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**Global initiatives: Integration of agricultural statistics
into national statistical systems**

**Global Strategy for Improving Agricultural Statistics:
Implementation Plan for Africa - Proposals on
Research Component¹**

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Acronyms

AFCAS:	African Commission for Agricultural Statistics
BMGF:	Bill and Melinda Gates Foundation
CAADP:	Comprehensive Africa Agriculture Development Programme
CGiAR:	Consultative Group on International Agricultural Research
FARA:	Forum for Agricultural Research in Africa
FOC:	Friends of the Chair
JRC:	Joint Research Centre
LSMS:	Living Standard Measurement Surveys
MDG:	Millennium Development Goals
NSDS:	National Strategy for the Development of Statistics
NSS:	National Statistical Systems
PARIS21:	Partnership in Statistics for Development in the 21 st Century
RCMRD:	Regional Centre for Mapping of Resources for Development
UNSC:	United Nations Statistical Commission
US\$:	United States Dollars

Executive summary

Three out of four poor people in developing countries live in rural areas. Most directly or indirectly depend on agriculture for their livelihoods. According to the World Development Report, agriculture is recognized as a vital development tool for achieving the Millennium Development Goals (MDGs), especially contributing to food security, raising the incomes of the poor, facilitating economic transformation and providing environmental services. This recognition has led to a renewal of the international community's commitment to agriculture and has been amplified by a new urgency driven by a changing global context.

Policies for improving food security and reducing extreme poverty require appropriate knowledge of the status, which means accurate statistics.

One of the development challenges is the paucity of data upon which to assess the efficacy of the policies and commitments to agriculture. Decisions about aid and/or investment efforts to foster agricultural growth need to be based on sound information on land use, factors of agricultural production, and the prevailing economic and social situation faced by producers.

There is a lack of a comparable minimum set of agricultural data, and many countries lack the capacity to produce and report the necessary data to monitor their national trends or inform the international development debate.

Official data submissions from countries in Africa are at their lowest level since before 1961, with only one in four African countries reporting basic crop production data.

The Global Strategy to Improve Rural and Agricultural Statistics which was adopted by the 41th Session of the United Nations Statistical Commission in February 2010 aims at addressing the root causes of the declining trends of agricultural statistics, particularly in developing countries by providing a framework and methodology that will lead to the improvement of national and international food and agricultural statistics to guide policy analysis and decision making in the 21st century. This Global Strategy is based on three pillars:

- The first pillar is the establishment of a minimum set of core data that countries will provide to meet the current and emerging demands.
- The second pillar is the integration of agriculture into the national statistical systems in order to meet policy maker and other data user expectations that the data will be comparable across countries and over time. The integration will be achieved by implementing a set of methodology that includes the development of a Master Sample Frame for Agriculture, the implementation of an Integrated Survey Framework, and with the results available in a Data Management System.
- The Third Pillar is the foundation that will provide the sustainability of the agricultural statistics system through governance and statistical capacity building.

As agreed at the Tunis and Rome Meetings of Stakeholders, the Implementation Plan for Africa of the Global Strategy will be developed under the overall supervision of the Global Strategy Implementation Office. The Implementation Plan will comprise three technical components; each of them will be developed as a standalone component but fully integrated and complementary to the other technical components. Consistency and coherence of the technical components will be ensured by the coordinating office of the global plan at the FAO.

The components will be lead by the following Organizations:

- Technical Assistance Component: African Development Bank Group (AfDB)
- Training Component: Lead United Nations Economic Commission for Africa (UNECA)
- Research Component: FAO
- Coordinating office of the global plan: FAO
- Governance Component: AfDB

The Implementation Plan for Africa will have a long term perspective (10 to 15 years but will follow a phased approach with the first phase covering the next 5 years (2011-2015).

While there is a growing importance of commercial and modern farms, the bulk of agricultural production (particularly food crop production) in most African countries still comes from small subsistence farmers, sometimes with low level of education or illiterate, using a wide variety of agricultural practices.

In this context, there are specific methodological challenges to measuring, with an acceptable degree of accuracy, some of the most basic variables on agriculture. There is also a wide regional diversity between different parts of the continent in terms of the importance of crops grown and the agricultural seasons that raises specific methodological problems. Also the livestock sector presents methodological challenges, particularly for data collection (e.g. enumeration of nomadic and semi-nomadic livestock, social constraints to obtaining accurate numbers on livestock in pastoral societies etc.). Methodological challenges for the fishery sector include estimation of fish production for in-land, traditional fishery and marine fishery. In the forestry sector, estimation of edible forest products, fire wood production etc, raise additional methodological challenges.

Research Component

There is a need for a comprehensive and integrated methodological research programme which can support efforts to improve agricultural statistics in Africa. With technological advances and experiences in other regions, alternative and more efficient methods and tools relevant to African context can be developed and implemented for improving data collection systems for better data quality, also taking into account the rapidly changing nature of agriculture and the emergence of new issues that make the available data and some methods obsolete.

In order to improve agriculture and rural statistics significantly and on a sustainable basis, all these problems need to be addressed as they are

inter-related, with particular attention to cost-effectiveness and sustainability. According to the specific problem, new data collection methods will be developed or existing methods will be adapted, updated and validated. The results of this component will serve as inputs for both the training component and the technical assistance component.

The Tunis Meeting of stakeholders identified an initial list of possible research topics, mainly based on the recommendations of various Sessions of the biennial meetings of the African Commission on Agricultural Statistics. The Conference recognised that further work is needed for identifying and prioritising research topics and proposed the criteria for prioritization of the topics.

After the Tunis meeting and in order to identify and better prioritise research topics, a survey questionnaire was developed and sent to all key stakeholders for agricultural statistics in Africa. The population surveyed included African agricultural statisticians, international consultants with long experience in Africa and other developing countries, International and Regional Institutions with experiences relevant to Agricultural Statistics in Africa, Academic and training institutions with experience relevant to Africa, selected Development Partners etc. It was mainly requested to respondents to rank the criteria and the research topics and to suggest one or 2 important additional ones. The replies to the questionnaires were analyzed in order to prioritize the research topics within the envelope foreseen for this component and focus on the topics with the highest priority.

During the meeting in FAO Headquarter held on 13 and 14 of September 2010, it was decided to identify thematic domains, describe how they relate to the global strategy and rank them according to their impact on the implementation of the Global Strategy for Africa.

The following priority areas were finally agreed:

Reference framework: Framework for development of an integrated agricultural statistics programme ; Mainstreaming agriculture into NSDS; Implementation of an Integrated Survey Framework.

Master frame for integrated survey: Use of GPS in the production of agricultural statistics; Linking area frames with list frames; Use of remote sensing.

Data collection methods: Improvement of estimation of crop area, yield and production; Methods for estimating crop area, yield and production of mixed crops, repeated cropping, continuous cropping; Methods for estimating yield of root crops; Cost of production; Methodology for enumerating nomadic livestock, estimating livestock products; Adoption of new technologies ; Forestry and deforestation; Crop forecasting and early warning; Inland fishery, aquaculture; Interaction between climate, environment, global warming and agriculture; Land use/Land cover monitoring.

Food security: Methodology for the estimation of supply utilization account, food balance sheets, food stocks, edible forest products; Nutrition indicators; Use of households' surveys / LSMS for food security indicators.

Market information: Estimation of farm gate prices; Collecting data on agriculture rural and border market prices; Collecting data on factors and product markets affecting agricultural activities.

Data analysis: Reconciliation of census data with survey data; Determination of user's information needs for decision making; Use of small area estimation methods for improving agricultural statistics.

Administrative data: Improvement of administrative data; Use of administrative data for improving agricultural statistics; Estimation of informal cross border trade data.

It is recognised that this list reflects the current issues and regular review and up-dating is required to address new and emerging priorities.

The following outputs are expected for each research topic:

1. Report with final list of criteria and priority research topics validated by main stakeholders during a regional workshop.
2. Reports on:
 - ongoing or already completed research activities on the selected priority topics
 - review of relevant literature (state of the art)
 - gaps analysis and remaining methodological issues identified
 - potential partner technical institutions
3. Empirical studies designed, and field tested by relevant technical partner institutions.
4. Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts.
5. Guidelines and handbooks prepared and disseminated
6. Training material prepared on the basis of guidelines and handbooks

The estimated cost for implementing the Research component is about 15,000,000 USD for 5 years. It has to be noted that many issues are relevant not only to Africa Region but also to other developing countries.

A list of 9 **quick win** topics is proposed which are highly needed/easy to implement and can produce visible results in the short term for an estimated budget of 500,000 USD.

For implementation of the Research component, to the extent possible, the existing structures will be used instead of creating parallel structures. Whenever possible, structures of the African Statistical System and African research institutes will be involved.

The donors will support the production of guidelines which will allow the countries to improve their capability to produce reliable agricultural statistics. The implementation of the guidelines will require

decreasing support from the donors with the increase of the experience of the countries in data collection, elaboration and analysis.

The research component will be coordinated, supervised and financially managed by a centralized body, but with a decentralized implementation structure.

Special attention will be given to the following points:

- supervision and coordination on how resources are used;
- transparency at the level of management;
- the assignment of subcontracts on tender basis or on comparative advantage basis (whenever possible to African institutions) depending on the topic, once a coordinating structure for research has been established;
- existing good models such as FARA and others.

The institutional framework for implementing the Research component will include a Research Unit of the Global Strategy Implementation Plan located at FAO which will work closely with Advisory Expert Groups selected from a network of specialists (institutions, academia, and individual experts). The conduct of the research on specific topics will be lead by selected partner institutions/experts under the technical supervision of the Research Unit and Advisory Expert Group.

A system for monitoring and reporting on implementation at every level will be established. Performance indicators, targets and milestones will be used to know if implementation is on course. One important part of the monitoring and reporting system will be to learn and adjust during implementation.

Part 1. Background and justification

1. Introduction

The importance of agriculture to the national economy of developing countries and its key role for overall economic growth, increased incomes, poverty reduction and fight against hunger is well recognized in many recent development studies. This is particularly the case in African countries where agriculture is the most important economic sector with 30-50% of GDP and the basis of living for the majority of the population.

However, the lack of reliable data on the sector is a major challenge for developing adequate policies and programmes, monitoring and evaluation of their outcome and impacts and informing the international development debate in a fast changing world. Agriculture sector is the one where data systems are the weakest and have been deteriorating over the last decades as documented by several recent assessment studies.

The Global Strategy to Improve Rural and Agricultural Statistics which was adopted by the 41st Session of the United Nations Statistical Commission in February 2010 aims at addressing the root causes of the declining trends of agricultural statistics, particularly in developing countries. The purpose of the global strategy is to provide a framework and methodology that will lead to the improvement of national and international food and agricultural statistics to guide policy analysis and decision making in the 21st century.

The Global Strategy is based on three pillars:

- The first pillar is the establishment of a minimum set of core data that countries will provide to meet the current and emerging demands.
- The second pillar is the integration of agriculture into the national statistical systems in order to meet policy maker and other data user expectations that the data will be comparable across countries and over time. The integration will be achieved by implementing a set of methodology that includes the development of a Master Sample Frame for Agriculture, the implementation of an Integrated Survey Framework, and with the results available in a Data Management System.
- The Third Pillar is the foundation that will provide the sustainability of the agricultural statistics system through governance and statistical capacity building.

The Global Strategy to Improve Agriculture Statistics identifies the *lack of adequate technical tools, statistical methodology and survey framework to support data production efforts* as one of the main reasons of insufficient and poor data quality on the agriculture sector.

2. Challenges for agriculture data collection in African context

Agriculture is an integral part of the complex African rural economy which has links with urban economies and populations. There are challenges to collecting and using agricultural statistics that are quite unique to Africa.

While there is a growing importance of commercial and modern farms, the bulk of agricultural production (particularly food crop production) in most African countries still comes from small rain-fed, subsistence farmers, sometimes with low level of education or illiterate, using a wide variety of agricultural practices (mix-cropping, continuous planting and harvesting on small and irregular shaped plots, etc.). In this context, there are specific methodological challenges to measuring, with an acceptable degree of accuracy, some of the most basic variables on agriculture, including crop area, yield and production, (particularly production for self consumption) when farmers do not keep any records and do not use standard measurement units.

There is also a wide regional diversity between different parts of the continent in terms of the importance of crops grown (cereals, root crops, fruits and vegetables, etc.) that require different methodologies for estimation of production. The agricultural year may also vary from one to two or three raining and planting seasons and could cover two different calendar years. The methodology to be applied to estimate annual production varies considerably.

For the livestock sector methodological challenges for data collection include enumeration of nomadic and semi-nomadic livestock, social constraints to obtaining accurate numbers on livestock in pastoral societies and estimation of livestock products, especially with regards to small animals.

Methodological challenges for the fishery sector include estimation of fish production for in-land, traditional fishery and marine fishery. In the forestry sector, estimation of edible forest products, fire wood production, estimation of the extent of deforestation etc, raise additional methodological challenges.

In many African countries, most producers are also consumers and collecting relevant data for understanding the decision making of smallholder producers where they are making both production and consumption decisions simultaneously are another challenge. Other problems that affect statistical activities are the extent to which agricultural activities are determined by the environment in which they take place and the impact of external events, especially weather conditions. There is a requirement, therefore, for detailed time series data that are disaggregated by agro-ecological zone, which is a major challenge for data collection in Africa, especially when combined with low population densities in many rural areas.

These factors, combined with the lack of well documented and factual information on the farming practices used, exacerbate the methodological challenges for data collection. As a consequence, the quality of data on agricultural sector in Africa, particularly its accuracy, has recurrently been questioned by data users.

3. Rationale for a research component

For several decades, and particularly in the 60's, 70's and 80's important efforts were made by FAO, the World Bank and several other Institutions and countries to develop tools and methods to address some of these specific challenges. These efforts resulted in the publication by FAO

of some basic methodological guidelines and practical handbooks on Agricultural statistics with particular relevance to developing countries which are still widely used by agricultural statisticians in African countries. Many of these data collection methods were based to a large extent on the research conducted in India by pioneers such as Mahalanobis, Sukhatme, Panse, Narain etc. However, with the decline in attention and priority given to the agriculture sector on the development agenda and subsequently the reduction of resources allocated to agricultural statistics, the methodological research relevant to African context became marginalized, despite repeated recommendations of the African Commission on Agricultural Statistics. FAO and other institutions and countries have continued their effort to develop methodologies, but these efforts are far from addressing all challenges for producing accurate agricultural statistics in Africa. There is a need for a comprehensive and integrated methodological research programme which can support efforts to improve agricultural statistics in Africa.

With technological advances, particularly the geospatial information and geo-referencing devices and experiences in other regions, alternative and more efficient methods and tools relevant to African context can be developed and implemented for improving data collection systems for better data quality.

Another factor to consider is the rapidly changing nature of agriculture and the emergence of new issues that make the available data and some methods obsolete. For example, information on bio-fuel, climate change and adaptation and mitigation practices as well as its impact on poverty is seldom collected and little is known about methods and best practices on how to collect that data.

In order to improve agriculture and rural statistics significantly and on a sustainable basis, all these problems need to be addressed as they are inter-related and partial solutions may provide short term improvement but will not be sustainable. Also, in implementing technical solutions, one key aspect often missing is cost-effectiveness and sustainability. Some interesting advanced tools and methods may be implemented on experimental basis. But their translation into operational tools and their sustainability is often not ensured. Therefore, there is still substantial work to be done in both developing new data collection methods and adapting, updating and validating existing methods for agricultural data collection in Africa.

Sound and cost-effective methodologies and tools are cornerstones for building effective and sustainable agricultural statistics systems in Africa. This is why a comprehensive methodological research component is a key element of the effort to improve agricultural statistics in Africa. The results of this component will serve as inputs for both the training component and the technical assistance component.

4. Methodology for developing the research component

The aim of the research component is to address specific methodological challenges faced by statisticians and data users in collecting and using agricultural statistics in Africa. The component takes into account the recommendations from the Stakeholders Conference in Tunis in February 2010.

The Tunis Conference discussed the main components to be included in the Implementation Plan for Africa of the Global Strategy to Improve Rural and Agricultural Statistics and identified the following components that need to be developed:

- Technical Assistance Component: African Development Bank Group (AfDB)
- Training Component: Lead United Nations Economic Commission for Africa (UNECA)
- Research Component: FAO
- Umbrella Framework: FAO
- Governance Mechanism: AfDB

It was agreed that the Implementation Plan for Africa will have a long term perspective (10 to 15 years but will follow a phased approach with the first phase covering the next 5 years (2011-2015). The initial estimation of the budget needed for this first phase will be about 50 millions dollars. The share of the various components will be the following: Technical Assistance (40%), Training (30%), Research (15%), Umbrella Framework (10%) and Governance (5%).

Regarding the research component, the Tunis Meeting identified an initial list of possible topics, mainly based on the recommendations of various Sessions of the biennial meetings of the African Commission on Agricultural Statistics. This initial list includes:

- improvement of estimation of crop area, yield and production, especially in the presence of mixed and/or repeated cropping, yield of root crops, small area estimation, edible forest products, etc.;
- testing of integrating remote sensing into the production of agricultural statistics:
 - (i) linking area frame with list frames for household survey;
 - (ii) how to use remote sensing with a list frame;
 - (iii) complete the FAO handbook on the use of GPS for crop area measurement;
 - (iv) use of Africover for stratification in area frame.
- methodology for food balance sheets compilation, informal cross border trade data, food stocks, farm gate prices;
 - reconciling census data with current survey data;
 - determination of user's (e.g. CAADP) information needs for decision making;
 - integrated agricultural survey methodology (master sampling frames and database); and
 - integration of administrative data for improving agricultural statistics.

The Conference recognised that further work is needed for identifying and prioritising research topics and proposed the following criteria for prioritization of the topics:

- responding to explicit country data needs;
- concerning the core set of variables in the Global Strategy;
- producing economic and social benefit;
- ensuring the integration of agricultural statistics with other domain (e.g. household data integrated with area frame data);
- adding value to existing or planned operational programs.

After the Tunis meeting and in order to identify and better prioritise research topics, a survey questionnaire was developed and sent to all key stakeholders for agricultural statistics in Africa. The population surveyed included African agricultural statisticians, international consultants with long experience in Africa and other developing countries, International and Regional Institutions with experiences relevant to Agricultural Statistics in Africa, Academic and training institutions with experience relevant to Africa, selected Development Partners etc.. It was mainly requested to respondents to rank the criteria and the research topics and to suggest one or 2 important additional ones. Almost all stakeholders surveyed replied, thus 30 filled questionnaires were received and processed. The questionnaires, list of replies and summary of the results of the survey are in annex IV.

According to the replies to the questionnaires, the rank of the criteria by importance is the following:

- a. Responding to explicit country data needs
- b. Concerning the core set of variables in the Global Strategy
- c. Ensuring the integration of agricultural statistics with other domain (e.g. household data integrated with area frame data)
- d. Adding value to existing or planned operational programs
- e. Producing economic and social benefit

The following research topics were submitted to the stakeholders for prioritisation:

Improvement of estimation of crop area, yield and production

This research topic will address various kinds of problems. For pure crops, particular attention will be devoted to:

- data collection methods, also taking into account improvements due technological innovation (e.g. GPS, remote sensing, and so on)
- modelling for yield estimation
- improvement of area estimation that, combined with improved yield estimate, will deliver reliable production estimates for the main crops.

Continuous cropping and harvesting create additional problems linked to the period of data collection and yield estimation.

Concerning yield, the first question is: what is the best methods for estimation in the different country situations? Farmers' declaration, crop cutting, expert estimate, etc.

Much research was carried out, mainly during the eighties, on the so called "objective estimates" for yield estimation and forecasting, using measurements and models as compared to farmers' estimates (FAO, 1982). Some African countries are using crop-cutting as objective estimates; some other countries are using farmers' estimates or estimates by extension workers. The debate on the best approach between crop-cutting and farmers or expert estimates is still on-going with problems linked to probable the positive bias for crop-cutting and questions related to farmers' ability to provide accurate estimate given also the diversity of local measurement unit.

Under this research topic, more comparative studies will be conducted and best country practices will be evaluated in order to provide up-dated guidelines to countries.

Use of GPS in the production of agricultural statistics

The first subject to be investigated under this research topic is to assess under which conditions, the use of GPS devices can replace the traditional method, based on compass and rope, for measuring crop area. The measurement of the area with a GPS device is faster and cheaper than with the traditional method; thus, in case the accuracy of the measurements is acceptable, a larger amount of information can be collected with the same budget and the precision of the estimates of the areas of crops can be increased.

Some research activities have already been carried out. The findings of these researches indicate that low cost handheld GPS devices are a viable alternative to time consuming and cumbersome distance and angle measurement when objective area measurement has to be performed by field staff in agricultural surveys. These devices are particularly relevant when the plots do not have a regular shape, since the accuracy of the GPS is acceptable and its use is faster and simpler. However, more evidence is needed for evaluating the accuracy of GPS measurements for very small plots, in the presence of abrupt slopes and under cloudy or raining weather conditions (see Keita and Carfagna, 2009 and Keita *et al.*, 2010).

Additional field tests will be conducted on small plots, plots on slopes and under different weather conditions.

Other uses of the GPS device for more efficient agricultural survey strategy will be investigated (geo-referencing statistical units as basis for field supervision and linkage to GIS).

Methods for estimating crop area, yield and production of mixed and/or repeated cropping.

The research topic 1 faces the problem of estimating crop area, yield and production; this research topic will focus specifically on estimation problems concerning mixed and/or repeated cropping. These kinds of cropping are common in many African countries and pose considerable estimation problems.

For mixed cropping, the most important problems are: the identification of the appropriate subdivision of the area between the different crops, the error committed, the precision of area estimates, the difficulties in the use of new technologies such as GPS and remote sensing. In some cases, permanent crops and annual crops are cultivated in the same field; in some others, different annual crops are cultivated in the same plot and do not grow in the same period.

For continuous cropping, the most important problem is the estimation of the yield: how and when can the yield be estimated?

Methods for estimating yield of root crops, edible forest products, etc. (total cost 310,400 US dollars).

Some of the main crops in African countries are root crops, thus much attention has to be devoted to the estimate of the yield of this kind of crops which, of course, pose specific estimation problems. Some attempts have been made in developed countries to produce estimates through statistical models based on the collection of a few data or to help the expert in order to reduce his subjectivity. These methods face more problems when the yield of root crops has to be estimated.

Development of master sampling frames

According to the Global Strategy for Improving Agricultural Statistics, the integration of agriculture into the national statistical system will begin with the development of a master sample frame for agriculture which will be the foundation for all data collections based on sample surveys or censuses. The master sample frame allows using both households and farms as statistical units and provides a linkage between the census framework and land use.

The basic principles are that all data collections will be based on sample units selected from the master sample frame, data collections integrated into the survey framework, and the resulting official statistics residing in the data management system.

The master sample frame must provide the basis for the selection of probability based samples of farms and households with the capability to link the farm characteristics with the household and then connect both to the land cover and use dimensions. The area sample frame meets this requirement. The methodology using the population census recommended for the World Program for the Census of Agriculture will also meet this requirement if—households from the population census are geo referenced and used as the frame for the agricultural census—and linked to satellite images of land use.”

Relevant Technical guidelines are needed for countries in different situations to implement these recommendations.

Linking area frames with list frames

Multiple frames (FAO 1996, FAO 1998, Carfagna 2001, Carfagna and Carfagna 2010) can be used to create a master frame which builds on the advantages of area frames and list frames. Once the country has

established the area frame, it could begin creating a list register of large or specialized farms to use in a multiple frame context. Nevertheless, the area frame can become the master sample frame for agriculture with the capability to directly link or geo reference farms and households with their associated land holdings. In case sample segments or points are associated with the census enumeration areas or administrative units, the master frame becomes part of the population census framework.

As many African countries are still using list frames derived from Population Censuses for their agriculture and household surveys, relevant and updated guidelines are needed to assist countries in linking area frames with list frames in an integrated survey framework.

Development of an integrated survey programme

The Global Strategy to Improve Agricultural and Rural Statistics stipulates that: “An integrated survey framework will be established to provide data measured consistently across time and comparable across countries using an annual survey of selected core items and rotating panels covering economic and environmental issues. The concept of a master sample frame will be extended to include a data management system for all official statistics related to agriculture.

The basic principles are that all data collections will be based on sample units selected from the master sample frame, data collections integrated into the survey framework, and the resulting official statistics residing in the data management system.”

This research topic addresses the issues related to the development of an integrated survey program in view of providing technical guidance to countries.

Methodology for the compilation of food security statistics

As stated in the Global Strategy to Improve Agricultural and Rural Statistics, the food security statistics are essential: “Food security is an essential requirement of any country. Assessing food security at the national level involves information on commodity production, using many of the indicators necessary for measuring productivity and enhancing the efficiency of markets. In addition, food security includes consideration of food trade and non-food use (fuel, drug industry, seed, feed, etc.). Information is also required on consumption by agricultural and non-agricultural households. The information collected in household surveys on food demand involves all households in the country, i.e. urban and rural (agricultural and non-agricultural). Food security also requires information to assess the food gap in terms of nutrients.”

Relevant guidelines are needed for countries at different levels of statistical development to compile Supply Utilisation Accounts and Food Balance Sheets, collect, compile and analyse food security indicators using integrated household surveys, agricultural censuses and other relevant data collection activities.

Estimation of food stocks

Reliable data on food stocks are essential for producing food balance sheets and for food security; however, statistics on stocks are very difficult to produce. When a limited number of enterprises account for most of the stocks, an acceptable underestimate of food stocks can be obtained; in other cases, producing reliable estimates is difficult and requires a considerable amount of resources.

Under this topic, best country practices will be documented and empirical studies will be conducted in order to provide relevant guidance to countries

Estimation of farm gate prices

Producers' prices for core crops, livestock, forestry and fishery should be produced regularly, since they strongly affect the economic conditions of the producers and their decision, such as seeding the next year.

Relevant technical guidelines are needed for countries to apply standard methods for collecting farm gate prices.

Reconciliation of census data with survey

In many African countries, where an integrated agricultural survey methodology (master sampling frames and database) is not adopted, the discrepancy between census data and survey data can be significant and can create serious difficulties to decision makers.

It is therefore envisaged under this topic to document best country practices and prepare technical guidelines to assist countries in reconciling census and survey data.

Determination of user's information needs for decision making

User's information needs should guide the production of agricultural statistics; however these needs are not easily identifiable, since in many cases users are not completely aware of their needs.

A research in this field will provide technical guidance on the best approach to systematically and regularly determine user's needs as basis for user-driven statistical systems.

Use of small area estimation methods for improving agricultural statistics

Resources available for producing agriculture statistics are limited, particularly in African countries; nevertheless, information is often required by users at high level of detail, particularly small geographical domains. In some cases, simple or sophisticated models and auxiliary variables can facilitate the production of statistics for small domains. The use of these techniques is called small area estimation. The accuracy of this estimation depends on the kind of model and on the quality of the information used. Administrative or remote sensing data are often used as auxiliary variables.

The research will evaluate the capability of small area estimation methods to produce accurate agriculture statistics for small geographical domains in African countries.

Use of remote sensing

Remote sensing data can give an important contribution for improving agriculture statistics in Africa. They can be used for a variety of purposes, such as estimating the cultivated area of countries or improving the precision of the estimates for specific crops. A major topic of research is the cost efficiency of the integration of remote sensing and ground surveys in African countries.

Other research topics are the use of AFRICOVER or more detailed land use/cover databases for stratification, the use of remote sensing data for small area estimation, the assessment of the most appropriate area frame for specific landscape types and the possibility of combining households surveys with remote sensing data (see Gallego *et al.* 2010, Gallego and Carfagna 2005, FAO, 1988).

Estimation of informal cross border trade data

Reliable data of food trade are essential for estimating the food availability and producing food balance sheets. However, the cross border trade is often informal; thus this kind of trade has to be estimated.

Use of administrative data for improving agricultural statistics

Administrative data have an important and increasing role in the production of agricultural statistics in various countries in the world. However, when administrative data are collected, the aims and the methods are very different from statistical ones and affect the results. Good quality administrative data can be profitably used for improving agricultural statistics using different techniques (Carfagna and Carfagna 2010). The possibility of using administrative data in African countries will be tested.

Methodology for estimating livestock population

The core livestock items include cattle, sheep, pigs, goats, and poultry. These are the major contributors to food supply and income to agriculture. Consumption increases as countries develop, therefore requiring more livestock consuming grain and adding to methane emissions. All these elements can be affected by policy decisions; thus estimating the livestock population is very important.

However, in presence of nomadic livestock system, production of accurate estimates of livestock numbers and production is a challenge in many African countries (FAO, 1992).

The replies to the questionnaires were analyzed in order to prioritize the research topics within the envelope foreseen for this component and focus on the topics with the highest priority. The resulting order is the following:

PRIORITY LEVEL 1: “Improvement of estimation of crop area, yield and production

PRIORITY LEVEL 2

- a "Use of GPS in the production of agricultural statistics";
- b "Development of master sampling frames"

PRIORITY LEVEL 3

- a "Methodology for the compilation of food security statistics";
- b "Methods for estimating crop area, yield and production of mixed and/or repeated cropping";
- c "Methods for estimating yield of root crops, edible forest products, etc."

PRIORITY LEVEL 4: "Development of an integrated survey programme"

PRIORITY LEVEL 5

- a "Linking area frames with list frames";
- b "Estimation of food stocks";
- c "Estimation of farm gate prices"

PRIORITY LEVEL 6: "Reconciliation of census data with survey data"

PRIORITY LEVEL 7:

- a "Use of remote sensing"
- b "Determination of user's information needs for decision making"

PRIORITY LEVEL 8: "Use of small area estimation methods for improving agricultural statistics"

PRIORITY LEVEL 9

- a "Estimation of informal cross border trade data";
- b "Use of administrative data for improving agricultural statistics"

In addition, the following topics were proposed by some of the respondents:

- Reconciliation of households survey (user) with farm structure survey (producer);
- Improved sample design for areas with low population densities;
- Estimation of costs of production for main agricultural chains;
- Estimation of key environment indicators;
- Integrated sample surveys for estimation of livestock products, including meat, milk, etc.);
- Sample survey for estimation of fisheries statistics (both inland and marine);
- Connection between the statistical methods for national statistics, and those for the agricultural research community;
- Automatic data processing;
- Conducting agriculture census with complete enumeration using remote sensing;

- Management of the sample in the case of annual agricultural surveys in the framework of a permanent system for agricultural statistics;
- Methods for estimating agriculture productivity;
- Method of estimating horticulture production (fruits and vegetables);
- Crop forecasting methods

Other important areas include issues related to collecting data on agricultural and rural markets, especially factors and product markets that affect agricultural activities.

The methodology for estimating livestock was included in the list of prioritized topics since this was the most requested topic among the additional topics proposed (5 out of the 19 additional topics).

During the meeting of main Stakeholders in FAO Headquarters held on 13 and 14 September 2010, to review and discuss the first draft proposals of the components of the implementation plan for Africa of the Global Strategy, the following final criteria for selecting and ranking research topics were adopted;

- Contribution of topics to implementation of Global Strategy recommendations
- Thematic grouping of topics using expert knowledge
- Use results of stakeholder surveys

The thematic domains were identified as follow:

I Reference framework - The second pillar of the Global Strategy is the integration of agriculture into the national statistical systems in order to meet policy maker and other data user expectations that the data will be comparable across countries and over time.

The integration will be achieved by implementing a set of methodologies which include the development of a Master Sample Frame for Agriculture, the implementation of an Integrated Survey Framework and the availability of the results in a Data Management System.

The guidelines proposed under the Reference framework will assist countries in their efforts to integrate agriculture into national statistical systems by providing adequate guidance on defining key elements for an integrated agricultural statistics programme, mainstreaming agriculture into NSDS and implementing an integrated survey framework.

II Master Frame for integrated survey - The integration of agriculture into the national statistical systems will begin with the development of a master sample frame for agriculture which will be the foundation for all data collections based on sample surveys or censuses.

The master sample frame allows the use of both households and farms as statistical units and provides a linkage between the census framework and land use. The basic principles are that all data collections will be based on sample units selected from the master sample frame, data collections integrated into the survey framework, and the resulting official

statistics residing in the data management system. The master sample frame must provide the basis for the selection of probability based samples of farms and households with the capability to link the farm characteristics with the household and then connect both to the land cover and use dimensions. The area sample frame meets this requirement.

The methodology using the population census recommended for the FAO World Program for the Census of Agriculture 2010 will also meet this requirement if households from the population census are geo referenced and used as the frame for the agricultural census and linked to satellite images of land use. The use of GPS in the production of agricultural statistics guaranties the geo-referencing of data collected, particularly households and plots.

The master frame for integrated survey also includes the use of an area frame in conjunction with one of the list frames which allows taking advantage of the strengths and weaknesses of each. This approach is particularly appropriate where there is a large variation in the sizes and types of agricultural holdings with a subset of large commercial farms. The list of commercial farms can be stratified by size and type, and the area frame ensures the population is completely covered by providing coverage of the small and subsistence farms, for more details see FAO, 1996 and FAO 1998.

In order to create a master frame for integrated survey, remote sensing data can be very useful for:

- creating area frames
- improving integration of data bases
- improving estimates through regression and calibration estimators

Remote sensing data can also be used for producing vegetation indices that show overall crop conditions plus information about changes in land cover and use. Wide literature is available in these fields (see Gallego et al., 2010, Gallego and Carfagna, 2005, Doraiswamy et al., 2005, Dorigo et al., 2007, Hannerz and Lotsch, 2008, Carfagna and Marzialetti, 2009 a, b., Gallego, 2004).

III Data collection methods - The complete survey framework includes the sample design, questionnaires, data collection methods, analysis, and estimation. It also takes into consideration the data sources in addition to sample surveys that provide input into the survey framework. A fundamental way to evaluate agriculture's affect on the environment is to monitor changes in land cover and use. Land cover does not change rapidly; therefore, the data are not required annually.

Practical handbooks will be prepared on the basis of good practices and empirical studies for use by agricultural statisticians.

Guidelines will be prepared for more cost-effective data collection methods on a variety of issues specific to developing countries agriculture.

IV Food security - The social dimension of the Global Strategy covers the need to reduce risk and vulnerability, including food security and issues related to gender.

Improved methods for producing food security data will be developed.

V Market information - Market information affects agricultural activities and farmers' decisions.

Adequate methodologies will be developed to produce farm gate prices, data on rural and border markets and data on production factors.

VI Data analysis - Basic information has to be carefully analysed in order to understand and monitor the agricultural sector. Reconciliation of census data with survey data, determination of user's information needs for decision making and use of small area estimation methods for improving agricultural statistics are particularly important and will be subject to appropriate methodological research.

VII Improvement and use of Administrative data - Governmental interventions such as subsidies, regulation and legislation often require agricultural holders to report production information. Land ownership and cadastral surveys provide useful information for constructing registers. Many references can be given on the use of administrative data for agricultural statistics (ESSnet ISAD, 2008, European commission 2003, Lavallée, 2005, Selander et al., 1998, Wallgren and Wallgren, 1999, 2007 and 2009).

Then, food inspections, animal health inspections, and trade data provide input to the utilization accounts.

Within each thematic domain, the main issues were identified. Some of such issues correspond to the research topics already included in the list of topics submitted to the stakeholder, some others were suggested by the participants to the meeting in Rome. Within each thematic domain, the rank of the research topics is given according to the replies of the stakeholders.

Table 1 shows the rank of the thematic domains and of the corresponding research topics. The table also shows the pillar of the Global Strategy the research topic contributes to implement. The research topics are classified according to their relevance mainly to Africa or also to other regions of the world.

Table 1:
Rank of the thematic domains and of the corresponding research topics

Thematic domain	Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions
Reference framework	Framework for development of an integrated agricultural statistics programme	II pillar		X
	Mainstreaming agriculture into NSDS	II pillar		X
	Implementation of an Integrated Survey Framework	II pillar		X

Thematic domain	Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions
Master frame for integrated survey	Use of GPS in the production of agricultural statistics	II pillar		X
	Linking area frames with list frames	II pillar		X
	Use of remote sensing	II pillar		X
Data collection methods	Improvement of estimation of crop area, yield and production	I pillar	X	X
	Methods for estimating crop area, yield and production of: <ul style="list-style-type: none"> • mixed crops • repeated cropping • continuous cropping 	I pillar	XX X	X
	Methods for estimating yield of root crops	I pillar	X	X
	Cost of production	I pillar	X	X
	Methodology for: <ul style="list-style-type: none"> • enumerating nomadic livestock • estimating livestock products 	I pillar	X X	X
	Adoption of new technologies	I pillar		X
	Forestry and deforestation	I pillar		X
	Crop forecasting and early warning	I pillar		X
	Inland fishery, aquaculture	I pillar		X
	Interaction between climate, environment, global warming and agriculture	II pillar		X
	Land cover monitoring	II pillar		X
	Food security	Methodology for the estimation of: <ul style="list-style-type: none"> • supply utilization account • food balance sheets • food stocks • edible forest products 	II pillar	X X X
Nutrition indicators		II pillar	X	X
Use of households surveys / LSMS for food security indicators		II pillar	X	X
Market information	Estimation of farm gate prices	I pillar	X	X
	Collecting data on agriculture rural and border market prices	I pillar	X	X
	Collecting data on factors and product markets affecting agricultural activities	I pillar	X	X
Data analysis	Reconciliation of census data with survey data	II pillar		X
	Determination of user's information needs for decision making	II pillar		X

Thematic domain	Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions
	Use of small area estimation methods for improving agricultural statistics	II pillar		X
Improvement and use of administrative data	Improvement of administrative data	II pillar	X	X
	Use of administrative data for improving agricultural statistics	II pillar	X	X
	Estimation of informal cross border trade data	II pillar	X	X

Pillar I: establishment of a minimum set of core data

Pillar II: integration of agriculture into the national statistical system

In developing the Research Component Project Framework, specific activities that need to be undertaken were identified as well as outputs to be produced and resources required.

It is recognised that this list reflects the current issues and regular review and up-dating is required to address new and emerging priorities.

Part 2. Project framework

1. Impact

The overall objective of the Research component is to support the implementation of the Global Strategy for Agricultural and Rural Statistics in Africa, through: (i) the establishment of a minimum set of core data to meet current and emerging demands; (ii) the integration of agriculture into the national statistical systems; and (iii) improved governance of agricultural statistics systems and capacity building.

2. Outcomes, outputs and activities

2.1. Outcome

The purpose of the project is to prepare technical guidelines, and handbooks on advanced methodologies, standards and tools related to the pillars of the Global Strategy to Improve Agriculture and Rural Statistics in the following priority areas:

Reference framework: Framework for development of an integrated agricultural statistics programme; Mainstreaming agriculture into NSDS; Implementation of an Integrated Survey Framework

Master frame for integrated survey: Use of GPS in the production of agricultural statistics; Linking area frames with list frames; Use of remote sensing.

Data collection methods: Improvement of estimation of crop area, yield and production; Methods for estimating crop area, yield and production of mixed crops, repeated cropping, continuous cropping; Methods for estimating yield of root crops; Cost of production; Methodology for enumerating nomadic livestock, estimating livestock products; Adoption of new technologies ; Forestry and deforestation; Crop forecasting and early warning; Inland fishery, aquaculture; Interaction between climate, environment, global warming and agriculture; Land use/Land cover monitoring.

Food security: Methodology for the estimation of supply utilization account, food balance sheets, food stocks, edible forest products; Nutrition indicators; Use of households' surveys / LSMS for food security indicators.

Market information: Estimation of farm gate prices; Collecting data on agriculture rural and border market prices; Collecting data on factors and product markets affecting agricultural activities.

Data analysis: Reconciliation of census data with survey data; Determination of user's information needs for decision making; Use of small area estimation methods for improving agricultural statistics.

Administrative data: Improvement of administrative data; Use of administrative data for improving agricultural statistics; Estimation of informal cross border trade data.

The outcome is Technical guidelines, and handbooks on advanced methodologies, standards and tools for reliable and cost effective agriculture and rural data collection adopted and used.

2.2. Outputs

The outputs expected are the following:

1. Report with final list of criteria and priority research topics validated by main stakeholders during a regional workshop back-to back with AFCAS
2. For each priority topic, reports on the on:
 - a. going or already completed research activities on the selected priority topics
 - b. review of relevant literature (« état des lieux » and « state of the art »)
 - c. gaps analysis and remaining methodological issues identified
 - d. potential partner technical institutions
3. Empirical studies designed, and field tested by relevant technical partner institutions
4. Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts
5. Guidelines and handbooks prepared and disseminated
6. Training material prepared on the basis of guidelines and handbooks

2.3. Activities

The following activities will be undertaken in order to produce these outputs (see also the logical framework and work plan, respectively in Annexes I and II)

Table 2: Outputs and activities

Outputs	Activities
1. Report with final list of criteria and priority research topics validated by main stakeholders during a regional workshop back-to back with AFCAS	1.1. Prepare the report with final list of prioritised topics following various consultations (Rome meeting, Kampala meeting, meeting with Donors, etc.)
2.1 Report on on-going or already completed research activities on the selected priority topics	2.1 Collect information concerning the on-going or already completed research activities on the selected topics
	2.2 Analyse the replies to the survey in order to identify possible partner institutions
2.2 Potential partners identified	2.3 Identify additional expertise on the research topics
2.3 Reports on:	2.4 Create small expert groups on various research topics which will help the research unit to identify the best partners
• review of relevant literature	2.5 Prepare the contracts for the partners (academic

Outputs	Activities
(« état des lieux » and « state of the art ») • gaps analysis and remaining methodological issues identified	institutions, research centres, individual experts, etc.)
	2.6 Coordinate the activities of the partners
	2.7 Facilitate networking among the partners
	2.8. Identify the relevant literature concerning the priority topics
	2.9. Review of the literature concerning the priority topics
	2.10. Identify and analyse the gaps and remaining methodological issues within the Global Strategy Implementation Office and in close consultation with the leaders of the training and technical assistance components, the Friends of the Chair, relevant research centres, other stakeholders and the donors
	2.11 Prepare a draft report on the on-going or already completed research activities and the gaps on the selected topics and literature review
	2.12 Organise workshops concerning the on-going or already completed research activities on the selected topics and literature review
3. Empirical studies designed, and field tested by relevant technical partner institutions	3.1. Design studies for the field tests
	3.2. Set up the methodology and the instruments (questionnaires, manuals, etc.)
	3.3. Select the countries and the samples for the experiments
	3.4. Conduct the field tests
4. Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts	4.1. Process and analyse the results
	4.2 Prepare a report on the findings and recommend possible solutions to issues
	4.3. Select the experts for the peer review and expert validation
	4.4. Submit the reports prepared to the experts
	4.5. Peer review and expert validation through a technical workshop
5. Guidelines and handbooks prepared and disseminated	5.1. Analysis of the results of the peer review and the expert validation
	5.2. Prepare relevant guidelines and handbooks
	5.3. Discuss the guidelines with the leaders of the training and technical assistance components, the Friends of the Chair, relevant research centres and other stakeholders within the umbrella component and finalise the guidelines
	5.4 Publication of handbooks and the guidelines
	5.5. Organise of dissemination workshop with countries and other stakeholders
	5.6. Disseminate the publications on the web
6. Training material prepared on the basis of guidelines and handbooks	6.1. Close interaction between the research component, the training component and the technical assistance component in order to take into account the results of the research and the guidelines when preparing the most advanced training material

3. Sustainability

It is crucial that the research topics will provide clear guidelines which can be effectively followed by African National Statistical Systems or by Ministries of Agriculture.

The following will be done to increase the prospects for sustainability:

Ownership

Stakeholder ownership of the results of the research activities will be promoted throughout the life cycle of the project, in particular, key African stakeholders.

Use of existing structures

To the extent possible, the existing structures will be used instead of creating parallel structures. Whenever possible, structures of the African Statistical System and African research institutes will be involved.

Mainstreaming project activities in NSS

Countries and organizations will be encouraged to implement project activities as part of their current activities in agricultural statistics supported by their respective governments. This will be done through extensive advocacy among high level policy and decision-makers.

Donor support

The donor support will allow producing guidelines which will allow the countries to improve their capability to produce reliable agricultural statistics. The implementation of the guidelines will require decreasing support from the donors with the increase of the experience of the countries in data collection, elaboration and analysis.

Over time, producing the minimum core data will constitute routine activities of NSSs in the countries.

4. Risks and assumptions

The risk management will be kept dynamic throughout the whole project life cycle. A Risk Log of all the unresolved problems and risks associated with the problems which may arise during a project will be maintained.

Possible important risks which could jeopardize the realization of the project outcomes and related mitigating measures that would minimize their impact on the success of the project are presented in table 3 below. The corresponding risk descriptions are also presented in the same table.

The assumptions, however, are basically the conditions needed to achieve results after the risks have been managed. For this reason, they have been defined for each activity and included within the logical framework (see Annex I).

Table 3:
Risks to project outcomes

Risk drivers	Description/Discussion	Mitigating measures
1. Donor coalition risks		
1.1 Unsustainable donor commitments	The donor commitment to fund parts of the project may not be sustainable along the whole life of project cycle	- The research component is conceived as a set of topics which can be supported and implemented separately and coordinated
1.2 Difficulties in mobilization and securing all funds required to cover project cost	It may not be easy to mobilize timely the total funds required to complete the project	- The research topics are standalone projects which do not need to start at the same time
1.3 Large project size	The research component faces many different methodological problems	- The research topics are prioritized in order to facilitate the choice of a subset of research topics, in case the donors are not able to support the whole research component
2. Project management risks		
2.1 Problems to coordinate the research component	The heterogeneity of the research topics requires the contribution of experts with diversified know how	- FAO will coordinate the implementation of all the activities
2.2 Weak coordination with the other components of the implementation plan	The research component could be weakly coordinated with the technical assistance a training components	- The umbrella framework has been conceived to guarantee coordination and integration of the technical components
2.3 Weak risk management system	If all possible risks are not regularly monitored, evaluated/controlled, and mitigated, they may arise and compromise the success of the project	- To put into place an operational risk management plan. - To ensure that related regular reports on the progress made are issued and discussed with the senior management, and the mitigating measure executed.
2.4 Inadequate allocation of resources (budget, human and materials) and delay in resource disbursement	The planning may have underestimated some required resources. Or disbursement of some resources may be delayed	- To revise regularly the budget and work plans - To ensure timely disbursement of all required resources

Part 3. Implementation and management arrangements

1. Institutional framework and implementation

The following will be done to ensure that the project contributes to successful achievement of intended outcomes in a timely and efficient manner.

As recommended by the stakeholder during the Tunis meeting, the research component will be coordinated, supervised and financially managed by a centralized body. The Global Strategy Implementation Office located at FAO will be the central unit responsible for the implementation of the research component. Many of the topics are relevant for more than one region and the best institutions to implement the research may be located in any region. FAO will work with the most qualified regional and international structures for a decentralized implementation.

Special attention will be given to the following points:

- supervision and coordination on how resources are used;
- transparency at the level of management;
- the assignment of subcontracts on tender basis or on comparative advantage basis (whenever possible to African institutions) depending on the topic, once a coordinating structure for research has been established;
- existing good models such as FARA and others.

The institutional framework for implementing the Research component will include a Research Unit of the Global Strategy Implementation Plan located at FAO which will work closely with Advisory Expert Groups selected from a network of specialists (institutions, academia, and individual experts). The conduct of the research on specific topics will be lead by selected partner institutions/experts under the technical supervision of the Research Unit and Advisory Expert Group.

1. Research Unit of the Global Strategy Implementation Office

The Research Unit of the Global Strategy Implementation Office will be in charge of the coordination and the quality control of the research and will be lead by one senior statistician, one statistician and an assistant. This unit will work in close collaboration with advisory expert groups.

The Research Unit will:

- Analyze the replies to the survey in order to identify possible partners;
- Identify additional expertise on the research topics;
- Create relevant advisory expert groups on the main topics which will collaborate with the research unity to identify the best partner institutions/experts to lead the research on specific topics;
 - Prepare the contracts for the lead partners (academic institutions, research centres, individual experts, etc.);
- Coordinate and facilitate the activities of the lead partners;
- Facilitate networking among the lead partners.

- Organise relevant workshops to review the gap analysis report and plans for empirical studies proposed by the lead partner
- Assist in the selection of countries and facilitate the implementation of the empirical studies by the lead partner.
- Review the findings and recommendations from the empirical studies prepared by the lead partner
- Select the experts for the peer review and expert validation of the findings and recommendations and submit the report
- Organise a technical workshop for peer review and expert validation of the findings and recommendations
- Analyse and summarise the results of the peer review and the expert validation and submit them to lead partner for preparation of a revised report
- Review the revised report and provide guidance to the lead partner to prepare relevant guidelines and handbooks
- Discuss the guidelines with the leaders of the training and technical assistance components, the Friends of the Chair, Advisory Expert Group and other stakeholders and finalise the guidelines;
- Coordinate the activities for the publication of handbooks and guidelines;
- Organise dissemination workshops with countries and other stakeholders;
- Disseminate the publications on the web;
- Ensure close interaction between the research component, the training component and the technical assistance component in order to take into account the results of the research and the guidelines when preparing the most advanced training material.
- Establish and facilitate a wide network of experts on various topics;
- Identify, centralise and disseminate relevant good practices as a knowledge sharing centre using web based tools

2. Advisory Expert Groups

The Advisory Expert Groups will provide technical advice to the Research Unit in their domains of expertise in order to ensure that the methodological research is implemented using the best technical standards. The Groups will:

- Collaborate with the research unit to identify and select the best partner institutions/experts to lead the research on specific topics;
- Provide advice on the gap analysis report prepared by the lead partner institution
- Participate in technical workshops and provide comments on gaps analysis and plans proposed by the lead partners to conduct empirical studies to fill the gap;
- Advise the Research Unit and lead Partner on the selection of countries for field test

- Contribute to the Peer Review of the findings and recommendations proposed by the lead partners from empirical studies
- Participate in the expert meeting to validate the findings and recommendations
- Review the draft guidelines and handbooks prepared by the lead partner and Research Unit
- Contribute to wide dissemination of the handbook and guidelines
- Assist the Research Unit in identify emerging topics and new methodological developments in their domains of expertise

3. Lead implementation partners

The lead partner will be mainly responsible for the conduct of research on a specific topic for which it has well established expertise and preparation of relevant handbooks and guidelines. The Lead partner will work under the technical supervision of the research unit and will undertake the following tasks in close collaboration with the Research Unit and the Advisory Expert Group:

- Identify the relevant literature concerning the specific priority topic;
- Review the literature concerning the priority topic;
- Identify and analyse the gaps and remaining methodological issue in close consultation with the leaders of the training and technical assistance components, the Friends of the Chair, relevant advisory expert group, other stakeholders and the donors;
- Prepare a draft report on the on-going or already completed research activities and the gaps on the selected topics and literature review;
- Prepare a plan for conducting empirical studies to fill the gap (design of the study, methodology, instruments)
- Organise technical workshops to present and discuss the findings of the gap analysis and proposed plan for conducting empirical studies to fill the gap;
- Select the countries and the samples for the experiments;
- Conduct the field tests;
- Process and analyse the results;
- Prepare a report on the findings and recommend possible solutions to issues;
- Revise the report to take into account the feedback from Peer Review and Validation Workshop
- Prepare relevant guidelines and handbooks.

Consistency between the research and the other technical components will be ensured through an overall technical framework which will also allow the integration of the regional implementation plan with the global implementation plan.

As indicated in the Governance mechanism, the proposed regional governance structures for the implementation of the Global Strategy in Africa include a Regional Steering Committee and a Regional Implementation Secretariat.

The Regional Steering Committee will be responsible for overall coordination and accountability for Strategy implementation. It will be chaired by the Chief Economist and Vice President of the AfDB, to raise the profile of the Committee and its role in the Strategy implementation in Africa.

A Regional Implementation Secretariat will be established at AfDB as part of its current statistical capacity building infrastructure. The other two technical component leaders (FAO and UN-ECA) will be members of the Secretariat. Its responsibilities will include, inter alia, mobilizing and allocating resources, monitoring, evaluating and reporting on Strategy implementation. Where appropriate, Regional Economic Communities and sub-regional organizations like AFRISTAT and Regional Statistical Training Centres will be involved in the implementation of the Strategy. Countries, which are the main beneficiaries of the Strategy, will be assisted to implement the Strategy using, whenever possible, the existing statistics coordination structures.

Ownership and participation

As stated earlier, stakeholder ownership of the results of the research and participation in the research activities will be promoted throughout the life cycle of the project, in particular, key African stakeholders. Ownership leads to more commitment, creativity, imagination, innovation and productivity.

Phased implementation

The different research topics can be implemented as standalone projects, although coordinated by the umbrella component. This organisation will allow a phased implementation, in case the whole budget foreseen will not be available. The prioritization of the research topics will facilitate the phased approach.

Monitoring and reporting

A system for monitoring and reporting on implementation at every level will be established. Performance indicators, targets and milestones will be used to know if implementation is on course. One important part of the monitoring and reporting system will be to learn and adjust during implementation.

2. Inputs/budget

This sub-section gives the budget and other inputs required for the implementation of the research component of the project (and not the whole project). The preliminary estimation of the cost of the activities to be executed in the course of the implementation of the Research Component of the Strategy (from 2011-2015) is estimated at **14,894,745 US dollars**. The totals for each research topic are the following:

Table 4.
Budget of the research component

Thematic domain/Research topic	Human resources US\$	Workshop and technical export meetings US\$	Empirical studies US\$	Publication US\$	Total US\$
Prioritization of criteria and research topics	19,950	50,050			70,000
Reference framework 584,010 US\$					
Framework for the development of an integrated agricultural statistics system	39,930				39,930
Mainstreaming agriculture into NSDS	39,930				39,930
Implementation of an Integrated Survey Framework	211,950	79,500	182,700	30,000	504,150
Master frame for integrated survey 1,154,150 US\$					
Use of GPS in the production of agricultural statistics	60,750	36,250	60,900	10,000	167,900
Linking area frames with list frames	139,050	36,250	115,800	10,000	301,100
Use of remote sensing	211,950	79,500	383,700	10,000	685,150
Data collection methods 4,118,500 US\$					
Improvement of estimation of crop area, yield and production	271,500	79,500	182,700	30,000	563,700
Methods for estimating crop area, yield and production of mixed crops, repeated cropping and continuous cropping	142,350	36,250	121,800	10,000	310,400
Methods for estimating yield of root crops	142,350	36,250	121,800	10,000	310,400
Methodology for enumerating nomadic livestock and for estimating livestock products	271,500	79,500	182,700	30,000	563,700
Cost of production	139,050	36,250	115,800	10,000	301,100
Adoption of new technologies	139,050	36,250	115,800	10,000	301,100
Forestry and deforestation	139,050	36,250	115,800	10,000	301,100
Crop forecasting and early warning	271,500	79,500	182,700	30,000	563,700

Thematic domain/Research topic	Human resources US\$	Workshop and technical export meetings US\$	Empirical studies US\$	Publication US\$	Total US\$
Inland fishery, aquaculture	139,050	36,250	115,800	10,000	301,100
Interaction between climate, environment, global warming and agriculture	139,050	36,250	115,800	10,000	301,100
Land cover monitoring	139,050	36,250	115,800	10,000	301,100
Food security 2,222,400 US\$					
Methodology for the estimation of supply-utilisation accounts and food balance sheets	453,600	159,000	365,400	40,000	1,018,000
Methodology for the estimation of food stocks	139,050	36,250	115,800	10,000	301,100
Methodology for the estimation of edible forest products, etc.	139,050	36,250	115,800	10,000	301,100
Nutrition indicators	139,050	36,250	115,800	10,000	301,100
Use of households surveys / LSMS for food security indicators	139,050	36,250	115,800	10,000	301,100
Market information 903,300 US\$					
Estimation of farm gate prices	139,050	36,250	115,800	10,000	301,100
Collecting data on agriculture rural and border market prices	139,050	36,250	115,800	10,000	301,100
Collecting data on factors and product markets affecting agricultural activities	139,050	36,250	115,800	10,000	301,100
Data analysis 799,800 US\$					
Reconciliation of census data with survey data	139,050	36,250	115,800	10,000	301,100
Determination of users' Information needs for decision making	90,450	36,250	60,900	10,000	197,600
Use of small area estimation methods for improving agricultural statistics	139,050	36,250	115,800	10,000	301,100
Improvement and use of administrative data 1,086,350 US\$					
Improvement of administrative data	139,050	36,250	115,800	10,000	301,100
Estimation of informal cross border trade data	139,050	36,250	115,800	10,000	301,100
Use of administrative data for improving agricultural	211,950	79,500	182,700	10,000	484,150

Thematic domain/Research topic	Human resources US\$	Workshop and technical export meetings US\$	Empirical studies US\$	Publication US\$	Total US\$
statistics					
Total Research topics	10,938,510				
Research Unit <i>Technical coordination and supervision (1 P4, 1 P2, 1 Assistant)</i>	2,242,680				
Total Research topics + Total technical coordination and supervision	13,181,190				
Indirect support cost (13%)	1,713,555				
GRAND TOTAL	14,894,745				

QUICK WINS

It is recognised that the mobilisation of resources and setting of the administrative arrangements for implementing the full Research component may take several months.

Many issues identified as priority topics could be implemented as soon as corresponding resources are available with minimum administrative arrangements. In fact work is going on for some of the topics by various institutions, including FAO and what is needed is to finalise the activities and produce the guidelines. Other topics require limited resources to produce highly needed technical guidelines.

It is therefore proposed to mobilise as soon as possible resources to focus on a limited number of highly needed/easy to implement topics which can produce results in the short term as quick wins.

The following topics and resources are proposed:

Table 5: Proposed topics for immediate implementation (quick wins)

Thematic domain	Selected Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions	Status	Expected time to completion	REVISED COST
Reference framework	1. Framework for development of an integrated agricultural statistics programme	II pillar		X		9 months	40,000

Thematic domain	Selected Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions	Status	Expected time to completion	REVISED COST
	2. Mainstreaming agriculture into NSDS (<i>finalise and publish the draft FAO/PARIS21 guidelines</i>)	II pillar		X	Draft available	3 months	40,000
Master frame for integrated survey	3. Use of GPS in the production of agricultural statistics (<i>additional field test for use of GPS to measure crop area in presence of slopes and cloudy conditions</i>)	II pillar		X	Draft handbook. Additional work on slopes and other conditions	6 months	90,000
Data collection methods	4. Improvement of estimation of crop area, yield and production (<i>field test of various methods for estimation of yield</i>)	I pillar		X	Focus on yield and production	9 months	100,000
	5. Cost of production (<i>finalise the documentation of selected country experiences as input to a comprehensive guidelines</i>)	I pillar	X	X	Work initiated	6 months	50,000
	6. Methodology for enumerating nomadic livestock (<i>finalise and publish draft</i>)	I pillar		X			

Thematic domain	Selected Research topic	Pillar of the Global Strategy	Relevant to Africa mainly	Relevant also to other regions	Status	Expected time to completion	REVISED COST
	<i>document on selected country experiences)</i>						
Food security	7. Methodology for the estimation of supply utilization account and food balance sheets (<i>finalise the draft methodological document being prepared by FAO</i>)	II pillar		X	Draft available Work initiated	3 months 3 months	40,000 40,000
Market information	8. Estimation of farm gate prices (<i>document country practices and prepare a best practice document</i>)	I pillar	X		Work initiated	9 months	50,000
Data analysis	9. Reconciliation of census data with survey data (<i>document selected country experiences as input to more comprehensive methodological guidelines</i>)	II pillar		X		6 months	50,000
TOTAL							500,000

All listed research topics are relevant to Africa, but some of them are also relevant to other regions, as described in table 1. Thus, we include in the budget to the Research Component for the Implementation Plan for

Africa only the costs for the research topics relevant to Africa mainly and the quick wins. The breakdown of this budget per year is presented in Annex III. In Annex IV, the breakdown of the budget for the research topics relevant also to other regions is shown. It is important to recall that also these research topics have to be implemented in the five years period.

Part 4. Oversight, monitoring, communication and reporting

1. Oversight and reviews

The overall oversight for the implementation plan will be under the responsibility of the structures defined in the Governance mechanism. At least 2 review and monitoring meetings will be organized each year to evaluate progress in the implementation.

2. Monitoring and evaluation system

The research component activities will be monitored especially with respect to their deadlines and ensuring the required quality of deliverables. The implementation of the research topics will be regularly assessed and evaluated.

The umbrella component will coordinate, monitor and evaluate the technical activities.

The table below will show the milestones/benchmarks for the research component to be reached (target indicators) by the end of the first five years of the project life cycle and related monitoring progress indicators (performance indicators).

Table 6: Milestones/benchmarks for the project

Milestones/benchmarks by end of 2015	Annual performance indicators
Final list of priority research topics identified	Report with final list of prioritized topics prepared by May 2011
Status of art concerning selected topics analysed, gaps analysis performed, remaining methodological issues identified	Report on the survey made by FAO and on the status of art and gaps analysis, prepared by the second year of activity for the specific research topic (the different research topics start in different years)
Partner technical institutions selected	Partner technical institutions selected by second year of activity of the research topic
Empirical studies designed and field tested by relevant technical partner institutions	Empirical studies carried out by the third year of activity
Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts	Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts by the third or fourth year of activity of the research topic (depending on the duration of the activities of the research topics, see the work plan and the budget)
Guidelines and handbooks prepared and disseminated	Guidelines and handbooks prepared and disseminated by June 2015
Training material prepared on the basis of guidelines and handbooks	Training material prepared on the basis of guidelines and handbooks by the end of 2015

3. Communication and visibility

The research component communication and sharing results with all stakeholders will allow them meet their requirements as well as strengthen sustainability of actions and results. As experience and best practices will be gained and lessons learned, this information will be shared with other countries and partner organizations to strengthen overall statistical development.

The mechanism for a transparent and timely flow of data and information will need to be established. This type of communication network will still be reinforced along the whole project life cycle so that the visibility of the Strategy is kept enhanced at national, Regional Economic Commissions/Sub-regional Regional Offices and regional levels.

4. Impact assessment and reporting system

The above mentioned monitoring and evaluation system will actually be accomplished through reporting. The reporting system will help to track the progress of the project, provide stakeholders with regular status updates related to the project, and alert them on any changes to the original plan.

Tools such as project status reports, charts, and standardized practices will be important for reporting project progress. These tools allow implementation offices to monitor and control the project by providing timely information that can warn them of potential problems or trends that may negatively affect project planning.

Annex I**Draft Logical Framework for the RESEARCH Component of the Global Strategy for Agricultural and Rural Statistics – Africa Implementation Plan**

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	REACH	PERFORMANCE INDICATORS	INDICATIVE TARGETS TIMEFRAME	ASSUMPTIONS / RISKS
<p>Goal: To support the implementation of the Global Strategy for Agricultural and Rural Statistics in Africa, through: (i) the establishment of a minimum set of core data to meet current and emerging demands; (ii) the integration of agriculture into the national statistical systems; and (iii) improved governance of agricultural statistics systems and capacity building</p>	<p>Impact: improvements in the coverage and quality of the minimum core data set, focusing on both national and regional priority data needs; greater integration of agricultural statistics with national statistical systems; and the increased and sustained capacity of the systems to meet the needs of users in the future</p>	<p>Beneficiaries: The main stakeholders in agricultural statistics in Africa, especially current and new users of the data and the personnel and institutions involved in data collection, compilation and dissemination.</p>	<p>Impact Indicators: 1. Overall capacity of agricultural statistics systems, for all African countries. 2. The quality of key minimum core data sets, for all African countries. 3. The number of countries that have implemented a master sample frame for agricultural statistics. 4. The number of countries that have implemented an integrated survey framework. 5. The number of countries that have implemented an integrated database. 6. The number of countries where the governance frameworks for agricultural statistics in countries are in line with the Global Strategy. Sources: Project Progress Report and Baseline Information Report.</p>	<p>Progress anticipated at end of phase 1: Reduce the number of countries whose systems are classified as low capacity by 25%. Increase the number of countries reporting key data of adequate quality to FAO by 25%. 50% of countries to have a master sample frame for agricultural statistics 50% of countries to have implemented an integrated survey framework. 50% of countries to have implemented an integrated database. 50% of countries to have an integrated governance framework in line with the Global Strategy Timeframe: By 2015</p>	<p>Assumption statement: Statistical systems are provided with adequate resources. Methodological guidelines and handbooks are easily accessible and widely disseminated. Trained personnel are retained and are able to apply their new knowledge, skills and competencies. National agricultural statistical systems get access to other aid. Governance structures of statistics are developed in line with the Fundamental Principles of Official Statistics Mitigation strategies: Continued advocacy for agricultural statistics Effective coordination of national statistical systems Continued aid for statistics generally</p>

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	REACH	PERFORMANCE INDICATORS	INDICATIVE TARGETS TIMEFRAME	ASSUMPTIONS / RISKS
<p>Project purpose: Prepare technical guidelines, and handbooks on advanced methodologies, standards and tools related to the pillars of the Global Strategy to Improve Agriculture and Rural Statistics in the following priority areas:</p> <p>Reference framework: Framework for development of an integrated agricultural statistics programme ; Mainstreaming agriculture into NSDS; Implementation of an Integrated Survey Framework</p> <p>Master frame for integrated survey: Use of GPS in the production of agricultural statistics; Linking area frames with list frames; Use of remote sensing.</p> <p>Data collection methods: Improvement of estimation of crop area, yield and production; Methods for estimating crop area, yield and production of mixed crops, repeated cropping, continuous cropping; Methods for estimating yield of root crops; Cost of production; Methodology for enumerating nomadic livestock, estimating livestock products; Adoption of new technologies ; Forestry and deforestation; Crop forecasting and early warning; Inland fishery, aquaculture; Interaction between climate, environment, global warming and agriculture; Land use/Land cover monitoring</p>	<p>Outcomes: Technical guidelines, and handbooks on advanced methodologies, standards and tools for reliable and cost effective agriculture and rural data collection adopted and used</p>	<p>Beneficiaries: Agricultural and rural data users and producers</p>	<p>Outcome indicators: % of countries using the guidelines and handbook for data collection</p> <p>Reduction of the average cost of data collection per statistical unit</p> <p>Level of accuracy of estimates of statistics for major crops at national level</p> <p>Sources: Project Progress Report and Baseline Information Report.</p>	<p>Progress anticipated at end of phase 1: The guidelines and handbooks are used for data collection in at least 50% of African countries</p> <p>The average cost of data collection per statistical unit is reduced by at least 50% with the use of new methodologies</p> <p>The level of accuracy of estimates of statistics for major crops at national level is increased by 30 % with the use of the new methodologies and tools</p> <p>Timeframe: By 2015</p>	<p>Assumption statement: Advanced and cost effective methodologies, standards and tools are used by data producers to produce better statistics</p> <p>Mitigation strategies: Improve access to guidelines and handbooks and methodologies and translate them into training curricula and programmes</p>

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	REACH	PERFORMANCE INDICATORS	INDICATIVE TARGETS TIMEFRAME	ASSUMPTIONS / RISKS
<p>Food security: Methodology for the estimation of supply utilization account, food balance sheets, food stocks, edible forest products; Nutrition indicators; Use of households surveys / LSMS for food security indicators</p> <p>Market information: Estimation of farm gate prices; Collecting data on agriculture rural and border market prices; Collecting data on factors and product markets affecting agricultural activities</p> <p>Data analysis: Reconciliation of census data with survey data; Determination of user's information needs for decision making; Use of small area estimation methods for improving agricultural statistics.</p> <p>Administrative data: Improvement of administrative data; Use of administrative data for improving agricultural statistics; Estimation of informal cross border trade data</p>					

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	REACH	PERFORMANCE INDICATORS	INDICATIVE TARGETS TIMEFRAME	ASSUMPTIONS / RISKS
<p>Inputs and activities:</p> <p>1.1. Prepare the report with final list of prioritised topics following various consultations, (Tunis meeting, Rome meeting, Kampala meeting, meeting with Donors etc.)</p> <p>2.1 Collect information concerning the on-going or already completed research activities on the selected topics</p> <p>2.2. Identify the relevant literature concerning the priority topics</p> <p>2.3. Review of the literature concerning the priority topics</p> <p>2.4. Identify and analyse the gaps and remaining methodological issues within the Global Strategy Implementation Office and in close consultation with the leaders of the training and technical assistance components, the Friends of the Chair, relevant research centres, other stakeholders and the donors</p> <p>2.5. Prepare a draft report on the on-going or already completed research activities and the gaps on the selected topics and literature review</p> <p>2.6. Organise workshops concerning the on-going or already completed research activities on the selected topics and literature review</p> <p>2.7. Identify potential institutions for leading the research on the topic</p>	<p>Outputs:</p> <p>1. Report with final list of priority research topics discussed with main stakeholders during a regional workshop back-to back with AFCAS</p> <p>2. Reports on:</p> <ul style="list-style-type: none"> • on-going or already completed research activities on the selected priority topics • review of relevant literature (« état des lieux » and « state of the art ») • gaps analysis and remaining methodological issues identified • potential partner technical institutions 	<p>Beneficiaries:</p> <p>Personnel and institutions involved in agricultural statistics in Africa</p>	<p>Output indicator:</p> <p>Technical quality of Methodological guidelines and handbooks</p> <p>Relevance to major agricultural data collection issues in African countries</p> <p>Cost-effectiveness of methodologies recommended in the guidelines and handbooks</p> <p>Sources: Project Progress Report and Baseline Information Report.</p>	<p>Progress anticipated at mid-term of phase 1: At least five Guidelines and handbooks rated with high quality by experts of the field and quoted in relevant scientific publications</p> <p>At least 20% of African countries adopt the guidelines and handbooks</p> <p>Progress anticipated at end of phase 1: At least 50% of African countries adopt the guidelines and handbooks</p> <p>At least 30% reduction of data collection cost in countries using recommendations in the guidelines and handbooks</p>	<p>Assumption statement: Statistical systems have qualified staff and adequate resources to adopt and apply advanced and cost effective methodologies, standards and tools</p> <p>Mitigation strategies: Guidelines and handbooks are translated into training material and reference documents for Technical Assistance and are widely disseminated and easily accessible</p>

HIERARCHY OF OBJECTIVES	EXPECTED RESULTS	REACH	PERFORMANCE INDICATORS	INDICATIVE TARGETS TIMEFRAME	ASSUMPTIONS / RISKS
<p>3.1. Design studies for the field tests 3.2. Set up the methodology and the instruments (questionnaires, manuals etc.) 3.3. Select the countries and the sample for the experiments 3.4. Conduct the field tests</p> <p>4.1. Process and analyse the results 4.2 Prepare a report on the findings and recommend possible solutions to issues 4.3. Select the experts for the peer review and expert validation 4.4. Submit the reports prepared to the experts 4.5. Peer review and expert validation through a technical workshop</p> <p>5.1. Analysis of the results of the peer review and the expert validation 5.2. Prepare relevant guidelines and handbooks 5.3. Discuss the guidelines with the leaders of the training and technical assistance components, the Friends of the Chair, relevant research centres and other stakeholders within the umbrella component and finalise the guidelines 5.4 Publication of handbooks and the guidelines 5.5. Organise of dissemination workshop with countries and other stakeholders 5.6. Disseminate the publications on the web</p> <p>6.1. Close interaction between the research component and the training component in order to take into account the results of the research and the guidelines when preparing the most advanced training material</p>	<p>3. Empirical studies designed, and field tested by relevant technical partner institutions</p> <p>4. Technical reports on findings and recommendations for possible solutions to methodological issues prepared, peer reviewed and validated by experts</p> <p>5. Guidelines and handbooks prepared and disseminated</p> <p>6. Training material prepared on the basis of guidelines and handbooks</p>				

Annex III**Breakdown per year of the budget for the research topics relevant to Africa mainly and for quick wins**

Thematic domains/Research topics	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR	Total for research topics relevant to Africa mainly and quick wins
Prioritization of criteria and research topics						
	70,000					70,000
Reference framework 584,010 US\$						
Framework for the development of an integrated agricultural statistics system						
	39,930					39,930
Mainstreaming agriculture into NSDS						
	39,930					39,930
Implementation of an Integrated Survey Framework						
Master frame for integrated survey 1,154,150 US\$						
Use of GPS in the production of agricultural statistics						
	90,000	77,900				167,900
Linking area frames with list frames						
Use of remote sensing						
Data collection methods 4,118,500 US\$						
Improvement of estimation of crop area, yield and production						
	187,900	187,900	187,900			563,700
Methods for estimating crop area, yield and production of mixed crops, repeated cropping and continuous cropping						
		77,600	77,600	77,600	77,600	310,400

Methods for estimating yield of root crops, edible forest products, etc.						
	77,600	77,600	77,600	77,600		310,400
Methodology for enumerating nomadic livestock and for estimating livestock products						
	140,925	140,925	140,925	140,925		563,700
Cost of production						
	60,220	60,220	60,220	60,220	60,220	301,100
Adoption of new technologies						
Forestry and deforestation						
Crop forecasting and early warning						
Inland fishery, aquaculture						
Interaction between climate, environment, global warming and agriculture						
Land cover monitoring						
Food security 2,222,400 US\$						
Methodology for the compilation of food security statistics						
	254,500	254,500	254,500	254,500		1,018,000
Methodology for the estimation of food stocks						
	75,275	75,275	75,275	75,275	75,275	301,100
Methodology for the estimation of edible forest products, etc.						
	75,275	75,275	75,275	75,275	75,275	301,100
Nutrition indicators						
	75,275	75,275	75,275	75,275	75,275	301,100
Use of households surveys / LSMS for food security indicators						

	75,275	75,275	75,275	75,275		301,100
Market information 903,300 US\$						
Estimation of farm gate prices	60,220	60,220	60,220	60,220	60,220	301,100
Collecting data on agriculture rural and border market prices			100,367	100,367	100,367	301,100
Collecting data on factors and product markets affecting agricultural activities			100,367	100,367	100,367	301,100
Data analysis 799,800 UD\$						
Reconciliation of census data with survey data	60,220	60,220	60,220	60,220	60,220	301,100
Determination of user's information needs for decision making						
Use of small area estimation methods for improving agricultural statistics						
Improvement and use of administrative data 1,086,350 US\$						
Improvement of administrative data	60,220	60,220	60,220	60,220	60,220	301,100
Estimation of informal cross border trade data				150,550	150,550	301,100
Use of administrative data for improving agricultural statistics			161,383	161,383	161,383	484,150
Total Research topics	1,064,065	1,358,405	1,642,622	1,605,272	1,209,847	6,880,210

Technical coordination and supervision	282,125	282,125	282,125	282,125	282,125	1,410,623
P4	127,053	127,053	127,053	127,053	127,053	635,267
P2	81,593	81,593	81,593	81,593	81,593	407,963
Assistant	73,479	73,479	73,479	73,479	73,479	367,393
Total Research topics + Total technical coordination and supervision						
	1,346,190	1,640,530	1,924,746	1,887,396	1,491,971	8,290,833
Indirect support cost (13%)	175,005	213,269	250,217	245,362	193,956	1,077,808
TOTAL	1,521,194	1,853,798	2,174,963	2,132,758	1,685,927	9,368,641
	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR	

Annex IV
Breakdown per year of the budget for the research topics relevant also to other regions

Thematic domains/Research topics	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR	Total for research topics relevant also to other regions
Prioritization of criteria and research topics						
Reference framework 584,010 US\$						
Framework for the development of an integrated agricultural statistics system						
Mainstreaming agriculture into NSDS						
Implementation of an Integrated Survey Framework						
	100,830	201,660	201,660			504,150
Master frame for integrated survey 1,154,150 US\$						
Use of GPS in the production of agricultural statistics						
Linking area frames with list frames						
		75,275	75,275	75,275	75,275	301,100
Use of remote sensing						
	137,030	137,030	137,030	137,030	137,030	685,150
Data collection methods 4,118,500 US\$						
Improvement of estimation of crop area, yield and production						
Methods for estimating crop area, yield and production of mixed crops, repeated cropping and continuous cropping						
Methods for estimating yield of root crops, edible forest products, etc.						

Methodology for enumerating nomadic livestock and for estimating livestock products					
Cost of production					
Adoption of new technologies					
	75,275	75,275	75,275	75,275	301,100
Forestry and deforestation					
	100,367	100,367	100,367		301,100
Crop forecasting and early warning					
	187,900	187,900	187,900		563,700
Inland fishery, aquaculture					
	100,367	100,367	100,367		301,100
Interaction between climate, environment, global warming and agriculture					
	100,367	100,367	100,367		301,100
Land cover monitoring					
	100,367	100,367	100,367		301,100
Food security 2,222,400 US\$					
Methodology for the compilation of food security statistics					
Methodology for the estimation of food stocks					
Methodology for the estimation of edible forest products, etc.					
Nutrition indicators					
Use of households surveys / LSMS for food security indicators					

Market information 903,300 US\$						
Estimation of farm gate prices						
Collecting data on agriculture rural and border market prices						
Collecting data on factors and product markets affecting agricultural activities						
Data analysis 799,800 UD\$						
Reconciliation of census data with survey data						
Determination of user's information needs for decision making						
				98,800	98,800	197,600
Use of small area estimation methods for improving agricultural statistics						
				150,550	150,550	301,100
Improvement and use of administrative data 1,086,350 US\$						
Improvement of administrative data						
Estimation of informal cross border trade data						
Use of administrative data for improving agricultural statistics						
Total Research topics						
	237,860	489,240	1,078,607	1,126,297	1,126,297	4,058,300
Technical coordination and supervision						
	166,411	166,411	166,411	166,411	166,411	832,057

P4	74,943	74,943	74,943	74,943	74,943		374,713
P2	48,127	48,127	48,127	48,127	48,127		240,637
Assistant	43,341	43,341	43,341	43,341	43,341		216,707
Total Research topics + Total technical coordination and supervision	404,271	655,651	1,245,018	1,292,708	1,292,708		4,890,357
Indirect support cost (13%)	52,555	85,235	161,852	168,052	168,052		635,746
TOTAL	456,827	740,886	1,406,871	1,460,760	1,460,760		5,526,104
	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR	GRAND TOTAL	

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