Methodological Issues in Agricultural Data Generation/Collection

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1. Introduction
In African economies, over 50 per cent of the population is engaged in agricultural activities; hence, the ability to support the population of African nations depends largely on their success in the agricultural sector. Success in the agricultural sector requires strategic planning which leans heavily on agricultural statistics. Agricultural statistics cover all activities of people engaged in the agricultural sector; the statistics play a dominant role in estimating future production, income, consumption of immediate and final goods and employment. When the distribution of income in the agricultural sector is studied in relation to that in the other sectors of the economy, we obtain an idea of disparities in income in the two sectors. Similarly, analysis of prices of agricultural products in relation to prices in the non-agricultural products would give us insight into terms of trade between agriculture and the other sectors. To this end, agricultural statistics are important when studied independently and also when they are studied in relation to the other sectors of the economy.

2. Basic Concepts
An insight into the basic agricultural structure of a country can be obtained by breaking down the total area of the country according to land utilization. In this manner, it is possible to determine the part of the total land that can be used for agricultural production of different types. The broad categories of land utilization are arable land (normally used for growing rotation crops), land under permanent crops, land under woods and forests, and all other land such as built-up areas, roads, parks, etc. The total arable land can be further broken down as land under major crops, under market and kitchen gardens, temporary fallow (left idle for a brief period to recoup before cultivation starts again), and all other arable land. The category of land under major crops includes crops such as millet, guinea corn, groundnut, beans, yam and cotton. For example, the Federal Bureau of Statistics vide the Annual Abstract of Statistics provides annual estimated area harvested with major crops in Nigeria. Another useful breakdown of the total area is by tenure. Information on agrarian structure is important as the nature of this structure has a considerable bearing on the efficiency of production. The important categories are area owned by the holder (who operates the land) or held in owner like possession, area rented from others, area operated on a squatter basis, and area under tribal or communal tenure form. A further useful indicator of the efficiency of production is the fragmentation of agricultural holdings (a holding is all land operated by a single person). The fragmentation is determined by the number of parcels on which the holding is based (a parcel is all land operated by a person at one place surrounded by land of other holders).
3. **Methodological Issues**

Methodological issues in agricultural data collection seek to identify principles about data collection that are linked to the cost and quality of data that promote precise estimates of parameters. This means that the process focuses on improving data quality within cost constraints, or alternatively, reducing costs for some fixed level of quality. Methodological issue in the context under consideration, is both a scientific field and a profession. For example, when we consider how data collection protocols affect survey estimates, the psychologists have been the leading sources of knowledge.

The various problems encountered when contemplating conducting an agricultural survey are of a conceptual, definitional and practical nature. Definitional problems relate to the concepts employed in collecting the data. For example, in dealing with conceptual problems, substantial adjustments had to be made by the Food and Agricultural Organisation (FAO) in 1969 to adapt the programme for the 1960 World Census of Agriculture to the special pattern of agriculture and social conditions prevalent in Africa. The main adjustments were done to a number of factors. For example, under traditional African conditions, it is not always clear what to be considered the main occupation of a holder as a person can be occupied in different occupations at different times of the year. Again, Egero (1973), describing this problem, noted that household data on agricultural activities proved quite difficult to interpret, partly due to the uncertainties resulting from how polygamous households had been treated, but mainly related to problems in the translation. He observed that what was called “main” and “secondary” agricultural produce was never really clear. These headings were both translated into plural form in Swahili with the result that rarely as few as two crops appeared on questionnaire. Arbitrarily, the two first recorded crops were chosen for coding in the processing of the data.

It may be noted that the questionnaire links the information need to the realized measurement. Unless the concepts are clearly defined and the questions unambiguously phrased, the resulting data are likely to contain serious biases.

On the difficulties of measuring the agricultural population, Koley (1973) remarked that the data of economically active women in the country were extremely unreliable due to the confusion arising from the definition of economic activity and hence uniformity in definition could not be maintained throughout the country. While he noted that the number of employees for both males and females may be regarded as reliable, he remarked that a lot of confusion arose in classifying people, particularly women, into own-account or family workers. This was due to the fact that in quite a few places, a man can have more than one wife who independently cultivates separate shambas though the shamba may customarily belong to the head of household. Hence, it was not surprising that almost the entire economically active female population barring a few in urban areas were engaged in agriculture either as own-account or as family workers. Among economically active males also, agriculture was by far the
most predominant occupation, keeping 85% of the population engaged, Koley has observed.

To solve these problems, the African programme provided alternative items in the questionnaire, namely:

1) Agricultural occupation, and
2) Agricultural and other occupation.

Second, in certain countries in Africa, farmers frequently work away from their holdings during a large part of the year. For example, on plantations, in mines or factories. Their own small holdings would then be operated mostly by other members of the family. In order to compare the output of such holdings with those under the continuous supervision of the holder, the required programme suggested that the information should be classified as follows:

1) Holdings under the continuous supervision of the holder, and
2) Holdings where the holder worked away from the holding during a continuous part of the year.

Third, under the legal status of the holder, the African programme provided for recording the cases where the holding is operated by a joint and extended family, as distinct from those operated by an individual holder. Furthermore, in order to assess the progress of the work undertaken in agriculture, the required programme required separate information on:

1) Holdings operated under a definite plan, and
2) Holdings operated under the traditional system.

Fourth, communal grazing land is of particular importance in Nigeria and Africa in general. A large proportion of agricultural production derived from livestock grazed on communal land, while production obtained from arable land is of limited importance. To solve methodological issues in data collection, the African programme added two questions:

1) “Does the holding consist of communal grazing land?”
2) “If not, has it access to communal grazing land?”

In this way, the relationship between individual holding and communal land could be clearly seen. The programme further suggested that countries concerned might also collect additional data relating to the number of livestock and the number of months grazed on communal land. Area used under mortgage was also listed in the African programme.

Fifth, in the case where permanent and temporary crops are grown simultaneously in the same field, the allocation of the land into the broad classes of land utilization was extremely difficult under prevailing African conditions. Each field recorded only once
could be allocated to the class of crops considered most important. Koley (1973) again stressed that yield figures were in most cases subjective estimates without specifying yield for mixed croppings and hence were subject to considerable margins of error. Koley (1973) observed that as a result of the problem, in the survey under reference, cash crops like cotton, coffee, and cashewnuts had, on the average, less acreage per household than food crops, like maize, sorghum.

The compromise solution adopted in the African programme was to subdivide land under temporary crops (as well as land under permanent crops) into:

1) Land exclusively under temporary/permanent crops, and
2) Land mainly under temporary/permanent crops.

Sixth, it was realised that the African programme asked for irrigated and non-irrigated area under arable land (land under permanent crops and for cultivated meadows and pastures). In addition to the total area under production, the African programme proposed that, in the case of mixed and associated crops, the following areas should be reported under individual crops.

1) Area of the crop grown as a single crop, and
2) Area of the crop grown as an associated crop. This breakdown was suggested in view of the economic importance attached to the extremely complicated question of mixed and associated crops in individual countries in Africa.

The world programme proposed that successive surveys should collect data on employment in agriculture. Under African conditions at that time, it was not feasible, though successive survey was a powerful strategy for measuring current employment in agriculture, estimate of change, and average over time.

The major change with regard to the farm population was the adoption of the concept of household to the African conditions. The housing unit in Africa was found in many cases to be composed of a group of huts, sometimes referred to as compound, where in a polygamous society, the husband lives in one hut and the other huts are occupied by his wives and children. These people do not live under the same roof, nor do they always take their meals together, as required by the definition of a household in the world programme. The criteria also do not apply in cases where the fields away from the village are operated by the members of the household, living in small camps near the field for the crop seasons, or even for the whole year in the case of permanent crops. In these circumstances, the criterion that members of the household should share the community life was considered to be an essential element on which the definition of household could be based.

Accordingly, the household for the purposes of enumerating the farm population was defined as the aggregate of persons generally bound by the ties of kinship, who normally reside together, not necessarily under the same roof.
Traces of some of these problems exist in Nigeria, even after many years. The challenge for the survey methodologist is to figure out how best to use the available resources and experience – how to balance the investments in each of the components of a survey to maximize the value of the data that will result.

Recognizing that each aspect of a survey has the potential to affect the results, there is need to take a total survey error approach in dealing with the challenges. The survey methodologist has, to decide which of a set of imperfect options is best. Again, the total survey error approach is to consider the various ways that the options will affect the quality of the resulting data and choose the one that, on balance, will produce the most valuable data.

Survey methodology is about having the knowledge to make these tradeoff decisions appropriately, with as much understanding as possible of the implications of the decisions. When a practical experienced methodologist makes these decisions, it is with a total survey error perspective, considering all the implications of decisions that are at stake and how they will affect the final results.

References