

## Agriculture, livestock and fishing

Information on the agricultural system, and therefore on the country's capacity to produce goods to meet its own food requirements, is a fundamental element for understanding and guiding development. It is no surprise, therefore, that statistics on production in a strict sense (quantity of cereals, vegetables, meat by animal species, cheese, etc.) are available all the way back to 1861. The surveys performed during the course of the 19<sup>th</sup> century, however, were not capable of guaranteeing the coherence and completeness that was achieved when the responsibility for agricultural statistics was passed to the Central Statistical Institute with Royal Decree no.1035 dated 02<sup>nd</sup> June 1927. This transfer ensured improved data quality and structure, thanks to new information taken into consideration in addition to production, such as the areas used for different cultivations and the production methods used, according to a scheme which is still the main reference used for national and European agricultural statistics today.

Important examples of the role played by Istat in that period in promoting statistics on the sector are provided by the indications that were implemented for the first time by the directors of Travelling agricultural authorities for the performance of the Second agricultural survey, as for the 1927 survey on fertilisers, performed in collaboration with the National Fascist Federation of Industrial Chemical Producers.

The survey techniques used in agricultural statistics, as for other sectors, have changed over time. Currently several methods are used in forming estimates, from surveys performed directly at production units (with CATI, CAPI and CAWI interviews) to administrative sources and estimation surveys. These last have always been a feature of agricultural statistics, involving a range of territorial structures. At the beginning of the century these were performed through Directors of travelling agricultural authorities, who in the 1930s became Provincial Agricultural Inspectors. Today, surveys are performed in collaboration with Regional authorities and independent Provinces.

From 1961 onwards, the snapshot provided by surveys was enriched with information from General Agricultural census surveys, conducted by Istat every ten years, relying on direct interviews with agricultural holders.

### Agricultural holdings

The Agricultural census surveys provide an exhaustive picture of the size and features of the agricultural holdings present on the national territory. In addition to creating a background of crucial information for understanding a sector which is strongly affected by local characteristics, the results are also used for building up a frame of productive units used in the years between each census as a basis for sample surveys, research and studies on the sector.

From 1961 onwards, the Agricultural census surveys have been performed approximately every ten years.

Regarding organisation, the census system has traditionally been structured on several levels, involving Regions, Provinces, Chambers of Commerce and Municipalities. Istat directs the technical and methodological coordination of the census network through its own local offices.

The field of observation for the Agricultural census survey takes into consideration all agricultural, forestry and livestock enterprises of any size and type of management (by legal or physical persons), with the exception of small family vegetable growers that consume their own produce. In addition to the figures on the "Italy universe" including all holdings regardless of size, the 2000 Census also provides those from the "EU universe", covering all holdings with at least one hectare of utilised agricultural area (SAU - UAA) and those with an UAA of less than one hectare but with a production value of more than 2,065.83 EUR. The 2010 Census, however, only applied the EU field of observation, introducing minimum physical thresholds on a regional level.

The survey unit for the Census was taken to be an agricultural and livestock holding and an only-livestock

holding without arable land. An agricultural and livestock holding was defined as a single unit, both technically and economically, formed of land, even in non-adjointed plots, and possibly with various types of plant or equipment in which agricultural or livestock activities are performed as a primary or secondary activity by a single management – physical person, company or institution - who bears the risk, either alone, as a farm-holder or a holder with paid labourers or partners, or as part of a partnership. Agricultural holdings are identified in each Municipality, in particular by the land registry showing the farm headquarter or, in the lack of this, by the land registry record into which most of the plots of the agricultural holding's area fall. "Farm headquarter" is taken to mean the complex of buildings situated in the agricultural holding and associated with the agricultural holding's activities. This corresponds to the place where the agricultural holding is managed from.

For all censuses, the survey method is based on the use of "face-to-face" interviews during which the enumerators fill out a paper questionnaire containing multiple choice answers. The main variables include the use of land, livestock, the characteristics of the labour force used on the agricultural holding and the general character of the holding (type of management, legal form, sale of products, etc.).

The 6<sup>th</sup> General agricultural census survey introduced some important new features from an organisational and methodological point of view. The most significant were regarding flexibility in the regional organisational network and the use of administrative sources in constructing the pre-census list and in the data checking and correcting phase. Furthermore, the possibility was introduced for farmers to fill out the questionnaire online and the introduction of an online survey management system.

The time series presented here refer to the figures collected during the five general agricultural census surveys that have not undergone adjustments regarding the values, given that the definitions have remained substantially unvaried over time. With respect to the double survey field introduced in 2000 with the aim of allowing comparisons from different periods, the tables show the figures relating to the so-called "Italian universe", including those holdings that would otherwise have been excluded from the survey in line with Eurostat size thresholds.

## **Agricultural crops**

Up until 1926, when Istat was founded, there was no a national service for agricultural statistics in Italy. Data collected before that year concerned the quantities of product of some crops, but not always the areas.

In 1907, a special office was set up in the Ministry of Agriculture, Industry and Commerce with the aim of setting up a system of agricultural statistics. Such system included a local organisation network with a Commissioner as head of agricultural statistics in each Province. The commissioner was usually the same Director of the "*cattedre ambulanti di agricoltura* (Travelling agricultural authorities)".

This organisation network was used to build up the first agricultural land register in 1909, with the aim of creating a base for new agricultural statistics. At the end of the data collection, the results were published for the following regions: Lombardia, Veneto, Marche, Umbria and Lazio, while the results for the remaining regions were not considered reliable and therefore were never released.

In 1924, the foundation of the Institute of Economics and Agricultural Statistics which took over even agricultural statistics did not improve the situation. Because of such problems, when agricultural statistics were transferred to the Central Statistical Institute in 1927, it was decided to create a general survey to form a reference base for obtaining reliable ongoing statistics and to describe the various aspects of agriculture in Italy – as the 1909 registry was intended. Operations for the second agricultural land registry began in 1929 and were concluded ten years later with the publication of a general report. The responsibility for the survey in each region was entrusted to the Directors of the "*cattedre ambulanti di agricoltura*". The Directors delegated the survey operations to technical staff. In order to achieve absolute conformity in survey operations, precise guidelines were issued for the various phases of the survey along with detailed regulations relating to the definitions and methodology to be used. An area within a municipality of approximately 100 hectares, named section, was adopted as data collection unit. In each section the surveyors verified the productive area (agricultural or forest) and how the area was divided among types of cultivation (arable land, specialised permanent crops, permanent grassland, forests, productive fallow), which in turn were divided into subcategories of types and methods of cultivation. At the same time, normal average production was estimated and even the number of plants for timber cultivation. The analytical results of the survey were published in provincial reports, divided by municipal districts, agricultural areas and zones.

It only became possible to associate ongoing agricultural surveys with the agricultural land registry in 1936, while up to this date the data for area and production were recorded separately for each type of crop or group of crops, and are not therefore comparable. In 1936 annual updating of the distribution of provincial areas by type and method of crop began. At the same time the number of crops covered by the survey was extended, and Provincial agricultural inspectors were asked to formulate forecasts for cereal, grape and olive productions and to provide information regarding the state of crops, the climate performance and parasite attacks.

During the war and in the following years, production estimates were made taking into account information provided by the institutions responsible for governing the use and distribution of food. Therefore it can be presumed that the estimates produced were considerably underestimated. When normality returned, the need for more reliable details on the areas invested in the different types of crop increased. Therefore, in 1950 a new survey was carried out and a series of corrections were introduced concerning the current surveys. An additional analysis on vegetable crops was introduced, a systematic survey of flower growers was begun, and a distinction between the production areas and total area was introduced in the case of permanent crops. The introduction of sampling techniques to estimate the production of some crops is particularly noteworthy, in addition to the usual estimation methods used by Provincial agricultural inspectors. In particular, this method of surveying was adopted in 1952 for wheat, grapes and olives and it was extended to citrus plants in 1954 and almonds and maize in the two following years.

In practical terms the agricultural area was split into agricultural fractions (approximately 230,000) of a dimension of between 90 and 120 hectares, forming a panel from which the sample units (*area sampling* method) were extracted using rigorous statistical methods. For each unit expert evaluations on features of interest were recorded. The sampling design was stratified in each province. The provincial sample size was split among strata using the criteria of improved proportional distribution, i.e. by taking into account the variability of yield within each stratus.

Adequately organised local offices, both in terms of quality and quantity, were responsible for performing the functions indicated above. The organisation included 19 departmental statistics workers, 94 provincial staff and 600 correspondents. The staff in these structures had a high level of professional training and quantity controls were performed jointly by civil servants from the Provincial agricultural inspectors and by Istat. This organisation allowed for the efficient performance of the function until the mid-1960s, with very satisfactory results also for the crops recorded using traditional estimation methods.

The transfer of some of these functions from Agricultural inspectors to Regional authorities, the new criteria adopted by the EU for the definition of primary and secondary areas and the introduction of the concept of intended use of products made it necessary to give up this mixed method and to come back to estimates made using the old criteria, both for the calculation of the areas invested and the harvest. In fact, the new concepts would have entailed in a review of agricultural fractions (for the purposes of reclassifying the normal productivity classes), which was not compatible with the organisational structures available, most of which had to be transferred to Regional authorities. In reality, the devolution of responsibilities from Inspectors to the Regions created serious problems for the surveys based on expert evaluations, because of the reduction in personnel used and their subsequent estrangement from life on the agricultural holdings, and because the conditions of production that changed from the classic rotation scheme to successive crops.

From 1981, the restructuring of the agricultural statistical system required by the EEC included the gradual introduction of a coherent statistics programme to be done using a sampling of holdings and well trained personnel. This personnel was designed to be part of a regional technical-administrative structure that was to ensure the survey was carried out and subsequently it had to submit the data recorded to Istat. Since 1981, Istat was delegated by the Italian government to perform these functions, thereby passing from simply receiving the data for processing and validation, to directly coordinating the restructuring of the surveys, from both a technical-methodological and organisational point of view.

To get around these issues, various initiatives were launched including the introduction of an agreement between Istat, the Ministry of Agriculture and Forestry and the Regions, establishing a programme of surveys based both on samples of holdings and elicitation of experts. Calendars and methods for submitting results to Istat were established. The methods of data collections and data transmission, communicated by post, specified the acquisition of information indicated in a previously agreed calendar before the 10<sup>th</sup> of each month, while the Regional Istat office performed a final control and immediately sent the information to the central office in paper form. Precise and fast reception of the information was necessary to ensure a quick turnaround of results regarding national, provincial, regional and district level

calculations, to be returned to the regions themselves.

Over the years the schedule of the survey had several changes in order to meet EU regulatory requirements (regulation no. 837/90 on cereals and regulation no. 959/93 on non-cereal crops) and national information requirements. Nonetheless, the collaboration among Istat, the Ministry of Agricultural and Forestry Policies and the autonomous Regions and Provinces still represents the cornerstone of the production of agricultural statistics by the National statistical system. Even today, the evaluation by expert method is one of the most widely used survey technique for agricultural areas and crop productions. In fact, data are recorded using monthly estimates supplied by the Provincial agricultural authorities or similar Offices in the autonomous Regions and Provinces. In order to improve the timeliness and quality of the information collected, data capturing techniques have been adopted using Istat's "Indata" portal. The designed software allows for a controlled data acquisition.

Note that data on agricultural area and crop productivity refer to the agricultural year, which begins on 01<sup>st</sup> November and ends on 31<sup>st</sup> October of the following year. For crops which are harvested after the end of the agricultural year, production is attributed to the year in which most of the crop matured. The survey calendar has recently been modified with the approval of new EU regulations (regulation no. 543/2009), to substitute the previous framework (Regulations no. 837/90 and no. 959/93).

Over the last few years, in order to calculate production performance in tobacco, rice and sugar beet sectors, Istat used data provided by the Agricultural Payments Agency (AGEA), the National Rice Institution and the Italian sugar beet growers association (ABSI) respectively. In the last years the "Agrit" survey carried out by Ministry of Agriculture has taken on an essential role. Such survey collects information on areas, yield and production and it is a *point frame sample survey*, i.e. through a direct observation of the land. Because of its quality it can be used to fill in the requirements indicated in EC regulation no. 543/2009.

### *Warnings for time series comparisons*

- In the period between 1877-1909 the production data for "sugar beet" were calculated according to annual national sugar production.
- In the period between 1909-1935 the production data for "chick peas", "peas" and "lentils" were calculated by dividing total production into the same proportions as recorded in the 1929 agricultural registry survey.
- Since 1971 arable land has not included crop tares and areas not used during the course of the year. Arable land lying fallow and kitchen gardens are included.
- Up until 1984 permanent grassland production was expressed as "normal hay" and since 1985 in thousands of fodder units.
- From 1985 to 2003 the total forest area also included the area covered with Mediterranean brush.
- In the period between 1996-1998 the item "watermelons and melons" did not include watermelons.
- Since 1999 cardoons have no longer been included in the item "cardoons, fennel and celery".
- Since 2005 the total forest area have not included other stocked areas.
- Since 2005 the definition of forest has been taken to be that of FAO, which specifies a coverage density of 10 per cent rather than 50 per cent as in the previous definition. Since 2005 other stocked areas have no longer been included.

### **Use of forests**

Forestry statistics are some of the oldest records available. Their evolution is described in detail in the section on [Environment and Energy](#), while here it will simply be noted that when the responsibility for agriculture and forestry statistics passed to the Central Statistical Institute, the survey on fellings areas and the survey on wood and non-wood removals defined forests as areas of land covered in woody forest plants, either trees or bushes, with a density of more than 50 per cent and with a production higher than that of uncultivated areas.

To improve forestry statistics, since 1947 the range of information collected has been increased along with the types of forest. The advantages of more detailed surveys were most noteworthy regarding the use and production of timber, with more details on both tree species and timber assortment.

Before 1947 all industrial roundwood was recorded under one of 16 species, while wood fuel was divided

into conifers and hardwoods species. On the other hand, regarding timber assortment or economic uses for timber wood, an initial division into 22 grades was gradually reduced first to 13 and then more recently to 7, accordingly with international definitions. Wood fuel was divided into firewood, brushwood, carbon and charcoal. Recently, however, all woods for energy use was classed into a single category. Modifications during the Post-war period to the survey technique for timber use adopted the “fellings area” as unit of measurement, classified by several parameters: the type of forest, the category of felling, the rotation, the felling areas and the climate region (agricultural region) associated with the name of the municipality.

Regarding the general and administrative structure of the surveys, the municipality became the territorial survey unit, included in the relevant agricultural area. Forestry authorities were named “Collection and correspondence body”, due to their specific competence in the area and local organisation. These authorities provided collaboration through their provincial offices and dependant local branches (Forest station commands).

In the last decade forestry statistics were revised several times following the transfer of responsibilities from State to Regions, and also to adapt them to the new information requirements demanded both at national and at international level. The body currently responsible for collecting and submitting data is the Regional government with its local offices, where established. The Region performs this task in collaboration with the State Forestry Department and Regional forestry authorities where specific conventions apply.

For statistical purposes, the use of fellings is recorded by the volume of timber separated from the soil, even if not hauled from the forest, as long as it is ultimately destined for hauling. The unit of measurement is formed by the volume of haulable timber from a felling, or the area of forest in which the soil has been totally or partially used, in a seamless manner. With reference to each felling performed within the district of individual municipalities, the survey attempts to determine the volume of fellings, divided by tree species, timber assortment, and type of forest and category of ownership.

#### *Warnings for time series comparisons*

- When drafting the data for this publication, timber assortment of industrial roundwood reclassified into macro-aggregates in order to make them comparable over time. For the same reason, the data relating to wood fuel and carbon were all shown in tons.
- Up until 2004, the definition of forest area required a minimum coverage of 50 per cent. In 2005, however, the coverage requirement was lowered to 10 per cent in compliance with recent international definition, implemented by the “National forest and forest carbon stock inventory” (INFC) conducted by the State Forestry Department.

## **Fertilisers**

The first chemical fertilisers date back to the late 1800s. The use of fertilisers remained modest and limited for a long time, and production increased in terms of both quality and quantity only after World War I, mainly thanks to the development of new processes of fixing nitrogen in the air. Surveys on the use of chemical fertilisers until 1926 served only to find out the quantities produced within the national territory and, in a more informal manner, those traded with other countries. In 1926, however, the national production and use of fertilisers began to take on significant proportions. It therefore became necessary to understand the types and quantities of fertilisers used on a provincial level; however, the problems associated with organising a capillary survey involving all farmers appeared insurmountable. It was therefore decided to gather information in each province on the amount of each fertiliser used by manufacturers and importers, as an acceptable approximation of their actual use.

The first survey in 1927 was conducted by the Central Statistical Institute in collaboration with the National Fascist Federation of Chemical Manufacturers, involving associated manufacturers and distributors, with the Italian Federation of Agricultural Consortiums for cooperative manufacturers, and with individual importers and distributors of fertilisers from abroad. This survey was about: imports of raw materials and chemical fertilisers; deliveries of chemical fertilisers produced in Italy; distribution of both Italian and foreign chemical fertilisers. The survey covered the whole population and was carried out

every six months, while the data also included any amounts left in warehouses<sup>1</sup>. The data relating to the years 1927, 1928 and 1929 were processed by the National Federation of Chemical Manufacturers, which took care of their publication both by calendar year and by survey in a pocket sized booklet entitled “Statistical yearbook of chemical products for agriculture”.

In 1930, the data processing task passed to the Central Statistical Institute, and therefore the series presented here run from 1931. The characteristics of the survey remained almost identical until 1934, when the survey was extended to include the quantity of primary fertilising elements (phosphorus pentoxide, nitrogen, potassium oxide) contained in the chemical fertilisers distributed for use, a fundamentally important factor in establishing the average distribution of these elements in each hectare of fertilisable land. In 1947, after the interruption caused by World War II, the Central Statistical Institute refined the survey and directly performed a census on “deliveries of chemical fertilisers for agricultural use produced in Italy or imported”, including data on the quantity distributed in each province and the fertilising elements contained in the products, without relying on the collaboration of the National Chemical Manufacturers’ Association (which had taken over from the Federations after the war). Until 1949 the Institute took care of sorting the data obtained by province, region and national total and publishing them by semester, solar year and agricultural year. The data were published in the *Monthly bulletin of agricultural and forestry statistics* until 1949. In the following decades, the survey underwent some modifications as a consequence of the new chemical fertilisation practices and of the availability of new products considered to be better.

Today, the survey on the distribution of fertilisers for agricultural use performed by Istat covers the quantity of fertilisers distributed for agricultural use. The fertilisers taken into consideration by the survey are natural or artificial, mineral or organic substances used to provide agricultural crops with one or more chemical fertility elements or modifying and improving the properties and chemical, physical or biological features of agricultural land. The definitions used in the survey correspond with those specified in Law no. 748/84 and subsequent modifications thereto, including Legislative Decree no. 217 dated 29<sup>th</sup> April 2006. The survey on fertilisers is an annual census carried out on all enterprises that distribute these products within Italy using their own or foreign brands. For each fertiliser, the survey records both the quantity of nutrients as set out in current regulations and the contents in nutrients declared by the distributor. The information is collected through self-compiled questionnaires filled in by the enterprises themselves, which then submit them to Istat via post, online or using *web-capturing* services. Enterprises are required to indicate the quantity of both national production and imports of fertilisers for agricultural use distributed annually in each province in tons.

In order to avoid duplicating data, exported fertilisers or those destined for uses other than agricultural are not included. The quantity given to other enterprises, which then sell them in their turn under their own brand (even following additional transformations, mixes, packaging, etc.) are only recorded by the enterprises that purchase them. The survey also includes the quantities produced by consortia, cooperatives, associations, agricultural enterprises or other bodies that distribute them to their own associates, partners, share-farmers, employees, etc. The quantities sold under a different brand from that of the distributor have to be declared only for imported fertilisers. In particular, the quantities of fertiliser sold loose or unpackaged are not recorded, except in the case in which they are sold as such by the distributor.

### *Warnings for time series comparisons*

Thanks to a reclassification of the data, the series presented here are sufficiently coherent over time. Nonetheless, please note the following inconsistencies:

- From 1931 to 1970 the years referred to agricultural consumption year running from 01<sup>st</sup> July to 30<sup>th</sup> June, while from 1971 to 2014 the years referred to the solar year: 01<sup>st</sup> January to 31<sup>st</sup> December.
- From 1931 to 1997 there was no heading for “other nitrates”.
- From 1931 to 1997 the following items were all recorded under “perphosphates”: mineral perphosphate, bone superphosphate and others.

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<sup>1</sup> In 1929, in order to refine the survey results with the information on warehouse stocks, a supplementary survey was attempted in collaboration with the Ministry of Finance and Transport, but with poor results.

- From 1931 to 1997 the following items were included under “other phosphates”: basic slags and powdered phosphates. Since 1998 a single item has been recorded.
- From 1931 to 1997 the following items were aggregated under “other potassics”: raw potassium salts, potassium alum and magnesium alum. Since 1980 a single item has been recorded.
- From 1931 to 1951 no data was recorded on “ternaries”.
- From 1931 to 1984 the item “total compounds” included the total sum of complex binaries, complex ternaries and compounds from blends.
- From 1931 to 2014 the following items were summed under “nitrates”: ammonium nitrate and calcium nitrate.
- From 1951 to 1986 the following items were aggregated under “ternaries”: complex ternaries, blend compounds.
- Data on “potassium nitrates” became available in 1957.
- Since 1986 the item “complex blend compounds” has no longer been included under “ternaries”.
- In 1986 data became available on “potassium phosphates”.
- Since 1987 the item “blend compounds” has no longer been included under “ternaries”.
- In 1998 the following items were summed under “phosphates”: simple and triple perphosphates.

## Quantity of livestock

The first data on the size of livestock became available only shortly before Istat was founded. The need to improve statistical surveys in this area was immediately identified by the institute, which set up a livestock census as early as 1928, which was supposed to be performed every ten years. However, the census was actually implemented in 1930, through a direct survey using a questionnaire to be filled out by the livestock owner. In the following years the results of the census were updated according to the municipal livestock tax and using direct surveys in those Municipalities where the tax was not applied.

Italy's involvement in the World War II led to the need for an annual survey of livestock holdings, and as a result in the years from 1940 to 1943 surveys of the entire population were performed using the same approach as in the 1930 survey, and estimates of livestock holdings relating to the number of animals were exclusively based on administrative data recorded by livestock tax regulation. These data were duly integrated to take account of both attempts at evasion by declaring fewer heads of stock and for those who were exempt from taxation for various reasons.

Following the suppression of the municipal livestock tax, it was no longer possible to carry out the survey using these data. Istat therefore decided to conduct the survey on the size of livestock of certain species (cattle and pigs) using the sample survey method. For technical and organisational reasons, these sample surveys were not performed on the previous annual basis. Therefore, in order not to break the continuity of survey and to meet the need for estimates of holdings even in horses, sheep and goats, the data were also estimated on the basis of the evaluations performed on a local level by Provincial statistics offices with the collaboration of Provincial agricultural inspectors, Provincial veterinary offices and sector associations. Furthermore, it should be noted that the size of livestock holdings was also ascertained in the General agricultural census surveys of 1961 and 1970.

The need to harmonise the surveys in the various Member States of the European Community made it necessary to perform specific surveys in the pigs and cattle sectors. In particular, this harmonisation covered the survey unit and the accuracy and speed of data reporting. Starting in December 1968, in compliance with the requirements established by the EC Council, the survey on livestock holdings in cattle, buffalos, pigs, sheep and goats was performed on a regular basis every four months. Up until the survey of August 1971, a sub-sample of farms was used extracted from the sample of agricultural-livestock holdings used for the 1967 EC survey on the structure of agricultural holdings.

This sample base was revised in the August 1971 survey, using the results of the 2<sup>nd</sup> General agricultural census survey. In the sample design, on a stratified level, it was established that error should not exceed 3 per cent for the entire holding in pigs. This meant that the number of agricultural holdings involved in the survey varied over time from a minimum of 28,000 to a maximum of 38,000, distributed over approximately 5,200 to 6,600 municipalities. Starting in April 1972, a sampling scheme with two stratified levels was introduced, allowing for a considerable reduction in the number of sample municipalities (approximately 1,400) with the same error margin. Furthermore, the December 1974 survey was carried out with a new sample design that used the results of the July 1973 updating of the records for agricultural holdings with 50 or more pigs.

The surveys were performed by collecting data directly from the agricultural holdings. The first cattle survey performed in compliance with EC Directive no. 73/132 dated 15<sup>th</sup> May 1973 was conducted in Italy on 01<sup>st</sup> December 1973. A sample of agricultural-livestock holdings, chosen from those recorded during the 2<sup>nd</sup> General agricultural census survey of 25<sup>th</sup> October 1970, was selected for the annual livestock surveys. Even in this case, data were collected directly from the agricultural holdings.

Currently, livestock surveys (including cattle, buffaloes, pigs, sheep and goats) are still sample surveys but they are carried out twice in a year; the sample is selected among the agricultural holdings located in the national territory. The reference dates for the survey are respectively 01<sup>st</sup> December and 01<sup>st</sup> June each year, and the variable recorded is the number of heads in the farm for each species. Since 2000 the CATI survey technique (Computer assisted telephone interviewing) has been used.

On the other hand, the number of horses held and the quantity of yolk wool produced are gathered using an estimation survey performed with the collaboration of the Chambers of Commerce, which set up expert teams to estimate the data of the livestock sector on a biannual basis. Up until 2006 statistics on the production of silk cocoons was transmitted annually to the competent category association. The quantity of eggs produced is estimated in the frame of National Accounts.

## **Slaughtered livestock**

The first monthly survey of slaughtered livestock performed by Istat dates back to 1939, although some data were collected in previous years in an irregular and non-systematic manner, both due to the enormity of observation field and the lack of suitable survey tools. The field of observation was initially limited to Municipalities with more than 10,000 inhabitants, and the survey was delegated to public and private slaughterhouses and to the Municipal taxation offices. Considering the success of the results obtained, the survey was extended the following year to Municipalities with more than 5,000 inhabitants and those that, although with a lower population, had an important role in monthly slaughtering. In December 1949 instructions were given to the remaining Municipalities (i.e. those with a population of less than 5,000 inhabitants) on how to communicate slaughtering data annually for their respective territories. Lastly, in 1966, the monthly survey was also extended to these Municipalities, using the same methods as those adopted for Municipalities with more than 5,000 inhabitants. Therefore, since this year the statistics on slaughtered livestock have covered the entire population and have been carried out monthly in the Municipalities of the whole country.

Statistical surveys on minor species (poultry, rabbits, etc.) encountered considerably higher difficulties than those indicated for the species above, due to the practical impossibility of identifying and accurately estimating the number of heads. In consideration of the ever-increasing weight of poultry production in the Italian economy and food budget, in 1968 Istat began conducting surveys at artificial incubation plants for eggs, in order to verify the production of chicks for the various species of bird. This survey was of fundamental importance for the acquisition of the base data for calculating the production of poultry meat and eggs for consumption, because farmers now almost exclusively rely on chicks from incubators for their activities.

In the following years the survey improved, supplying useful indications for the creation of a similar survey that has been carried out from 1972 onwards which uses the same methods for all the member States in the EEC. Today, slaughtering statistics for cattle, pigs, sheep, goats and horses are based on monthly records of head slaughtered at authorised slaughterhouses and cover livestock bred either domestically or abroad. The survey is based on samples and has been conducted using CATI since 2002. The survey records both the number of heads of livestock slaughtered and their live weight (at the time of slaughter) and dead weight, as defined for each species by sector regulations. The slaughtering of poultry, rabbits and wild animals are estimated by national Accounting, as the rate of home slaughtering is particularly high for these species.

## **Various animal products**

Reliable statistical information on the production of milk from cows, buffaloes, sheep and goats were almost inexistent up until 1949. For the years before this date, estimates were generally only available on a national level, collected by sector institutions or researchers. In 1949, 1950 and 1951 Istat implemented a complete and systematic survey on milk production, relying on collaboration with the Provincial

agricultural inspectors. The survey base was represented by the checks on the size of dairy livestock and by expert evaluation of the average milk yield by each cow.

In the following years this survey system was abandoned and substituted with the sample survey method. The surveys, limited to cow and buffalo milk, were generally combined with those on the number of cattle heads and buffaloes and the data recorded referred both to the production and the use of milk, either by the farm itself or by third parties. Moreover, Istat also carries out an annual survey on the sterilisation of cow's milk.

Starting with January 1974, in order to harmonise milk and dairy product (butter, cheese, etc.) surveys with the guidelines issued by the EC Council (no. 72/80 dated 31<sup>st</sup> July 1972), Istat launched a wide and articulated programme of periodical surveys in the sector of the collection, production and use of milk. "Special surveys" were also performed in implementation of EC directives, in order to harmonise the surveys in the various Member States. This harmonisation allowed the surveys to be carried out at the same date, using a single survey unit, granting a similar level of reliability among the different countries and the possibility of ensuring the availability of results on pre-established dates.

According to the guidelines, two distinct surveys were carried out in the milk and dairy product sector: the first on the activity of milk collection, processing and transformation, and the second on the production and use of the milk itself within farms. The survey units for the first survey were: a) dairy factories or farms conducting sterilisation and/or milk transformation; b) farms, whose processing or transformation plants are comparable to those used by the factories mentioned above, that process or transform their own milk and sell the resulting dairy products to third parties; c) dairy factories or farms that collect milk and cream and sell them wholly or partially to the units mentioned in point a) without processing or transforming them. The information collected is processed in order to obtain monthly and annual data on the milk yield and the manufacturing of dairy products, the annual overall view of milk use in addition to certain structural data on the survey units.

After a transition period for the development of the technical and executive means, the survey begun in January 1974, involving approximately 4,500 units each month. The wide dispersion of the survey units and the pre-established dates for the data to be made available according to the directive, created considerable technical and organisational problems. Therefore, after the initial period, it became necessary to entrust the data collection from dairy factories and farms to Municipal authorities, which rely on surveyors trained by Municipal offices, while the operations were coordinated by the competent Provincial statistics offices.

The second survey on the production and use of milk in farms was carried out annually together with that on livestock, and covered the same field of observation of the monthly survey. From the early 1990s until 1999 the first of the two surveys was conducted on a monthly basis by the post for all the survey units.

Since 1999 the survey on collected milk and dairy products has been carried out using CATI technique in two separate surveys: a monthly sample survey and an annual census. The annual census of milk and dairy products is conducted by Istat in compliance with European Commission Decision no. 97/80/EC dated 18<sup>th</sup> December 1996 and its subsequent integration no. 288 dated 2005, including regulations implementing Council Directive no. 96/16/EC and no. 2003/107/EC on the statistical surveys to be performed in the milk and dairy product sector. The reference text establishes the list of dairy products to be recorded: raw material collected (cow's milk, sheep's milk, goat's milk and buffalo milk, relating to the national territory, cream, skimmed milk, etc.), fresh products obtained (drinking milk, buttermilk, cream, fermented milk, milk-based drinks, etc.) and products obtained (concentrated milk, butter, cheeses divided by type of milk, etc.), in addition to the percentages of fat and protein. The reference population is represented by all the farms or dairy factories that purchase whole cow's milk directly from farms or collection centres to be transformed into dairy products. The reference period is the solar year.

#### *Warnings for time series comparisons*

- From 1861 to 1920, livestock were referred to 31<sup>st</sup> December. The livestock recorded was of national production: livestock for slaughtering imported alive was therefore excluded, and wool was considered as yolk wool.
- From 1861 to 1920, the data on the milk produced were converted from hectolitres into tons to make them comparable.

## Fishing

Between 1861 and 1946 surveys on the fishing industry were organised by the Directorate-General of Shipping through 23 port authorities. The difficulties encountered caused an underestimation of the quantity of fish landed.

However since 1947 a fairly coherent series of data has been available, providing a complete and sufficiently reliable overview of activities in a sector which is of considerable importance for the Italian economy. Indeed, in that year Istat carried a survey on lagoon and sea fishery products, and in 1949 another survey on the quantity of fish landed by tunny-fishers. These were shortly followed by the survey on fishing in inland waters and by the survey on the sale of fishery products. In 1953 the survey on motor boats equipped for fishing was also carried out, in collaboration with the Ministry of Shipping. Statistics on lagoon and sea fishery products were collected on a monthly basis and took into consideration all the amounts landed with the exception of those from tunny-fishing and ocean fishing, which were part of separate specific surveys. The quantities recorded were from those introduced into the local market, those sent to markets in other areas, and lastly those consumed by the fishermen themselves. The bodies set up to record the data were the wholesale fish markets, fish collection centres, fishermen's cooperatives, Nautical district offices, District shipping offices and Beach harbour authorities. The statistics on fishery products from tunny-fishing was also carried out on a monthly basis. The survey form was filled out by the owners or managers of tunny-fishing boats, while the coordination and control of the survey was entrusted to Port authorities.

The survey on fishery products outside the Mediterranean Sea was designed to collect the data necessary to integrate those on fishing products in the Mediterranean Sea. The data themselves, obtained through records held by the Port authorities, were on the quantities of fish, molluscs and crustaceans fished in the Atlantic Ocean by ships with Italian crew flying the national flag. The survey regarded the same products recorded by the monthly survey on lagoon and sea fishery products and was conducted in 80 centres such as wholesale fish markets, collection centres and fishermen's cooperatives.

The survey of fishery products in the Mediterranean Sea was carried out twice in a year and implemented by Provincial statistics offices which relied on coastal Municipalities for data collection. These offices indicated the data relating to the quantity of fish landed by professional fishermen and amateurs for each lake or artificial reservoir within their territory, together with the overall value of the products, using a specific form. Within the framework of fishing production in inland waters another survey was performed with the aim of ascertaining the amount of equipment and products of trout-farming each year.

At the present time, statistics on lagoon and fishery products are divided by species fished by Italian boats in the Mediterranean Sea or oceanic fishing zones and landed in national territory. Until 2004 the data relating to fishing in the Mediterranean Sea were recorded through an exhaustive survey by Port authorities, which collected the fishery statistics held by all the recording bodies in their area of competence (fishermen's cooperatives, marine compartments, beach harbour authorities, local offices, etc.). In 2005 the survey was completely reorganised and transformed into a sample survey with the methodology dictated by Istat and performed by IREPA (Institute for economic research in fishery and aquaculture). The survey is now based on CAPI (Computer assisted personal interviewing) techniques, i.e. conducted by interview with responses recorded alive by computer. The survey is carried out using a sample of fishing boats enrolled on the registry of fishing licences granted by the Ministry of Agricultural and Forestry Policies.

Fishery production in oceanic waters is drawn from an exhaustive survey, carried out by Istat, on ships flying the Italian flag authorised to perform sea fishing activities in oceanic waters. The survey on the number and main features of motor boats equipped for fishing, realised until 1994, was based on the updating of a special archive set up at Istat. The updating of this archive was done in agreement with the Ministry of Shipping. The data required in the survey form covered the main characteristics of the boat and its engine, the type of fuel used, the auxiliary equipment for navigation and fishing, the type of fishing performed, the equipment for preserving fishing products and the number of crew. The form was filled out by the Commanders of the nautical offices, who then submitted a copy to Istat and one to the Ministry of Shipping.

### *Warnings for time series comparisons*

- Data on the quantity of fish landed were recorded from 1933 to 1936 and from 1947 onwards; on

the other hand, for the years from 1888 to 1916 and from 1926 to 1927, only the production value was recorded. The amount of fishery products relating to these periods was obtained by dividing each value by the average price for the corresponding year, calculated according to the parallel relationship between the performance of the price of certain products and that of the prices of fishery products.

- For the periods in which no records were kept, data were interpolated taking into account the information drawn from publications of the time.
- As no data were kept regarding the number of fishing boats for the years 1861 to 1870, 1879, from 1917 to 1924 and from 1941 to 1946, these data were also calculated by interpolation.