

Agriculture activity in the national accounts - how well it is measured?

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Abstract:

Paper recognizes the fact that 'on-farm' activity has undergone major change over the years. Farming households and their activities are now linked with other economic activities and have taken a complex shape. These issues need to be considered for providing database for decision-making.

The SEAFSA (A System of Economic Accounts for Food and Agriculture, FAO, 1996) has been designed using format recommended by the 1993 SNA to meet the data requirements of planners and policy makers for dealing with the formulation of various plans and policies relating to food and agriculture. The System consists of production, generation of income, allocation of primary income, and capital accounts for institutional sectors and establishments (agricultural holdings) as well as the goods and services accounts for agricultural production in the format as recommended by the 1993 SNA. At country level while implementing the System units for which accounts are required to be included would depend on the proposed field of economic analysis.

The paper, while reviewing current status of the development of statistical system in developing countries and the work done by the FAO in this field, calls for actions in two directions, namely, to improve the quality and coverage of the data on agricultural output, input and other related fields and locating areas of priority action to develop a system of indicators in the framework of the SEAFSA/ SNA to monitor and evaluate economic policies and programmes. Specific attention has been given in the paper to (a) how to cover informal agriculture, (b) changes required in the land use classification, and (c) use of time-use survey approach along with cost of cultivation/production surveys to get improved/reliable data on agricultural inputs. This will be useful for creating an information system as well as to compile an indicator system for analyzing agri-environmental and gender related aspects.

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1. Introduction

Over the years, “on-farm” activity has undergone major change. Farming households and the activity is now linked with other economic activities and has taken a systems approach. Table below presents evolution of the farming system in the last four decades.

Table – Evolution of the Farming Systems Approach

Characteristics	1970s	1980s	1990s	2000s
Systems Level				
Farm				
Household				
Group/Community				
District/Zones/Catchments or Sectors				
Livelihood Focus				
Crops				
Crop-Livestock				
Multiple Household Livelihoods				
Functional Focus				
Research				
Research & Extension				
Research, Extension & Support Services				
Multi-sectoral, incl. Infrastructure				
Stakeholder Focus				
Public				
Public and civil society				
Public, civil society & private				
Other Foci				
Gender				
Household food Security				
Productivity & Resource Management				

Source: Farming Systems and Poverty – Improving Farmers’ Livelihoods in a Changing World, FAO (2001)

The table indicates that prior to seventies agricultural activity was based on individual farms which changed to household based approach in 1980s to meet the entire family needs and to group & community for taking advantage of infrastructure needs and is moving in 2000s towards districts/Zones/Catchments or Sectors to conserve the natural resources. Keeping this in view analyst and policy maker focusing on livelihood of

farmers slowly moved from crop production to crop & livestock production and finally to multiple economic activities to take advantage of any gainful employment, which can improve the family's livelihood. Correspondingly any economic system, which exists today, is becoming of interest of not only public sector but also of the civil societies and private bodies. Last but not the least the agricultural activity today would like to take into account role of gender in maximizing level of livelihood and productivity related issues as well as management of natural resource as part of main activity. These aspects need to be considered for providing database for decision-making.

It is also true that farmer typically view their farms, whether small subsistence units or large corporations, as systems in their own right. It has been realized that the functioning of any individual farming system is strongly influenced by cost incurred in producing goods, which in turn depends on external rural environment, off-farm economy through commodity and labor markets linkages. To give desired direction to agricultural development it is essential to formulate appropriate policies and develop institutional set-ups. The effective assessment of many agricultural policy options requires estimates of the likely responses of different types of producers, and an appraisal of the impact on farm-households of the proposed measures. These judgments require a better understanding of the nature of agricultural systems, including the characteristics and behavior of different types of agricultural production units.

Conceptual framework for compiling a complete set of national accounts was presented in 1968 with the release of the third revision of the System of National Accounts (SNA). The SNA released by United Nations contains a coherent, consistent and integrated set of macroeconomic accounts; balance sheets and tables based on a set of internationally agreed concepts and definitions, classifications and accounting rules. However, the main purpose of the fourth revision of the SNA (1993) is not the compilation of gross (or net) domestic product and such other macro-economic aggregates for a country or a region alone but also to support a frame for analytical studies. The 1993 SNA has been explicitly designed to be a flexible tool for collating data which can support many facets of economic analysis and policy formulation. The system is built around a sequence of interconnected flow (national) accounts linked to different monetary and physical databases relating to economic activities taking place within a given period of time through social accounting matrices supported by the concept of satellite system. The objective of the present paper is to bring out how the agricultural activity is included in the total system and how well it is being measured in actual practice in the developing countries.

2. Efforts at international level

The need for a coherent system of economic accounts to support creation of reliable database on food and agriculture for decision making was recognised by the Food and Agriculture Organization of the United Nations (FAO) in early fifties when food balance sheet was being compiled to assess the food availability in the world. The experience gained in producing the recurring publication "Output, expenses and income of agriculture in European Countries (FAO, 1953) was the starting point for the basic work in this direction. The first international standards for agricultural sector accounting were released in the

publication “Agricultural sector accounts and tables: - a handbook of definition and methods (FAO, 1956)” by the Joint ECE/FAO Agriculture Division for European countries. A detailed description of the journey undertaken from the starting phase to the publication of a handbook entitled “A system of Economic Accounts for Food and Agriculture (FAO, 1996)” has been included in the “Annex 2.1 – The Historical Development” of the publication.

The SEAFAs have been designed using format recommended by the 1993 SNA to meet the data requirements of planners and policy makers for dealing with the formulation of various plans and policies relating to food and agriculture. The SEAFAs follow basically the concepts and definitions of 1993 SNA. In most of the countries, for policy decisions, one requires to know the economics of production and supply & uses of food and agricultural products, details of income accruing to agricultural households and composition and source of nutrition in the food of the total population. Thus, in general, the main objectives of agricultural policies¹ can be grouped into three broad groups, namely, (a) securing improvements in the efficiency of the production and distribution of food and agricultural products, (b) bettering the condition of the rural population, and (c) raising the level of nutrition and standards of living of people. To study these aspects, the System (SEAFAs) consists of production, generation of income, allocation of primary income, and capital accounts for institutional sectors and establishments as well as the goods and services accounts for agricultural production in the format as recommended by the 1993 SNA.

In the SEAFAs format of all accounts listed above, excepting Capital Account, is the same as recommended by the 1993 SNA. In case of Capital Account the format has been truncated to present only gross capital formation on the uses side and external assistance obtained for capital formation on the resource side. The balancing item of the account denotes internal resources of the country. The account does not include items like domestic saving and capital transfer.

At country level, while implementing the System, units for which accounts are required to be included would depend on the proposed field of economic analysis. The planners and policy makers require data on production, income, consumption and capital employed sometime for establishments which are engaged in the production activity as a group of producers of homogeneous products and sometime for institutional units who are responsible for undertaking the activity, depending on the situation under consideration. Keeping in view the earlier background, the system includes accounts for institutional units as well as for establishments (units of homogeneous production) and for goods and services.

The concept of satellite accounts introduced in the 1993 SNA made it possible to formulate an integrated system by taking food and agriculture together in one single framework. The provision of additional information of cross sectoral nature made it possible to include the economic aspects of production & consumption of food, income generation in the food production activity, capital formation & requirement of capital for food production, by

¹ In fact these objectives are part of the ‘Preamble’ for establishing the Food and Agriculture Organisation of the United Nation (FAO, Basic Text).

taking relevant components from agriculture, forestry, fishery and manufacturing sectors. Possibility of using complementary or alternative concepts made it possible to include in the system, matters of social concern like nutritional status of food which is generally measured in terms of the calories, fat and protein contents etc., which are physical in nature. Thus the System also includes a set of accounts for food production and consumption.

Detailed structure and accounting framework of the SEAFSA can be seen in the FAO (1996). The publication apart from presenting accounting framework also incorporates essential concepts and definitions (extracted from the SNA 1993) and a brief discussion on uses of the System, data sources, etc. To understand the basic approach of the SEAFSA it would be useful to highlight a few points:

1. Basic objective of the SEAFSA is not to create a System for compiling macro-economic aggregates for the food and agriculture sector. In most of the countries, these are already being compiled by the offices responsible for compilation of national accounts. This System has been designed to provide guidelines for organising analytically sound and user's friendly information system to the statisticians and economist working in the Ministries/Departments relating to food and agriculture for their use as well as for the use of national accountants. The System can be taken as a mean to improve quality and reliability of various databases.
2. Recognising the need for detailed analysis of the population dependent on agriculture the System has put special emphasis on agricultural households. This is in accordance to the recommendation of the 1993 SNA which suggests that the sector may divided into sub-sectors taking into account analytical needs (paragraph 4.158 of the SNA'93). However, this does not mean that the SEAFSA does not support accounts for other institutional sub-sectors. This depends purely on the type of analysis needed by the country.
3. Although the SEAFSA recognises that it is feasible and useful to construct complete sequence of accounts for institutional units, the present set would be adequate to organise databases for undertaking simple analysis.
4. The SEAFSA or for that matter any other publication does not provide concept of agricultural household or the informal agricultural sector. However, it is necessary to understand the alternative manner in which these sub-sectors could be defined and relate definition to the economic analysis (for further details, please see Narain, 1999).

3. Current Status of the Work

The FAO after releasing the SEAFSA organized four workshops in the form of National Demonstration Centers (NDC) in Africa (Ghana, 1995), Asia (SIAP/FAO Workshop - China, 1998) Central and East European countries (Hungary, 2000) and Asia (India, 2002). After the very first NDC, it was realized that despite the increasing awareness of the importance of statistics in planning for agricultural development, most developing countries still do not have an adequate system of statistics pertaining to the agricultural

sector. The available agricultural data are incomplete in terms of (a) the range of commodities covered (for example, in many cases only cash crops for large farms are covered), (b) the range of variables or data sets covered (for example in many countries data on agricultural inputs are practically non-existent), and (c) coverage of the nation (sometimes parts of the country are excluded from the national statistical reporting system). Furthermore, even when data are available, their reliability is often questionable.

In case of many countries collection of data on agricultural production is being done in the Ministry of Agriculture, while compilation of national accounts is the function of Central Statistical Office (CSO). In some cases it was also noted that the two departments are doing their job independently. In fact, agricultural data in a country also come from other kinds of censuses or surveys as well as from administrative records. As the different institutions involved are not aware of each others activities, there is considerable duplication of effort and, in many cases, conflicting data are reported for the same items.

In many countries work on national accounts is limited only to estimation of value added using production approach. Estimation procedure, in many cases, was faulty using inappropriate assumption. As regards data on the welfare of the households engaged in agricultural activities and the food consumption level of the population, in many countries appropriate household surveys are either not available or not regularly undertaken. When it comes to data relating to the depletion of land resources and their environmental effects the situation is still worse. Finally even when considerable data relating to the agricultural sector are available, it has been seldom recognised that the different data components often have different coverage and time frames thus requiring special processing, tabulations, adjustments etc. prior to their usage in an integrated manner or for the purpose of a particular study or analysis. Reasons for this state of affairs are many. To improve the situation, the FAO released another handbook entitled "Handbook on the Compilation of Economic Accounts for Agriculture (2002)" to further guide member countries on the subject.

Delhi (India) Workshop² highlighted the role of EAA for planning and policy making. In this context the areas of concern were illustrated by giving particular consideration to topics relating to gender issues, environmental degradation and food insecurity, which have been the subject of discussion at various international forums. It was noted that (a) presently none of the participating countries prepares EAA in the manner recommended by the FAO, and (b) the data availability in some of the countries is very poor. The existing censuses and sample surveys, particularly of the surveys for estimation of cost of production/cultivation of crops and livestock that can provide the important database on agricultural holdings/households for preparing the EAA, are being not organized scientifically to facilitate compilation of EAA.

To get a further insight into quality of data and reliability of estimates of value added, in an internal exercise value of agricultural production (at current and constant prices in local

² Participants from 9 countries Bangladesh, Laos, Nepal, Sri Lanka Bhutan, Cambodia, Pakistan Iran and India attended the workshop.

currency and US \$) were compiled using the data on agricultural production and prices received by the farmers collected by the Organization and compared with the estimates of value added released by the World Bank (at current and constant prices in local currency and US \$). The study revealed that:

- the proportion of value of agricultural production at constant prices does not have uniform relation with agricultural value added at constant price over time and space;
- implicit price index numbers also do not indicate some what similar trend as indicated by implicit price index number derived from value added series or the index numbers of consumer prices;
- intra-country (cross section) analysis does not indicate some what consistent picture for some of the important commodities.

4. The way ahead

A review of the current status of the development of statistical system in developing countries and the work done by the FAO, calls for actions in two directions. The first action is required to improve quality and coverage of the data on agricultural output and input. The second area of priority action is to develop a system of indicators which are required to monitor and evaluate economic policies and programmes. As it is not easy to collect comprehensive data for creating a global information system based on SAM approach, the other action is required to select some important tasks for immediate attention and list the required data for the purpose.

While looking at the existing databases many countries are collecting fairly good data on output of major crops. More over this is one area where a large amount of literature is already available. Only issue is the availability of resources (finance and man power) which is not the area of discussion here. For improving the crop production data, immediate attention is required to extend the coverage to minor crops and agricultural production being done outside agricultural holdings (e.g. crop grown at bunds, kitchen gardens, road side plantation, etc.) as well as horticultural crops and livestock production. On the intermediate consumption side, statistics on inputs are generally very weak. Brief descriptions of these areas are given below:

(a) Horticultural crops and Livestock production

Horticulture which includes crops such as fruits, vegetables, spices, nuts and flowers, is an important segment of the agriculture sector. There has been a perceptible change in the consumption pattern by increasing the share of horticultural products. This sub-sector has peculiar features such as including trees which are perennial in nature with long gestation period as well as short duration field crops; output is collected in number of pickings. Place of growing can be canal/river banks, field bunds, road side and kitchen garden as well as stray trees. Due to very nature of the sub-sector special attention to develop a suitable methodology is required. FAO has already taken a step in this direction by organizing an Expert Consultation on Horticultural Statistics (Harare, Zimbabwe, July

2004). However a more concentrated effort is required for developing a strategy for covering these activities which have been discussed along with informal agriculture.

Statistics on livestock production other than meat production from slaughter houses is not being collected systematically in many developing countries. Statistics on milk, wool and eggs production suffers from similar deficiency. It would therefore be necessary to improve the methodology for collecting these statistics including data on cost of production of these items. Plenty of literature is available on this subject.

(b) Statistics on Agricultural inputs, producer prices etc.

Many countries do not have satisfactory data on agricultural inputs and prices received by the farmers. In cases where data on inputs are scarce or unavailable, certain ratios based on special studies or other related factors are applied to the value of output to arrive at value added. However, most appropriate method would be to conduct proper cost of production surveys.

Lately time use studies/surveys are being undertaken by some of the countries to assess contribution of personal services of women and other members of the household, who produce these services. These surveys can provide data on time use by the household members on various economic activities and personal services produced and consumed within the households that are presently outside the production boundary of the SNA. These surveys can be combined with the cost of production surveys to provide improved data on labour cost as well as a sound basis for assessing role of women in agriculture.

Normally prices used in estimating production should reflect as accurately as possible the prices received by the producers, adjusted for indirect taxes and subsidies. Contrary to this, many countries are using variety of prices, including wholesale/consumer prices, without making any adjustment for relevant trade and transport margins. An appropriate solution to this issue would be either to collect data on prevailing prices in the primary agricultural markets along with crop cutting experiments or to take average prices in the peak marketing period (defined for each crop separately) in the primary agricultural markets. It is evident that it is very difficult as well as costly to collect comprehensive data on producer prices. The countries may, therefore, collect such data on important produce and prices for other products/crops may be derived from wholesale and consumer prices by making suitable adjustments for trade and transport margins.

(c) Informal Agriculture Sector

The concept of “Informal Sector” adopted at the fifteenth International Conference of Labour Statisticians (January 1993) cover units that are engaged in the economic production of goods or services but operates at low level of organisation. According to this concept the informal agriculture sector would consists of:

- agricultural activities of small and marginal cultivators as well as those cultivators/rural households who grow a few trees or maintain a few livestock to meet their own needs;

- gathering of forest produce (including collection of fuel wood) or fishing in local ponds/rivers; and
- agricultural activity of tribal/ nomadic population, such as shifting cultivation;
- agricultural activity of households living in urban or semi-urban areas. These households have a system of maintaining a small kitchen garden to produce vegetables, or have a small pond to grow fish, or to raise domesticated animals (cow, sheep, goat, pig or poultry) for getting a regular supply of livestock products. These activities are very often known as urban agriculture. The product of such activities are either consumed within the household or sold in the neighbourhood for supplementary income.

This activity can be undertaken by households either as their principal activity, or secondary activity, or, as hobby (i.e. without taking it as a gainful regular economic activity).

In many developing countries this activity provides food which raises the level of nutrition for not only the population living below the poverty line but also to the households in the middle and higher income group. Although the Programme for the World Census of Agriculture (FAO, 1995) etc. recommends to cover such activities, in practice, this would be rarely feasible because of the cost involved. The nature and problems for each of the activities listed above are different. Agricultural activities performed by the marginal and small farmers can some time be a secondary activity which might be missed when data are collected in a household survey covering units with agriculture as their principal activity. Even in cases where crop production activity of small & marginal farmers are collected using crop estimation surveys, output of horticulture (i.e. trees on the holding) and output of pet livestock are very often missed. In cases of shifting cultivation or urban agriculture generally data are not collected because of difficulty of developing the frame and cost involved.

Thus, in many countries no reliable data are available although the need for information on informal agriculture is recognised. Output of such activities is very often imputed (without any basis) in formulating derived statistics like food balance sheets and estimates of national income. To make appropriate intervention a minimum set of data is required on these activities in order to study following aspects:

- size of informal agriculture in terms of the total land area covered and the number of households involved;
- the socio-economic characteristics of the households practicing informal agriculture and those providing the labor input;
- role of women in the activity;
- the type of inputs used and the sources of its procurement;
- the output of the activity and final use of the produce (household consumption or sale);
- problems faced by the households in acquiring inputs, credit (if required) or in selling the output; and
- impact of the activity on environment and health.

Some of the feasible cost effective solutions to collect the required data are given below:

1. It is necessary to refine survey techniques by taking into account type of crop and manner of its cultivation (perennial crops, short duration crops grown in regular holdings, crops/trees planted at field bunds, crops/trees planted on canal bunds as well as grown in forest areas, road side plantation and kitchen gardens). Data for these seven strata can be collected using area sampling with multiple frame surveys based on independent sampling design/crop-calendar/sampling fraction/frequency. Area under some of the crops (e.g. road side plantation) may be imputed on the basis of number of trees.
2. A possible vehicle for collecting data on production in kitchen gardens is the household consumption survey which is conducted in many countries at regular intervals. A survey may not provide a reliable estimate of the magnitude of such activities, unless the need is recognized explicitly while framing the questionnaire and designing the survey. In countries where household consumption surveys are conducted at regular intervals, it may be feasible to include pointed questions about the presence of related activities and record their output used in final consumption by the household. The required data can be collected in a separate schedule from a sub-sample of the main household consumption survey,
3. While designing a fresh survey it may be appropriate to consider small area techniques or ratio/regression estimators,

(d) Land Use Classification

Land use classification corresponds to the description of the land in terms of its use for socio-economic purposes and is determined by the physical, economic and institutional framework taken together. Such information is required for physical planning and land management etc. The Economic Commission for Europe (ECE), while developing a set of ECE Environmental Indicators in the year 1989, released Standard Statistical Classification of land use mixing some categories of land cover and taking into account economic activities. This classification does not provide information that would be directly relevant to measure land use changes, estimation of crop production, etc. This classification of land is also not suitable for creation of sampling frames using remote sensing techniques. Some of the problems that are faced in collection, compilation and presentation of data on land use are given below:

1. *Concepts and definitions:* There are no universally accepted concepts and definitions for some of the items in the classifications. Countries have developed their own definitions depending upon their needs and the statistical system of the country.
2. *Mixed coverage:* Data on fallow areas, pastures, shifting cultivation and forestlands are very rarely available and are very often mixed up with arable land, grasslands or forestland.
3. *Multiple-use forestland:* Forestland in particular presents a high degree of complexity in land classification systems because of excessive multiple use. Problems are especially related to properly surveying land use and presenting results statistically and in maps

4. *Non-agricultural land use*: Built-up and residential areas are relatively easy to measure in terms of land coverage and less so in terms of land use, as the built-up areas need to be further divided into lower level categories to provide useful information for land use planning.

At various international forums, it has been recognized that information on land use is essential. What is also recognized is that the land use information must satisfy the needs of many diverse users, some of whom require linkages with policy relevant information. These requirements suggest that an ideal classification can be prepared by evaluation of each segment of land as is being done in preparing land cover statistics. Each segment can be divided into smaller units that can be identified through ownership and associated with the economic activities that are being performed on it. In addition, the concept of gross and net area under use may be adopted as is being done to compile data under different crops. In building these associations, one can easily use principles laid down in ISIC for classifying activities into principal, secondary and ancillary activities and their association to the owner of the unit. To meet the needs of multiple users, one may consider taking ISIC classes and incorporating other details at the second or third level. This framework would provide a correspondence between land, labour, capital, and goods & services produced.

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