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The present state of agricultural statistics in developed countries: situation and challenges

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1.1 Introduction

Agricultural statistics in the UN Economic Commission for Europe (UNECE) region are well advanced. Information collected by farm structure surveys on the characteristics of farms, farmers' households and holdings is for example combined with a variety of information on the production of animal products, crops, etc. Agricultural accounts are produced on a regular basis and a large variety of indicators on agri-economic issues is available. At the level of the European Union as a whole the harmonization – forced by a stringent regulatory framework – of the collection, validation and analysis of agricultural information has led to a settled system of statistics. Recent developments in methodologies for data collection (e.g. using hand-held computers, registers and administrative sources, advanced sampling techniques and remote sensing) are shaking up the development of agricultural statistics. There is a lack of uniformity in the pace at which different countries in the UNECE region are introducing new methodologies and techniques. The need to reduce the burden on farmers and to organize the collection and analysis of data more efficiently creates a set of challenges for the countries.

This chapter covers the situation for the majority of UNECE countries. At the time of writing the UNECE comprises the whole of Europe as well as the USA, Canada, New Zealand, Australia and Brazil. The work of Eurostat (the statistical office of the EU) covers in full the 27 member states and the four countries of the European Free Trade Association. The requirement for the acceding and pre-accessing countries to comply with the regulations at the moment of accession means that the western Balkan countries and Turkey are still developing their standards; in these countries the situation in both agriculture and agricultural statistics is more traditional, and at different stages en route to the EU model. For the EU's other neighbours in Europe, the model is more based on the Commonwealth of Independent States (CIS) approach to statistics, but also strongly harmonized and converging to the EU model. The contribution of the USA can be considered partly valid for Canada, Australia and New Zealand. Nevertheless, especially for these countries, some specific circumstances might not be fully covered. Finally, the situation in Brazil is that of a specific country with a strong development in new technologies for statistics and a very specific agricultural situation.

The term 'agricultural statistics' is here taken to include statistics on forestry and fisheries. It implicitly also includes statistics on trade in agricultural products (including forest and fishery products) as well as issues related to food safety. The definition of agricultural statistics is based on three conditions, all of which have to be met. In this definition, agriculture consists of the use of land, the culture of a living organism through more than one life cycle, and ownership. Land is used for many purposes, ranging from mining to recreation. Agricultural land supports the culture of living organisms and their ownership. This separates aquaculture from capture fishing and tree farming from forestry. Agriculture includes the management of water, the feeding and raising of organisms through several growth stages. Tree farming includes the management of the soil, fertilization, and pest management as the trees or other ornamental plants are raised through various stages of growth. In both cases, farmers can choose to use the land for other purposes than aquaculture or raising tree crops.

The raising of awareness of the effects of globalization and the impact of climate change have led in the UNECE region to a greater understanding by statisticians as well as the politicians of the need to analyse different societal developments in relation to each other rather than in isolation. However, the interrelatedness of agriculture with, for example, land use and rural development, and also with environmental sustainability and overall well-being, is considered to be not yet fully reflected in available statistical information.

Agriculture in the UNECE region is in general characterized by the use of highly advanced technologies. Machinery, new production methods, fertilizers, pesticides and all kinds of supporting instruments have created a sector that is more businesslike than some traditional primary industries. At the same time, the recent emphasis on sustainability, environmental protection and ownership has led to more attention being given to the important role of rural areas. The increased use of modern technologies and the increase of scale has created a farming sector with relatively strong relations to other sectors of society, both at the level of the sector as a whole as well as at the level of individual farmers and their households, for example, with regard to employment and time use. The

paradox of increased efficiency on the one hand and more emphasis on sustainability and environmental protection on the other is considered one of the main challenges for current agricultural statistics that justifies a reflection on their future.

The burden on farmers and decreasing response rates have forced the statistical institutes and other agricultural data collectors to enhance their efforts to deploy new data collection techniques and to make more use of other types of information, for example, from administrative sources. Growth in the availability of advanced IT tools for data collection, analysis and dissemination techniques is also forcing the statistical institutes to review the methodologies applied in agricultural statistics. Furthermore, the pressure to lower the administrative burden by simplifying regulations in agricultural statistics has created an emphasis on changes in the fundamental legal and methodological bases for agricultural statistics.

The enlargement of the EU in 2004 and 2007 and enhanced cooperation with future acceding countries and other neighbouring countries has visibly increased the impact of decisions on the organization and content of agricultural statistics in the EU. The greater variety in crops and methods demands a review of the existing statistics, specifically in the EU context.

In agricultural statistics in the UNECE region, the number of international and supranational organizations involved is currently quite limited. In the UNECE context, only the Food and Agriculture Organization (FAO) in Rome and Eurostat in Luxembourg play a role of any significance. The UNECE secretariat in Geneva and the Organisation for Economic Co-operation and Development (OECD) in Paris are no longer heavily involved. At a global level, the number of organizations involved is also very limited, this being the main reason for the decision of the UN Security Council in 2006 to close down the Inter-Secretariat Working Group on Agricultural Statistics. Both in Northern America and in Europe, however, there are many other organizations outside statistics involved in agricultural statistics and information. Traditionally, many of the agricultural organizations as well as the agricultural ministries are involved – as part of, for example, the Common Agricultural Policy – in collecting and using information on agriculture. This chapter has been written from the viewpoint of the national statistical offices, related governmental bodies as well the international and supranational organizations mentioned above. However, for a complete overview of ongoing work in agricultural statistics, this has to be complemented with information from other international and branch organizations.

The chapter is structured as follows. In Section 1.2 the current state and political and methodological context of agricultural statistics in the UNECE region is described. The main items discussed are the infrastructure for agricultural statistics, the information systems for collecting structural information, the statistics on production, the monetary elements, the added value in the production of agricultural statistics, other important sources, the relations with other statistics and the use of administrative data. Fishery and forestry statistics are also briefly discussed. In Section 1.3 governance and horizontal issues are discussed in more detail. In Section 1.4 some developments in the demand for agricultural statistics and some challenges are discussed. Finally, Section 1.5 focuses on the main recommendations for agricultural statistics in the UNECE region, regarding both content and governance.

1.2 Current state and political and methodological context

1.2.1 General

Agricultural statistics in the UNECE region have a long history at national level, especially in the European Union. The harmonized and integrated European system has evolved over the past five decades into a sophisticated and effective system. The priority attached to agricultural statistics in earlier years (especially from the middle of the last century till the early 1990s) reflected the need for this statistical information for the implementation and evaluation of the agreed Common Agricultural Policy¹ (and later also the Common Fisheries Policy) and the share of agriculture in the economy, employment and land use, both in EU and in national budgets. Nevertheless, resources for agricultural statistics have for the last decade or so been constant or diminishing and, compared to other areas of statistical development and innovations in agricultural statistics, are rather limited, thus also showing that resources have been shrinking. As a result, in many countries the current priority of this domain of statistics does not reflect the attention it deserves, considering the important position it has meanwhile assumed, for example, in the conservation of nature and the impact of climate change. Only in the last few years has an increase in attention become apparent, mainly as a result of the recognition of the important relation agriculture has with environmental issues such as climate change and the emphasis on developments in small areas.

In recent years, several initiatives have been taken to review the effectiveness of the current system of agricultural statistics, especially in the EU. This is partly the result of the emphasis on better regulations but also a direct result of changes in the Common Agricultural Policy, shifting its main objectives from purely directing the market to a position where developments are followed more indirectly. As agricultural and rural development support mechanisms have also been changed, instruments to monitor developments also need to be renewed. A set of recommendations on renewing agricultural statistics were developed in 2004. Part of these initiatives related to restructuring, and part related to simplification.

The developments described are in principle valid for the whole of the UNECE region. However, the regions in Europe outside the EU and the (pre-)accessing countries are still characterized by different degrees of a more traditional set of agricultural statistics. The main differences and changes that can be observed between the different systems relate to the main lines of resolution – geographical, temporal and subject-oriented resolution for agricultural statistics.

For the CIS countries there is clearly a general understanding of the need for further improvement of agricultural statistics on the basis of the international standards. It should be emphasized that agriculture statistics in the CIS countries have undergone significant changes since the inception of the CIS in 1993. The changes in statistics reflect to a considerable extent the transformation of centrally planned economies into market-oriented economies in all economic sectors, especially agriculture. As a result of

¹ The creation of a Common Agricultural Policy was proposed in 1960 by the European Commission. It followed the signing of the Treaty of Rome in 1957, which established the Common Market. The six member states were individually responsible for their own agricultural sectors, in particular with regard to what was produced, maintaining prices for goods and how farming was organized. This intervention posed an obstacle to free trade in goods while the rules continued to differ from state to state, since freedom of trade would interfere with the intervention policies.

economic reforms in agriculture a number of large agricultural enterprises (with state or collective ownership) were liquidated and significant number of small and medium size private enterprises and farms were created in their place. This development resulted in considerable problems with the collection of primary data needed for compilation of agricultural statistics relating to various aspects of economic process in this sector of economy. Under these conditions a system of sample surveys had to be introduced in order to obtain data on the activities of numerous small private farms and personal plots of households which were to supplement the data from the reports submitted to statistical authorities by agricultural organizations (relatively large enterprises with different type of ownership).

An example of this transition in the CIS countries is the transition from the Material Product System (MPS) to the System of National Accounts (SNA). This transition required the introduction of new concepts of output and intermediate consumption in order to ensure compilation of production accounts for agriculture consistent with the SNA requirements. The CIS countries were assisted in this endeavour by CIS-STAT in the context of more general work associated with the implementation of SNA 1993 by the CIS countries. The issue which requires attention in this context is the treatment of work in progress as prescribed in the SNA, treatment of different types of subsidies, and adjustment of figures on seasonality. Using the above concepts in practice required considerable work associated with collection of primary data both on output and input and achieving consistency of the estimates based on the data from different sources. Recall that in the former USSR an essential element of agricultural statistics used for compilation of the most important tables of the MPS was a wide and detailed system of supply and use tables compiled for major groupings of agricultural products (both in physical and value terms) by the major types of agricultural enterprises (state farms, collective farms, personal plots of members of collective farms, personal plots of employees, etc.). Data from this system of tables were used for computation of agricultural output, major elements of input and some items of disposition of agricultural goods (final consumption, increase in stocks, etc.). Unfortunately, during the market economy transition this system of tables was considerably reduced and the structure of tables was simplified. As a result agricultural statisticians face serious problems associated with provision of data for compilation of major SNA accounts in strict compliance with the adopted definitions and classifications. For example, the structure of supply and use tables currently used by many CIS countries does not make it possible to isolate the consumption from own production which is to be valued in basic prices as the SNA requires.

In the rest of this section, the developments in agricultural statistics are described along the lines of the main statistical infrastructures available. The emphasis is on the national statistical institutes as the data providers, or, in the context of North America, on the National Agricultural Statistics Service (NASS) and United States Department of Agriculture (USDA). In many countries, however, in this domain there is a range of other governmental organizations collecting information on farms and the farming industry, for administrative reasons but also for statistical purposes. The situation in the USA is a strong example of such wide involvement. While the NASS collects agricultural data primarily through direct contact with farmers or farm-related businesses, other parts of the US government also provide statistics relevant to American agriculture. The Census Bureau collects international trade statistics for all products and works with the USDA to develop relevant product definitions for food and agriculture. The Agricultural Marketing Service

collects market prices for a wide range of agricultural products. The Natural Resource and Conservation Service collects statistics on land use, soil quality and other environmental indicators. The Economic Research Service (ERS) in the USDA has worked with the Census Bureau and the Department of Health and Human Services to add modules to surveys of consumer behaviour and health status to support economic analysis of food security and food choices. ERS has also purchased private data to support research into and analysis of consumer food choices.

1.2.2 Specific agricultural statistics in the UNECE region

The description in this section is restricted mainly to those sources that are managed by the statistical offices. Administrative use of farm data, especially for the bookkeeping of subsidies, premiums, etc., is an important issue in this basic and essential sector for society. These sources are very different in the countries concerned and require a different approach. For reasons of simplicity, only those that are reflected at the regional level are discussed. A more detailed analysis in future should be used to shed light on the still relatively many undeveloped possibilities for integrating these other sources into the compilation of official agricultural statistics. Such an endeavour might fit very well with the aim of making as much use as possible of existing data sources.

Another issue which is difficult to avoid touching on in a discussion on agricultural statistics is the traditional relations with trade and customs statistics – food and agricultural products being very strongly related to agricultural production and for many countries and regions an important source for indirect income via taxes and levies. In this chapter this issue will only receive very brief attention.

Farm register

The availability of an up-to-date register of farms and farm holdings is considered an important feature of a good infrastructure for agricultural statistics in developed countries and is seen as the basis for a coherent system and also, if coordinated with national business registers, a tool contributing to the integration of agricultural information with that of other sectors. The fact that farm registers are often not included in business registers, or are kept separately, poses problems when constructing the sample frames for the surveys. The European Union has experienced technical and coordination problems with updating EU-level farm registers and protection of individual data. Several of the countries in the UNECE region, in relation to the agricultural census, have developed a farm register. A farm register provides a basic tool as a frame for sampling and, provided that appropriate information is included, it may permit effective sample design with stratification by size, type and location. It could also call into question the cost-effectiveness of full agricultural censuses. However, the coverage of a farm register should be carefully analysed, otherwise the costs for keeping it up to date could be too high. A possibility would be to improve household statistics to contain data on subsistence farming, i.e. small farm holdings not producing for the market, but merely or mainly for their own consumption.

Most recent experiences show that the overall support for such a register at EU level – preparing the way for EU sampling and EU surveys – is not yet sufficient. This way of substantially reducing the burden and allowing a linking of sources has until now been possible only in a limited number of countries. The development of farm

registers with at least a minimum of common coverage (e.g. containing only the market-oriented farms as described above) could be regarded as an ideal situation and as an effective response to the future. In the EU, it is not (yet) possible to discuss a regulation including farm registers because of specificities in the agricultural statistical systems of the member states. The fact that a common approach to farm registers is not yet possible can be considered a serious problem but also one of the most important challenges for further development, especially given the need for effectiveness and the desire to reduce the burden on farmers. For future strategic planning in this domain, an overview of the countries that have and those that do not have a farm register would be useful. Where a farm register is available its characteristics should be described, and when no farm register is available an indication should be given of alternatives on which the census of agriculture is based.

Farm structure surveys

The farm structure survey (FSS) is considered in UNECE countries to be the backbone of the agricultural statistics system. Together with agricultural censuses, FSSs make it possible to undertake policy and economic analysis at a detailed geographical level. This type of analysis at regular time intervals is considered essential. In the EU, several simplifications have been made in recent years. From 2010 the frequency of FSSs will be reduced from every two to every three years. The decennial agricultural census carried out within the FAO framework will take place in most UNECE countries by 2010. Furthermore, not all the variables are subject to detailed geographical or temporal analysis. This allows the regular FSSs to focus on a set of core variables and to be combined with specific modules with less geographical detail and eventually more subject detail. In the coming years, such a system with a base FSS and a set of specific modules on, for example, use of fertilizers and production methods will be developed. This method is considered to deliver an important contribution to reducing the response burden. In opposition to this development, however, is the increased pressure to add new variables and items to the questionnaire. These new demands stem from the new developments mentioned above – production methods, water usage, etc.

For the EU countries, the design and basis content of the FSS is regulated by European law. For many member states, the survey instrument is an ideal tool to which can be added some country-specific questions. This so-called ‘gold plating’ is a topic in many of the discussions on the burden of statistics, but also an issue that implicitly generates a more effective use of the survey instrument. In light of this, further extensions of the scope of surveys are in principle not recommended. Furthermore, decision-makers should be informed on the substantial costs of agricultural surveys, especially when no administrative data are available.

In Brazil, the situation is in principle similar but in its implementation is more advanced than in the EU. The integration of the National Address List for Statistical Purposes with the Registers of the Census of Agriculture has allowed the Brazilian Institute of Geography and Statistics (IBGE) to construct the first list frame of productive units in completely computerized form. This list will gather data on all of the country’s 5.2 million agricultural producers, with their respective geographical coordinates. On the other hand, the rural area which encompasses all the sectors surveyed by the Census of Agriculture will form the Area Frame including all the information surveyed. Both

list and area frame will be able to function as a source for the selection of the agricultural holdings to be researched by agricultural surveys based on probability sampling. These surveys, combined with the current surveys, will make up the National Brazilian Agriculture Statistics System which is presently being developed.

An issue that has recently attracted much discussion in the context of the new EU Farm Structure Survey Regulation and of the preparations for the new regulations on crops and on meat and livestock is the reference to geographic entities. From the descriptions above – and also from knowledge of the Brazilian and US situation – it is clear that there is increased demand for small-area estimates and for data that allow the description of land use and rural development on a small scale. Such detail is also required especially for agri-environmental indicators. Geocoding or the reference to small geographical entities is, however, an issue that is discussed with respect to both confidentiality and increased burden.

The FSS in the EU is in the census years upgraded to cover all farms and holdings. For the EU and most of its neighboring countries this will be held in 2010. For example, in Armenia, Belarus, Moldova, Tajikistan, Turkmenistan, Uzbekistan and Ukraine the agricultural censuses are intended to be carried out in the foreseeable future. In recent years a number of CIS countries have already carried out agricultural censuses: Kyrgyzstan in 2002, Georgia in 2004, Azerbaijan in 2005, Kazakhstan in 2006, and Russia in 2006. As a result of these censuses valuable information on the state and development of agriculture (both nationally and regionally) was obtained. For example, data on a number of agricultural enterprises were updated and can be used for planning and organizing different sample surveys.

Farm typology

In the EU, closely related to the farm structure surveys is the management of the community farm typology. This typology plays an important role in the classification of holdings by economic size and type. It functions as a bridge between the Farm Accounts Data Network and the farm structure surveys. Recently this typology has been updated to better take into account the recent changes in the Common Agricultural Policy to decoupled support.

Farm Accounts Data Network

The Farm Accounts Data Network (FADN) is a specific EU instrument, developed and managed by the Directorate-General for Agriculture. The FADN is an important source for micro-economic data relating to commercial holdings. For purposes of aggregation, the FADN sample results are linked to population results derived from the FSS using groupings based on the community typology. The creation of unique identifiers in the context of the agricultural register would enhance this linkage and, if privacy and confidentiality concerns could be dealt with satisfactorily, would permit more complex analysis, at least if the FADN were a subsample of the FSSs. The current status of confidentiality in both the FSS and the FADN does not, however, allow the combination of these two very rich surveys.

For the USA, a similar situation obtains for the Agricultural Resource Management Survey (ARMS). Policy issues facing agriculture have also become increasingly complex in the USA. In the past 20 years, government support for farmers has changed from being

based primarily on supporting market prices to policies that include direct payments to farmers, government support for crop and revenue insurance, payments for environmental practices on working farm lands, and payments for not farming environmentally sensitive land. Increasingly complex agricultural policies require new types of data and at lower geographical scales. For example, land conservation programmes require information about land qualities or services provided as well as the value of alternative uses of land. In the USA, statistics on rental rates have been mandated in the recent Farm Bill for very small geographical areas. In addition, government support for risk management requires information to determine farmers' eligibility for insurance payments. The types of statistics required to support economic analysis of the new suite of farm programmes extend beyond those required for programme management. Farmers participate voluntarily in US government programmes, and data required to analyse the effects of programmes start with information that affects programme participation, including participation in off-farm employment and demographic characteristics. Other information needs include statistics on production decisions, technology choices, and farm financial outcomes. The ARMS provides the main source of farm business and farm finance data for US agriculture and is jointly conducted by the NASS and ERS. ARMS data support indicators of farm sector health such as income and expenditures. Equally important, the micro-data from the ARMS serves as the basis for research on programme outcomes, including informing ongoing international policy debates about the degree to which different types of payments are linked to distortions in agricultural markets.

Area frame sampling

A recent and very important development in agricultural statistics is the use of remote sensing and aerial photographs in combination with in-situ observations. In the UNECE region, these methods for collecting information on rural areas have developed into a strong pillar of agricultural and land use statistics. Similar examples from USDA and IBGE illustrate this. The Land Use and Cover by Area Frame Sampling (LUCAS) survey of the EU is conceived as an area-based sample, designed to provide timely estimates of the area of the principal crops with high precision and a relatively low level of geographical resolution with the advantage of a low response burden. Nevertheless for small or very heterogeneous countries the reduction of response burden by using LUCAS or other EU sample surveys could be smaller than expected, as they might need to be completed in order to have any usefulness at national level. The LUCAS survey has demonstrated its usefulness and versatility. In the recent past, several LUCAS surveys have been carried out and analysed as a set of pilot studies and the next survey, covering all EU member states, will be carried out in 2009.

The continuation of LUCAS is currently under consideration. For its original objective of calculating early estimates of cultivated areas, the LUCAS surveys had to compete with the more structural inventories, perhaps not with more geographical detail but with an expected higher level of accuracy as these are based on farmers' detailed information about their own parcels. Based on the evaluation of the potential use of LUCAS, a wider use of this survey is foreseen, not solely serving agriculture and changes in land use but focusing more on non-agricultural applications, such as environmental (soil, land use and ecosystem) issues. The possibility of combining aerial interpretation with georeferencing and observations on the spot allows the combined analysis of data on agriculture, environment, and more general land use issues. The use of a fixed sample,

with observation points stable over more than one survey period, allows the construction of panel data and monitoring of important developments in land use to a high level of statistical significance.

As the EU Common Agricultural Policy has changed over the years, funding has focused more on developing rural areas than on price support for farmers. In order to monitor the changes, rural development statistics are needed. These statistics are related not only to agriculture, but to all entrepreneurial activities in rural areas, as well as other socio-economic issues. However, as there are several methods used to define rurality, the problem has been to decide the regional level at which the data should be collected. The solution chosen so far has been to collect the data at the lowest available regional level, and then to flag these regions/districts as rural, semi-urban or urban, depending on the methodology chosen for the analysis at hand.

An issue deserving special mention in the context of rural development is the work of the Wye Group. This group prepared the handbook on *Rural Households' Livelihood and Well-Being* (United Nations, 2007) which gives an excellent overview of possible statistics on rural households.

The statistics described above are based on surveys on a more ad hoc basis or on regularly collected financial data based on farmers' administrative obligations. However, most of the agricultural statistics are not based on ad hoc surveys but on a very well-established and traditionally organized system of counting on a regular basis the stocks and changes thereto as well as the number of transactions (transport and slaughter) and specific points in the chain from crop and product to food. Statistics on meat and live-stock, and on milk and crops, are examples characterized by a high frequency of data collection. Statistics on vineyards and orchards are normally collected less frequently. Most countries have seen an increased use of information technology in the reporting by farmers and from farmers to the statistical institutes. Automated systems support the modern farmer in monitoring the milk yield per cow, the food consumption of the animals, the use of specific extra nutrition, pesticides and fertilizers but also the use of water. EU member states' statistical collection systems and also those of the other countries in the region are increasingly based on the use of internet and related systems to collect this regular information from the farms and holdings. However, this situation is by no means universal. The use of ad hoc surveys is also still considered an important instrument for collecting regular information on the flows in the production cycle. These statistics are now briefly described with reference mainly to the situation in the EU.

Meat, livestock and egg statistics

These traditional animal and poultry product statistics – resulting from traditional regular livestock surveys as well as meat, milk and eggs statistics – still play a key role in the design, implementation and monitoring of the EU Common Agricultural Policy and also contribute to ensuring food and feed safety in the EU. European statistics on animals and animal products are regulated by specific EU legislation. Member states are obliged to send monthly, annual and multi-annual data to the European Commission within pre-defined deadlines. In addition, for several meat products and eggs, the supply balance sheets provide the major type of resources and uses.

The first chronological animal data series in the EU were created for bovine animals in 1959, followed by series for sheep and goats in 1960, monthly meat production in 1964 and pigs and livestock in 1969. The statistical system was progressively improved

and enlarged, and now Eurostat receives statistical information from the 27 member states broken down into roughly over 700 individual values per country, some of which are multiplied by 12 for monthly data or by 4 or 2 for quarterly and half-yearly data, respectively.

For these traditional statistics, recent years have witnessed a substantial effort on both the methodology applied by the countries and the improvement of the procedures for data transmission, in particular by using standard formats in the telecommunication net. For example, to achieve this goal, the EU's new eDAMIS²/Web Forms application has to considerably improve the data transmission from the member states to Eurostat and has allowed for an improvement not only of work efficiency but also of efficacy for both Eurostat and EU member states. As a result, data quality has improved in parallel with the simplification of data treatment operations.

Milk statistics

Milk statistics relate to milk produced by cows, ewes, goats and buffaloes. For the EU they are concerned with milk collected by dairies (monthly and annually) at national and regional level, milk produced in agricultural holdings (farms), the protein content and the supply balance sheets. Triennial statistics provide information on the structure of the dairies. Data collection and pre-validation are carried out through, for example, the use of the Web Forms system which ensures the management of deadlines and monitors the data traffic.

Statistics on crop production

The traditional statistics on crop production correspond in general to four families of data. First, the Early Estimates for Crop Products (EECP) provide, for cereals and certain other crops, data on area, yield and production before the harvest. Second, the current crop statistics provide at national level, for a given product, the area, yield and production harvested during the crop year. For some products data are requested at regional level. Third, the supply balance sheets give, for a product or group of products, the major type of resources and uses. Finally, the structural data for vineyards and orchards and the inter-annual changes for vines of wine grape varieties give information about age, density and variety of the different species. Crop product statistics cover cereal production, products deriving from field crops, fruits and vegetables, and the supply balance sheets for a large number of crop products. They also include two specialized surveys: one on vineyards with a basic survey every 10 years and an annual one to monitor changes that have occurred; and another one on fruit tree plantations every 5 years.

In the USA, NASS collects and publishes, based on annual or monthly surveys, data on crop production, livestock inventories, livestock products, farm finances, sector demographics, chemical usage, and other key industry information. In contrast to statistical programmes in other countries, government statistical agencies in the USA are focused specifically on data needs relative to the agency, department or cabinet area in which they reside.

Eurostat transmits to EU member states the forecasts (for the current year) of the Eurostat Agromet model (obtained by extrapolation of the statistical trend) for area, yield

² Electronic Data Files Administration and Management Information System.

and production. From February to October, the member states react to these proposed data and transmit their own new estimates back to Eurostat. The objective is to obtain data on area and production for the main crops before the harvest. The EECP is one of the main inputs used by the Directorate-General for Agriculture for its short-term forecasts and analysis of the agricultural markets on the commodities considered.

Vineyards

Surveys on vineyards are intended to collect information on vines and wine production in the EU member states at different geographic levels (nationally and regionally) and over time. Thus, they provide basic information to enable evaluation of the economy of the sector at production level and, in particular, they permit evaluation and measurement of the impact of the implementation of the common market organization for wine. Member states on whose territory the total area of vines cultivated in the open air is more than 500 hectares have to do a survey on these areas. They have to conduct their surveys within a fixed time-frame and have to ensure high-quality results. The scope of the basic survey is the area under vines, while the survey unit is the agricultural holding. In the case of the intermediate survey, only areas under vines for wine are surveyed.

Survey on plantations of certain species of fruit trees

Basic surveys (apple, pear, peach, apricot, orange, lemon and small-fruited citrus trees) are carried out in the EU every five years, to determine the production potential of plantations from which fruit produced is intended for the market. Data are collected on the areas under fruit trees broken down by region (production zone), species, variety, density (number of trees/ha) and age of the trees.

The chronological crop data series start with data from the early 1960s. The statistical system has been progressively improved and enlarged, and now Eurostat receives and publishes harmonized statistical information from the 27 member states broken down into several thousand individual values per country, some of which are multiplied by several (1 to 8) waves for the different updates taking place every year. As for meat and livestock statistics and animal products, a substantial effort has also been made in this area to improve the methodology applied by the member states and candidate countries, as well as the procedures for data transmission, in particular by using standard formats and electronic data transmission.

Although validation procedures have recently improved, mainly because they were introduced into the data treatment process, there is still considerable room for further improvement, especially in advanced validation.

Agricultural monetary statistics

Collection and validation of these include the economic accounts for agriculture and forestry, the agricultural labour input statistics, and the agricultural price in absolute terms and in indices. The agricultural accounts data at the national level are regulated by legislation which prescribes the methodological concepts and definitions as well as data delivery. The accounts data at regional level and the agricultural price statistics are transmitted on the basis of gentlemen's agreements. Data for agricultural accounts are provided annually, while price statistics are transmitted by the EU member states on

a quarterly and annual basis. In the CIS countries, due to a considerable reduction in the number of supply-and-use tables and the simplification of their structure, there are problems with the integration of agricultural statistics with national accounts.

Fisheries statistics

The programme of fisheries statistics in the EU provides statistical information on fisheries needed for the management of the Common Fisheries Policy. The programme comprises the following elements: catch statistics, landing statistics, aquaculture production statistics, supply balance sheets for fisheries products, fishing fleet statistics, employment statistics, socio-economic data, and structural and sustainability indicators. The programme of work is designed primarily to provide statistical support for the management of the Common Fisheries Policy and to meet the EU's commitments to international bodies of which the EU is a contracting party. Apart from meeting numerous ad hoc requests for data from EU institutions, national and international organizations, and public and private organizations and individuals, Eurostat meets routine requests for data from the FAO: fishing fleet statistics, thereby removing the obligation of EU member states, the Northwest Atlantic Fisheries Organisation and other regional international organizations to supply data; catch statistics to meet the EU's obligations as a contracting party of these organizations and the International Council for the Exploration of the Sea (ICES); and catch statistics, under the terms of the Eurostat/ICES Partnership Agreement.

For the EU region Eurostat is planning a redesign of the fisheries statistical database. The new design moves away from a global system of management of fisheries statistics to a system which is more focused on the needs expressed by users and of higher quality. With revised needs and uses for fisheries statistics and fewer resources available, there is a need for a more efficient and higher-quality data environment and a decrease in the workload for data providers. An important consideration for this redesign is a decrease in the overlap of data systems with those of other international organizations, such as the FAO.

Forestry statistics

The Forest Action Programme of the European Communities, adopted in 1989, and more specifically Regulation (EEC) No. 1615/89 establishing a European Forestry Information and Communication System, are the basis for the collection of EU forestry statistics, not only on the present situation of woodlands and their structure and the production and consumption of wood, but also on developments in the afforestation of agricultural land, the forestry situation in the various regions of the Community, and the exploitation, processing and marketing of forest products.

Cooperation between Eurostat, the Directorate-General for Agriculture, UNECE, FAO and the International Tropical Timber Organisation (ITTO) take places through the Inter-Secretariat Working Group on Forest Sector Statistics (IWG), in which the OECD also initially participated.³ The aim of the IWG is the optimization of the use of scarce resources, so that each piece of information is collected only once from each country and there would be only one entry for each transaction in all the international data sets. Together, the partners created the Joint Forest Sector Questionnaire (JFSQ) and its harmonized definitions in 1999. For each country, the JFSQ produces core data on

³ Eurostat document 'IWG Mandate Jan 1996' of 20 October 2003.

harvesting of roundwood from the forest (by type of wood), production and overall trade of primary wood products (by quantity and value), and overall trade in secondary processed wood and paper products (by value). These production data are very reliable when available directly from the countries. When not available, they are estimated from (as a minimum) export figures (which is unsatisfactory) or from other sources, such as industrial associations, company news on the Internet (which is very time-consuming). Agreement must be obtained from the country's correspondent to be able to publish the estimates.

As a consequence of enterprises reducing activities in some countries and/or enterprise mergers, some of the production data can no longer be reported due to confidentiality rules. It would be possible to produce different kinds of aggregates if countries could be persuaded to supply the relevant confidential data.

Some countries are experiencing difficulty in obtaining data on wood produced in private forests, so the total for those countries may be considerably underestimated. Another source of underestimation is likely to be the non-reporting of household use of roundwood or the direct sale of wood by forest owners to private households, mainly for heating purposes. It is clear that the reliability of the data produced could be improved by wood balances for each member state and the EU as a whole, as was shown by the recent Joint Wood Energy Enquiry of UNECE.⁴ Such data would also be a valuable source of information for energy statistics.

Data on trade has declined in quality ever since the introduction of simplified customs procedures for intra-EU trade in 1993. From then on, data was collected directly from companies, and threshold values-below which nothing has to be reported-were applied. As of 2006, further simplification allows Member States to drop the net mass of a product if a supplementary unit of measurement is reported. Several Member States have chosen to apply this option. As of 2008, only dispatches are foreseen to be reported, doing away with the data on arrivals. The possibilities for cross-checking anything are rapidly diminishing.

Integrated Environmental and Economic Accounting for Forests uses an exhaustive questionnaire. Data have been collected once as a test and a second time in 2007. The proposal is therefore to further simplify the questionnaire and to collect these data every 5 years, which would be adequate for the slow rate of change in forestry. The purely economic data for forestry and logging (output, intermediate consumption, net value added, entrepreneurial income, labour input, etc.) covered in one of the tables could be collected yearly.

Agri-environmental indicators

The requirement to include environmental assessments in all policy areas has led to the collection in the EU of a set of 28 agri-environmental indicators; these have been selected from a group of 75 indicators that are usually collected. Many relate to other environmental statistics already collected, except that they are broken down by the agricultural sector. Some of them relate to specific policy actions and are therefore available from administrative sources, where other indicators have been developed specifically for the

⁴<http://www.unece.org/trade/timber/docs/stats-sessions/stats-29/english/re-port-conclusions-2007-03.pdf>.

purpose. The basic principle in the EU is that already available data should be used wherever possible, and that new data collection should be used only when really necessary. The agri-environmental indicator data collection system is still under construction, partly because some of the indicators are still under development, partly because the required data are not collected and proxies have to be used.

Rural development statistics

These are a relatively new domain and can be seen as a consequence of the reform of the Common Agricultural Policy, which accords great importance to rural development. Eurostat has started collecting indicators for a wide range of subjects – such as demography (migration), economy (human capital), accessibility to services (infrastructure), social well-being – from almost all member states at regional level. Most of the indicators are not of a technical agricultural nature. Data collected cover predominantly rural, significantly rural and predominantly urban areas according to the OECD typology.

The UN Committee of Experts on Environmental-Economic Accounting, in cooperation with the London Group, is preparing the revision of the System of Economic and Environmental Accounting. Many UNECE countries are involved in this process. The objective is to provide a framework that allows the development of indicators for monitoring and directing policy decisions where economy and environment are interlinked. Agricultural and forest accounting are strongly related to this system and very well established. This development of integrated accounting is considered one of the most useful developments towards a single consistent statistical framework for agriculture and the environment. Sustainability of ecosystems is also related to these topics. The developments in this domain, mainly initiated by the European Environmental Agency, are at an early stage of development.

The overview given in this section is far from exhaustive. In general, however, it reflects the main agricultural statistics in the UNECE region. Smaller data collections on endangered species, home farming and ornamental aquaculture – which might be useful in a full description of the situation in a specific country – have not been included.

1.3 Governance and horizontal issues

1.3.1 The governance of agricultural statistics

The success of statistics depends to a large extent on issues of governance. The governance of the statistical work chain traditionally in the UNECE countries covers a well-developed system of agricultural statistics as reflected in the overview above. Data collection and analysis are done via well-established and documented procedures and good cooperation between the national institutes and other governmental organizations. In the EU context an important part of procedures for collecting and providing data is set in stone by the EU regulations. In the neighbouring domains of trade and employment statistics this is also the case. However, in the relatively young domain of environmental statistics and ecosystems these statistical procedures are far from being well established. The agencies involved are still developing their methods and the availability and accessibility of many data sources is still not appropriately documented.

In the USA there is a great variety of organizations involved in the collection and analysis of data on agricultural and related issues. This holds also true for Europe. In

2005 the European Environmental Agency, the Joint Research Centre, Eurostat and the Directorate-General for Environment agreed to work together on the development of data centres on environmental and related issues. Ten such data centres are planned (e.g. on land use, forests, and water). The objective of each data centre is to function as a portal for all the available information in that specific field and to create a virtual knowledge centre.

The recent EU communication on the Shared Environmental Information System (SEIS) even goes a step further, at both European and member state level, in promoting the enhancement of the exchange of available data sources, avoidance of overlapping data collection methods and the use of administrative sources and non-official statistics to supplement official statistics. This development is considered an important way forward in an efficient use of all the available information and will be an important asset in the work on combining agricultural statistics with several domains of environmental statistics.

International coordination

The number of international and supranational organizations involved in agricultural statistics is rather limited. The FAO and Eurostat are the main international organizations involved. The OECD and UNECE were more involved, especially via the Inter-Secretariat Working Group on Agriculture. However, the activities of these organizations are currently limited and there is presently no forum to discuss issues concerned with agricultural statistics at the UNECE level (except for forestry statistics).

In the early 1990s cooperation among states led to a set of so-called joint questionnaires which facilitate the efficient coordination of data collection in some areas. Changing demands of course require a regular updating of these joint questionnaires. This regular updating, however, is not easy to organize, even if only because of natural divergences in the use of the data by the organizations as the years pass.

The FAO regularly collects information on agriculture that can be compared to the information Eurostat collects for the EU member states. In coordination with the FAO, Eurostat tries to limit the burden for the member states as much as possible – one way of doing this is to avoid asking questions that overlap with those asked by the FAO. It can be concluded that cooperation, especially on the traditional agricultural statistics, needs to be improved. At a recent EU–FAO meeting (in Brussels in December 2008) the need for closer cooperation was emphasized. For fisheries and forestry, relations are considered to be good.

Compared to other fields of statistics, the international global cooperation in agricultural statistics has not resulted in many overarching groups such as city groups. The only relevant city group is the Wye Group as mentioned earlier. Perhaps more important for the functioning of the global governance structure for agricultural statistics is the network around the International Conferences on Agricultural Statistics (ICAS) meeting and the network of regional conferences initiated by the FAO.

1.3.2 Horizontal issues in the methodology of agricultural statistics

From the description in Section 1.2, a distinction can be made between the regular inventories on products and stocks, the ad hoc surveys and the special data collections by more advanced techniques such as remote sensing, etc. For the regular data collections, well-established systems have been developed and these do not need to be discussed. Several specific problems, however, occur in the field of agricultural surveys. These problems

are to an important extent not typical of agricultural statistics but also characterize data collection experiences in social and business statistics. These problems are summarized below. The examples below are mainly taken from IBGE and NASS/USDA, but are also valid for the rest of the countries.

Respondent reluctance: privacy and burden concerns

Although the agricultural sector is somewhat unique and not directly aligned with the general population on a number of levels, concerns regarding personal security and privacy of information are similar across most population subgroups in the USA, Brazil, and Europe. Due to incidences of personal information being released by businesses and government agencies, respondents now have one more reason for not responding to surveys. While this is not the only reason for increasing non-response levels on surveys, it represents a huge challenge for future data collection efforts. The strong protection afforded to respondents by law is sometimes not enough, particularly considered alongside the other challenge faced by statistics of reducing respondent burden. With trends showing that fewer farms increasingly represent a larger proportion of UNECE agricultural production, respondents are being contacted multiple times within a sampling year.

The NASS, in an effort to mitigate the reluctance of respondents, employs a variety of practices intended not only to encourage response to a specific survey, but also to demonstrate the value of good data. These strategies include personal contact by interviewers familiar with the respondents, small monetary incentives, a sampling methodology that factors burden into the probability of selection, flexible use of multiple data collection modes, and public relations efforts demonstrating the uses of data. Over the past few years, the NASS has directed resources specifically towards increasing response rates on the agency's two largest projects, the Census of Agriculture and the ARMS. Although resulting in some short-term increases in response, the efforts have not shown an overall increase in survey response rates or their concern for non-response bias. The NASS is putting extra effort into better understanding the characteristics of non-respondents so as to be able to describe them, make appropriate data adjustments, and better understand the potential magnitude of bias introduced. One could also surmise that changes in response rates are directly tied to the changing face of agriculture.

In the EU, the experiences with the FSS are similar, with member states reporting increasing problems with response rates. This is the most cited reason for not wanting to increase the number of variables to be collected. Some countries have addressed the problem by making response a legal obligation, but most have decided that this is an inappropriate solution. Perhaps the most common approach is to try to make use of administrative sources, making the respondents aware that data are collected only where it is really necessary. Other countries have reformed collection methods, combining, for example, computer-aided telephone interviews with prefilled questionnaires sent in advance. Obviously, there is no unique solution available; problems like these must be solved based on the cultural situation for each respondent group, with, for example, bigger enterprises being treated in a different way than the small part-time farmer.

The increased demand from users for FSS micro-data also creates a problem in the EU. Confidentiality rules do not allow these data to be disseminated, even within the group of restricted users under the EU confidentiality regulations. The process of making FSS micro-data available to researchers has not yet been approved by the member states, and as some have indicated that they will use their right of veto to protect their data,

this clearly hinders the further increase in the use of such data for advanced analysis and thus also their credibility.

Small and diversified farm operations

For agricultural statistics in general, and for the EU and the NASS survey programmes in particular, the coverage (for the different crops such as acres of corn or the number of cattle represented by the farms on the frame) is a very important issue. In the regulations used for EU statistics, the desired accuracy and coverage are described in detail. Furthermore, countries are requested to provide detailed metadata and quality information.

In general, active records eligible for survey samples account for 80–95% of total US production for most major items. Medium to large size operations are typically sampled at higher rates as they represent a greater proportion of production being measured. This is adequate for the survey programme where the major focus is agricultural totals at the federal and state levels. For the census programme, the focus is county-level data on farm numbers by type and size, demographics, acreage, production, inventory, sales, labour, and other agricultural census items. Consequently, adequate coverage of all types and sizes of farms is needed to ensure reliable census results.

Even though the NASS publishes coverage-adjusted census data, a specific issue for the USA is the need for adequate list frame coverage for all types and sizes of farms to ensure reliable county-level data for all census items. Although coverage goals are established to generate increased agency attention to list-building needs, coverage of the total number of farms has been decreasing over the last few censuses. These decreases are due primarily to the increasing number of small farms which are difficult to locate through traditional list-building approaches. Also, they are difficult to properly maintain on the list frame due to their borderline ‘farming/not farming’ status. Small farms routinely enter and exit at a faster pace than larger, more commercial size farms. To keep coverage high for farm numbers, the NASS must keep rebuilding its lists. Additionally, before conducting the 2007 Census of Agriculture, the NASS recognized the extensive interest in minority farm numbers and specialty commodity farms and attempted to improve the reliability of these data through extensive list-building efforts.

Estimates for small domains and areas

An issue already reflected on earlier in this chapter is the increasing demand for data for small domains. In agriculture, these small domains could be geographical areas or unique commodities. Legislators are more frequently seeking data at lower levels of aggregation. In order for survey-based estimates to be reliable, the sample sizes would be required to increase beyond the organization’s capacity to pay. The NASS’s approach has been to augment probability-based survey estimates with non-probability-based survey data. Much effort is put into investigating statistical methods for small-area estimation that use models borrowing strength from other data sources such as administrative data or other areas. This procedure allows estimates that can have a proven measure of error.

Uses of data for unintended purposes

For many years, the NASS has estimated crop and livestock production at the federal, state, and in some instances county level. NASS stakeholders have utilized published

estimates for marketing and production decisions, agricultural research, legislative and policy decisions, and implementation of farm programmes. Data needs have evolved over the past several years, resulting in uses of NASS information to establish USDA farm programme payment levels and calculate the USDA Risk Management Agency (RMA) insurance indemnity payments to farmers.

The RMA has provided group risk insurance products, Group Risk Income Protection (GRIP) and Group Risk Plan (GRP), to farmers for a number of years. These policies were designed as risk management tools to insure against widespread loss of production of the insured crop in a county. NASS county yields for insured crops are currently used in determination of payments to farmers. The NASS county estimates were not originally designed for such use. The estimates for a 'small area' (such as a county) are often not as precise as one would desire as the basis for insurance policies. However, the NASS estimates are the only source of data at the county level available to the RMA.

Programme content and stakeholder input

National statistical offices work very hard to understand the needs of the data user community, although the future cannot always be anticipated. As the primary statistical agency for the USDA, the NASS services the data needs of many agencies inside and outside the Department. Partnerships have been in place with state departments of agriculture and land-grant universities through cooperative agreements since 1917 to ensure statistical services meet federal, state, and local needs without duplication of effort. This coordination maximizes benefits while minimizing respondent burden and costs to the taxpayer. The NASS also considers the thousands of voluntary data suppliers as partners in the important task of monitoring the nation's agricultural output, facilitating orderly and efficient markets, and measuring the economic health of those in agriculture.

The NASS uses numerous forums to obtain programme content and customer service feedback. For many years, NASS has sponsored data user meetings which are a primary source of customer input that keeps the NASS agricultural statistics programme on track with the needs of the user community. Data user responses have played a vital role in shaping the agency's annual and long-range planning activities.

For the EU, the Standing Committee on Agricultural Statistics (CPSA), along with several other committees, functions as the sounding board for initiatives in the field of agricultural statistics. Most of the initiatives come from coordination meetings at expert level, often generated by policy debates in the EU Council and Parliament.

Funding for agricultural statistics

Agricultural statistics and especially the farm structure surveys are an expensive method of data collection. In the EU, the European Commission co-finances the data collection work of the FSSs and also finances the LUCAS survey. For the 2010–2013 round of the FSSs, the European Commission has reserved a budget of around €100 million. However, an important part of the work has to be funded by the countries themselves.

The funding situation for the NASS as a national statistical institute responsible for agricultural statistics is different. As the need for data continues to grow, so does the NASS budget. From its inception as an agency in 1961, the NASS appropriated budget has grown from under \$10 million annually to its current level of about \$140 million. In addition to appropriated funding, NASS receives approximately \$15-\$20 million annually

through reimbursable work for other federal agencies, state governments, and agricultural commodity groups. NASS funding level increases have come about primarily due to a corresponding increase in workload. However, the NASS continues to find ways to become more efficient and currently employs fewer personnel than it did in its early years as an agency.

Legal procedures

An issue specific to the situation in the EU is the procedure for the agreement of the EU Council and Parliament on new regulations. The organization of this process is complex and time-consuming; however, in the context of the necessary legal basis for statistics, it is very necessary. The preparations begin with task forces and working groups in the member states before progressing to the level of the CPSA or the Statistical Programming Committee who then agree to submit the proposal for discussion with the other services of the Commission and then the Council and Parliament.

The way the regulations are organized ensures that the requirements for the statistics to be collected and delivered by the member states are described in detail. Changing or adding to these requirements, or actively integrating new developments into the data collection process, is therefore almost impossible. This means that the instruments are well developed but somewhat inflexible. It also allows member states, via so-called ‘gold plating’, to take the initiative of adding questions or variables to the questionnaires or making changes to existing ones for their own use.

1.4 Development in the demand for agricultural statistics

Agricultural statistics (including fisheries and forestry) have a long history. The subject has an extensive literature. A major reason for the review on which this chapter is based is the recognition of the need for a reorientation of agricultural statistics in order to integrate them into the wider system of statistics. New demands on environmental impact and ownership of rural areas, water and energy use, etc. have been signalled and need to be included. Recent conferences have concluded that globalization and issues such as climate change demand a different approach to statistics, given the important role of agriculture in the global economy, the sustainability of the global economy and modern society more generally, and this clearly includes agricultural statistics. More information is needed on the demand side and the non-food use of agricultural products. Furthermore, these conferences have concluded that, especially in developing countries, the capacity to produce agricultural statistics has decreased. The main developments are described below.

Small-area statistics

There is increasing demand for information on small areas, and the interplay between rural and agricultural issues as well as issues of territorial cohesion has become important in many countries. Coastal areas, small island economies, urban and rural areas all require a specific set of indicators that reflect the integration/cohesion and development of these areas. There is an increasing demand for indicators for these types of areas. The need for spatial information combined with socio-economic information and environmental data

is, for example, expressed in several communications from the European Commission. Agricultural statistics will be pushed to deliver small-area information. Surveys based on samples are an important instrument (with a sufficient coverage, of course). Multi-purpose surveys with a georeference are seen as important sources for data to be complemented with spatial agricultural information. Next to this approach, aggregated municipal or regional information is also considered important information on this level.

Integrated economic and environmental accounting

At the aggregated level, sound indicators that give a good insight into the mechanism of agricultural society in relation to the economy and environment are needed. The integration of agricultural statistics with other statistics is a process that is tackled especially from the viewpoint of integrated economic and environmental accounting. The UNECE region is actively participating in preparations for the revision of the System of National Accounts (dating from 2008) where the relevance of satellite accounts is emphasized. The related revision of the System of Environmental and Economic Accounting is on track with the work of the London Group. Agriculture is well represented in the discussions. The process of building these integrated systems, the extraction of valid sets of indicators and the adjustment of the basic statistics to these more systematic approaches remains a medium-term project.

Farm register and area frame

Farm structure surveys are the backbone of agricultural statistics, delivering micro-information that allows the detailed analysis of mechanisms on individual farmers' and farms' behaviour. The response burden described in Section 1.3 forces investment in the use of more efficient instruments for collecting data. Linking sources is a way forward in combination with a permanently updated farm register and area frame. Such frames facilitate sampling, but in themselves can already supply a lot of basic information. In many countries these farm registers have been built or are under development.

New data collection tools

Modern technologies for data collection for agricultural and land use statistics are being implemented in many countries. As in many surveys, the use of data collection via computer-assisted personal or telephone interviewing has become the rule rather than the exception. The NASS and many EU countries have used the Blaise software for such interviewing for many years. A more recent development is the use of Internet questionnaires mainly for annual and monthly inventories. Both NASS/USDA and IBGE have accumulated considerable experience in using modern technologies in data collecting. For IBGE, there is the experience in electronic collection of the 2007 Census of Agriculture, integrated with the population count and with the construction of a National Address List for Statistical Purposes. This operation covered the entire 8.5 million square kilometres of the national territory, collecting information from 5.2 million agricultural establishments, in 5564 municipalities, and from 110 million persons, in 28 million households located in 5435 municipalities. In the censuses, the integration of these surveys was facilitated by the use of a hand-held computer, the personal digital assistant (PDA), equipped with GPS, in the stage of field operation.

The use of this technology enabled the construction of a more consistent rural address list. For the first time, Brazil conducted an operation of this magnitude using only digital collectors (PDAs), which allowed better control of the quality of data obtained in the fieldwork, both at the stage of collection and in the supervision by the central bureau. This operation required the use of 82 000 PDAs with GPS and the participation of 90 000 persons. The electronic transmission of the data directly from the PDA of the census takers to the central computer of the IBGE reduced the data processing time and contributed a significant saving of resources, since it eliminated the stages of transportation, storage and digitization of the data, essential when paper questionnaires are used.

The use of PDAs in combination with other remote sensing tools constituted a unique combination for data collecting. The PDAs were equipped with GPS and helped to associate the collected agricultural data with the geographic coordinates of the 5.2 million rural units visited. Each agricultural holding could be visualized by means of Google Earth images, combined with the grid of rural census sectors. This procedure allowed the IBGE to monitor the evolution of the entire data collection operation more closely.

Georeferencing

Information on the positioning (georeferencing) of agricultural holdings creates new possibilities for dissemination of information from the Census of Agriculture, such as the publication of agriculture maps, with the description of the process of occupation of the national territory, according to the diverse products, agricultural techniques, areas of forest reserves and biomes, hydrographic basins, Indian lands, and several other instances of georeferenced information. For the future design of LUCAS in the EU, the design used by IBGE is an important precedent. The NASS has a long history of using geographic information system (GIS) techniques to assist in fulfilling its mission. In the NASS approach, some recent developments are described in great detail. It is evident that the methods described above are an important addition to the development of good statistics on land use. The need for detailed spatial information requires the use of these types of new tools.

Small-area estimates

An important development is the need for up-to-date and accurate small-area estimates. The demand for early estimates for advance warning on crops, and for results for small domains, continues to increase. In agriculture these small domains could be geographical areas or unique commodities. Statistical methods are being used for small-area estimation that use models and modelling techniques borrowing strength from other data sources such as administrative data or other areas.

The overview of recent developments is not complete without mention of the permanent need to update the existing list of products, goods, etc.: crops for bio-fuels and genetically modified products, organic production methods, etc.

1.5 Conclusions

From the foregoing description there are clear priorities for developments in agricultural statistics. The developments of course are in the substance of the individual statistics.

They are described in the paragraphs above and will not be repeated here. However, we will focus here on some of the more horizontal issues of governance and dissemination of information.

In general, cooperation between countries and international organizations requires greater priority so that maximum use can be made of the global statistical infrastructure in order to improve agricultural statistics. In the international cooperation an intensified cooperation in Joint Questionnaires but also in the sharing of experiences has been relatively weak in the last decade. With respect to the increased need for high-quality agricultural statistics, stronger cooperation and leadership are needed, as indeed they are in relation to the need to link with other areas of statistics.

With respect to governance at the national level, close cooperation with the main stakeholders active in agricultural statistics at the national level is essential. Many governmental organizations are involved in the collection and use of agricultural statistics. In this schema national statistical institutes play an important role as data providers, but also a reference for data quality issues. For efficient use of available information, good coordination is needed, both at the level of data collection and analysis and in describing the need for statistics and the feasibility of collecting certain types of data.

Agricultural statistics can still be characterized as a rather traditional sector in statistics, and it has only recently been recognized that linkages with other fields such as the environment and socio-economic issues are relevant. The agricultural statistical system is somewhat inflexible. This is partly due to the way the system is constructed (many regulations) but can also be related to the relatively low priority given in recent years to modernization. Recent developments clearly indicate a need to liaise closely with environmental and spatial statistics and, in the context of rural development strategies, a stronger interrelation with social and other economic statistics.

The access to micro-data for researchers is an important development in increasing the value and credibility of agricultural statistics. Solutions for the issue of confidentiality have to be found both in information technology and in legal structures.

Acknowledgements

This chapter is based on the in-depth review of agricultural statistics in the UNECE region prepared for the Conference on European Statistics (CES). In its third meeting of 2007/2008, the CES Bureau decided on an in-depth review of this topic. It was requested that the review took into account recent developments such as the increase in food prices and the impact of climate change, and incorporated the final conclusions and recommendations reached at the fourth International Conference of Agricultural Statistics (ICAS IV, Beijing, November 2007) on the situation of agricultural statistics. The in-depth review was discussed in the October 2008 CES Bureau meeting in Washington, DC, again discussed and approved at its February 2009 meeting and finally presented to the CES Plenary meeting in June 2009 in Geneva. The review was also updated following the written January 2009 consultation of the member countries. In general the countries were very positive about the review and comments that referred to issues not yet covered have been included in the final version. The review also takes into account the results of the Expert Meeting on Agricultural Statistics held in Washington on 22–23 October 2008. The CES recognized the timeliness of this review because of the food crisis, increases in food prices, climate change, etc., and stressed that the current crisis

might help to raise the profile and emphasize the importance of agricultural statistics. The in-depth review was based on preparatory contributions from Eurostat, the IBGE and the NASS. To compile the review, use was made of a variety of information sources on the current state and future challenges of agricultural statistics, an important input being the policy reviews on agricultural statistics issues of Eurostat, the Wye Group Handbook (United Nations, 2007) and the results of the 26th CEIES seminar ‘European Agricultural Statistics – Europe First or Europe Only’ (Brussels, September 2004). Furthermore, the review benefited greatly from the input from the CES Bureau members, input from experts from the UNECE member states and especially from CIS countries. This chapter was written with contributions from the United States Department of Agriculture and the National Agricultural Statistics Service (Mary Bohman and Norman Bennet), the Brazilian Institute of Geography and Statistics (Eduardo Nunes Pereira) and the Interstate Statistical Committee of the Commonwealth of Independent States (Michael Korolev). However, the final responsibility for this chapter rests with the author.

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