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GLOBAL STRATEGY FOR THE IMPROVEMENT OF AGRICULTURAL STATISTICS

Global Strategy to Improve Agricultural Statistics

Draft with FAO status included

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Global Strategy to Improve Agricultural Statistics

Executive Summary

Policy makers at the national and international level and those developing investment strategies to enhance economic development face many challenges with the changing face of agriculture in the 21st century. While agriculture is the primary source to feed, clothe, and provide materials for fuel and housing for a growing world population, the challenge is at the same time to lift millions of people out of poverty and hunger, reduce the impact of agriculture on the environment and global warming, and sustain water and land resources. These are issues that go beyond national boundaries.

The purpose of the global strategy is to provide the vision for national and international statistical systems to produce the basic data and information to guide the decision making required for the 21st century. This vision is:

- Countries will agree upon a minimum set of core data that meet the emerging demands, and all will pledge to provide annually.
- Agriculture will be integrated 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 an agreed upon suite 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 an Integrated Data Base.

The global strategy is based on a thorough assessment of data user needs and what is currently available. This revealed that not only is there a serious decline in the quantity and quality of agricultural statistics, it is occurring at the same time many new data requirements are emerging. These emerging data requirements include issues surrounding agriculture including poverty and hunger, global warming, the use of land and water, and the increasing use of food/feed commodities to produce bio-fuels.

These data requirements led to defining a conceptual framework that provides an overview of the dimensions of agriculture. This conceptual framework brings forestry, fisheries, and land and water use into the agricultural and rural framework. The conceptual framework and data requirements call for a linkage between the household and the agricultural holding. The scope and coverage of agricultural production and activities is outlined.

The assessment of national agricultural statistical systems in the context of the conceptual framework points to an urgent need to improve the statistical capacity of countries to rebuild their capabilities to meet the new challenges. The assessment also showed a need to improve the coordination between national statistical organizations and others producing agricultural statistics.

A menu of indicators is provided to define the data that the statistical system should provide. From this menu, a subset of core indicators is selected for the national annual statistical program. This minimum set of core indicators is identified to be used as a starting point to build agricultural statistics systems for the 21st century. A strategy to determine the content, coverage, and frequency of the national system that goes beyond the core set of indicators is provided.

The emerging data requirements, the conceptual framework, the assessment of the national agricultural statistics systems, and the choice of a core set of indicators all point to the need to integrate agriculture into the national statistical system. The strategy identifies three pillars upon which the integration will be achieved. 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. An integrated survey framework will be established to provide indicators measured consistently across time and comparable across countries. The concept of a master sample frame will be extended to include an integrated data base for all official statistics related to agriculture.

The basic principles are that all data collections are based on sample units selected from the master sample frame, data collections are integrated in the survey framework, and the resulting official statistics reside in an integrated data base.

These principles will affect the governance at the national level where the effort to integrate agriculture will affect the roles of both the national statistical organizations and the ministries of agriculture and those from other sectors. The strategy suggests each country establish national statistical councils to coordinate the integration; however, the strategy leaves the respective roles of the organizations to the countries to decide.

The steps to implement the strategic plan will depend upon the statistical capacity of each country. Those needing to reform their statistical system will begin with the core items and build the rest over time. The next group is the countries with National Strategies for the Development of Statistics being implemented. These national strategies need to be reviewed in light of the strategic plan and revised if necessary. The third group includes the countries with developed statistical systems. However, many of these do not meet the integration requirement and will need to begin by developing a master sample frame for agriculture and an integrated data base.

The strategy is a long term effort with its implementation proceeding in stages that will depend upon each country's initial statistical capacity. Given the dynamic nature of agriculture and accompanying issues, the strategy should be considered to be a living document to be updated when needed to reflect current situations.

This paper presents the overall strategy. It will be followed by an implementation plan following review by the national and international partners and additional input received.

Chapter 1. Introduction

1. The purpose of the global strategy is to provide the framework and methodology that will lead to the improvement of national and international food and agricultural statistics. Here, agriculture includes forestry, fisheries and aquaculture. The strategy identifies the key issues and challenges for agricultural statistics, establishes a core set of statistics that are comparable and relevant, and provides methodologies to measure them under a framework to integrate agricultural and rural statistics into the national and international statistical system. The strategy provides a model to integrate the overlapping data requirements from other sectors, and addresses the need to improve statistical capacity. A key element is the integration of agriculture into the national statistical system.

> ***The use of the word "agriculture" in the strategy is inclusive of the broader scope to include forestry, fisheries, and aquaculture.***

2. This strategy, produced under the auspices of the United Nations Statistical Commission, is necessary for several reasons. The first is that there has been a decline in the quantity and quality of data coming from national statistical offices and/or Ministries of Agriculture. This is true for even basic crop and livestock production data. This decline is taking place at the same time that several urgent and emerging data requirements are also not being met. While most countries, especially developing countries, are not meeting the minimum requirements for agricultural statistics, there is a growing need for additional information to guide policy decisions regarding agricultural and rural development and monitor progress towards meeting the Millennium Development Goals. In addition, data are simply not available to answer questions regarding agriculture's affect on the environment and global warming and the consequences of the emerging production of bio-fuels from feedstock.

3. Several events in recent years have led to the decision to develop a global strategy. At the United Nations Conference on Financing for Development in 2002, both developing and developed countries committed to a shared responsibility to achieve development results, especially where critical to meeting the Millennium Development Goals. This requires data to monitor and evaluate indicators about all phases of the development process from planning to implementation to completion.

4. The major theme of the The World Development Report[1] "Agriculture for Development" is that agriculture is critical if countries are to achieve the targets in the Millennium Development Goal of reducing by half the number of people suffering from poverty and hunger.

5. According to the World Development Report (WDI), three-fourths of the poor people in developing countries live in rural areas and most depend on agriculture for their livelihood. The importance of agriculture in the effort to reduce poverty places agriculture at the center of the development agenda. However, this increases the need for monitoring and evaluation tools to learn what does and does not work. These tools require much of the basic data countries should be providing any way, but are often not available. The report provides an extensive review of issues ranging from the promise and risks of bio fuels, the potential of innovations from science and technology, and the mitigation of climate change.

6. One of the outcomes of the 2007 International Conference on Agricultural Statistics was that there was not only a lack of direction regarding data requirements posed by the MDG's, but also to guide policies regarding food vs. bio fuels, global warming, the environment, and food security. The dilemma posed by these emerging data requirements is that one reason they are not being met by the national statistical systems is because organizations other than the National Statistical Offices responsible for sectors such as land and water use, forestry, and fisheries have also not only failed to keep up with the increasing demand for data but also failed to integrate all data available to address problems.

7. The Independent External Evaluation of the FAO[2] stated that "the time has come for a total re-examination of the statistical needs for the 21st century and how they can best be met." As a result, there was also an external evaluation of the FAO's work and role in statistics[3]. The major conclusion of this evaluation is that the most pressing "emerging" data need is actually a "re-emerging" need to improve the capacity for agricultural statistics at the country level. The evaluation also recognized the increasing demands for new statistics and the need to integrate data on agriculture, fisheries, forestry to understand their affect on the environment, climate change, and the use of bio fuels to deal effectively with policy issues.

8. The United Nations Statistical Commission (UNSC) initiated the effort to develop a global strategy to improve agricultural statistics during its 2008 meeting and formed a working group. Since that time, a draft report[4] providing a framework to develop a strategic plan has been prepared which formed the basis for a meeting of experts and stakeholders in October 2008. This meeting was attended by heads and representatives of national statistical offices or ministries of agriculture from 27 countries and also included the FAO, the World Bank, IMF, Eurostat, OECD, and the US Department of Agriculture. The Gates Foundation and the United Kingdom Department for International Development were also represented. The outcomes of this meeting formed the basis for a paper discussed at the 2009 meeting of the UNSC[5]. The conclusion of the UNSC was consensus on the current unsatisfactory situation of

agricultural statistics and the need for a global strategy to make the necessary improvements.

9. The long term goal is to provide a globally agreed core set of indicators for agriculture and rural development under a United Nations mandate. The strategy reflects agreement reached among national and international statistical organizations, donors, and other stakeholders.

10. A minimum core set of statistics is identified that each country will pledge to provide **annually** and at the **national** level. This core set is required to provide national and international policy makers necessary information about issues that go beyond national boundaries. It is recognized that this core set will not satisfy all of the national information needs. Therefore, a framework to determine the additional data requirements and level of detail required at the national level in addition to the core set is provided.

Defining Indicators, Statistics, Data items, and Data:

a. An indicator provides a broad signal of change, direction, or state of being. The GDP is an indicator of the size of the nation's economy, the GDP growth rate a measure of the health of the economy. A food production index is an indicator for food security.
b. The statistics are the numbers that represent each indicator for a point in time, scope, and coverage.
c. Data items are those needed to provide the statistics describing each indicator. Maize, wheat, and cattle etc. are data items that enter into the estimation of the Food Production Index.
d. The data include the acreage, yield numbers entering into the estimate of production of each crop, livestock numbers for meat production, etc. The terms "statistics" and "data" are used interchangeably.

11. The strategy provides a blueprint to ensure the integration of agriculture into the national statistical system when national strategies for the development of statistics are developed and implemented. It also establishes a basis for statistical capacity building by identifying methodological practices based on the premise these enhance the integration of agriculture into the national system.

12. The plan provides the basis for national statistical organizations and line ministries to combine forces to advocate for additional resources and funding to support agricultural statistics.

13. The next chapter outlines the current and future requirements for statistics. The vision for the global strategy must begin with an understanding of the issues that generate the need for indicators and data. The chapter provides an overview of

the traditional data requirements plus the emerging issues that created the demand for a strategy. The indicators needed to deal with each issue are defined. Chapter 3 builds on this by providing an overview of the conceptual framework and dimensions of the overall agricultural system as it relates to the need for statistics and information.

14. Chapter 4 provides an overview of the current status of agricultural statistics. This assessment provides an overview of the challenges to be faced to improve the agricultural statistics system and sets the stage for the strategy to identify a core list and integrate agriculture into the national statistical system.

15. Several actions and initiatives have already either been taken or are underway to improve agricultural statistics. Chapter 5 provides an overview of these actions which contributed to the conceptual framework.

16. Chapter 6 provides a menu of indicators for agricultural and rural statistics that is inclusive of the broadened scope which includes forestry, fisheries, and land and water use. A set of core data requirements is taken from this menu. Chapter 7 provides the strategy to determine the content of the national data requirements that go beyond the international set of core indicators.

17. Chapter 8 sets the stage for agricultural and rural statistics to be integrated into the national statistical system. It provides the vision for the integration to be based on three pillars; the establishment of a master sample frame, the survey framework, and data management.

18. Chapters 9, 10, and 11, respectively, provide the vision for a master sampling frame for agriculture, an integrated survey framework, and coordinated data management systems. Chapter 12 brings the strategy to the governance stage spelling out the roles of the national statistical organization and other stakeholders. The strategy concludes with chapters about data quality and the way forward including an overview of the implementation plan and efforts to improve statistical capacity.

Chapter 2. Requirements from Data Users

19. The purpose of this chapter is to provide a review of the current and emerging data requirements that led to the goal to develop a global strategy. The issues faced by policy makers, the public, and donors that depend upon information to guide their decision making are outlined along with the required indicators and data to meet their needs.

20. While many think official statistics are mainly required for policy purposes, there are other uses that need to be considered. For example, when decisions are made about initiating a particular activity to promote rural development, there should be a process to monitor and evaluate the progress with the

capability to make corrections. Decisions to invest, either by the public or private sectors first depend upon data to justify the decision as well as monitoring and evaluating progress and results. A third use of data is to ensure markets operate efficiently. In many cases, the same data required for policy making also are needed for investment decisions and marketing purposes. The next three paragraphs outline the traditional data requirements and respective indicators; even these are not being produced by many countries, or are of poor quality needing to be improved.

21. **Supply and utilization of agricultural products**. The starting point is the traditional and fundamental requirement for statistics on crop, livestock, and aquaculture production. These need to be viewed in the context of the supply utilization accounts and food balances which provide comprehensive pictures of the country's food and other commodity supplies during a specified period. The data required are production, imports, and stocks on the supply side and utilization for food, feed, seed, quantities exported and amounts available for food. These provide an overview of the matching of food availability with food use, or for non food products a fundamental matching of supply and demand. Data requirements are:

    a. Crops--Area harvested, yield, production, utilization, stocks, imports, exports.

    b. Livestock-- Number of breeding animals, births, animals slaughtered, imports, exports. Quantity of meat, milk, wool, etc produced, utilization, imports, exports.

    c. Aquaculture and fisheries—Quantity produced, and trade for food and non food purposes.

    d. National annual average prices

    e. Cost of production inputs

22. **Early warning.** Natural disasters such as storms and droughts can cause serious disruptions in food supplies and also distort prices. Either insufficient food is available and/or so expensive the poor cannot afford to purchase them. Early warning takes another turn when supplies either become unavailable or prices too high because of economic situations or policies taken by some one else. The food price crises following the increased use of food products for fuel is a good example. National leaders need to be informed of these problems so that actions can be taken before it becomes too late to take corrective actions. Data requirements are:
    a. Forecasts of production of agricultural products as a measure of change or relative to an average production.
    b. Forecasts of commodity prices

23. **Efficient Market System.** Effective marketing systems depend upon information on supply and demand and that all participants in the marketing system have equal access to the information. The marketing system needs to be considered in the broader sense to include markets for inputs and those involved

at every stage of the chain from production to final delivery to the consumer. Data requirements are:

a. **Forecasts of production or supplies**
b. Estimates of quantities produced, quantities traded, and demand for food, seed, feed, bio fuels, and other uses.
c. Market prices at the point of first sale

24. The independent review of the FAO statistics program included an effort to seek input on emerging data needs from major users and partners. The following table provides a summary of the data needs resulting from input from data users and stakeholders.

Table A. Emerging Data Needs identified in Review of the FAO Statistics program

Interviews with Major Users and Partners	**Results from Users Survey**	**Regional and Country Interviews**
Prices	Prices	Prices
Energy/ Bio-fuels	Energy/ Bio-fuels	Energy/ Bio-fuels
Agro-Environmental	Agro-Environmental	Agro-Environmental
Climate Change	Climate Change	Climate Change
Trade	Trade	Trade
Rural (sub-national) Data		Rural (sub-national) Data
Water		Water
Household Consumption, Food Security		Household Consumption, Food Security
Economic Accounts		Socio-economic data
		Land/soil (cartography & cadastre)
Management of natural disasters	Fishery Statistics	
Technology Needs and Issues:		
GIS, Remote Sensing	GIS, Remote Sensing	GIS, Remote Sensing
Integrated Data Systems	Integrated Data Systems	
	Improved Search Engine	
		Improved (full and free) Access to databases

25. The above table reflects the emerging requirements for data required about bio-fuels, the environment, global warming, and adds the requirement for the data systems to be integrated. The remainder of the chapter provides an over view of issues faced by the agricultural and rural sectors, and the indicators required to guide decision making.

26. Agriculture development and growth as an instrument for poverty and hunger reduction. Agricultural growth can come from government subsidies to introduce new technology, the investment in irrigation and infrastructure such as roads, education and health facilities, trade policies favoring small agriculture

holders, policies about rural employment, and decentralizing non farm economic activities to rural areas to name but a few. According to the WDR, GDP growth originating in agriculture is at least twice as effective in reducing poverty as GDP growth originating outside agriculture. Data requirements are:

a. GDP and value added by agriculture, public spending on agriculture and on agricultural subsidies, public spending on infrastructure in rural areas, improvement in crop yields, increased productivity of livestock production, improved management of fishery resources, value of imports and exports, number of agricultural workers and income, rural household income, number of rural poor and under weight children, changes in land use.

b. The Source Book of Indicators[6] provides a set of 19 core indicators for monitoring and evaluating rural development; these are shown in annex 1

27. **Food security.** Food security is an essential integrating variable. Assessing food security at the national level involves information on agricultural food production and food trade for the estimation of amounts of domestic food supply, while the additional information on food utilization patterns including exports and non-food use (fuel, drug industry, seed, feed, etc) provides an indication of the food supply for human consumption. The information required involves food production as an agricultural output, local food consumption from agricultural and non-agricultural households, and international trade. 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 on food needs to assess the food gap in terms of nutrients that translated to commodities can provide inputs for agricultural policy. Data required are:

a. Food availability as measured by food balances including fishery and aquaculture supplies, current food prices, household food consumption, international trade, and the household economic situation by income class.

b. Food consumption in terms of calories and nutrients available and consumed

28. A**griculture's affect on the environment.** Agriculture can be seen as the largest user of water, the cause of agro chemical pollution and soil degradation, and a contributor to climate change. Fishery, in fact, directly utilizes and impacts on national resources and environments. Agriculture's environmental footprint also involves the management of animal waste and the spread of animal diseases. However, agriculture also has a role in sequestering carbon, managing watersheds, preserving biodiversity and providing feed stock for bio fuel production. Data requirements are:
    a. Use of inputs such as irrigation, fertilizer, pesticides, and energy,
    b. Use of tillage methods, productivity or change in crop yields, animal concentration, change in land use such as deforestation, and the impact of the use of inputs on the economic situation of the household. Exploitation rates of fishery resources, impacts on the ecosystem by fisheries and

aquaculture including discharge from the fishery and aquaculture sectors, and the quantity of cultured seeds released into natural environments. Other indirect indicators include land use changes resulting from urbanization, increased intensity of cultivation of marginal and erodible land, and the management of livestock.

29. **Climate change.** There are two dimensions to climate change; one is how agricultural contributes to climate change, the other is how climate change affects agriculture. In addition to being a significant user of land and consumer of fossil fuel, agriculture contributes directly to greenhouse gas emissions through practices such as rice production and the raising of livestock.[7] Deforestation caused by agricultural encroachment also contributes to global warming. On the other hand, forests are major consumers of carbon, the amounts dependent on the type of tree species, their growth rate, and age. Changes in land cover can affect the absorption or reflection of light which also contribute to global warning. Agriculture could be affected by global warming increasing the incidence of droughts leading in a reduction in grain production followed by food shortages and increases in poverty. Data required are:

    a. Land use changes including forest and woodlands, changes in agriculture production, use of agricultural practices such as tillage methods, increase in livestock numbers.
    b. Note that many of the issues relating to land use also affect the environment.

30. **Food and Feed products for Bio-fuels.** The goal to reduce carbon emissions from burning fossil fuels can come from the increased use of food and feed stock to produce bio fuels. While this can significantly increase prices and income for the producers, it can raise food prices to a level forcing people back into poverty. The use of bio mass to produce fuel has resulted in intensive efforts to use non food crops instead of food crops for fuel production. One example is switchgrass being developed for use on marginal, highly erodible lands. It also requires less energy than food crops in the conversion from bio mass to fuel. Another example is Jatropha which is a small tree producing seeds that when crushed produce oil that can be used for making bio diesel. The crop is being grown in S. America, Africa, and Asia and is resistant to drought and pests. The potential for these commodities could have economic consequences if they replace traditional crops and their established infrastructures for inputs and marketing. Data required are:
    a. Area harvested and quantities of feedstock by crop type used for bio fuels, prices received for feedstock vs other uses, quantities of bio fuel produced, economic impact on farms and rural households from bio fuel production, changes in land use and cropping to provide feedstock for bio fuels.
    b. Quantities of food in terms of energy, protein, and fat by crop type used for fuel production; prices received for food commodities for fuel production vs human consumption.

c. Note, the use of alternative crops increasing cropping intensity will affect land use and have environmental and climate change affects.

31. **Forestry.** Forestry has a direct link to agriculture because it involves the use of land and affects the environment, bio diversity, and global warming plus provides income to households. Agricultural expansion is a principal factor contributing to deforestation which results in increasing levels of carbon dioxide in the atmosphere. Forests and woodlands absorb carbon dioxide (a major cause of global warming) from the atmosphere, thus mitigates the affect of carbon emissions from burning fossil fuels. Data required are:
    a. The basic data required from the forestry sector includes the area covered, volume of wood as measured by national forest inventories, quantities and value of wood removed, utilization such as paper, fuel, lumber, and the value of other services provided.
    b. Information is needed on deforestation, where and the rate it is occurring, and the land uses to which it is being converted.
    c. In many countries, these statistics are not provided by the national statistical offices, but other governmental entities.

32. **Land Cover and Use.** Land is the foundation of agriculture. How the land is used determines its sustainability and productivity. The use of land can also have environmental consequences that range from pollution of waterways to global warming. Land cover is defined as "the observed physical cover including the vegetation (natural or planted) and human constructions that cover the earth's surface[8]. It is necessary to monitor land cover over time to reveal changes resulting from deforestation, urbanization, desertification, and other measures related to not only agricultural productivity but the overall affect on the environment and global warming. Data required are:
    a. Volume of wood as measured by national forest inventories, quantities and value of wood removed, utilization such as paper, fuel, and the value of other services provided.
    b. Land use monitoring as it affects the climate and environment

33. The Land Cover Classification System[9] classification manual (LCSS) jointly prepared by the FAO, the United Nations Environment Programme (UNEP), and Cooperazione, Italiana provides an international classification standard describing land cover as characterized by the arrangements, activities, and inputs people undertake in a certain land cover type to produce, change or maintain it. This establishes a direct link between land cover and the actions of people in their environment. For example, "grassland" is a land cover, rangeland implies its use to support livestock, thus is a land use. The LCCS is becoming the international standard for land classification.

34. **Water use.** Like land, water is a critical integrating variable that is cross cutting with agriculture, forestry, and fisheries which in combination affect the environment, climate change, and food security. Water for irrigation is a major factor to improve land productivity and crop yields. According to AQUASTAT, FAO's global information system on water and agriculture, agriculture uses 70 percent of freshwater withdrawals globally and 85 percent in developing countries. Demand for water is increasing for both agricultural and non agricultural uses. In some countries, this is leading to unsustainable extractions of ground water. There is a lack of data concerning water use for agriculture, the distribution of irrigated land, and water use practices including aquaculture. Data requirements are:
    a. Use of water for agricultural and non agricultural purposes by source, areal of land under irrigation and crop yields by irrigated/non irrigation
    b. Irrigation methods.

35. **Fisheries.** Fish and other aquatic organisms are major sources of food and household income. This domain includes the capture of fish in the open sea shared by all countries, captures in the coastal zones managed by each country, captures from rivers and other fresh water sources, and finally aquaculture which involves the use of land, inland and coastal waters, and the culture of fish. Countries are responsible for the provision of statistics on all fisheries and aquaculture within their own national jurisdiction areas including their exclusive economic zone as well as conducted by vessels which fly their flags.

36. Many aquatic organisms migrate among multiple countries' jurisdiction areas as well as between national jurisdiction areas and open access areas including high seas. Regional Fishery Bodies have been formed to coordinate the data collection and management of fishery resources and fisheries of such areas and species. Data collected by Regional Fishery Bodies generally contain more detailed information on operational and biological aspects of capture fisheries.

37. Small scale and subsistence aquaculture and capture fisheries often provide the opportunity of last resort for earning and food security for people without access to land. Also, small households tend to involve multiple activities, e.g. combination of subsistence aquaculture in conjunction with agriculture. Increased competition between aquaculture and agriculture for water and land use is emerging, especially as one of climate change impacts. Data requirements are:

    a. The basic statistics collected are number of fishers/fish farmers, number of fishing vessels, quantity and value of capture and aquaculture productions, trade, fishery commodities and quantity used for non-food use such as fish meal.
    b. Identification of households from population/agricultural census engaged in aquaculture and capture fishery.

38. **Capital Stock.** Production capability and potential for economic growth are affected by investments in capital stock. Capital stock at the micro level includes long term investments in equipment, buildings, irrigation systems, animal breeding stock, and the planting of semi-permanent tree and vine crops. Capital stock at the macro level includes investments in infrastructure, research, and education. Information about all components are needed to guide developmental efforts.

39. **Gender.** The above data requirements involve mostly the factors affecting production, the environment, and climate. Gender, especially the role of women in managing agricultural holdings, needs to be known as it affects development activities. Data on sex of the agricultural holder should be collected.

40. These issues are not independent of each other, and much of the data are needed for more than one indicator. The goal of the strategic plan is to capture the inter relationships of these emerging issues and ensure appropriate indicators are defined and underlying data provided. This points to the single largest problem with current agricultural and rural statistics; many of the issues have been considered independently which does not allow the cross-cutting analysis to understand the impact on one sector caused by actions taken elsewhere.

41. The next chapter considers the data requirements to describe a conceptual framework for agriculture statistics which will guide the strategy.

Chapter 3. The Conceptual Framework for Agricultural Statistics

42. The data requirements addressed in the previous chapter extend beyond the usual crop and livestock data and are more inclusive of forestry, fisheries and aquaculture, and statistics related to land, water, and the environment. The purpose of this chapter is to define the scope of the strategy to improve agricultural statistics, to identify the portions of the above sectors to be linked with agriculture and rural statistics, and to provide a framework for the remaining components to be dealt with by a careful coordination of efforts.

43. The development of the conceptual framework as it relates to agriculture and statistics starts by recognizing some fundamental aspects about the natural environment that make agriculture a unique sector.

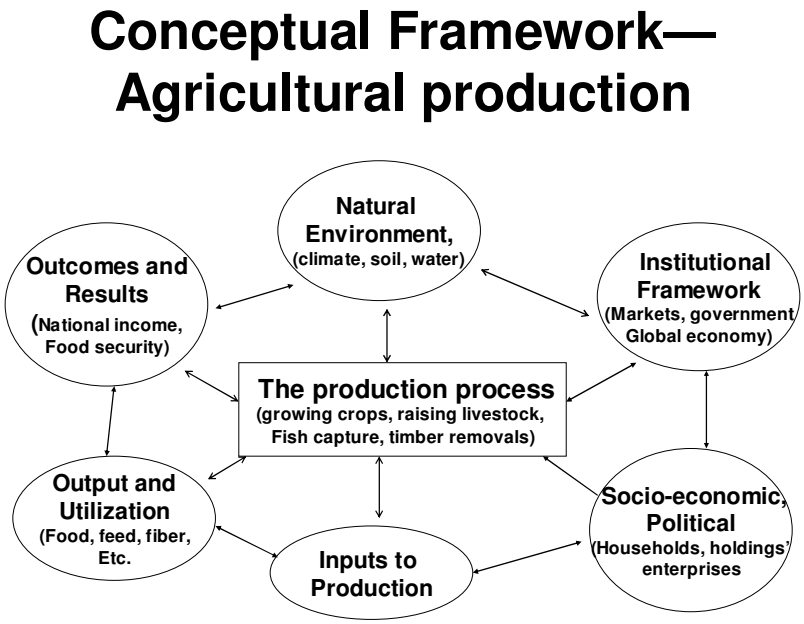
    a. The production process leading to the output of commodities is renewable, not like mining and other activities that provide minerals and fossil related fuels that are not replaceable.
    b. The climate and the environment in which agriculture takes place have a great affect on the availability of inputs, technology used, and resulting outputs from the production process.

c. While agricultural production is renewable, the production process can affect the future climate, the environment, and its future sustainability.

44. The natural environment is just one dimension of agriculture that affects and influences the outcome of the production process. Figure A provides an overview of the dimensions of agriculture that collectively enter into the production of food, feed, seed, fiber, etc. and the outcomes affecting food security, income, and economic well being for the country. Dimensions in addition to the natural environment affecting the agricultural production system and ultimately the requirements for statistics are:
    a. The **institutional framework.** This includes the availability of markets, policy decisions made previously that affect the current situation, and factors supporting agriculture such as research and extension. Markets can be viewed from both the macro (national international) to the micro level (sub-national and sectors for inputs and the processing stages from harvest to the consumer.) Government in this sense represents decisions made ranging from taxes, tariffs, to regulations and policies affecting everything from the availability of inputs to how the outputs are distributed.
    b. **The Economic-political structure.** This includes households, agricultural holdings, and businesses. Rural households in general and those with agricultural holdings enter into the conceptual framework for agriculture. All have input into the production process determining what is to be produced, the selection of inputs, providing labor, and making decisions about the output and utilization.
    c. **Factors of production** include capital stock, land, labor, capital, water, and other inputs. The investment in capital stock such as equipment, land improvements and the planting of permanent tree crops is a long term commitment. The investment in capital stocks or deciding on the choices of inputs is influenced by the dimensions described above and also affects the output.
    d. All of the dimensions described above influence events leading up to the **Production process.** However, once the process has begun, little can be done to influence the outcome except additional use of short term inputs such as fertilizer, feed, etc. However, it is at this stage where food supplies may be most vulnerable because stocks from the previous harvest may be disappearing. Information at this stage about the pending output becomes critical.
    e. The **Output** of the production process is basically the products produced. The out put dimension includes the utilization of the products produced. This dimension is another unique feature of agriculture because the production process is dependent on previous output in the form of seed, feed, and breeding stock.
    f. The **Outcomes and results** of the production process affect the national economy, and have longer range implications about the climate and environment. The micro elements include food security and household

well being. A critical element is that the outcomes and results influence the availability of resources to start the production process over again.

Figure A. The Conceptual Framework for Agricultural Statistics



45. The conceptual framework as outlined in Figure A shows the dimensions are inter related; that is, a decision or outcome of one affects some or all of the others. The outcomes and results dimension completes the production process with several outcomes including the affect on food security, but is the beginning of the next production cycle.

46. The intersection of the connections between the dimensions of the conceptual framework. It points to the need to produce data that can be used as described in systems of accounts such as supply utilization accounts, food balances, and income accounts for the household and agricultural enterprises. The conceptual framework also points to the need for a system of environmental accounts that describes the affect of agriculture on the natural environment dimension. It should be noted that information about the conceptual framework comes from many sources including the government, households, agricultural holdings, and agricultural businesses.

47. The starting point to determine the scope of agricultural statistics is the system of national accounts (SNA) which provides international standards for concepts,

definitions, and classifications of economic activities. The International Standard Industrial Classification of Economic Activities (ISIC) provides the classification of enterprises to industries. The Food and Agricultural Organization (FAO) uses this classification as the basis to determine the scope of the agricultural census as described in The World Program for the Census of Agriculture-2010 [10]. The scope of the agricultural census includes establishments engaged in agricultural production activities, specifically the growing of crops and engaging in animal husbandry. Forestry and fisheries are generally outside the scope of the agricultural census except when aquaculture and forestry are activities carried out in association with the production activities of the agricultural holding.

48. The FAO's World Program for the Census of Agriculture recommends that the scope of the 2010 round of the census follow the narrow view of basic production activities with the agricultural holding as the statistical unit. However, the same report provides guidelines about the use of a population census and the collection of agricultural data for households that are not agricultural producers. The use of the population census to obtain basic information about agricultural and rural households provides the vehicle to broaden the scope of the coverage required to meet the emerging data requirements as described in the introduction. The following paragraphs define the elements to be included in the conceptual framework for agricultural statistics.

49. **The Statistical Unit.** The traditional statistical unit for agricultural censuses and surveys has been the agricultural holding. However, the household is one of the basic elements of a national statistics system with UN standards providing a common definition. In the developing world over 3 billion of the 5.5 billion people living in these countries live in rural areas; 2.5 billion are in households involved in agriculture and 1.5 billion are households with small agricultural holdings according to the World Development Report for Agriculture. Policy decisions and development efforts need to be monitored and evaluated based on the economic situation of rural households and those with agricultural holdings with information about their income from all sources, their input to the labor pool, and an understanding of barriers preventing them from rising out of poverty.

50. The FAO World Program for the Census of Agriculture defines an agricultural holding as "an economic unit of agricultural production under single management comprising all livestock kept and all land used for agricultural purposes." It also goes on to define two types of agricultural holdings, those in the household sector and those in the non-household sector such as corporations or government institutions. For the purposes of the strategic plan and the scope of agricultural statistics, there will be two statistical units, the household as an agricultural holding and agricultural establishments in the non household sector. There is usually a one-to-one correspondence between an agricultural holding

and a household, especially for small holdings. The FAO classifies household holdings as single holding households, multiple holding households, and partnerships of two or more households operating the same holding. The FAO uses the national accounting concept of establishment for agricultural holdings in the non-household sector. The use of both the household as an agricultural holding and the establishment as statistical units will be a fundamental requirement for the methodology to be implemented.

51. **Inclusion of Rural Households.** Agricultural development provides a pathway out of poverty and hunger for the rural poor. These pathways can include improving the income of small agricultural holders through wage employment in agriculture or the rural non farm economy, or by migration. Rural development is high on the agenda of policy makers in developed countries as well. The need for statistics for rural development led to the production of a Handbook on Rural Households Livelihood and Well-Being[11]. The necessary data underlying many of the indicators needed to monitor rural development, and economic growth leading to poverty and hunger reduction are based on the rural household as a statistical unit. The Handbook provides a set of indicators that focus on the household associated with agricultural holdings as the primary reporting unit.

52. For the purposes of the strategic plan, rural households will be included in the scope of broad agricultural statistics. Rural households are defined by the FAO in terms of households located in rural areas. The definition of rural area is usually based on population density which may vary by country. Since population densities vary so much across countries, the definition of rural will be based on a range of the number of inhabitants per square kilometer.

53. Scope of Agricultural Production. The scope of agricultural production is defined by the International Standard Industrial Classification of Economic Activities group 011(growing of crops, market gardening, and horticulture), 012 (farming of animals), and 013 (growing of crops combined with farming of livestock).

54. Agro forestry is considered to be an agricultural activity because it involves purposely growing trees following agricultural practices. The FAO also recommends the census include forestry and agro-forestry production and land use when it is part of the agricultural holding. However, this excludes a major portion of forest and woodland in many countries where there are huge tracts of forest land publically or privately owned strictly for conservation, recreational, or timber purposes.

55. For the purposes of the strategy, the scope of agricultural statistics will include two components: the measurement and mapping of forestry as a land cover and land use for the entire country, and the provision of the other data needs for

forestry and woodlands that are part of an agricultural holding. The required data for the forestry and woodland outside agricultural holdings will be provided by the conventional sources which from a governance standpoint will become part of the national statistical system for coordination purposes.

56. The strategy will consider the following components of fisheries to be linked in the scope of agricultural statistics. All aquaculture and capture production, employment and food security information will be in the scope of agricultural statistics. Aquaculture is defined by the FAO (World Programme for the Census of Agriculture) as the farming of aquatic organisms such as fish, crustaceans, mollusks, aquatic plants and other aquatic organisms. This implies the feeding, regular stocking, protection from predators and raising of organisms through one or more life cycles. This does not mean the national statistical office undertakes the data collection if it is the responsibility of another governmental body. However, the responsibility for oversight should be placed under the governance of the national statistical system with the provision of linkage and the use of common standards, definitions and classifications and utilizing common or inter-operable data bases.

57. **Coverage of Agricultural Activities.** Many countries use minimum size criteria holdings must meet before they are included in a census or survey. Many countries may also concentrate their efforts on major producing areas and not provide estimates for the entire country. The minimum size criteria differ depending on the country and vary from the area of the holding, number of livestock to commodity sales. The minimum size criteria are used for cost effectiveness purposes. However, the reality is that in many countries, the small scale or household plots make a significant contribution to household food supplies or a source of extra income. Small holdings are often the responsibility of women.

58. For the purposes of the strategy, all units regardless of size and location regarding agriculture should be included in the scope of agricultural statistics. This would be made possible by the inclusion of some basic questions about agriculture in the population census as proposed by the FAO. Some countries such as China and Russia have accomplished this by conducting a rural census instead of an agricultural census. This also means that the statistical unit will be the household except where there is a separate agricultural enterprise. The inclusion of the small and geographically isolated household holdings in the annual statistical program will be considered in the methodology chapters. The minimum size criteria and geographic coverage should be inclusive for the population and agricultural censuses, but can be different for the annual survey program.

59. Land cover mapping as provided by satellite imagery will be one of the pillars of the methodology to be implemented. The emphasis will be on geo referencing rural and agricultural households from population/agricultural

censuses which will become data layers on the satellite imagery. This will provide the linkage between measures of the land use and the economic situation of the rural and agricultural households. For the purposes of the strategy, the Land Cover Classification System after incorporating codes covering land used for aquaculture, inland waters and marine waters will be the standard for land classification.

60. For the purposes of the strategy, the scope of agricultural statistics will include uses of water for agricultural purposes including irrigation and other uses, the source of irrigation water, the land under irrigation, the irrigation method, and the resulting production. This will be done in collaboration with the FAO-AQUASTAT Programme, the global information system on water and agriculture.

61. The data requirements and the conceptual framework of agriculture have been described. The next chapter provides an overview of the current state of agricultural statistics and an assessment the quantity and quality of data provided.

Chapter 4. Overview of the Current status of statistical systems for food, agriculture, fisheries and forestry

62. The assessment of national capacity in food and agricultural statistics builds on studies conducted by FAO Statistics Units and other Institutions, such as PARIS21. Of particular relevance is the report of the *Independent Evaluation of FAO's Role and Work in Statistics* prepared in 2008 which found that "the quantity and quality of data coming from national official sources has been on a steady decline since the early 1980s, particularly in Africa". The Report also indicates that "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". These findings and conclusions are confirmed by recent assessment studies. The assessment provides an indication of the current status of national agricultural statistics based on information available, the trend in terms of their capacity and an attempt to explain the reasons of this trend.

63. A major cause of the declining trend is the *weak institutional capacity* in many countries which has major consequences for the quality of data found in global statistical systems and databases. An underlying cause leading to poor quality data is the lack of country capacity to collect basic data on agriculture following a period of deterioration in overall national statistical capacity. This, in turn, is due to a large extent to donors and national governments reducing the priority and resources for the collection of basic statistics, including agricultural statistics, over the 1980s and into the 1990s.

64. **National Institutional framework:** The institutional framework and resources allocated to agricultural statistics within the national statistics system vary widely between countries. However, there is converging evidence that there is a declining trend in most developing countries with decreasing availability of technical staff and financial resources allocated to agricultural statistics. Very few countries include agriculture in their National Strategies for Development of Statistics (NSDS) or have a well defined and formally adopted strategic plan for agricultural statistics. In some countries, centralized organisational structures are in place with National Statistical Offices having the main responsibility for agricultural statistics while in others a decentralised system with line ministries playing a major role in the production of agricultural statistics. In some other countries there is no clear definition of responsibilities between NSO's and line ministries. Furthermore in many of these countries, there is a lack of functioning coordination mechanisms between the various institutions involved in agricultural statistics. More in-depth assessment studies are needed in many regions to have a more precise picture by country.

65. *In Africa,* more than 60% of the countries have decentralised systems with Ministries of Agriculture having major responsibility for agricultural statistics. Many countries lack functioning coordination committees. The capacities for agricultural statistics are generally weak with systems under-resourced and donor dependant. *In Asia,* the majority of countries have centralized systems or if decentralized there is strong coordination. Many countries have capacity to produce a minimum set of agricultural statistics with adequate resources. However, there are still some countries in the region with weak capacity and inadequate resources. In *North Africa, the Near East and some Central Asian countries,* there is a large diversity of organisational systems but with predominance of decentralised systems. The performance of most national agricultural statistics systems is below standard. *In North and Latin America,* there is a mixture of centralised and decentralised systems and a large diversity in the performance of agricultural statistics systems. *In Europe,* many countries have centralised systems with adequate capacity to produce agricultural statistics.

66. **The inclusion of agriculture in National Strategies for the Development of Statistics (NSDS).** A review by PARIS21 found that, of a total of 78 International Development Association (IDA) countries, 43 (55%) have a strategy for the development of statistics where agriculture is or is supposed to be included. Among these 43 IDA countries, it can be said that only 4 to 10 countries (therefore only around 10% of all IDA countries in the world) have included agriculture more or less appropriately in the NSDS process. Analysis shows the quality of the NSDS regarding agriculture is in general extremely low, including areas of utmost importance such as food security (only 3 IDA countries in the world with a consistent approach.) In general, action plans do not include appropriate survey programs. Budgets for meeting a potential

demand for agricultural statistics have been adequately designed in only 7 countries.

67. Of the 43 countries having integrated agricultural statistics into the NSDS process, the coverage of sub-sectors and domains is far from adequate. Crops are better covered (in 33% of strategies) than livestock (20%). Other sectors (Fisheries, forestry and agro-industry) are — for the majority of countries — completely ignored, sometimes irrespective of their economic importance for the country. Regarding domains, only production (25% of the strategies) and prices (15%) are mentioned. Other domains (trade, marketing, resources, and consumption) are ignored for more than 90% of the existing strategies.

68. In conclusion, a large number of the countries have developed or are developing a National Strategy for Development of Statistics. However, few countries have included agriculture in their NSDS or have a well established and formally adopted pluriannual agricultural statistics programme. Factors explaining this fact are very well known: in many countries the first generation of NSDS was NSO-centric; the demand from Millennium Development Goals has been mainly translated into solutions tailored towards the health and education sectors; agriculture is a complex sector with many stakeholders and data producers; statistical legislation covering the whole statistical system is not always appropriate; within Ministries of Agriculture the profile of statisticians is sometimes very low and the statistical function disorganized.

69. **National participation in population census programmes***: For the 2000 round, a* total of 230 countries had conducted their population census before 2005. A large number of countries (170) conducted their censuses in the period from 2000 to 2004 and a total of 159 countries are planning to conduct their next population census in the interval between 2009 and 2014. It should be noted that many countries are conducting their census in 2010 which is in line with the UN Population Division recommendation censuses to be taken in years ending in 0. Among the countries which have not yet planned their next census, some have recently conducted a census while the remaining countries do not have adequate conditions for undertaking such an operation because of socio-economic instability. A review of past population censuses shows that only a limited number of countries have included specific data items related to agriculture in their census questionnaire. FAO and UNSD have recommended that countries better coordinate the population and agricultural censuses for the 2010 round

70. **National participation in agricultural census/structural survey programmes***:* The number of countries conducting agricultural censuses has trended upward over the decades with about 81 countries[12] in the WCA 1950 round, 103 countries in the 1980 round, and a record number of 124 countries in WCA 2000 round. According to information available with FAO so far, 71

countries out of a total of 189 FAO member countries have plans to undertake a census during 2006-2015.

71. Regarding the **sampling frame** and basic material used for censuses and surveys, the choice of strategy and methodology largely depends upon availability, administrative structure for building the sampling frame, and mechanisms to keep them up-to date. In most countries, the administrative material/structures that are used for undertaking an agriculture census or surveys are: (1) Cartographic material (particularly enumeration area maps), updated in most countries when a population census is undertaken, (2) Lists generated by population census or the last agricultural census (3) Registers of farmers or agricultural enterprises which are mandatory under a law or provide some financial benefits, such as in Australia, Kuwait, Luxemburg; (4) Record of ownership of land parcels as in India and Pakistan; (5) Facilities to handle aerial photos and satellite imageries, either manually or electronically e.g. Morocco, Chile, Fiji, and Columbia. However, the use of an area frame is not widely used in developing countries with the exception of the Americas region. Also, most countries lack a regularly up-dated and integrated master sample frame with linkage between agricultural census/survey units and household survey units.

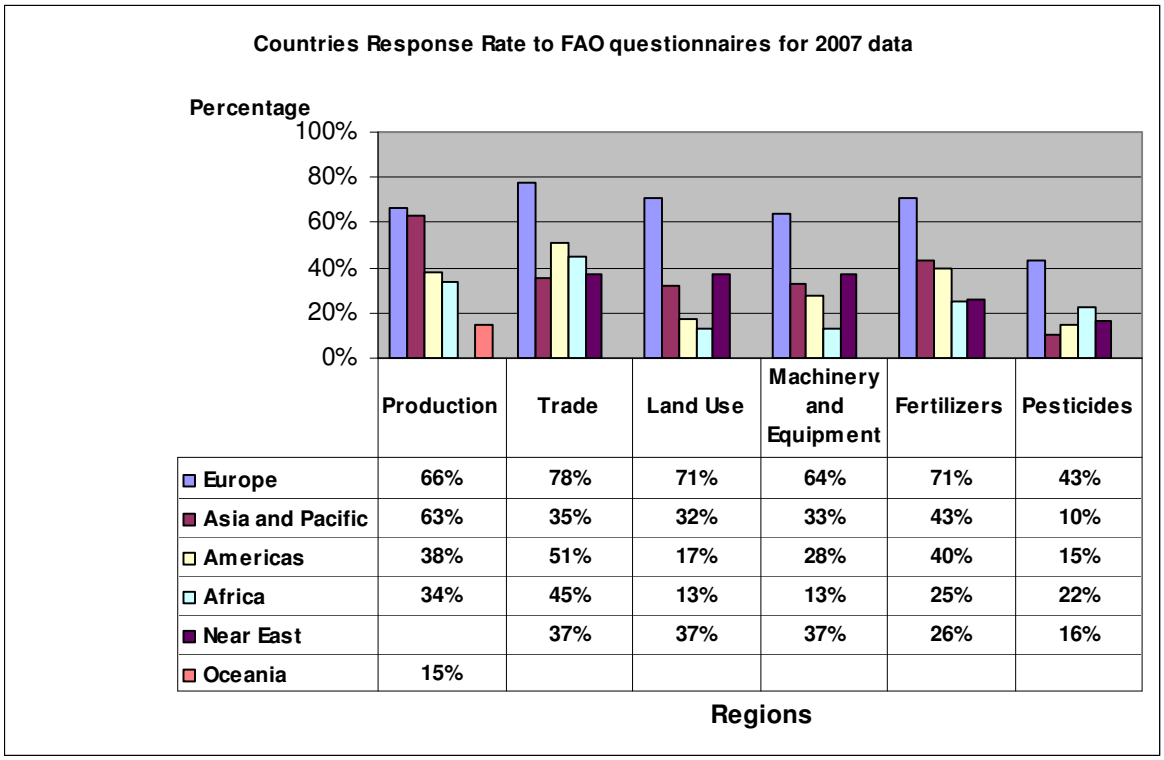
72. **Current production** data in many countries are produced through annual agricultural production surveys conducted by the Ministry of agriculture or by the NSO. Such surveys often cover major crops and livestock. In many countries the annual production estimates are also produced through the reporting system of extension services of the Ministry of agriculture which provides data at more detailed administrative unit levels and for minor crops and livestock. Non comparable results occur when the NSO's data are based on an annual production survey, and the Ministry of Agriculture's estimates come through their administrative reporting system; these can differ significantly if there is no coordination between the two institutions. In some countries agricultural production surveys serve as the basis for forecasting agricultural production. Countries also face methodological challenges and constraints with root crops, continuous harvesting, mixed cropping etc.

73. **National household surveys** (NHS) are also conducted in a large number of countries on a sample basis using the population census frame covering both the urban and rural areas for compiling the basket of weights for the Consumer Price Index and inputs for the household expenditure component of National Accounts. NHS's have widened their collection of data on household income and expenditure to include MDG indicators related components such as education, assets, anthropometry, livelihoods, coping strategies, etc. which are used as inputs for the monitoring reports of the progress towards the MDG. These surveys have become an important source of information for the MDG reports, the Poverty Reduction Strategy Papers (PRSP) and for the National Food Security Plan (NFSP). Some countries have embarked on a regular programme of NHS which are conducted on a yearly or five year basis. There are 152 countries which have conducted at least one NHS over the past 30

years. However, current information on countries' planned NHS's is not available. The World Bank Living Standard Measurement Surveys will continue to provide assistance to countries in conducting NHS with an updated list of components. In many of current household surveys, physical quantities of food for consumption are missing which make it difficult to compile food security indicators and related analysis.

74. **Integration and methodological issues**: In most countries, surveys are conducted on ad-hoc basis with no linkages to a master sampling frame or the use of the same geo-referenced statistical unit for data collection. It is therefore difficult to integrate data coming from various surveys and to do in depth analysis with cross-tabulation of variables from different surveys. Also, the total cost of these ad-hoc surveys tends to be much higher in countries where the available resources are limited. This contributes to the lack of integration of agricultural statistics within the national statistical system with typically the Ministry of Agriculture conducting annual agricultural production surveys and the National Statistical Office conducting Household surveys with no coordination. The data generated through these surveys are also not integrated into a common data base that can be accessed by analysts and other data users. This situation contributes to the weak capacity of countries to produce required data as it can be seen in the low response rates to FAO questionnaires.

75. **Availability of data on Production, Trade, Land Use, Agricultural Machinery and Equipment, Fertilizer and Pesticides***:* FAO sends questionnaires to all its member countries to collect data on Production, Trade, Land Use, Machinery and Equipment. National responses to these questionnaires constitute the main source of data that feed into the FAO global database, FAOSTAT. However, the response rates vary considerably from one region and country to another and the quality of data reported is also very diverse. The figure below presents the response rate to the last questionnaire sent to countries by data domain and by region. It appears clearly that in almost all domains, response rates from Africa (except for trade and pesticides data) are the lowest while Europe has the highest rate. The analysis of the trend shows that for production data for the last seven years, the response rate has remained more or less stable with about 80 countries reporting annually, most of which are in Europe and Asia. Response rates from Latin America for Production, Land use, Machinery and Equipment and pesticides are also very low.



	Production	Trade	Land Use	Machinery and Equipment	Fertilizers	Pesticides
Europe	66%	78%	71%	64%	71%	43%
Asia and Pacific	63%	35%	32%	33%	43%	10%
Americas	38%	51%	17%	28%	40%	15%
Africa	34%	45%	13%	13%	25%	22%
Near East		37%	37%	37%	26%	16%
Oceania	15%					

76. Availability of Data on Producer prices*:* Data on producer prices are being collected for primary agricultural products and livestock. However, only 28 percent of the countries provided price data to the FAO in 2007 with the lowest numbers in Africa, Latin America, and the Near East. Prices were only provided for less than half of the crop and livestock products. A major reason for the weak response is the lack of producer price data collection and compilation system in many countries.

77. **Capacity and availability of Fisheries and Aquaculture Statistics***:* Fishery and aquaculture statistics are required for two major purposes, one to assist

policy decisions toward sustainable development of the fisheries and aquaculture sectors, including their sustainable contribution to food supply, particularly as a source of protein and the other to provide basic data to assess the status of natural fishery resources and ecosystems and impacts of fisheries and aquaculture activities. In general, the latter requires specie specific detailed and accurate data on biological and operational aspects of fisheries. When stocks and fisheries are managed based on scientific stock assessments and other international arrangements, high level monitoring capacities have often been developed producing large quantities of high quality data. .However, those capabilities tend to be limited to catch and effort monitoring and the general capacity for data collection of social and economic information that is important for policy making tends to be much lower.

78. Fishery and aquaculture production data are often collected by specialized agencies, while data on social and economic aspects are in general under the responsibility of national statistical organizations. In some countries, aquaculture and capture fishery sectors are monitored by different agencies and often there is no responsible agency for the freshwater capture sector. This causes substantial under-representation of the freshwater fishery sector in fishery statistics. At the same time, small scale fisheries and aquaculture are considered largely under-represented due to the difficulty to collect data. Communications and coordination among different agencies within a country is found to be rare and troublesome.

79. FAO has for many years been asking countries to provide statistics on the number of fishers/fish farmers, number of fishing vessels, quantity and value of capture and aquaculture productions, trade, fishery commodities and quantity used for non-food use such as fish meal. More than 90% of countries with fisheries and aquaculture sectors provided some production data to FAO in recent years, 76% with regular reporting, but the reporting rates reduce to 40-60% in the case of other statistics such as numbers of fishing vessels and fisher folk, trade and disposition of fish production for food and non-food uses. The quality of the production data was reasonable while the rest of the data were provided as aggregates and therefore of lesser quality and of limited use for fisheries management.

80. The FAO Committee of Fisheries adopted the Strategy for Improving Information on Status and Trends of capture Fisheries (FAO-STF) in 2004 and the FAO Strategy for Improving Information on Status and Trends of Aquaculture (FAO-STA) in 2007. Both were subsequently endorsed by the United Nations General Assembly. Inventories of fisheries data collection programmes and methods have been developed since 2004 for South East Asia, Central America, the Pacific and West Africa. These inventories identified the lack of human and financial resources and difficulties to cover small scale marine fisheries and inland fisheries due to their wide dispersion/spatial coverage and high cost for the establishment of a sampling frame as two common obstacles. Problems identified for individual regions are as follows: (i)

South East Asia: Aggregated data, focus on total catch & value, limited use of data for management and Marine small scale fisheries and inland fisheries not well covered; (ii) *Central America and Caribbean*: Fisheries viewed as "Export-oriented industry" and Small scale fisheries not considered in national planning, rural development and PRSP; (iii) *Pacific*: Large dispersion of fisheries over 1000s of Islands?**,** Limited coverage of coastal small scale fisheries; and (iv) *West Africa*: aggregated data, focus on total catch & value, limited use of data for management, Marine small scale fisheries and inland fisheries not well covered and Approaches and methods not appropriate for monitoring inland fisheries.

81. Although monitoring of fisheries, due to specific characteristics, differs technically from collection of agriculture data, the collection of fisheries data, especially for small scale and inland fisheries, also needs some rethinking. A major obstacle for obtaining data about small scale and inland fisheries is the lack of a master sample frame. Incorporation of fisheries data into national/regional censuses or development of linkages with licensing systems would improve the efficiency and sustainability of fisheries data collection.

82. National capacity and availability of Forestry Statistics: Like statistics on fishery and aquaculture, forestry statistics have two major objectives, one to assist policy decisions toward sustainable development of the forestry sector and the other to provide basic data to assess the status of forests and impacts of forestry activities - as well as of activities in other sectors - on forests. Given the prominent role of forests in conserving biological diversity and mitigating climate change, demands for data at both national and international levels have increased in recent years, both in terms of the level of demand but also in terms of the scope of information requested and the timeliness of data required.

83. Most of the industrialized countries with large forest areas have detailed forest monitoring systems in place. However, these systems tend to be limited to basic data on the tree resources and their potential yield as well as on production, consumption and trade of wood products. The general capacity for data collection of information on other goods and services provided by forests and on socio-economic information important for policy making tends to be much lower. Very few developing countries have national forest monitoring systems and some have only ever conducted one national forest inventory – mostly in the 1970s and 1980s and financed by external donors.

84. Forestry data are most often collected by specialized agencies different from national statistical organizations or agricultural agency. In many countries, two separate systems exist: One for monitoring the status of the forest resources and one for the production, consumption and trade of forest products.

85. The FAO, the International Tropical Timber Organization (ITTO), the UNECE, and EUROSTAT working together developed the Joint Forest Sector Questionnaire which is distributed to the network of national statistical

correspondents in 182 countries each year. Just over half of the countries (96) responded to the most recent questionnaire (2008). Response rates are particularly low for African countries (just over 25%) and for countries with limited forest area, but also for Asia (around 40%). In addition to country responses received, forest product data on production are supplemented with official data available from national statistical offices and the UN Statistics Division. The 96 countries which responded to the questionnaire in 2008 accounted for almost 80% of global production of main forest products (industrial roundwood, sawnwood, wood-based panels and paper), however they accounted for only 30% of estimated global woodfuel production. The biggest issue remains to obtain reliable statistics on products which are produced by the informal sector – woodfuel and charcoal. Reliable national statistics simply do not exist in many cases, particularly in African countries.

86. For the purpose of the Global Forest Resources Assessments (FRA), FAO works closely with countries and forest assessment specialists in the planning, design and implementation of the assessments through regular contact, expert consultations and training for national correspondents in regional and sub-regional workshops. The outcome is better data, a more transparent reporting process, and enhanced national capacity in data analysis and reporting. However, this has only been possible thanks to considerable extra-budgetary resources. As a result, the global response rate (for 229 countries and territories) for the last assessment (FRA 2005) was 75%. The lowest response rates were from regions with many small island developing states and territories (Caribbean and Oceania), while the highest response rates were from South America (100%), Asia (83%) and Europe (79%). Even Africa had a response rate of 76% including dependent territories.

87. However, countries still have difficulties in reporting on a number of topics, including the production and value of non-wood forest products, the species composition of the standing stock, employment in forestry, and the value of wood removals. In addition there is an urgent need to address the current conceptual and practical difficulties in collection and analysis of the information, mainly because of the large, sometimes extreme, variations in the time, extent and content of the information available at the national level.

88. The quality of the data - and particularly the generation of trends over time - is further complicated by the variation in the purpose and methods by which information is collected among and within the countries. Information on the most basic variable of these assessments - the forest area - is often based on very old data. At the extreme, the most recent forest inventory used for reporting to FRA 2005 is as old as from 1956 in one country in the Caribbean – and from 1970 in Eastern and Southern Africa. For Africa as a whole, the forest-area weighted average date of the most recent forest inventory was 1986, i.e. data which was almost 20 years old at the time of reporting. Although information obtained from remote sensing is generally more recent, it is as old as from 1969 in one country and, on average (weighted by forest area) from

1988 in Africa as a whole. This obviously influences the quality of the data and the reliability of the trend estimates.

89. Serious efforts are needed to improve the capacities of developing countries to undertake national forest inventories. Through the National Forest Monitoring and Assessment Programme, FAO is supporting a number of countries to do so, but relies on extra-budgetary resources for this. The recent interest in setting up a mechanism to reward developing countries for a reduction of carbon emissions from deforestation and forest degradation (REDD) under the United National Framework Convention on Climate Change (UNFCCC) has resulted in renewed interest by donors to fund the setting up of national forest monitoring systems, which will hopefully lead to improved capacities in countries to generate new data. FAO is also undertaking a global remote sensing survey of forests in order to generate updated and more consistent data on the rate of deforestation at global, biome and regional levels, involving all countries in the process. See: http://www.fao.org/forestry/fra2010-remotesensing/en/ for details. The remote sensing survey will not generate data valid at national level but it will provide important capacity building and a framework for countries to establish their own monitoring systems.

90. **National capacity and availability of Water Statistics***:* Countries do not systematically and at a regular interval report data. FAO does thorough and detailed continental/regional updates every 5-10 years. For example, in 2005, data for the African continent were updated; the Middle East in 2008 and data for the rest of Asia are currently being updated. These updates are done using a detailed questionnaire containing around 75 variables related to water and agriculture. (see most variables in the database at http://www.fao.org/nr/water/aquastat/data/query/index.html). For many countries FAO works through consultants in order to be able to receive this detailed, but extremely important and in high demand information. The quality of information obtained from countries varies a lot between countries, but most is below standard.

91. With regard to the capacity of countries in **land degradation assessment**, FAO has recently developed novel standardized methodologies for this within the framework of the LADA project (Land degradation assessment in drylands), involving 6 pilot countries (but now being adopted by other countries).

92. **Data dissemination:** Since agricultural statistics are generally collected by a variety of national agencies, they are generally also disseminated in a decentralised fashion. A review of publications on agricultural statistics found the most frequent disseminators of agricultural statistics were: National Statistics offices; Ministries of Agricultural Fisheries and Forestry; and Central Planning Ministries. National agricultural and rural data are not only disseminated by countries, they are also disseminated by country groups/ supranational organisations such as Arab Organization for Agricultural Development (AOAD), E.U. (Eurostat), Organisation of The Islamic

Conference (OIC), The West African Economic and Monetary Union (UEMOA), etc, by commodity or industry groups such as: the International Rubber Study Group (IRSG), The International Fertilizer Industry Association (IFA) or by commercial information providers such as Oil World or F. O. Lichts. This review is limited to country level dissemination of agricultural and rural statistics.

93. The most common statistical dissemination formats are: paper publications, on-line databases, CD-ROM/DVD, internet, electronic press releases/ newsletters. The decisions taken in statistical offices on what to disseminate, in whatever format are a function of overall resources of the national offices including data availability, budgetary resources and technical skills of the staff of the office.

94. The vast majority of countries (over 90%) are able to produce and disseminate *statistical yearbooks*, with about 75-80% being able to produce and disseminate agricultural yearbooks and bulletins. However, only about half of the countries have produced a statistical yearbook since 2003 and about one third of the countries have produced agricultural yearbooks since 2003 which included production data. About 25% of countries have not produced a statistical or agricultural yearbook with production data since the year 2000.

95. Most countries have more than one website that included agricultural or rural statistical information and often there are problems accessing these websites for developing countries. Few countries had the data available but it was available to paying users only. The review of national agricultural statistics dissemination of various agricultural domains via websites reveals that no countries produced a "full" dataset for all domains, with very few countries (around 10%) releasing most of what would be considered a "full" data set requested by FAO. The Land-use domain was the only one that was disseminated by more than 50% of the countries. The potential of internet dissemination solutions such as CountrySTAT (see: countrystat.bas.gov.ph) is considerable as it not only consolidates all the relevant national data agricultural or rural statistical information into one website, it also provides a reliable technological base and the ability for countries to disseminate data in a timely fashion. More generally, a national Data warehouse solution would be an important factor of integration of agricultural statistics into national system of statistics.

96. It appears that a more detailed review of national and international dissemination of agricultural and rural statistical information is needed to obtain a fuller picture of the situation. A more detailed review would also focus on other data providers such as: country groups/ supranational organisations; commodity groups and commercial data providers. Other aspects on the quality of dissemination such as: the amount of data collected but not disseminated, the use of data release calendars, the coherence of the data disseminated, the comparability of data over time and the comparability of data over countries would need to be reviewed. Specific domains such as forestry and fisheries and

specific data collections such as censuses of agriculture would need further detailed review with respect to dissemination activities.

97. From this assessment, it appears that the coverage and relevance of information available vary from one region to another and from one domain to another. There is a clear indication that a supplementary detailed and systematic assessment study is needed in many domains to serve as a practical basis for a comprehensive and country-specific capacity building programme. Such a study will provide a detailed diagnosis and analysis of country profiles regarding the main data domains, including data gaps, data quality and related institutional and methodological limitations with regards to priority data needs. This study should be conducted in parallel to the development of this strategy paper.

98. However, with the limited information available, it can be concluded that there is no unique model or system of agricultural statistics which would be suitable to all countries. The statistical systems for collection and dissemination of agricultural statistics can either be centralized or decentralized. An appropriate model for each country would need to be decided keeping in view its geo-political, administrative and legal structure[13]. A centralized system could have comparative advantages in terms of economies of scale, credibility, objectivity and independence, use of uniform standards and harmonized concepts, provision of one-stop-shop for data users and establishment of national data archives to facilitate easy access and production of special-purpose statistics on demand. On the other hand, in a decentralized system the statisticians work more closely with data users and acquire intimate knowledge of data domains and hence tend to be more responsive to the needs of the users. The administrative records become accessible for statistical users and hence their potentials more fully utilized. However, it appears that countries with centralised systems have better performance. Countries with decentralized systems for collecting agricultural statistics need a strong coordinating mechanism among the different agencies playing a role in the system. Also, despite the limitations of information available, it appears that Africa, Near East and Latin America have the largest number of countries with weak agricultural statistics systems.

Chapter 5. Platform for the Strategic Plan

99. The strategic plan to improve agricultural statistics is developed on the platform provided by several independent and joint efforts of the World Bank, FAO and other international organizations. These efforts resulted in several bulletins and handbooks that recognize the need to improve agricultural statistics, offer solutions, and provide guidance for capacity building. The strategic plan brings these efforts together in a way to provide a way forward.

100. One of the most difficult parts of developing an information system is to define the indicators needed and the necessary data to produce them. This has to

be based on the requirements placed on information by policy makers as well by the private sector for investment and marketing decisions. A summary of the major publications that provide the concepts and framework, constraints and initiatives for the strategic plan follows.

101. Tracking Results in Agricultural and Rural Development in Less-than-ideal Conditions—A Source Book of Indicators. This is a source book on monitoring and evaluation for agriculture and rural development in countries where conditions are less than ideal with respect to availability of reliable information and a lack of statistical capacity. The purpose of the sourcebook is to examine how one measures the impact of development initiatives. It provides a framework for standardizing approaches for selecting indicators and provides a menu of core indicators for monitoring and evaluating agricultural and rural development activities at the project, national, regional, and global levels.

102. The Source Book also encourages building up statistical capacity because it contributes to the national development goals that encourage economic growth and poverty reduction. It also identifies the use of household surveys to address data needs to measure progress towards the achievement of the millennium development goals.

103. The source book also points out areas where methodology needs to be improved to provide the necessary data. One example illustrated problems remaining with crop cutting surveys to measure yields. The source book also provides steps to define a strategy to implement monitoring and evaluation steps as part of any agriculture and rural development effort.

104. World Programme for the Census of Agriculture 2010. This publication provides a new approach to be used for agricultural censuses. The emphasis is on a system of integrated agricultural censuses and surveys within the national statistical system which provides two fundamental components of the strategy. The World Program introduces the concept of adding questions to the population census to identify households that have agricultural activities (including fishery and forestry). This would provide the linkage between rural households and agricultural holdings. The publication outlines a modular approach for the census of agriculture based on a complete enumeration of key data and a series of sample-based modules to collect more in-depth data. The core data are to be collected in the population and agricultural Censuses, respectively are defined. The publication provides the concepts and definitions of agricultural census items, defines the census within the framework of the System of National Accounts, the International Standard Classification of all Economic Activities, and the classification of crops, livestock, aquaculture and machinery and equipment.

105. Independent Evaluation of FAO's Work and Role in Statistics. An expert panel prepared a comprehensive review of all aspects of FAO statistics

and capacity building programmes. FAO's mandate covers all countries, but is focused on developing countries where it is often the sole international source of agricultural production and price statistics. Major issues raised included the not only the declining quality of agricultural statistics, but also the availability; only 26 percent of the countries submitted crop production statistics for 2005. The report stressed a renewed commitment to statistical capacity building. It also makes a strong case for the integration of data bases across sectors to avoid duplication and conflicting numbers.

106. **Paris 21 and African Development Bank Guide to Planning a Coordinated National Statistical System[14] and A Guide to Designing a National Strategy for the Development of Statistics[15].** These provide a broad guide for integrating sectoral statistical systems such as agriculture into the national system. The strategy will have significant implications for statistical capacity building. The integration of agriculture into the national statistical system will allow capacity building efforts to be more focused on methodology that best meets the overall requirements. The National Strategies for the Development of Statistics will have to be re-framed to reflect the inclusion of agriculture into the national system.

107. **World Bank and Gates Foundation initiative to improve the quality and policy relevance of household level data on agriculture in Sub-Saharan Africa.** This initiative involves the inclusion of agriculture into the World Bank Living Standards Measurement Survey (LSMS) in 10 Sub-Saharan African countries. The purpose is to fill the gaps in knowledge about agriculture and to improve the quality, relevance, and sustainability of agricultural data systems. The set of surveys will be integrated into each country's existing system of household and other surveys. They will focus on agriculture using a multi topic survey instrument as the base. Both non-farm income and agricultural activities will be captured along with multi-sector information to provide a better understanding of what drives farm production. This integrated survey framework meets many of the goals of the strategy, thus will be providing a proof of concept test.

108. **Coordinating Working Party on Fishery Statistics (CWP) Handbook of fishery statistical standards.** The CWP was established in 1959 as a coordination mechanism under Article VI-2 of the FAO Constitution to agree on standard concepts, definitions, classifications, and methodologies for the collection, collation, and dissemination of fishery and aquaculture statistics. It also provides the framework to coordinate data collections, especially for captures on the high seas beyond the national jurisdictions. The Handbook is a living document, providing an overview of standard concepts, definitions, classification and methodologies used in fishery and aquaculture statistics, which is available at http://www.fao.org/fishery/cwp/search/en.

Chapter 6. Menu of Indicators and Core data requirements

109. This chapter builds off the data requirements, the conceptual framework, and the efforts described in the previous chapter to improve agricultural statistics. For example, the Source Book provides a menu of 86 indicators to monitor short, medium, and long-term developmental activities; 19 are considered to be core meaning they should be an output of every country's national statistical system.

110. Table 2 in the appendix provides a menu of indicators, the data required by each indicator, data sources, and technical notes. The core indicators provided in the Source Book and the emerging requirements described in the FAO evaluation were the starting points. The menu of indicators also includes those needed to understand the issues surrounding the environment, climate change, and the introduction of bio fuels.

111. Many of the indicators such as growth in the GDP from agriculture require many sources of data. However, it should be noted that a large number of indicators are based on the basic statistics on the production of crops, livestock, aquaculture, fish captures and harvest of forests. It should be noted the indicators require data to come from many different sources ranging from households, holdings, processors, and administrative data from different levels of government.

112. There are probably few if any countries in the world that can provide the full set of indicators shown in table 2 for any point in time. The measurement of the GDP is a good example. It requires the annual value of the output for the entire range of agricultural commodities which includes those widely produced to other commodities such as spices, specialty fruits, vegetables, and livestock that are produced on only a small number of farms or in only a few localities. The production of these items is likely only obtained from agricultural or other censuses and is extrapolated forward during these periods.

113. Because countries have varied and limited capabilities, it will be necessary each one establishes priorities on what will be in their statistical system in addition to a core set that are universally needed and are comparable across countries.

114. While the menu covers more than any country can do or may need, there is a subset within all of the data requirements that should be produced in the national and international statistical system. The following paragraphs describe the process to arrive at an internationally agreed upon set of core data items each country will provide data annually. Each country will then add its additional requirements to this core list.

115. A core data item is one whose data enter into a a multitude of indicators needed to monitor and evaluate development policies, food security and

progress on meeting the MDG goals, and provide input to the national accounts. The data for each item provide input into the measurement of value added by agriculture, and enter into global balances of supply and demand for food and other agricultural products. A core item should be a major user of land if it is a crop, contribute significantly to farm and rural household well-being, and one that has an affect on the environment and climate change. A core item should be one that is the first to be included in the statistical system and the last to remove with budget shortfalls.

116. Core items and their related data are required by the global statistical system to monitor issues that go beyond national boundaries. The globalization of the world's economies means that an action in one part of the world affects food supplies, the environment, and climate in other areas.

117. Core items should establish the framework for the agricultural and rural components of the National Strategies for the Develop of Statistics (NSDS) when they are being implemented. The set of core data items will be the building block to establish methodology and to integrate agriculture and rural statistics into the national system.

118. Data for core items should be provided annually with some exceptions to be defined below.

119. The designation of core starts with food and fibre statistics for the major crop items, statistics on animal and fishery production, timber removals, labor force, changes in land cover and use, and farm and rural household income. Supply use data such as stocks prior to harvest, quantities used for food, feed, bio-fuels, and trade are also considered to be core. Producer prices during the year are needed for marketing purposes. National annual average prices are required to determine income as well as value added to the national accounts.

120. Table B, which follows, provides the core data items and the respective data sources. The data collection and estimation activities do not need to be implemented at the same time. The first step would be to provide the basic statistics shown in the second column. The next step would be to provide the utilization data, stocks, and prices shown in the third column. The use of administrative data, especially trade, will depend on each country's situation. More will be said in the methodology chapters about the final column which references the use of geo referencing and satellite imagery. The goal is that survey and census data should be geo-referenced where possible to make the linkage between the economic indicators and those for the environment and climate change.

Table B. Core data items and associated data by source.

Core	Sample	Enterprise	Administra	Remote

Data Items	survey/ census, farms household s		tive	Sensing
Data to be provided annually				
Wheat, Maize, Barley, Sorghum, Other coarse grains, Rice Sugar crops Oil crops	Acres harvested, yield, production, own consumption prices	Amounts in storage Amounts processed for food, feed, food. oil, and Bio fuel— prices	Imports and exports, subsidies	Early warning of crop conditions Link with land cover/use
Fiber— cotton, flax,	Acres harvested, yield, prices	Amounts ginned or processed, by products, and prices	Imports and exports, prices, subsidies	Early warning, link with land cover/use
Crop specifically produced for Bio Fuel	Acres harvested, yield, prices	Amounts processed by utilization	Imports, exports, prices subsidies	Link with land cover/use
Cattle, pigs, sheep and goats	Inventory, meat, milk and wool production, own consumption and prices	Amount processed into meat, milk, fiber, etc, Prices	Food inspections, Imports, exports	Geo referenced to land cover/use for environment and Global warming monitoring
Chickens,	Inventory, meat and egg production, own consumption and prices	Amount processed into meat, egg production Prices	Food inspections, imports, exports	Geo referenced to land cover/use for environment and global warming monitoring
Fishery Captures	Quantity landed, own consumption , and discarded, number of days fished	Amount produced, amount processed for food and non-food use, prices, operational data	Imports and exports, subsidies, price	
Aquaculture production	Areas cultured, production, and prices	Amount produced, and processed, prices	Imports and exports, subsidies, price	Link with or geo referenced to land cover/use
Forestry	Quantity and	Prices	Imports,	Geo

production	value of removals of products from forested areas and respective utilizations		exports	referenced to land cover/use
Changes in land cover and use	Rural and farm households geo referenced	Geo referenced	Soil surveys, mapping, public administered and or protected land/water	Map to satellite imagery classified by land cover.
Labor & wage rates	Number of family workers and hours worked on own agricultural, fishery, aquaculture, and forestry enterprise, number of workers hired, hours worked and earnings	Number of paid hired workers, hours worked, and earnings. Number of service workers, hours and earnings.	Entitlements paid	
Household income—farm and rural	Income to the household by source		Government entitlements	
Data to be provided on a periodic, but scheduled basis				
Inputs	Quantities of seed, fertilizer, pesticides, feed, water, energy, capital and capital stocks	Quantities of inputs such as seed, fertilizer, pesticides, feed, water, energy, capital and capital stocks	Government provided technology, seeds, etc	
Demographics of agricultural and rural population	Number of households, population, age, and education levels by gender			
Food consumption	Unit value—quantities		Food provided by government	Geo reference households

	and cost of food consumed		and non government organizations	

121. The core crop and livestock commodities account for over 95 percent of the world's production of cereals and meat. Their respective data will be inputs to the value added to the GDP, food production indexes, food security, productivity of crop and livestock production, and commodity balances. The labor force data are used to measure productivity, measure how labor force numbers and income change over time and its contribution to the welfare of the household. Household income is a fundamental measure of well being, and poverty.

122. There are core elements that are not required every year because they either do not change much from year to year or are difficult and expensive to obtain. Inputs are used to evaluate improvements in crop yields and animal production, to derive value added, and also to understand environmental issues. The demographic data provide the basis to evaluate income, incidence of poverty and other factors by type of household, and its age and education classification.

123. While the purpose of this exercise is to establish agreement on a core set of data, countries will have additional data requirements or require data for the core items to be in more within country detail. They may also have crop or livestock items more important to their economy than some of the core items. Teff in Ethiopia is an example; it is a major source of food in that country but with little production elsewhere. The national requirements need to be spelled out because that will affect the methodology to be used, the requirement for resources, and the need for capacity building.

124. The following chapter rounds out the steps to determine the content of each country's national statistical program for agriculture of which the core data items will be a subset.

Chapter 7. Strategy to determine the content of the national statistical system, and the coverage and frequency.

125. The FAO classification in the World Program for the census of agriculture includes over 149 crops, 28 livestock species, and about 1400 fisheries and aquaculture species. Not all are produced in every country nor are they of equal importance where they are produced. Therefore, the first step is to identify the national set of crop and livestock items that will be added to the core list shown in Table B. This is an iterative and subjective process requiring some knowledge of the country's agriculture and demographic characteristics. This knowledge may come from the subjective input from experts, if for example, there has not been a recent census of agriculture or other survey or administrative data are not available. The following table provides an example

of the factors to be considered to determine the inclusion of an item and the frequency of coverage.

Table C Factors to determine inclusion and the frequency of additional crop and livestock items in a country's national statistical system.

Examples of products, inputs, or services	Utilizes % of total land/water	% of total value of production from agriculture	Year to year change in value	% of Households or enterprises producing	% of production by commercial enterprises	Impact on environment and climate change Scale 1 to 10	Permanent or temporary crop
Wheat							
Maize							
Rice							
Cassava							
Nuts							
potatoes							
Olives							
Grapes							
Cattle							
Ducks							
Captured fish							
Cultured fish							
Timber							
Ginseng							
Garlic							
Forest/ grasslands							

The purpose of this exercise is to provide measures of the relative importance of all components of a nation's agriculture, land/water use, economy, environment, and impact on climate change. These measures can be input to the decision on the frequency for which data are provided; for example annually, periodic, or during the population and/or agricultural census.

126. The goal should be to provide annual data for those data items that combined account for over three fourths of the country's value of production and coverage of land, have a production output that can vary significantly from year to year, impact the majority of the households, and have short term affects on land use and the environment. The inclusion of items that are produced by only a small number of households or holdings or account for only a small share of the nation's land has sample design and resource implications. For example, sampling theory shows that the relative variance of the estimated mean is approximated by the relative variance of the positive sample units plus the relative variance of the estimated proportion of positive population units.

127. $CV^2(Y) = CV^2(Y_p) + CV^2(P)$

128. Suppose only a third of the households or holdings have a particular item. The sample size will have to be 4 times larger than if about three fourths have the item to achieve the same level of precision. If only 10 percent of the households or holdings have the item, then sample sizes triple over what is needed if a third are positive and would be 12 times greater than if $(P) > .75$ for the same level of precision. The general conclusion of this exercise is that

minor and relatively rare commodities should be candidates to only be included in the agricultural census. The exception would be if the sample frame contains sufficient data that can be used in the survey design to target the rare items.

129. The next step is to review the rural development indicators for monitoring and evaluation and include those relevant to the national situation. Then each country should determine the level of geographic coverage and detail to be provided for the core plus additional items added. The same issue raised above about the proportion of households/holdings that have the item will also determine the level of geographic detail or other breakdown that can be provided from the sample surveys. These have implications about the methodology to be used and resources required. The annual data collections will rely upon sample surveys which will limit the geographic detail that can be provided. Therefore, it may be only through an agricultural census that detailed geographic or size distribution data can be provided. The agricultural census also provides the sampling frame for the annual surveys. These issues form the basis for the FAO methodology to integrate the agricultural census with sample surveys.

130. The final step to the process is to list the items to be included in the national statistical system for agriculture, determine the desired level of detail, and indicate for each item the level of detail that will be provided.

Table D. Frequency of coverage by geographic and structural detail.

	Level of geographic and structural detail			
Data Item	**National**	**Major Production Areas**	**Within country administrative areas**	**Size and/or type of household and or holding**
Crop A	**Annual**	**Annual**	**Decennial**	**Decennial**
Crop B	**Bi annual**	**Bi annual**	**Decennial**	**Decennial**
Crop C				

Time and available resources result in a necessary compromise between frequency, level of geographic detail, and structural breakdowns. These categories need to be considered for each data element. Every data item to be included in the national statistical system should be arrayed in a way to provide an overview of the requirements

Crop Z				
Livestock A				
Livestock B				

Livestock Y				
Economic variable A				
Land Variable				
Labor				

131. At this stage, each country should have an overall picture of the content of its national statistical system for agriculture including the rural, forestry, and fishery components. Input from policy makers and other data users should shape the final picture which then forms the basis for selecting the best methodology to produce the results.

132. Often a country requires data at sub-region or other administrative areas, but would face very large sample sizes to produce the more detailed estimates. Small area estimation methods should be explored as well as considering the use of administrative data. The following chapter addresses the integration of agriculture into the national statistical system.

Chapter 8. Integrating Agricultural and Rural Statistics into the National Statistical System.

133. The strategic plan stands on three pillars, the selection of an agreed upon set of indicators, their integration into the national statistical system, and the methodology to measure them. The purpose of this chapter is to define integration and provide the vision for agricultural statistics within the framework of the national statistical system.

Reminder: The use of the word "agriculture" in the strategy is inclusive of the broader scope to include forestry, fisheries, and aquaculture.

134. One of the shortcomings of current statistical systems in both developed and developing countries is that data collections across sectors are often done independently using different sampling frames and surveys leaving no

opportunities to measure the impact of an action in one sector on another. For example, the estimation of the production of crops and livestock is often done outside the realm of the national statistical office; therefore, there is no opportunity to understand how agricultural production activities affect the farm household. The economic situation of the household and its income from non agricultural sources affect decisions made about the agricultural holding. A serious short coming is that the farm household is not connected to agriculture as a holding. Household surveys are often conducted in isolation from farm households, or with sample sizes too small to disaggregate the data. These examples point to the single largest problem with current agricultural and rural statistics, many of the issues are considered independently which does not allow analysis across categories or sectors.

135. More than one governmental organization is often involved in the collection and analysis of agricultural, fishery and forestry data without coordination. While the National Statistical Office may produce the agricultural census, the annual production data could come from the ministry of agriculture, and the contribution of the fishery and aquaculture sectors may come from another authority and may be ignored or neglected by the National Statistical Office.

136. The FAO World Program for the Census of Agriculture outlines several advantages of an integrated statistical system. Major reasons are to avoid duplicating efforts, prevent the release of conflicting statistics, and ensure the best use of resources. In addition, concepts, definitions, and classifications become standardized allowing a better collection of data across sources.

137. The vision for the future of agricultural statistics and its integration into the national statistical system is based on three components: the establishment of the master sample frame, and the integrated survey framework and data base. These are outlined in the following chapters. These steps are outlined with the understanding this is a long-term strategic plan. Not all countries will start at the same place or proceed at the same pace.

Chapter 9. Strategy to implement a Master Sample Frame for Agriculture

138. The population and establishment censuses form the foundation and provide the benchmarks for official statistics. The population census provides the basis to establish a household register (or in many developing countries, data at the enumeration area level) for sample surveys conducted between census periods. The establishment censuses also form the basis for registers, such as agriculture registers of agricultural holdings and establishments. When the registers are developed, they also contain data brought forward from the respective census that are used for sampling purposes, for example, to stratify by size and type for more efficient sampling purposes.

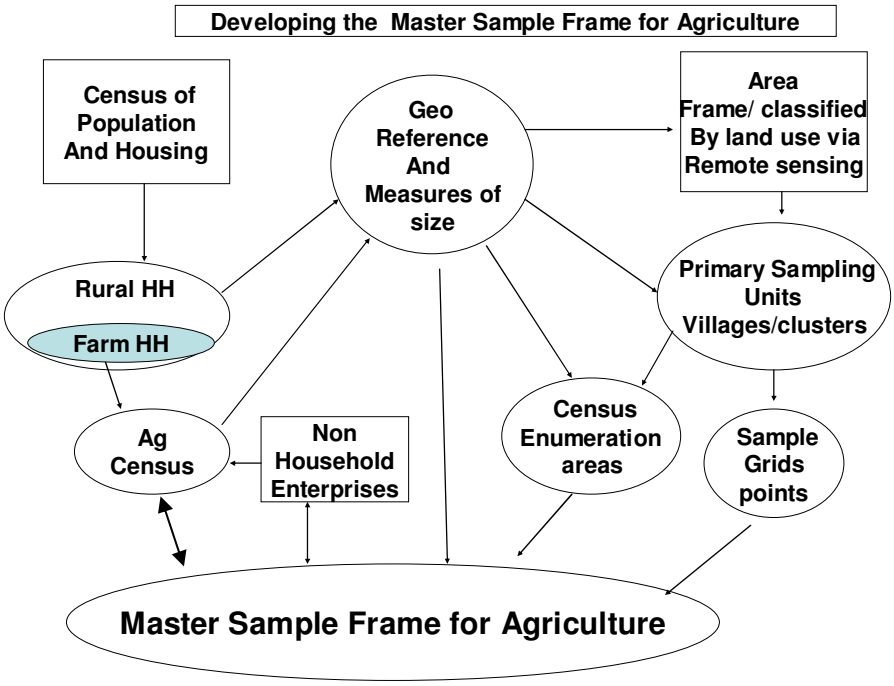
139. The integration of agriculture into the national statistical system is built on the concept that all census and survey data collections for agriculture be based on sample units selected from a single source, the Master Sample Frame for agriculture. The use of a master frame will ensure sampling and reporting units are consistently classified across different agricultural subsectors and that appropriate linkages are made between households and the agricultural holding.

140. The use of a master sample frame avoids duplicative efforts of different organizations maintaining their own frames. The concept of a master frame follows the recommendation in the FAO World Program for the Census of Agriculture which is that the population censuses obtain sufficient data about agriculture, aquaculture, fisheries and forestry to create a register of households by type: rural households, rural households with household plots, and rural households with agricultural holdings. The use of the population census to identify rural and agricultural households provides a linkage between population and agricultural data.

141. The creation of a master sample frame begins by linking households from the population census to those with agricultural holdings. The second step in the integration is to create a register of establishments not connected to a household and add it to the master sampling frame.

142. Many of the data requirements and the conceptual framework require a linkage between the agricultural production process and the natural environment calling for many of the data collections to be linked to land cover and land use. The next step in the creation of the master sampling frame for agriculture will be to use remote sensing products to create an area frame consisting of a digitized data layer classified by land use.

143. By geo referencing the household and enterprise registers, they can be linked to the area frame. This can be done at the household level, administrative area, or census enumeration area. It is often the case in developing countries that the counts of people and households are only available for the enumeration area; in these situations, the enumeration areas should be geo referenced. Diagram B provides a graphical view of the components of the master sample frame for agriculture and how they are linked to a land cover based area frame.



This establishes a method to link the economic and demographic information from the censuses and surveys to the land/water use at the sample level.

144. The design of the master sample frame offers several alternative sampling methods. One is the direct selection of households and enterprises. A problem with this method is that the frame becomes out of date over time. An alternative is to employ multi-stage sampling where primary sampling units and census enumeration areas are selected. When the PSU's such as census enumeration areas are screened, the frame for estimation purposes becomes current. The master sample frame also allows the alternative of selecting simple area frame samples of grids or points which may be an alternative for countries that do not have current census data.

145. Households, holdings, and enterprises may not be suitable sample units for surveying capture fishery production, while the master sample frame will be efficient for monitoring all the other aspects of fishery sector. When utilizing landing sites as the sampling unit for data collection of capture production, the survey on the other aspects of fishery sector will need to include questions about the landing sites used by each household, holding and enterprise to allow integration of two different sampling schemes.

146. The vision for the future of agricultural statistics and its integration into the national statistical system is based on three components: the establishment of a master sample frame, an integrated survey framework, and data management. The next chapter provides the vision for the survey framework.

Chapter 10 Strategic Vision for the Integrated Survey Framework

147. The purpose of this chapter is to provide the strategy for the integrated survey framework. The complete survey framework includes the sample design, questionnaires, method of data collection, analysis, and estimation. It also takes into consideration the data sources in addition to sample surveys that provide input into the survey framework. The overall strategy is presented; the technical and methodological elements will be part of the implementation plan.

148. The vision for the survey framework starts with the goal that it be sustainable, and provides an annual work program that is consistent from year to year so that the statistical staff is fully utilized over time. The exceptions will be the population and economic censuses if conducted. The goal is to define the annual data collection in a way to minimize the required scope of the censuses; in other words have an integrated data collection system.

149. Timing and frequency of data collection are issues for much of agriculture. Crops have different production cycles that are seasonal while livestock production is determined by not only by the respective reproductive cycles, but also the continuous production of commodities such as milk and eggs. Aquaculture has similar characteristics as livestock production. The rural labor force is also affected by the seasonal nature of agriculture affecting the opportunities for work and earnings. The timing of data collection affects the quality of the data, especially if a lengthy recall is required. As a result the data collections should coincide with the recent harvest periods. For example, if crop yields are determined by crop cutting surveys, then these have to be done shortly before harvest. Capture production requires frequent samplings and surveys, e.g. twice a week, or every 5 days, to reflect frequent and unpredictable changes of catch species composition and resource availability in addition to seasonality.

150. The Master Sample Frame for Agriculture forms the foundation for the integrated survey framework. The framework also considers the need for the linkage between different data items not only between themselves, but also the natural environment dimension defined in the conceptual framework.

151. The preparation of the national survey framework needs to start by adding the national data requirements to the set of core to determine the content of the annual and periodic data collections as outlined in chapters 6 and 7. The survey framework needs to be designed to provide as much overlap as possible of all data requirements without creating lengthy questionnaires. The modular approach proposed in the FAO World Census of Agriculture should be considered for items that cannot be surveyed every year.

152. Figure B provides an overview of the elements of the integrated survey framework. The starting point is the Master Sample Frame and the information brought forward from the population and agricultural censuses geo referenced to land use. This can be used for both sample design and estimation.

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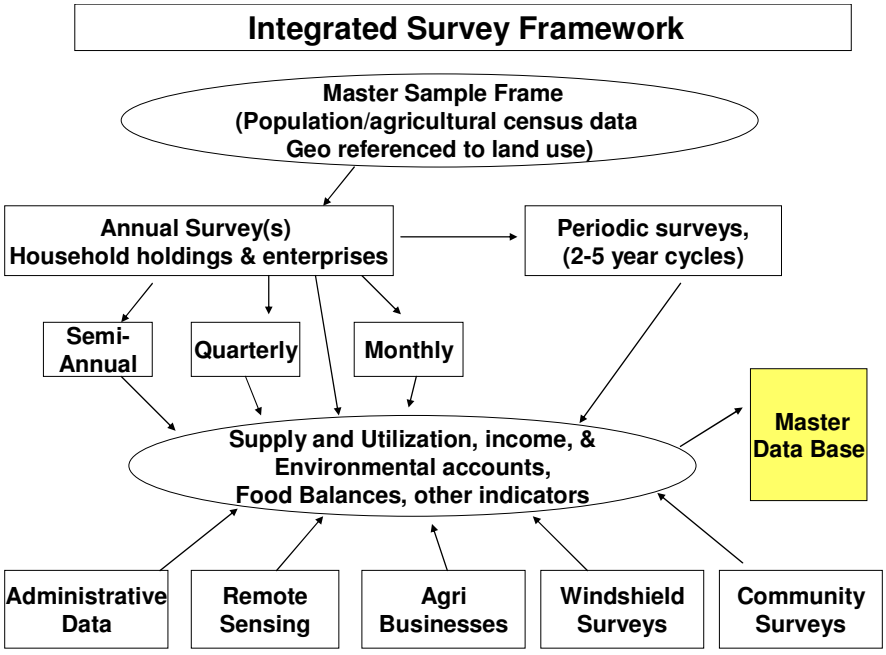
Figure B. Integrated Survey Framework



153. The survey framework is inclusive of households, households with agricultural holdings, and agricultural holdings. However, to provide linkage across data items, the framework builds off the use of large annual surveys that also are used as a base for sub-sampling for within year surveys. The data collections for items not surveyed annually (such as production inputs) should also come from the annual surveys. The integration is achieved by connecting as many of the samples as possible.

154. The survey framework also recognizes that some data need to be collected more often than annually because of the seasonal nature of agriculture and the crop and livestock production cycles. Each country will need to evaluate the content of their national program to determine the desired frequency of surveys for the different data items. Crop yield estimation poses a challenge, and depending on the crops included, may require more than one survey.

155. The survey framework takes into account the additional data sources that need to be included in the overall framework. These include:

a. **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. Food inspections, animal health inspections, and trade data provide input to the utilization accounts.
b. **Remotely sensed data** include vegetative indices that show overall crop conditions plus information about changes in land cover and use. The survey framework should include the need to provide ground truth data if remote sensing information is to be used to estimate cropland areas.
c. **Agri-businesses** are the source of utilization data and prices.
d. **Windhield surveys** refer to the input from expert judgment to evaluate agricultural conditions. The Source book refers to a procedure where experts travel a specified route on a periodic basis and record the condition of crops, which provide an input into crop yield forecasts.
e. **Community surveys**--The World Programme for the census of agriculture provides an overview of data that can be collected at the village level. These data include information about the infrastructure and services available to households and agricultural holdings, occurrences of food shortages, frequency of natural disasters, etc.

156. The final elements in the integrated survey framework are the indicators to be computed and their storage in a master data base. This brings the strategy to the third methodological component to integrate agriculture in to the national statistical system as outlined in the next chapter.

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Chapter 11 Strategic Vision for the Integrated Data Base

157. The integrated data base is built upon the strategy that begins with a Master Sample Frame for Agriculture from which all samples for data collection under the Integrated Survey Framework will be selected. The survey framework includes many different sources of information to produce the final indicators. The development of an integrated data base completes the strategy.

158. The integrated data base is built on the basic concept that the official numbers for each data item appear one time. For example, the integrated data base should only provide one recording of the nation's population or maize production for given reference period to avoid duplication and confusion when the numbers differ. The concept of an integrated data base does not mean there is only one, but it implies data items appear only one time.

159. It is essential that data be comparable across countries in order to aggregate results to regional and global totals. The FAO classifications such as the Indicative Crop Classification (ICC) should be adopted. ICC has been developed based on the Central Product Classification as described in the World

Programme for the Census of Agriculture. The same publication also provides a classification for livestock, and machinery and equipment.

160. A longer term view of the integrated data base is the inclusion of micro data.

161. It builds on the concept of the Master Sample Frame by containing census and survey data associated with each frame unit that goes across time. As with the Master Sample Frame, each survey unit whether it be a household or household with agricultural holding or establishment, will appear only once. The primary use of data base is to provide a structure to store data at the lowest level of each data collection for each survey unit. The purpose is to provide the capability to include and connect data for each sample unit from censuses and sample surveys across time.

162. The value of the integrated data base will increase over time as it grows. It will not only provide more analysis capabilities across time, it can be used to improve data quality by comparing survey information with census data or between surveys over time. The output of the aggregated values will be the input to Country Stat following its methods and principles.

163. The integration of agriculture into the national statistical system through the implementation of a master sample frame, the integrated survey framework, and the integrated data base will require countries to review their current governance structure and if necessary make changes to meet the challenges for coordination.

Chapter 12 Governance and Statistical Capacity Building

164. Governance needs to begin at the national level and deal with how to organise a national statistical system around the ministries involved in data collections for the different sectors included in the agriculture domain.

165. Each country should establish a Statistical Council including the Ministry of Agriculture, the National Statistical Office, and other organizations providing statistics or administrative data about the overall scope of agriculture to jointly organize and coordinate the development and use of the master sample frame, the integrated survey framework, and data base. It may be determined that some ministries are best suited for some activities such as the master sample frame, or to conduct specific data collections. The basic concepts in the vision statements will need to be honoured; that is data collections will be based on the master sample frame and integrated survey system with the outcomes stored in the integrated data base.

166. The integration of agriculture into the national statistical system does not mean all responsibilities fall on the National Statistical Office or the Ministry of Agriculture. However, it does mean that the organizations with overlapping data needs accept the master sample frame, integrated survey framework, and data base principles.

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167. The integration of agriculture into the national statistical system has several implications for international organizations. They will need to work within the governance structure established for each country for their data requests. It will also lead to the coordination of their data needs to minimize the data reporting responsibilities of the national statistical system.

168. The strategy has implications for donor organizations, including those supporting statistical capacity building, again their efforts will need to focus on the governance structure each country has organized.

169. The integration of agriculture into the national system will change the focus of statistical capacity building which currently focuses mainly on the national statistical offices. The inclusion of agriculture statistics in the national statistical system means that it must also be a primary element of the National Strategies for the Development of Statistics.

170. The strategy, which includes the use of remote sensing, the concept of a master sample frame and the challenge to design an integrated survey framework and data bases calls for expertise difficult to maintain in many countries. This raises questions about the establishment of regional centers of excellence for remote sensing, statistical methodology, and information technology to provide national support.

Chapter 13. The Data Quality Framework and Challenges Remaining.

171. The strategy framework will include a data quality dimension which for agricultural statistics will include: accuracy; timeliness; comparability; and availability. A guiding principle will be that the assessment of the quality dimensions will be data user and customer driven.

172. The dimensions of accuracy and timeliness pose a dilemma for agriculture because of the seasonal nature of production which requires a compromise. It will be necessary to determine from the data users their requirements for timeliness which will influence the overall accuracy. A very important element of timeliness is the publication of a calendar showing the dates results will be published.

173. The comparability element means that data are not only comparable across countries, but also over time. This poses another dilemma because of the dynamic nature of agriculture may not always allow a long time series of data.

It will pose a dilemma when the methodology from the strategy is implemented. Again, final decisions need to be user driven.

174. The concept of availability has two dimensions; the release of official statistics and the availability of micro data for research and analysis purposes. Official statistics are a public good and should be made equally available to all.

175. However, the access to micro data raises issues with data confidentiality. The guiding principles in the "Fundamental Principles of Official Statistics" presented by the UN Statistical Commission include the requirement that individual data collected by statistical organizations be strictly protected and used exclusively for statistical purposes. This raises the issue of a data access policy because in order to integrate statistical data with data collected by other specialized agencies such as the fishery agency, to understand some policy issues or to advance the boundaries of research, it is necessary to have access to household or enterprise level data. Through the International Household Survey Network, tools for documenting and disseminating micro data according to international standards and practices have been developed. Each country will need to determine a data access policy that provides access to micro data within its confidentiality requirements.

176. The strategy does not solve data methodology problems. Crop yield estimation is still very difficult, especially where multi –cropping is used and where the producers cannot provide a measurement of area in standard units. Challenges remain to reach the potential of remote sensing which still cannot provide estimates of area by individual crops. The integrated survey framework will provide challenges for sample design, and determining what types of data can be included in an integrated survey questionnaire.

Chapter 14. The Way Forward: Implementation Plan and Capacity Building Programme.

177. This paper provides a strategy to improve agricultural statistics to meet the requirements for policy and decision making to meet the challenges posed in the 21st century. It is recognised that some of the aspects of the strategy need additional development which will be included in the final version. Such aspects include:

- the conceptual framework for compiling, integrating and analysing agricultural statistics. A sub-group of the Friends of the Chair Group may be tasked with this development with support of FAO and other Agencies;
- the assessment of country capacity in agricultural statistics which needs to be complemented by specific studies in domains where information is insufficient. This additional study may involve FAO, World Bank, PARIS21 and countries. The detailed assessment will serve as a basis for the statistical Capacity Building Programme.

178. The strategy should be user driven and responsive to their requirements for the content of the program, the timeliness of the data, and the overall quality.

179. The success of the global strategy will require a national and international effort and commitment to take on the statistical capacity building required to rebuild the national statistical systems. Once adopted, this Strategic framework will be the basis for a plan of implementation with a core capacity building programme. The implementation of the strategy will build on the detailed country assessment and will define specific actions at country level, regional level and international level to identify priority areas, resources required and timeframe. For many developing countries assistance from Donor Agencies and Technical Cooperation Agencies will be needed to support the initial phases of capacity building. This capacity building includes many things starting with the support to:

a. Build an infrastructure of statisticians and supporting staff including data collectors,
b. Educate staff on statistical and survey methodology,
c. Develop and maintain the use of a Master Sample Frame, implement the new survey framework, and integrate data bases.
d. Provide computers, software, and other technical equipment,
e. Collect, validate, process, and publish results

180. The review of the existing National Strategies for the Development of Statistics should be systematically done to ensure they are consistent with the integration of agriculture into the national systems. Each country needs to review their NSDS, if one is in place, and update it if necessary. If one is not in place, countries need to begin the process taking into account the strategy. Support from PARIS21 and other Donor and Technical Cooperation Agencies will be required for the implementation of this activity.

181. Support to methodological research at regional and global levels will be also required to prepare technical guidelines in areas such as integrated master sampling frame with geo-referenced statistical units and master database, integrated household surveys, crop yield estimation in difficult conditions such as mixed cropping, root crops, continuous harvesting, use of remote sensing etc.

182. There are elements of the strategy that countries can begin immediately to review. One is to review the menu of indicators and suggested set of core data items with policy makers and other data users. The on-going work of Wye City Group on *Statistics on Rural Development and Agricultural Household Income* could provide an important input to this process. The other issue is to begin the dialogue with other institutions producing agricultural statistics about the integration of agriculture statistics into the national statistical system.

183. The above two efforts should also focus on resource requirements and seek the combined support of all stakeholders to obtain the necessary funding.

184. Regarding the timetable, the next step in the development of the strategy is for a comprehensive review of the strategy by all stakeholders who will come together at the ISI Satellite Meeting on Agricultural Statistics in August, 2009. The outcome of this meeting will be the final strategy to present to the UN Statistical commission for its approval and suggestions about an implementation plan.

185. The strategy provides a long term view. It should be considered to be a living document that will be updated as new issues emerge.

186. Once the strategy is approved by the United Nations Statistical Commission reflecting the acceptance by the countries, the next step will be the preparation of a plan to implement the global strategy. The implementation plan will consider the reality of the existing national statistical systems and be country driven.

187. The implementation plan will ensure that it includes the input and participation of policy makers and other data users.

Appendix: A Indicators

TABLE 1 . PRIORITY MONITORING AND EVALUATION INDICATORS

A Sector-Wide Indicators for Agriculture and Rural Development
1 Public spending on agriculture as a % of GDP from agriculture sector
2 Public spending on agricultural subsidies as a percentage of total public spending on agriculture
3 Prevalence (%) of underweight children under five years of age in rural areas Prevalence (%) of stunted children under five years of age in rural areas
4 Food production index
5 % annual growth in agricultural value added
6 Rural poor as a proportion of total poor population Rural hungry as a proportion of total hungry population
B Specific Indicators for Sub-sectors of Agriculture and Rural Development
B1 Crops (Inputs and services related to annual and perennial crop production)
7 % change in yields of major crops of the country
B2 Livestock
8 % annual growth in value added in the livestock sub-sector
B3 Fisheries and Aquaculture
9-1 Capture fish production
9-2 Aquaculture production
B4 Forestry (Developing, caring for, or cultivating forests; management of timber production)
10 Proportion of land area covered by forest (%)
B5 Rural Micro and SME Finance
11 % of the rural population using financial services of formal banking institutions
B6 Agricultural Research and extension
12 Public investment in agricultural research as a % of GDP from agriculture sector
B7 Irrigation and Drainage (services related to water use in agriculture)
13 • % of users who report significance increase in crop yields as a result of provision of irrigation and drainage services
B8 Agri-business (Agricultural Marketing, Trade and Agro-industry)
14 % change in sales/ turnovers of target agro-enterprises
C Indicators for Thematic Areas related to Agriculture and Rural Development
C1 Community-based rural development
15 • % of target farmers who are members of producer organizations
16 Agricultural withdrawal as % of total freshwater withdrawal
17 Ratio of area protected to maintain biological diversity to surface area of the country
18 % change in soil loss from project watersheds
C3 Land Policy and Administration
19 % land area for which there exists a legally recognized form of land tenure

Table 2. Menu of indicators, data requirements, data sources and technical notes

Indicator	data requirements	Data Sources	Technical Notes
Sector Wide indicators for agriculture and rural development			
Gross Domestic Product (GDP)—	Sum of the value added by all producers in the economy	Censuses and surveys of firms, farms, and households for small holders.	.Value added should include unreported activities as well as the value of informal or small scale operations. Annual estimates between census or surveys based on extrapolations based on other indicators.
GDP growth from Agriculture value added.	Estimates of total production and value for all commodities produced in the country; including that from small holders/household plots minus estimates of the cost of inputs such as seed, feed, energy, fertilizer, labor, etc. Agriculture includes forestry and fisheries	Censuses and surveys agricultural enterprises, farm and rural households, administrative and processor. data	SNA concepts followed. Problems include estimation of output consumed by the household and the annual coverage of all commodities
Public spending on agriculture, subsidies, and infrastructure	Government budget allocations, and spending related to agriculture. Agriculture includes forestry and fisheries	Ministry of Finance, National Accounts, Planning commissions, Donor reports	The definition for public spending on agriculture should follow the UN Classification of Functions of Government (COFOG) for agriculture
Public spending on rural infrastructure including health and education	Government budget allocations, and spending related rural areas	Ministry of Finance, National Accounts, Planning commissions, Donor reports	Rural should be defined based on ranges of population density so results are comparable across countries
Investment in capital stock	Inventories of machinery and equipment owned by agricultural holdings, buildings such as milking purposes, animal breeding stock, area of semi-permanent crops such as trees and vineyards,	Agricultural resource surveys of holdings and agricultural enterprises	Machinery and equipment inventories should be by purpose (tillage, harvesting, etc.) and size

	number of trees and vines		
Demographics of agricultural and rural population	Rural population and number of rural households, number of agricultural enterprises, number of agricultural households and population living in them, age and education levels. Agriculture includes forestry and fisheries	Census of Population, Census of Agriculture, Household surveys, administrative records	Rural should be defined based on ranges of population density so results are comparable across countries
Gender	Sex of agricultural holder	Census of Population, Census of Agriculture, Household surveys, administrative records	
Percent of rural children that are underweight compared to national level	Anthropometric data	Anthropometric Surveys	Indicator of the result of food insecurity.
Percent of rural children that are stunted compared to national level	Anthropometric data	Anthropometric Surveys	Indicator of the result of food insecurity.
Rural poor as a percent of total poor population	Household income and consumption estimates for national poverty lines. Purchasing Power Parities for comparisons across countries	Household Surveys. International Comparison Program for comparisons across countries	Countries should use poverty estimates based on PPPs and extrapolate between ICP benchmarks
Rural hungry as a percent of total poor population	Household income and food consumption estimates for national minimum energy requirements.	Household Surveys. International Comparison Program for comparisons across countries	Countries should use hunger estimates for monitoring food deprivation levels
Change in Land Cover and use	Land Cover Classification System (LCCS), Area and geo-referenced for Cultivated land, Grass/pasture, inland water, marine water, wetlands, shrubland, woodland, fallow/idle cultivated land, barren land, urban/developed areas, areas equipped for irrigation.	Land use surveys, satellite imagery	Ground truth data required to provide more detailed breakdowns of cultivate land, especially for crops in small plots. Difficult to apply in detail where multi-cropping is used.
Food production index, food security	Area, production and yield for food crops, livestock numbers and production of meat, milk, eggs, fish captured and cultured, and other food products, non-food use of food products, food imports and exports	Agricultural Census, surveys of agricultural enterprises, processors, fish landings, administrative data such as imports, exports. Food Balances and Household consumption surveys	Follow FAO guidelines for inclusions and exclusions

Trade—imports and exports	Imports and exports—quantities and values of agricultural products including fishery and forest products	Customs inspections—in some countries the customs offices collect the data which then are turned over to the national statistical office for compilation	National statistical offices should collaborate with customs officials to ensure coding and classifications follow international guidelines
Indicators for subsectors of agricultural and rural			
Productivity of Crop production as measured by crop yields	Quantity harvested per unit of area such as hectare and area harvested. Area harvested, distinguished between irrigatedharvested crops and rainfed harvested crops	Census of Agriculture, crop cutting surveys. Production sample surveys, processor surveys, such as oil seed crushers, cotton ginners	Difficult to measure with mult-cropping or with crops that can be harvested > once a year. Crop cutting can over estimate yields
Crop balances	Area Harvested, Quantity harvested, quantities imported/exported, change in stocks, quantities by utilization such as food, bio fuels, own consumption, for every crop including those produced for fiber and oil	Surveys of agricultural enterprises, administrative data on trade, processors by utilization, household surveys for own consumption	Crop balances should reflect the growing cycle and marketing year which could be different from the calendar year.
Livestock productivity as measured by value added	Estimates of quantity and value of production of meat, and poultry, milk, eggs, by products such as hides and skins, wool mohair minus costs of inputs such as feed and replacement stock	Surveys of agricultural enterprises other enterprises such as slaughter plants, dairies, processors. Household surveys for own consumption	Own consumption should be included, difficult to measure.
Livestock and poultry Balances by species	Number of animals born, acquired, slaughtered, deaths from disease. Number of animals by purpose such as breeding, meat, milk, wool, and by age breakdowns relevant to specie. (see FAO 2010 Census)	Surveys of agricultural enterprises at least annually but more often for species with more frequent births during a reference period. This ranges from annually for cattle to monthly for egg production.	Data collection intervals should reflect the reproductive cycles. This suggests annual for cattle, semi annual for pork, quarterly or shorter for poultry, milk,
Productivity of Capture Fish production	Quantity of fish taken by unit of fishing effort; Scientific estimates of fish stock and exploitation rates;	National fishery surveys, surveys at landing sites, on-board observers, national, regional and global assessment results;	
Productivity of aquaculture	Estimates of quantity and value of production of fish by species minus costs and quantity of inputs such as seed, feed and fertilizers	Surveys of aquaculture enterprise, and holdings, aquaculture census, market certifications,	

Fish balances	Quantities and value of captures form coastal and offshore waters, rivers and lakes including non-landed catch; Quantities and value of products from aquaculture; utilizations including own consumption and discards, imports and exports, inputs such as seed and feed; outputs such as stocking; for each aquatic species	National fishery surveys, fishery census, aquaculture census, surveys of fishery and aquaculture enterprises, , processors, market information, administrative and inspection sources	See CWP Handbook, FAO coding and classification
Forestry balances	Quantity and value of removals of products from forested areas and respective utilizations	Appropriate ministries, satellite imagery, price surveys or processor data	
Commodity Prices	Market reports of prices being offered by commodity and location. Prices received by the enterprise at the first point of sale,	Market observers, Surveys of enterprises, agro enterprises purchasing commodities from agricultural enterprises	Care needed to ensure units of measure for pricing are comparable
Consumer Prices	Monthly/seasonal prices paid by the consumer	Consumer Price Index,	Care is needed to ensure highly seasonal products do not distort the price series.
Early warning	Information about pending shortages in food or other economically necessary products	Surveys of crop conditions, satellite imagery of vegetative indexes, changes in trade data, animal disease outbreak	These do not have to be statistically rigorous, mainly to provide an early warning that other interventions are needed
Climate Change, land, and the environment			
Change in proportion of land area covered by forests, rate of deforestation	Area geo referenced to map materials	Ministry responsible for forestry, satellite imagery	Follow LCCS classification
Percent of land and water area formally established as protected areas	Land and water area and geo referenced to mapping material	Responsible ministry—satellite imagery	Follow LCCS coding with expansion covering inland and marine water bodies
Irrigated land as percent of total cropland	Total cropland and area irrigated by source of water for irrigation—(surface water, groundwater, treated wastewater, etc.) - by method (surface, sprinkler, localized irrigation) Crop yields from irrigated land compared to yields	Agricultural Census, other crop related surveys or water user survey	irrigation refers to the artificial application of water to assist in the growing of crops (and pastures). Can be done by letting water flow over the land ("surface irrigation"), by spraying water under pressure over the land concerned ("spinkler irrigation"), or by bringing it directly

Productivity of irrigation	from non irrigated areas.		to the plant ("localized irrigation")
Withdrawal of water for agriculture as a percent of total water withdrawal	Area under irrigation, number of irrigations, irrigation intensity and requirements by crop, water withdrawal and turn over rate for aquaculture consumption, per capita consumption by people and animals	Appropriate ministries, special studies or surveys to estimate water use in agriculture and aquaculture, surveys of aquaculture enterprises and holdings.	Should include both surface and ground water. Coding and classifications should be defined
Change in soil loss from watersheds	Reduction in crop yields, reduction in area of cultivated land	Appropriate ministries, geo referenced data with satellite imagery	
Affect of inputs on the environment	Fertilizer, pesticide, and other chemicals applied to the soil, water bodies, and plants by type of crop and watershed area, stocking	Agricultural census and or follow-up surveys—best if data geo referenced to satellite imagery for watershed links	
Habitats and ecosystem	Ecosystem health, status of vulnerable ecosystems	Specific survey, national, regional and global assessment results,	
The agricultural and rural economy			
Agricultural and rural Labor	Number of paid and unpaid household members working on agricultural, fishery and forestry enterprises, number of paid workers and earnings. Number of rural population employed in non farm activities and earnings.	Labor force surveys, household surveys	Need to establish standards for minimum ages of workers and the number of hours worked per week to be considered a worker. Need to ensure female workers are counted
Rural household income	Income from agriculture by sector (crops, livestock, aquaculture, fisheries, forestry, income from other sources such as labor, other enterprises	Rural Household Survey.	Rural to be classified using range in population density.
Percent of rural population using services of formal banking institutions	Total number of rural households, number using credit or savings services	Central Bank or commercial banks, special surveys, agricultural census	
Change in sales of agro enterprises	Sales, net profits of enterprises providing services to agriculture	Special surveys	Use standard accounting principles

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