according to the following timetable:

Activity	Commencement	Completion
Discussions and meetings with Eurostat, Board of Agriculture etc.	1998	Spring 1999
Review of processing routines	15 February	15 April 1999
Printing of forms	13 April	23 April
Insertion in envelopes: automatic/manual	20 April	22 May
Delivery to Posten (Post Office)	25 May	25 May
Initial checks of incoming forms, analysis of crop rotations	4 June	30 Nov
Normal reference date for forms	10 June	
Requested final date for transmission of forms	17 June	
Reminder 1 (card)	30 June	
Reminder 2 (card)	14 July	
Reminder 3 (including a new form)	11 August	
Drawing of sample for preliminary statistics	11 August	
Preliminary statistics returned (sample-based)	30 August	
Non-response follow-up by tel.	10 Sep. 1999	Feb. 2000
Register check of crop data etc.	25 Nov. 1999	Feb. 2000
Extracts from statistical register relating to crop data etc.	7 March 2000	
Compiling of tables, text and layout for four reports for successive publication	March	May 2000
Completion of missing data and partial non-responses for employment, machinery etc.	March	October 2000
Dispatch of additional forms for employment/machinery	17 March	20 March 2000
Telephone completion of employment/machinery data by Interview unit	10 April	28 April 2000
Calculation and completion (incl. some imputing) for remaining non-responses for employment, machinery etc.	November 2000	
Compiling of tables, text and layout for employment etc.	November	Dec. 2000
Data delivery 1 to Eurostat	26 Feb. 2001	
Data delivery 2 (slightly revised) to Eurostat	2 April 2001	

3.3. Planning of survey operations

3.3.1. Population and frame

Target population

The study target in this survey is the agricultural holding, i.e. a unit under single management, which operates in agriculture, forestry, animal husbandry or horticulture. The respondent is one or several person in the holding.

The target population is agricultural holdings in Sweden, which met at least one of the following criteria in June 1999:

- at least 2.1 hectares of arable land
- at least 50 cows or 250 cattle or 50 sows or 250 pigs or 50 ewes or 1000 poultry (including chickens).
- at least 200 m² area under glass or 2500 m² outdoor cultivation.

Terms and definitions

The definitions are aligned with those of Eurostat, but in some cases are formulated slightly differently.

Holding

Agricultural holding refers to a business under a single management which operates in agriculture, forestry, animal husbandry or horticulture. Holdings are divided into groups in terms of legal status and management.

- holdings operated by natural persons (individuals, single company)
- holdings operated by legal persons (estate of deceased person, limited liability company, state, municipality, church, other).

Holder

By holder is understood the person who has the legal and economic responsibility for the activity. Under EU provisions only one person can be returned as holder. The farm register (LR) provides for 1-3 holders. For this reason SCB has decided to consider the person entered first (holder 1) as the holder in returns to Eurostat. The holder can own or lease the holding.

In this context a natural person cannot be the holder in a holding operated by a legal person.

Manager

The manager is the person in the holding responsible for day-to-day operation. Generally the holder is also the manager.

Hours per year in agriculture in the holding

Only work in the holding within agriculture (including horticulture) is recorded. Maintenance of machinery, buildings and administration etc. relating to agriculture are considered as agricultural work, but not work in own forest, in the household or in a holding activity other than agriculture. All permanent or temporary employees aged 16 years or over are included, irrespective of whether they are paid or unpaid.

Annual Work Unit (AWU)

Hours worked in agriculture are calculated as annual work units. An annual work unit corresponds to the working time of a full-time employee in agriculture, which in Sweden is 1 800 hours per year. When a person is employed less, the corresponding AWU share is calculated. Recorded employment of 1 800 hours or more is always calculated as 1 AWU.

Arable land

Land which is used or may be used for cultivation or pasture and which is suitable for ploughing.

Pasture

Land which is used or may be used for pasture and which is not suitable for ploughing.

Forest land

Land which is suitable for timber production and which is not largely used for any other purpose as well as land where there should be forest to protect against sand or landslides or to prevent the mountain boundary line from moving down.

Land which is partly or wholly unused shall not be regarded as forest land if there are special reasons why it should not be used for timber production.

Land should be regarded as suitable for timber production if according to established assessment criteria it can produce on average at least one cubic metre of timber per hectare per year.

Other land

Land which is not suitable for use in horticulture, pasture or timber production.

Frame population and coverage

Annual updates of the farm register have guaranteed high data quality in the register. The updated data from one year have formed the basis for the frame of the next year's survey. The 1999 frame population was comprised of holdings from the 1998 survey. The annual processing exercise has kept track of ongoing changes in the structures of holdings.

Over-coverage - holdings which are not part of the 1999 target population, mainly holdings which have recently closed down - have been identified and removed from the register and have obviously not been included in the returns.

Under-coverage - newly-created holdings which belong to the 1999 target population, but which were not included in the frame - could be identified by monitoring property changes, and have been entered in the register and included in the returns.

There is some uncertainty whether some very small farms are over or under the threshold values for inclusion as a holding. Above all, the requirement of at least 2.1 hectares arable land generally applies.

When respondents reported holding changes according to the instructions on the form it was relatively simple to update the register. When the data supplied were inadequate, further investigations were necessary. In general the remaining degree of under-coverage was estimated to be so small that no adjustment was made for this.

The structure survey not only provides statistical results, but it also provides an updated register.

3.3.2. Survey design

The 1999 structure survey was conducted as a total survey.

3.3.3. Pilot survey

No special pilot survey was conducted in advance of the 1999 structure survey. Though partly sample-based, the 1995 and 1997 surveys were designed in a similar manner to the 1999 survey and provided a sound basis for planning that survey.

However, before conducting the first survey to comply with EU requirements in 1995, there were a number of pilot surveys on employment in agriculture. First a small trial study was conducted with questionnaire surveys of a sample of 200 holdings to test terminology etc. The study was followed up with telephone interviews.

In addition, in the same year, before conducting the standard survey, a trial survey tested different types of forms on a sample of 3 000 holdings. The experiences gained from these pilot surveys were then applied to the standard surveys.

3.3.4. Information and training of staff and respondents

As mentioned above all responsible staff in SCB have many years' experience of conducting farm structure surveys. Since the overall survey design was the same as in previous surveys, no major investment in training was necessary.

Before starting the exercise, two days at a boarding school were set aside for the entire group of staff, during which various aspects of the survey were discussed.

So as to ensure that all those involved mastered the partly new technology introduced with the transition to compiling statistics in a PC environment, the staff involved received training and information on various parts of the production chain. It was important that everybody had the same view of and approach to the various types of steps. As in previous years a special manual was compiled to help with the task.

For the special telephone completions for employment and machinery, made with the help of SCB's interview unit, staff received information on the subject area and on which data should be collected.

Scarcely any investment in training was required for respondents. Since the form was very like those used in previous years' surveys, many holders were relatively well acquainted with them. The special information booklet with examples of how to complete the form provided useful guidance. In addition, there was a special group help number where experienced SCB staff could give advice on completing the form.

There was also a description of the 1999 farm register with detailed information for external interested parties.

3.4. Data collection and data recording

3.4.1. Sample drawn for interim report

One sample was processed separately to meet national requirements for a rapid interim report. A stratified probability sample of 21 000 holdings was drawn from the entire frame population. The processing of this sample was given priority in order to obtain statistics on use of arable area and livestock numbers. The interim statistics reflected the situation for survey processing on 11 August 1999. The statistics were published in a special report, Statistiska Meddelanden J 61 SM 9901, on 30 August 1999. Since the interim report is not part of EU requirements, it will not be dealt with further in this methodological report.

3.4.2. Data collection

Collection and preliminary checks (analysis of crop rotation)

SCB's staff was responsible for data collection as part of the farm structure programme. Forms printed for holdings already included in the farm register contained 1998 data on holders, property belonging to the holding, the different types of land and parish affiliation.

SCB's dispatch unit undertook the task of preparing the envelopes and delivering them to the Post Office. At the end May 1999 letters were sent containing forms, instructions and reply envelopes to all those included in the Farm Register who were considered to have an obligation to provide information (approx. 86 000). In the course of the processing, forms were also sent retroactively to others who were found to have an obligation to provide information.

The stated reference date was 10 June 1999 and the completed forms were to have reached SCB by 17 June at the latest. The holders who did not send in the form by the stated date received reminders on a maximum of three occasions during the period from end June to mid-August. A new pre-printed form was included with the third reminder.

The date of receipt of the forms was recorded with the aid of bar code scanners. Then there was a preliminary check with analyses of crop rotations. Forms with no changes to pre-printed data on holders and property and with the most important other sections completed were then passed on for data recording. Changes in just name and address data were recorded, listed and checked.

Forms stating that another person had taken over all or part of the land area were analysed. A form was sent to the new holder if this had not already been done. When that form was returned it was checked against that of his predecessor.

Additional collection for employment etc. .

Crops and livestock data had been processed in this way up to March 2000. Data in sections relating to employment etc. had been completed only if there had been contact with the respondent anyway.

To obtain data from those who had provided no data on employment, a special additional form was sent to 20 737 holdings in March 2000. In the case of 12 758 of these holdings information on machinery, which had not been provided either, was also requested. Most of the holdings fell into the group of small holdings. About half of the additional forms were returned completed by the beginning of April. In parallel with this continued inflow, SCBs Interview unit, which is specially skilled in telephone interviews, spent time obtaining additional data via telephone. During April the data for about 2 300 larger holdings were completed via telephone contacts.

Most of the remaining forms could be corrected by computer or manually using control statements received in the course of computer checks against established control criteria. Remaining non-responses and partial non-responses were then completed using data obtained for comparable holdings. Data input, completions and processing were carried out during the period from April to September 2000. The final work on non-responses for both employment and machinery and the processing of data on rural development took place during October up to the beginning of December 2000.

Data recording

All the staff working with the forms were able to record the data supplied. The PC-based application for the 99 Farm Register was used to search for current holdings using the SCB id. number. The application was made up of three pages and started with data on the person listed as holder 1. Further holders (users) were recorded when the holding was run by several persons. This was followed by data on the holding and type of land use.

On page two data were recorded on crops and livestock and on page three data on horticulture, employment, machinery etc.

The data entered by the holder on the form were recorded in empty fields using the tab key. Changes to earlier data were simply made directly. A few people were responsible for most of the recording work.

The in-house application for the farm register was developed with the aid of the programme Visual Basic. Once data were entered there were also accessible for further processing.

3.4.3. Checks of recorded data

Detailed computers checks were made of individual data on the forms. Checking criteria were supplied for checking different parts of the report. These comprised:

- summation checks
- checks of extreme values
- logic checks
- checks of unusual combinations
- checks of missing values
- comparisons with equivalent data on holdings from previous years.

Example of computer checks:

- errors in arable area
- large pasture area + few livestock or sheep
- open fields – major change
- data on non-farming activity missing
- year of birth of holder's spouse missing
- several managers listed

A control statement was issued when holdings provided data, which did not meet one or more of the checking criteria.

There was then a manual check of the data identified in the control statements. In many cases the identified errors could be corrected using data from the forms. In certain cases the holders were contacted by telephone and at the same time data were collected on sections, which had not been completed. Following authorisation from the Data Inspectorate, the Board of Agriculture's crop aid register was also used for this correction work and to complete non-responses.

For each holding, the type of occupancy, holder category etc were encoded as a basis for the statistical report.

The corrected and completed holding data have formed the primary material for all statistical compilations from the farm register.

The instructions provided generally permitted the data to be corrected or completed directly on PC.

3.4.4. Non-responses

When collection work was complete, there were still some non-responses for crop data in the case of 4 054 holdings (5.0 %) The non-responses were relatively evenly distributed by size and county. For these holdings certain data (total crop areas) were obtained in the first instance from the Board of Agriculture's aid register (IAKS) and then from the latest available Farm Register data (LBR 1995 to 1998). The data from IAKS were used in the case of 2 325 holdings.

There may be some over-coverage (holdings which have closed down) among the non-response holdings. In the case of data on area, the degree of uncertainty arising from non-response is generally considered very small.

Non-response in recorded employment data was initially somewhat higher: 4 790 holdings (5.9%). 75% of these were so-called small holdings. Non-response processing concentrated primarily on medium and large holdings.

In addition, there was partial non-response, e.g. various missing characteristics because holders had provided incomplete data, e.g. the section on employment might include persons with data on age and sex, but the holder may have "forgotten" to include the number of hours worked in an agricultural or non-agricultural activity.

Non-responses, for all or parts of the employment sections, were completed by imputation based on the data for equivalent holdings, which had replied in full. It was assumed that there were no systematic differences between responding and non-responding holdings.

Non-response for tractors could largely be completed using data on tractors taken from SCB's Vehicle Statistics Register.

There may be some over-coverage (holdings which have closed down) among the non-response holdings. In the case of unemployment data, the degree of uncertainty arising from non-response is generally considered very small.

3.5. Data processing and analysis

Measurement

Measuring errors occur when incorrect data are provided and not corrected in the course of the checking process. This survey, like most, contains different types of measuring errors. To a certain extent errors cancel each other out. But the net error can also be systematic. We have carried out some analyses to determine if systematic measuring errors have occurred. We shall touch on some causes of measuring errors. No adjustments for measuring errors have been made.

Based on previous area checks it is estimated that the measuring error for the total arable area at national level tends to be marginally overestimated. In the past the data on utilised arable area could also include certain cultivation barriers in the form of ditches, smaller impediments etc. Following EU entry these measuring errors declined since most holders now have access to up-to-date and correct area data from area aid applications. However, it can still be difficult for the farmer to differentiate correctly between arable land and pasture.

Measuring errors can also appear in statistics on holdings and holders, owing to difficulties in definitions and demarcations. The use of pre-printed forms should mean under-estimation of the number of changes in, *inter alia*, type of occupancy (ownership/leasehold) and type of land use. Measuring errors for pasture, forest land and other land are probably greater than for arable land, since the data are not checked as carefully.

Data on the agricultural labour force contain intrinsic measuring errors. The risk of memory error is obvious in the case of those who must report the number of persons employed and the number of hours they work during a given twelve-month period. People may be forgotten, too many people may be included or incorrect hourly data given.

There is also a risk of *specification error*, particularly in employment, as to what is defined as employment or not. The borderline between leisure occupation and work in agriculture can be fluid, particularly for those mainly employed outside agriculture. The fact of being in permanent or temporary employment may also be incorrectly reported. For holders who combine agriculture with another activity, e.g. own forest, the demarcation can be incorrect. The understanding of the concept of family and what should be

included in the holder's family can vary. Adult children with their own family elsewhere are obviously not always considered to be the holder's family members.

In this survey the respondents have provided the data themselves in line with instructions. Obvious misunderstandings which were discovered in the course of the checks have been corrected.

Analysis

As the data received were definitively recorded, certain results were earmarked for analysis. One important analysis was to identify any remaining non-responses and partial non-responses to form the basis for the further processing of non-responses. Comparisons were also made with previous years to evaluate results at national and regional level.

3.5.1. Methods to correct missing or incorrect data

As already described in this chapter, different methods were adopted to complete missing data and to correct errors. The following were the most important methods used:

- Analysis of holding transfers indicated on the form. This often resulted in the closure of holdings, as often the farm had been combined with another holding
- Completion/correction via telephone contacts with the respondent
- Completion of crops by making cross-checks using the Board of Agriculture's aid register
- Apart from the 99 Farm Register, each member of staff also had direct access on his PC to
- FDB, the company data base
- FTR, the tax register of agricultural holdings
- the telephone directory

In addition a special operational PC provided access to an up-to-date population register. This register could be used to complete or correct data.

Other completion methods

- Completion/correction using previous structure surveys, via PC or previous forms
- Completion/correction in the case of horticultural holdings using the 2000 Horticulture Census, via PC and horticulture forms
- SCB's interview unit conducted special telephone processing directed at all large agricultural holdings
- Completion of data on tractors by cross-checks with SCB's vehicle statistics register. This register includes all registered tractors.
- After all other methods have failed, an imputation procedure was undertaken for employment data which could not be completed. As a basis for the imputation, holdings were classified into 12 size groups.

The holdings included in each group formed the basis for the imputation, which involved random distribution of data. The smallest holdings, "small-holdings", accounted for 75% of the holdings for which imputations were carried out.

The software used to process, calculate and compile tables was SQL, SAS and Excel.

3.5.2. (Estimates and sampling errors, not relevant)

3.5.3. Non-sampling errors

See section on measuring, point 3.5

3.5.4. Calculation analysis

Overall structural conditions in agriculture remain relatively stable from one year to the next. Data collected annually, e.g. on crops and livestock, are compared with previous years to determine whether the changes are reasonable.

Certain comparisons were also made with corresponding data in administrative registers (primarily the aid register). For the agricultural labour force, comparisons were made with corresponding surveys in 1997 and 1995 and the changes between the years were calculated. Results show that employment in agriculture has fallen very sharply. The changes in both the number of persons and in the number of AWUs were analysed also at regional level to check if the results were reasonable.

4. PUBLICATION AND DISSEMINATION

The results were published as reports in SCBs series: Statistiska meddelanden.

SCB requirements stipulate that these include, in addition to the recorded results, a description of the methodology and a quality declaration.

Title, number of pages	Ref.	Publication date
Preliminary data: Use of arable area and number of livestock in June 1999, 16 pages	J 61 SM 9901	30 August 1999
Agricultural holdings, holders and type of land use on 10 June 1999, 104 pages	OJ 34 SM 0001	19 April 2000
Use of arable area and horticulture on 10 June 1999, 85 pages	OJ 10 SM 0001	4 May 2000
Livestock on 10 June 1999, 113 pages	OJ 20 SM 0001	17 May 2000
Type of farming of holdings on;10 June 1999, Typology data, 92 pages	OJ 35 SM 0001	9 June 2000
Employees etc. in agriculture, 1999, 48 pages	OJ 30 SM 0001	28 December 2000

Results on employment were also published on SCB's home page as a pdf-file. This publication was also accompanied by a press release. This contributed to the fact that about 40 newspapers in Sweden wrote articles on the data taken both from the press release and from the pdf-file.

At the request of the Board of Agriculture, SCB produces an Agricultural Statistics Yearbook where the results of the farm structure surveys are published together with other agricultural statistics.

SCB and the Board of Agriculture have links to each others' home pages to facilitate access to all structure statistics which are published as National Official Statistics. In addition, SCB and the Board of Agriculture have a common portal with links to different sites relevant to agricultural statistics: "Signpost to Swedish Agricultural Statistics".

SCB is also responsible for statistical databases, which are available to the public free of charge via the homepage, under the title "Sweden's statistical databases". Statistics are entered after they have been published. On this database certain structural data from the beginning of 1980s can be studied.

5. PROPOSALS FOR FURTHER WORK

EU-entry and the resulting increase in administrative aid systems for agriculture provide an opportunity to reduce the burden on respondents. Wherever possible statistical requirements should be met by the data already supplied to the administrative systems, e.g. on crops and livestock.

Before the 2000 Structure Survey, conducted to meet national requirements, a new farm register (LBR) had been drawn up by the Board of Agriculture in cooperation with SCB. In the 2000 survey, data on crops and to a certain extent also on livestock could be obtained from administrative registers, thereby reducing the task of providing information. The new farm register functioned as a tool to collect supplementary structural data on agriculture. These data were collected in the form of a postal survey.

The new farm register will be used for the 2003 structure survey in accordance with EU requirements. In-depth planning is necessary to arrive at an optimal solution, which minimises the supply of data while simultaneously obtaining all the data.

The relatively large time gap between the 1999 and 2003 surveys will make it more difficult to provide reliable estimates for certain characteristics, e.g. AWU, since data will not be collected in the intervening years.

REFERENCES

Information om LANTBRUKSREGISTRET 1999, Booklet drawn up by SCB in consultation with the Board of Agriculture.

Kvalitetsbegrepp och riktlinjer för kvalitetsdeklaration av officiell statistik, MIS 1994:3, SCB. Updated essay in MIS 2001:1, June 2001.

Lag om uppgiftsskyldighet på OJrdbrukets område, SFS 1992:888

Förordning om uppgiftsskyldighet på OJrdbrukets område, SFS 1992:1032

Statistiska centralbyråns föreskrifter om uppgifter till lantbruksregistret, SCB-FS 1999:7

Sekretesslagen, SFS 1980:100