PLENARY SESSION

01

MODERNIZATION OF AGRICULTURAL STATISTICS TO RESPOND TO NEW MULTIDIMENSIONAL DEMANDS

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ABSTRACT

Institutes of Statistics, National Institutions and International Organizations are committed to modernizing statistics worldwide. This commitment should include also agricultural statistics, which plays a key role in the analysis of human development, as widely acknowledged, for example in the Millennium Development Goals.

Modernization means changing, renewing, in order to better achievequality and relevance of statistical informationas well as efficiency in the production of such information. Modernizing implies lower costs, with a great opportunity, especially for developing countries.New technologies and statistical methods can enable to gain of efficiency, reducing time needed to improve and to fill the gaps.

Primarily, the exploitation of administrative sources provides a tremendous opportunity to reduce data collection costs, and therefore helping the modernization ofdeveloping countries and facilitating reducing differences between countries. The use of new technologies, new methods and the exploitation of existing databases can be favored by the action of international organizations.

Thus, the main areas of intervention of modernization processes are: joint exploitation and integration of data from different sources (e.g. administrative data vs survey data, master sampling frames, big data etc.), new data collection techniques, new technological improvements (e.g. GPS and remote sensing) and the production of new indicators in response to the growing demand by policy-makers and decision makers for statistics based oninformation that is interlinked in economic, social, and environmental aspects (e.g. indicatorsfor gender/youth-related data, rural statistics,agro-environment data, better integration of geographic information and statistics).

In addition to the above areas, organizational and human resource management issues are equally important. In particular , investing in the development of human capital will be crucial for the modernization of agricultural statistics as well as for the development in general .

To show the main and most challenging opportunities and advantages of the modernization of agricultural and rural statistics, discussing the key success factors of this process are the objectives of the session.

PAPER

Mr Gennari, distinguished guests, colleagues, good morning. It is indeed a great pleasure to welcome every one of you to the ICAS VII International Conference on Agricultural Statistics.

This seventh edition -- that we, as Istat, the Italian National Institute of Statistics, have had the honour to organise in collaboration with the Food and Agriculture Organization -- is intended to offer you the ideal forum to share views and ideas on the changing needs and new opportunities for agricultural statistics, both in terms of needs for information and methodological tools.

The next three days provide a very full agenda with a rich programme of sessions and side events. The conference has as its foundation 4 Plenary sessions, with 48 Parallel sessions focusing on: 5 sets of themes, 3 multi-disciplinary themes and one poster session. More than 200 presentations are scheduled, with over 600 contributors and almost 500 registered participants from some 80 countries around the world.

Today, I wish to discuss the modernisation of statistical systems, and of agricultural statistics in particular, which I believe is essential in order to be able to address the increasing complexities of the compelling need for information.

Of course, we are no longer at the starting gate of this race for information. A significant wealth of information at the global level has already been made available. Moving forward from this as a baseline, I would like to showcase just a few relevant and multidimensional milestones which also indicate directions for the future of world agriculture.

The need for information is still growing very quickly. World statistical capacity is growing too, and with the agreement that has been reached on the Sustainable Development Goals (SDGs), data producers are being asked to accelerate their production to new levels. The SDGs represent a challenging opportunity to strengthen the institutional statistical framework, to support governments' decisions, to enhance capacity, foster co-operation, share experiences and reduce inequalities. Actually, as we will see, agriculture statistics play a central role in the 2030 Agenda for Sustainable Development.

I will briefly review the coordinated efforts of agricultural statisticians in the building and achievement of a coherent global system of agriculture statistics based on high quality data.

Finally, starting from the existing toolbox that countries may use to produce high quality data, I will stress some key elements in the process of modernization of statistical systems as a strategy for the integration of sources, technologies, methodologies and competencies, a strategy which, I believe, is also highly relevant for agricultural statistics.

Agriculture lies at the very centre of a number of interconnections between humanity, its odds of survival, living conditions and the planet. It is no wonder, then, that the demand for statistical data related to the primary sector is increasing.

As it has been for thousands of years in the past, agriculture today is the basis of human food production. The perspectives for world population represent a huge challenge: the population of the world is expected to surpass 9 billion people by 2050, and feeding 2 more billion people represents the major goal for world agriculture. We need to address this challenge, which is all the more serious because the increase in population will occur entirely within urban areas.

Today, one person out of nine still experiences chronic hunger. The percentage of the undernourished population has gone from a level of 19 to 11 percent, nearly fulfilling the Millennium Development Goal target to "halve, between 1990 and 2015, the proportion of people who suffer from hunger". However, this situation is still far from satisfactory, particularly in those 30 countries where hunger affects over 20% of the population.

At the dawn of the third millennium, almost 2.6 billion people still base their subsistence on the pursuit of agriculture, forestry, fishery or hunting activities. The economic weight of the agricultural sector has experienced a long term decline, even if it recovered part of its original share of global GDP in the last decade, and today it represents about 4.3% of total GDP. One fifth of the employed population in the world is engaged in the agriculture sector.

Meanwhile, thanks mainly to a continuous rise in productivity, agricultural production has progressively increased, supplying more and more food to the world population (sessions B7 and B8 will be dedicated to agriculture productivity). At the same time, food deficit (a basic measure of access to food) has decreased considerably since the Nineties all over the world. Of course, food availability does not always guarantee high food security, which is also determined by income, food prices, infrastructures and social support. Many African countries still register a daily per capita food deficit index well over 100 kilocalories.

As for what concerns environmental issues, agriculture plays a positive role in capturing carbon, managing watersheds, preserving biodiversity and landscapes, and providing feed stock for biofuel production. At the same time, in most countries, agriculture is the largest user of water, a big producer of chemical pollution and soil degradation and a contributor to climate change. The Intergovernmental Panel on Climate Change estimated that agriculture accounted for one fourth of global greenhouse gas emissions in 2010, mostly with crop cultivation, the raising of livestock and deforestation. The trend is not encouraging. Agriculture greenhouse gas emissions have grown by 15% since 1990, even if they rose less than emissions from other human activities. In the same period, the production of livestock grew by 72% and 3% of forests disappeared. According to FAO's 2016 SOFIA Report, the status of fish stock is also of great concern, despite certain improvements in the recent past.

Well, some of these key facts and figures in agriculture I just presented are probably well-known to most of you, and this is only a minor portion of the data you can find on FAOStat and in other international data-warehouses. However, let me say that if we are able to draw accurate pictures of world agriculture, it is thanks to producers of agricultural statistics, to FAO, to National Statistical Offices, researchers, it is thanks to you.

Nevertheless we cannot consider ourselves satisfied, ever: very basic information. such as, for example, the exact number of farmers, is still unknown. A long road is still ahead of us and important challenges need to be met.

First of all, a huge new need for information is represented by the Sustainable Development Goals and the set of indicators associated with them. Agriculture is by nature a crucial determinant of any sustainable development strategy. Each one of the 17 Sustainable Development Goals somehow relates to agriculture, and agriculture can be considered as a common thread that binds all of the 17 SDGs together.

For some of the goals, the relationship is direct and self-evident, such as for the 'zero hunger goal (2)', 'life on land (15)' and 'fishery (14)'. We have to consider that the rural population represents the largest majority of the world's poor (1) and agriculture is a massive (substantial) source of employment and a fundamental economic sector (8). Infrastructures (9) will definitely alleviate poverty, facilitate access to food and water, but also generate employment and reduce poverty in rural areas, thus reducing overall inequalities (10) and limiting the creation of slum dwelling (11). The enhancement of a sustainable consumption and production model (12) forecasts a sharp decrease in food wasted.

Food systems consume about a third of the world's available energy and agriculture contributes to the production of energy crops (7), effects healthy environments and produces emissions (13). Crops and livestock account for about 70 percent of all water withdrawal, and agriculture is also a significant water polluter, therefore playing a central role in the clean water goal (6).

In some cases, the relationship between agriculture and SDGs is less immediate, but still strong and persistent. Since the demand of water and wetlands is at the heart of many conflicts, an increase of efficiency and sustainability in agriculture might be considered as a tool to promote peaceful and inclusive societies (16). Over half of the food in the world is produced by women, but difficulties in access to resources makes them less productive than their male counterparts, feeding gender inequality (5). Moreover, child agriculture workers represent nearly 60 percent of child labour that has limited access to a quality education (4). Finally, all these processes need a strengthening of international aid and technical cooperation for agriculture (17).

On overall, statistics has been given a prominent role in the implementation of the 2030 Agenda for Sustainable Development and, in particular, in the monitoring of the 169 targets associated with the 17 goals.

This new common framework could bring about important results in terms of statistical capacity. Indeed, data availability has significantly improved thanks to the adoption of the Millennium Development Goals framework. Yet, with 304 proposed indicators, some of which are difficult to monitor or have very little data coverage and availability, monitoring the SDGs will be even more challenging as time goes on, and it will entail significant costs. The latest Statistical Capacity Indicator dashboards show that during the past 10 years nearly 30% of the 146 selected countries never conducted an agriculture census, the fundamental source of information for this field.

Substantial work is still needed to strengthen statistical systems at the national level and improve methodologies. According to the Sustainable Development Solutions Network (SDSN, a global UN initiative), about 1 billion dollars a year may be needed in 77 low income countries to strengthen statistical systems in order to support and track the SDGs. (*The issue of financing the modernization and resource mobilization will be addressed on Friday in Plenary PL 4*).

The increase in statistical capacity must be confronted with a view to building a consistent and homogenous global system of agricultural statistics, which will necessarily be based on the interdependence of national and international statistical activity.

This comprehensive and detailed framework is represented by the Global Strategy to Improve Agricultural and Rural Statistics, which was approved by the UN Statistical Commission in 2010 and aimed at improving the availability and use of reliable agricultural and rural data.

These goals are to be achieved with the production of a minimum set of core economic, social, environmental and geographical data, which each country in the world should collect; through a more complete integration of agricultural statistics into national statistical systems and by achieving substantial advances in governance and statistical capacity building.

The challenge represented by the new emerging demands for information and processes has to be tackled keeping in mind the ultimate goal of statistics: producing high quality data.

Data quality basically refers to compliance with agreed upon international standards: the professional independence of statistical authorities, the adoption of sound methodologies, the accuracy and precision of estimates, their timeliness and punctuality, their coherence, comparability, accessibility and clarity.

In addition to what has been said, official statistics is encountering human and budget constraints all over the world. Thus, efficiency also becomes a necessary condition for meeting our responsibilities.

However burdensome, quality standards should be applied to each step in the data chain, from the statement of objectives to data collection and processing to dissemination.

Indeed, there are many challenges National Statistical Offices need to face:

- The measurement of new complex cross-cutting issues (such as, for example, globalization, sustainable development, climate change)

- Sampling surveys are expensive, response rates are decreasing, and it is necessary to limit response burden. Nonetheless, the conduct of surveys will remain essential in order to satisfy the multidimensional demand for good quality statistics

- Agriculture, forestry and fisheries statistics normally draw on several different sources and are often collected by statistical offices, ministries and other research authorities, therefore consistency checks are important

- Data collection should not be redundant. Close cooperation should be established between all institutions involved for the purpose of increasing efficiency

- New technologies, administrative data and big data may reduce the number and the sample size of statistical surveys; we shall see several examples of this during the conference. Re-thinking data capturing systems represents a milestone in re-engineering the work of statistical offices

- Finally, human capital skills must be improved and adapted to changing roles and responsibilities

All these factors contribute towards the enlargement of the methodological toolbox and a re-thinking of the organization traditionally implemented by statistical offices. New methodological and technological instruments and international best practices should drive change; new possibilities for collecting, processing, integrating and disseminating high quality statistical data in a more efficient way should be explored.

We refer to all these different improvements using the term "modernisation".

The modernisation of agriculture statistics needs to be addressed through the analysis of the strengths and weaknesses of available techniques.

Traditional statistical surveys tend to respond to local or national conditions, cultures and goals, even if, over the past few years, increased efforts have been made to establish methods to allow comparison and evaluation across national and cultural boundaries.

Aside from their solid methodological background, dependence on traditional surveys is associated with a difficulty in identifying other coherent and timely data sources.

Administrative data are more and more important in the framework of official statistics (*sessions F32 and F33 are specifically dedicated to this issue*). The acquisition of administrative data may have lower costs for the statistical offices, and timeliness is normally not an issue but may vary widely among sources. A lot of capacity is required for setting up the infrastructures for storing and computing this type of data and the methodologies for exploiting them in official statistics production. The measurement of accuracy is also a complex issue to be managed; stability and efficiency of national statistical systems are key requirements to ensure the usefulness of these data for statistical purposes.

Experts' estimations are very often used for hard-to-measure phenomena, such as rare or illicit cultivations, even though the quality of expert's estimates may be poor (*Session B9 tackles this issue*). These estimates should be periodically benchmarked with more robust measurement tools.

Statistical models (which will be discussed during sessions G43 and G45) and Small Area Estimations are also needed when very detailed or rare phenomena are to be measured (for example, to estimate crop production for particular small areas or the degree of humidity of some cereals). They enhance overall quality, leveraging spatial and time correlations of data.

Finally, the use of Big Data in the agriculture statistics framework is still developing, but some best practices are rapidly growing, and examples of application are going to be discussed during various sessions of this conference.

Among Big Data techniques, the ones deriving from the use of remote sensing are very often used in agriculture; they may achieve high quality standards, especially in estimating coverage and detail. This is one of the latest measurement tools, however it usually requires additional field surveys to validate the preliminary estimations from satellite images (*Session F30 is specifically dedicated to these techniques*). Recently, the availability of free of charge maps has reduced the costs of implementation, although a relevant capability of the statistical office is still needed.

Other Big Data sources are used in agriculture to a lesser extent. Potentially, the implementation of more robust methodologies and best practices will improve quality and timeliness of agriculture statistics.

Nevertheless, the use of Big Data introduces new areas of concern related to data access and privacy issues, real costs, a shift in IT requirements, the impact on consolidated methods and data processing.

All these techniques may be combined with each other, as often happens in many statistical offices. As

stressed by Constance Citro "we can and must move from a paradigm of producing the best estimates possible from a survey to that of producing the best possible estimates to meet user needs from multiple data sources". In order to achieve this goal, we need to build capacity in different directions, by integrating knowledge and methods and experimenting and co-operating with many national and international partners.

Increased effort must be dedicated to the full integration of administrative data with existing surveys. Statistical institutes in Northern European countries have shown that a "register-based statistical system" can be a powerful approach for fully exploiting all statistical information in an integrated manner. Data sources integration in agricultural statistics along with observation of the associated populations allow for measurement and evaluation of various issues related to the agricultural sector: for example, the educational level of a farm holder and the size of the farm can affect the productivity of land parcels and the risk of malnutrition of rural households (*Plenary session 2 and sessions F33, F34, F35 are dedicated to these topics*).

Techniques should be "sustainable" for statistical offices. Sustainability depends on human skills, technical development, financial support and specific strategies.

The answer to these strategic, thematic and methodological challenges lies in the modernisation of statistical systems.

Key elements of the modernisation process could be summarised as follows:

- Assessing user needs as the first stage for tailoring products and services
- Giving incentives for the development and exploitation of methodological, technological and organizational innovation
- Integrating and linking sources to boost coherence
- Guaranteeing a sound legal framework to manage the existing trade-offs among confidentiality, open access to microdata and IT security
- Enhancing and reorienting staff skills (*session H48 addresses this issue*)
- Moving away from the traditional 'silo' approach of statistical agencies towards the setup of horizontal services (for management, methodology and IT services that would serve to impel the integration process)
- Reducing the response burden with the reuse of available data and information
- Increasing the use of technology, resulting in significant efficiencies and reducing time lags

The adoption of a "register-based statistical system" represents a milestone in a modernization strategy for official statistics. It is a structure based on the integration of administrative and survey data which are organized into a system of statistical registers linked together on the basis of defined keys. Such a system may succeed in terms of reducing costs and response burden while continuing to maintain data quality.

A register-based system represents a long-term goal to be progressively implemented in accordance with country-specific characteristics, whereas its adoption should be based on best practices and institutional support from statistical offices already involved in such a process.

I would also like to stress the crucial role that the Census of agriculture plays for agricultural statistics. As we have seen before, a significant number of countries are still not carrying it out. Since the 1980s, the FAO World Program for the Census of Agriculture has been setting definitions, concepts, standards and guidelines, in order to ensure data comparability and address emerging information needs.

The 2020 edition of WCA calls attention to emerging themes in the digital era, giving emphasis to the use of information technology in data collection, processing and dissemination. Technology also serves to support data dissemination with the use of interactive maps, charts and graphs; aggregate data and microdata can be disseminated on-line to empower wide public access. The use of these accessible technologies inevitably represents the immediate future for agriculture censuses all over the world.

It is clear that modernization initiatives need to be shaped in accordance with the maturity of the particular national statistical system and with awareness of the institutional setting. Countries are at different stages in terms of their use of administrative records and innovation methodologies, and, in addition, statistics production in diverse thematic areas may be at different stages within the same country.

To summarize, five key drivers may characterize a successful process of modernisation: trust, quality,

competencies, research and innovation, partnership.

These drivers are strongly related and they feed on each other. Quality, transparency and the independence of the statistical authorities are crucial to engender trust in an NSI's work; quality is based on the competencies of the researchers and analysts who are responsible for the day to day data production. Research in the development of new techniques and methodologies is crucial in fostering improvements, defining new processes and procedures, creating new products. Finally, modernization calls for strong partnerships among the public and private sectors and the scientific community in order to enrich the information and improve data quality.

I would like to close with an invitation to all the stakeholders in the agriculture statistics system: the national statistical systems, national and international agencies, the scientific community, private data producers and data owners, governments. There is an increasing need for stimulating a coordinated effort to fulfil international goals set at the global level, be those relative to the production of new information, or relative to the adoption of methodological standards.

Of course, everyone needs to take part in this process, according to his or her own abilities and responsibilities.

Donor countries have recovered only in 2013 the absolute value of Official Development Assistance, yet without raising its share of GDP. Even if agriculture is increasing its share of total ODA, thanks to a steep increase in bilateral and multilateral aid flows to agriculture, there is a need for additional resources. Sharing experiences among NSIs and taking advantage of globalisation can disseminate innovative solutions for every country.

Let me conclude by stating that modernisation is a priority on the statistical agenda today and in the future. Efforts to modernise agricultural statistics are crucial for providing those tools that are essential in order to be able to address particular issues and monitor advancements in the sustainable development agenda.

Keeping this in mind, we should all be engaged and forward looking. I wish for all of you a very fruitful work throughout the next three days. Thank you.