

Social Science Interface Research Unit

**AN APPROACH  
TO TARGETING  
THE RURAL POOR  
FOR  
AGRICULTURAL  
DEVELOPMENT  
IN  
SUB-SAHARAN  
AFRICA**

**Fassil G. Kiros**  
Principal Research Scientist and Unit Head

**Research Paper No. 12**  
**September, 1993**

**A CONTRIBUTION TO SSIRU'S  
STUDIES ON DEVELOPMENT  
OF "TYPOLOGIES OF RURAL  
PRODUCERS"**



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# AN APPROACH TO TARGETING THE RURAL POOR FOR AGRICULTURAL DEVELOPMENT IN SUB-SAHARAN AFRICA

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Fassil G. Kiros

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## INTRODUCTION

In spite of several decades of development planning and agricultural research by National Agricultural Research Systems (NARS) and institutions of the Consultative Group for International Agricultural Research (CGIAR), there has so far been no breakthrough in agricultural development in sub-Saharan Africa. Different explanations might be given for this state of affairs. However, according to one study, among the basic explanations is the fact that "...there is an inadequate understanding of small farmers' goals and resource limitations". (Jahnke, H. E. *et al.*, 1986:105) As a result, research objectives, and we might add development objectives in general, tended to be very different from those of the clientele.

The necessity to better understand the developmental and technological requirements especially of the rural poor in sub-Saharan Africa can hardly be overemphasized. This, however, poses a difficult task. It may not be evident to many people that poverty is a socio-economic phenomenon which is difficult to explain and much more so to measure. It is a phenomenon which may be understood differently in different societies. In Ethiopia, for example, the Amharic term which is commonly used to refer to the poor is *yenie bitie* or "my type". This may imply one of two things. It may imply a desire on the part of the society to save a person the embarrassment of being referred to as *deha* or poor. It may also suggest that poverty is so widespread in Ethiopia that few feel that their condition is any different from most people. No doubt, different conceptions of and attitudes toward poverty are manifested in other societies.

In sub-Saharan Africa, most of the population regarded as poor are those which reside in the rural areas. Various designations have been employed to refer to the rural poor which comprise most of the rural producers. They have been referred to as *resource-poor farmers*, *peasants*, *subsistence producers*, *small producers*, etc. Such terms are likely to mean different things to different people. The term *resource-poor farmer*, for example, which has received currency in recent years, may be ascribed a broad or a restricted definition. Broadly, the term may denote the absence of adequate amounts of the basic productive factors such as land, labor, and farm implements. Narrowly, it could mean the lack of cash for the purchase of such production inputs as fertilizer or "improved" seed varieties.

The term *peasant* is especially problematic because its usage in the African context often leads to socio-political controversy. Some students of the subject of peasantology are not certain that the peasant mode of production, understood as a system of production which is in the process of change from subsistence to commercial production, prevails in Africa. Others acknowledge that such a process of change is quite evident. (Post, K. 1977) For this and other reasons, as John S. Saul has stated, the controversy on the subject of the peasantry "easily degenerates into a mere word-game" (1974:45). The use of the term *peasant* may also be confounded for other reasons. For example, it is sometimes used to denote an "ethic of indolence



- 2 which assumes indolence is the preferred human condition". (Seavoy, R. E. 1986:10-24) Marx's reference to the peasantry as "barbarians" and his analogy that their system of production forms "much as potatoes in a sack form a sack of potatoes" are well-known. (1935:109) There have been many other references to the peasantry which make its usage unhelpful for an objective understanding of their condition and of the problems of production which they encounter.

The term *subsistence producers* is no less problematic. Generally, it denotes a system of production basically geared to home-consumption. This would not, however, suggest a homogenous system of production, since the actual types of production and the extent of self-sufficiency of the producers tend to vary widely. The *subsistence* system is also commonly described as a system of low production and income, or characterized by the limited use of modern production inputs, slow rate of change, etc. It is therefore again difficult to find a commonly accepted set of criteria for the description of the subsistence system of production. (Wharton, C. R. 1970: 15-16).

The concept of *small producers* being a relative concept, obviously indicates different levels and conditions of production prevailing in different countries, or regions within a particular country. This concept will be discussed further below in relation with the broader problem of resource endowments. Suffice it to note here that it can be meaningfully applied only in specific socio-economic and spatial contexts.

The difficulty of coming to terms with the phenomenon of poverty based on the various designations of the rural producers in Africa is evident from the foregoing comments. It is the purpose of this paper, therefore, to suggest some objective criteria which can help to differentiate among various categories of agricultural producers in general, and more particularly assist in identifying the relatively poor among these in order to more effectively meet their development needs.

The first part of the paper consists of a review and evaluation of various indicators of poverty which have been used for different purposes by development policy-makers and planners. The purpose of this review and evaluation is to determine whether the various indicators can be usefully applied in the circumstance of the rural poor in Africa. The second part of the paper demonstrates the need for an alternative approach to rural poverty, referred to as the "production-based" approach, which can offer a more direct basis for differentiating among rural producers in general and for identifying the rural poor in particular. The third part of the paper specifies and describes a number of factors which directly affect the types and levels of production in the rural sector and as such can provide the basis for developing potentially measurable production-based indicators of rural poverty. The fourth part provides the results of a study aimed at the evaluation of the indicators identified based on empirical data generated by means of a major rural survey conducted in Western Kenya. The final part of the paper provides some concluding remarks concerning the potential value of the research findings and the direction of further research in this area.

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## REVIEW AND EVALUATION OF CONCEPTS AND INDICATORS OF POVERTY APPLIED IN DEVELOPMENT PLANNING 3

There has been much research and writing regarding the subject of poverty and its indicators. An outstanding example is the work of the United Nations Research Institute for Social Development aimed at the development of level-of-living indicators and their measurement. However, it will be evident from the discussions below that progress in this area leaves much to be desired.

In the 1960s and earlier, development policy-makers were satisfied with the definition of poverty as a condition reflected by low per capita income. Typically, development plans (usually known as five-year plans) would be prepared and implemented with the primary aim of raising per capita income. The desired aim was, however, not always fulfilled. The number of people with low or declining per capita income showed an increasing trend in many developing countries. During the period of a quarter of a century between 1965 and 1989, for example, the average annual rates of growth of per capita GDP were negative in the case of more than 50% of the low-income countries of sub-Saharan Africa. Over 17% had annual average growth rates of 0–0.3% during the same period (Table 1).

In actual fact, of course, national income statistics pertaining to sub-Saharan Africa can inform little about the actual income levels of the relatively poor segments of their populations. This is not only because per capita income constitutes the average of the "incomes" of the very rich and the very poor, but also because National Income statistics in the context of the countries of sub-Saharan Africa do

Table 1. Average Annual Growth Rates of Per Capita GDP  
— 1965–1989

Low-Income African Economies	Growth Rate of Per Capita GDP
Benin	-0.1
Burkina Faso	1.4
Burundi	3.6
Central African Republic	-0.5
Chad	-1.2
Ethiopia	-0.1
Ghana	-1.5
Kenya	2.0
Lesotho	5.0
Madagascar	-1.9
Malawi	1.0
Mali	1.7
Mauritania	-0.5
Niger	-2.4
Nigeria	0.2
Rwanda	1.2
Sierra Leone	0.2
Somalia	0.3
Tanzania	-0.1
Togo	0.0
Uganda	-2.8
Zaire	-2.0
Zambia	-2.0

Source: The World Bank, World Development Report 1991, p. 204.



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- 4 not satisfactorily reflect the actual "income" levels of the majority of those rural producers whose primary aim is to meet household consumption needs. We find therefore that per capita income fails to reflect the actual economic conditions of the large segment of the population with which we are here concerned, namely the rural "poor".

Because of the deficiency of per capita income statistics, other approaches to the analysis of poverty have been advocated. These are based on various conceptions of rural welfare. One approach describes poverty as a situation where the minimum necessities for the sustenance of life are lacking. These necessities are defined in terms of minimum food requirements. Among the methods proposed for the measurement of the degree of fulfillment of the minimum requirements are indices of per capita food consumption, calorie intakes and anthropometric data. (Glewwe, P. *et al.*, 1988: 7-9) However, in the circumstances of largely rural societies such as those of sub-Saharan Africa, the data requirements of such an approach and the basis for the determination of consumption minima would be difficult to meet. In addition to the large volume of data which would need to be generated, it would be difficult to take full account of the wide variations in the customary diets or to establish standards of consumption appropriate to diverse occupational, environmental and other considerations.

Another approach to the definition of poverty is based on the application of the so-called *basic-needs* concept. There have been widely divergent perspectives regarding basic needs ranging from reformist to radical positions. The concept is basically applied to determine or assess the extent to which physical needs such as clothing and shelter, and social needs such as health services and education are met in developing countries. (Streeten, P. 1977: (19)3; Streeten, P. *et al.*, 1981) Thus, a group of people may be regarded as poor when some of these basic needs have not been met to the desired level. However, as in the case of the concept explained above, this approach can produce useful indicators of poverty only if the desired elements and desired levels of basic needs can be objectively specified. This is, however, rarely accomplished. The basic-needs approach has therefore served as little more than an expression of a holistic conception of the level of living.

Still another approach is one which focuses attention on demographic indicators of poverty. These indicators include life expectancy at birth, and infant and child mortality. Such data are generally used to indicate the degree of poverty which prevails on the national level. The data are rarely available in a disaggregated form for specific regions or social groups within a particular country. Moreover, it is quite possible for the indicators to improve to some extent as a result of health campaigns (e.g. vaccinations against certain diseases) even though people may continue to suffer from the lack of food and from dietary deficiencies. Hence, demographic data may not adequately describe the conditions of poverty which prevail especially in rural areas.

Other conceptions of poverty have also been based on the use of composite indices of some of the elements indicated above. The so-called *Physical Quality of Life Index*, for example, combines life expectancy, infant mortality and illiteracy to produce a composite indicator of poverty. Most recently, the United Nations Development Programme has come up with what is referred to as a "human development index". This is a composite index of life expectancy, adult literacy, mean years of schooling, and real per capita GDP. According to this index poverty







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weighs most heavily in the countries of sub-Saharan Africa. Such indicators of poverty, if based on reliable data and consistently applied can provide a general idea of the extent of poverty. Yet again, disaggregated data are rarely found on the various elements of the composite indices. It is therefore quite possible for a country to rank fairly high on the basis of such indices, but for a significant segment of the population to suffer from the ill effects of poverty-generating factors. 5

In general, it is found that the various approaches to the description and measurement of poverty levels outlined above share some fundamental weaknesses. The first of these is the fact that they are based on a narrow and static conception of poverty, or as one writer has put it, on poverty as a *state*, rather than as a *process*. The *state* of poverty refers "to the extent of deprivation in a population" while the *process* of poverty "relates to the reproduction or change in the distribution of resources which make up the capacity of the poor to meet their basic needs". Thus, "impoverishment occurs because of a deterioration in the value of the two main parameters — endowments and exchange entitlements — which constitute the basis of household or individual claims to the social product". (Kabeer, N. 1991:243–244).

Thus, many social scientists agree that the problem of poverty should be analyzed in a broad socio-economic context.

*"Poverty cannot be understood by isolating the poor and treating them as a special group. Society is seen as a series of stratified income layers and poverty is concerned with how the bottom layers fare relative to the rest of the society. Hence, the concept of poverty must be seen in the context of society as a whole. The study of the poor then depends on an understanding of the level of living of the rich, since it is these conditions relative to each other that are critical in the conception of inequality. To understand the poor we must then study the affluent". (Rein, M. 1977:46).*

The second major weakness which is related to the above has to do with the assumption generally made that the poor constitute a homogenous mass of people with identical characteristics. This is far from the truth. The poor in the countries of sub-Saharan Africa consist of heterogenous groups in terms of their socio-economic characteristics. Thus, one author for example distinguished between ten different categories of the poor in Africa which he referred to as the landless, the peasants, the pastoralists, the salaried and self-employed, the unemployables, the disreputable poor, the refugees and squatters, the fisher people and the hunter-gatherers. (Bibangambah, J. 1985: 29–33) One can perhaps add other categories to this list of the poor. The important point, however, is to recognize that each such category would call for particular sets of policies to deal with it effectively.

It will be found that the various categories of the rural poor may suffer from different levels of poverty, a fact which is not always recognized. One therefore often hears terms such as "the poorest of the poor" or "the poor and the ultra-poor". These "underclasses" of the poor have been distinguished by a number of indicators.

*"...First, there are sharp differences in nutritional behaviour induced by economic change. The ultra-poor, when income goes up a little, spend as if*



6 *their overriding priority were to obtain more (and inexpensive) calories. Other poor people do not.*

*"...Second, there are corresponding differences in 'physical' indicators of undernutrition. The ultra-poor, despite devoting some 80 percent of income to low-cost foods, are much more prone than others to the forms of mortality, illness, and inadequate physical and mental performance associated with severe anthropometric shortfalls. The other poor people, in most studies, do not show such conditions.*

*"...Third, the anthropometry of the great majority of poor but not ultra-poor people (though often classified as 'mild' or 'moderate' undernourishment) is not convincingly associated with functional impairment or medical risks....*

*"...Fourth, the impact of undernutrition and disability severely affects the capacity of the ultra-poor to supply labor. Age-specific participation rates, as expected, rise sharply with deepening poverty, but that rise is halted or reversed among the very poorest.*

*"...Fifth, casual-labor status, 'unemployment', and severe fluctuations in unemployment (as also in participation and wage-rates) are linked to lack of assets and to ultra-poverty". (Lipton, M. 1988:4-5).*

A distinction of special importance between the poor and the "ultra poor" is also the difference in the incidence they manifest along regional/spatial and gender lines. It is found, for example, that the incidence of the very poor is much greater in the rural than in the urban areas. This is an important fact because the vast majority of the population of many countries of sub-Saharan Africa live in the rural areas. It is also found that female-headed households appear to be represented among the very poor more than male-headed households. (Lipton, M., *op. cit.*, pp. 13, 45).

Thirdly, a number of the indicators of poverty reflect some degree of value judgements and arbitrariness in differentiating the poor from other segments of the population.

*"The result is that those who hold different value judgements concerning how stringent or lenient the poverty standard should be, can use the same data to demonstrate that poverty is either a significant or trivial problem". (Rein, M., *op. cit.*, p. 61).*

Finally, it is found that the various approaches to poverty have had limited impact on development policy-making and action especially in rural areas. As indicated above, most of the indices of poverty discussed above are of macro-economic or macro-social nature and are usually applied for comparative purposes on a global scale or among developing countries. It is not common to find development plans or programmes which are based on a systematic analysis of the many dimensions of poverty or its incidence within particular regions of a country. It is more common, on the level of the grassroots to find the implementation of



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"poverty programmes" with various limited objectives such as those often supported by Non-Governmental Organizations (NGOs). 7

The foregoing discussion reveals the difficulty of coming to terms with the phenomenon of rural poverty. The major conceptual weaknesses outlined above suggest the need for an approach which can more directly address the basic factors which account for widespread poverty in rural areas.

#### THE NEED FOR PRODUCTION-BASED INDICATORS OF RURAL POVERTY

A more direct approach to poverty would be one which identifies and focuses on the core of the problem of poverty. In the circumstances of the rural producers of Africa, there can be no doubt that the hard core of the problem of poverty lies in the fact of low and declining per capita agricultural production. It is found in the fact that most of the producers are increasingly unable to meet their basic food requirements even at the customary relatively low levels of nutrition in spite of the fact that they devote nearly all of their energies to the incessant struggle to meet these requirements. As reported by the World Bank:

*"In terms of energy value, food consumption in sub-Saharan Africa between 1965 and 1986 averaged 2100 calories per person per day, or about 85% of the recommended requirements. It is estimated that about one-quarter of sub-Saharan Africa's population — more than 100 million people — obtain, on average over good and bad crop years, less than 80% of the daily calorie supply recommended by FAO and WHO. In drought and other bad years the numbers would be even larger". (1989:72).*

A number of the indicators of poverty discussed above actually mirror this problem. Per capita income is primarily a function of agricultural production as far as the rural sector is concerned. It need hardly be stated that per capita food consumption depends on production itself. Indicators of nutritional levels such as calorie intake, anthropometric measurements and related health indicators are primarily the reflections of the extent of food supplies. And so are to a large extent the demographic indicators of poverty such as high infant and child mortality and low life expectancy at birth. Data recently revealed by the World Bank relating to the early stages of development in the US and Britain, for example, show the likely important role played by improvements in nutritional levels in decreasing rural mortality. (World Bank, 1991:53).

The long-term effects of improved health services in the sub-Saharan African countries will also ultimately depend on increased agricultural production. Needless to say, improvements of health conditions resulting from vaccinations against widespread causes of ill health, and improved sources of water supply have significantly contributed to the reduction of infant and child mortality and to the increase of life expectancy. Paradoxically, however, such improvements by themselves may not result in sustained long-term improvement of the quality of life unless accompanied by rapid increases in food production. The actual outcome might otherwise be the decline of per capita food availability, as indeed has been the case in many countries of Africa in recent periods, likely counteracting much of the positive impact of improved health services.



8 It must be remembered moreover that health services and other aspects of "basic needs" such as education, shelter and the like are not "free goods". Ultimately, availability of or access to such services and amenities will depend on sustained increases in productive capacity. In the case of sub-Saharan Africa this means primarily increased productive capacity in agriculture.

All this is by no means to imply that there should be less emphasis on the delivery of social services in the future, but that far greater effort needs to be made to increasing agricultural production than has been evident in the past. This should be based on a better understanding of underlying factors which hamper increased agricultural production. Indeed, *it is these factors which should appropriately serve as the sources of the indicators of rural poverty in sub-Saharan Africa.* As we shall see below, such factors will bring into focus not only the main poverty-producing elements discussed earlier but also issues of distribution or access to resources.

#### **BASIC FACTORS DETERMINING AGRICULTURAL PRODUCTION AND INCOME IN SUB-SAHARAN AFRICA**

In most countries of sub-Saharan Africa, the levels of agricultural production and income are likely to be determined by many factors among which are the following: (1) Endowments of basic factors of production; (2) Agro-ecological factors; (3) Access to modern knowhow and production inputs; (4) Ownership of livestock; (5) Structure and diversity of production activities; (6) Gender-related and other personal characteristics of producers. These factors will be closely examined below.

##### **1. Endowments of Basic Factors of Production**

Agricultural production basically depends on endowments of land, labour, and stock of physical capital. The fundamental importance of these factors in the context of the traditional system of production will be considered below.

###### **(a) Endowment of Agricultural Land**

As indicated earlier, among the most common terms used to describe the agricultural producers of sub-Saharan Africa is that they generally consist of *small producers* or *smallholders*. As already indicated, this description can have operational value only in particular contexts. The notion of *small producers* can signify producers cultivating different sizes of land. Land-holding patterns even within relatively restricted areas can vary significantly even though the ceiling might not exceed a few hectares. Production levels are, therefore, likely to vary reflecting the sizes of agricultural land being cultivated by different households.

It should, however, be recognized that there are circumstances where the concept of differential landholding is strictly not applicable to the situation of many rural producers. Examples of these are traditional communal tenure systems and producers' cooperatives. The endowment of agricultural land would also need to be assessed in terms not only of size of land cultivated, but also in terms of its suitability for the use to which it is put, the level of its fertility, the degree of its consolidation or conversely its fragmentation, and the degree of control exercised by the producers in its cultivation.



### (b) *Supply of Labour*

It is generally assumed that household sizes tend to be large in the rural areas of sub-Saharan Africa. Household sizes of ten or more persons are not uncommon even within nuclear families. Within polygamous homesteads, the numbers can be greater. This situation has led to the assumption that labor supply is abundant in rural areas. The familiar notion of "disguised unemployment" has been used to describe a situation where rural labor supply may be underutilized.

It is now well established that rural households are characterized by high dependency ratios, indicating that members of such households consist largely of children as well as the aged. As a result, many households face labor shortages during certain seasonal agricultural activities and often when new methods of production are introduced. The agricultural producers differ significantly in their ability to overcome the labor constraints which they encounter. Those producers who are able to make use of hired labor during certain seasons are, other things being equal, likely to be better off than those who are unable to do so. This problem is not difficult to appreciate in view of the fact that the traditional production methods are relatively highly labor-intensive.

### (c) *Stock of Physical Capital*

In the context of the traditional agricultural producers of sub-Saharan Africa, the instruments of production consist of implements employed in the various stages of the production process. Draught animals may also be appropriately considered as productive capital in some of these agricultural systems. The production capacity of rural households can vary significantly according to the degree of ownership of agricultural implements and draught power. This is a matter which hardly requires much elaboration.

## 2. Agro-Ecological Conditions

It is well known that sub-Saharan Africa covers highly diverse agro-ecological regions which are also reflected within sub-regions and within particular national boundaries. One synoptic classification identifies five major agro-ecological zones on a continental level which are characterized by particular types of production problems such as soil deficiencies, low and erratic rainfall, labor shortages, scarcity of land, etc. (Refer to Table 2) Quite evidently, micro-level characterizations would reveal many more problems reflecting the peculiarities within the various agro-ecological zones. These natural conditions would obviously make considerable differences in production potential even within fairly limited geographic areas such as a *district* as in Kenya, or a *wereda* as in Ethiopia. Thus, in South Nyanza District of Kenya, for example, production conditions differ between Oyugis Division with its bi-modal rainfall, and the adjacent Kendu Bay Division distinguished by its unimodal rainfall pattern. Studies in Ethiopia have revealed different problems of production even within particular peasant association areas which covered an estimated 800 hectares. (Kiros, F. G. 1975/76) An understanding of the effects of agro-ecological elements can therefore serve as one basis for assessing the potential capacity of agricultural production, and hence the likely differences in poverty levels between agro-ecological areas, and to a lesser extent within such areas.



Table 2. The Major Agro-Ecological Zones of Sub-Saharan Africa and Associated Problems of Agricultural Production

Agro-Ecological Zones		General Problems of Agricultural Production
Humid Tropics of West and Central Africa	-	Soil fertility due to leaching
Sub-Humid West Africa	-	Seasonal labor shortage
	-	Poorly developed infrastructure
	-	Deficient soils
	-	Tsetse infestation limiting ox cultivation
Sorghum and Millet Belt of West Africa	-	Water availability
Savannah of Eastern and Southern Africa		
• Relatively Dry Areas	-	Low and erratic rainfall
• Relatively Wet Areas	-	Seasonal labor shortage
Highlands of Eastern Africa	-	Shortage of land

Source: Stephen J. Carr, *Technology for Small-Scale Farmers in Sub-Saharan Africa*, World Bank Technical Papers Number 109, Washington, DC, 1989, pp. xi-xii.

### 3. Access to Modern Knowhow and Productive Inputs

The basic technology employed in traditional farming systems is that which is reflected in the cultural practices and embodied in the instruments of production. Although the technology is rudimentary, it has enabled traditional societies to sustain themselves for centuries. Even in this last decade of the twentieth century, agricultural production in sub-Saharan Africa is largely dependent on the continued utilization of this traditional technology. However, the need is now urgent for the introduction of new technologies in African agriculture because the traditional methods no longer enable the producers to satisfy their subsistence requirements while at the same time meeting the increasing market demand for agricultural produce.

One of the basic challenges which currently preoccupies policy-makers and agricultural scientists alike is how to develop and effectively apply new technologies which can result in significant and sustained increases in agricultural production. Successes in meeting this challenge have been few in sub-Saharan Africa. At the same time, there has been an uneven pattern of adoption of certain new methods and inputs of production on the part of some of the traditional producers. There seems to be little doubt that those producers who have effectively put to use some of these new methods and inputs have raised their productivity, often significantly. Hence, the degree of access to modern knowhow and productive inputs can serve as an indicator of the level of production and income attainable in the circumstances of the African rural producers.

### 4. Ownership of Livestock

As indicated above, ownership of draught animals is a basic requirement in most traditional farming systems. Livestock obviously also serve as direct sources of food and income.



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The role played by livestock in traditional production systems would however vary. It is well known that large herds are generally required for the maintenance of pastoral people. Among sedentary agricultural producers, even the ownership of a few animals can be advantageous when effectively integrated in the farming system. 11

Livestock not only serve as sources of meat and milk for household consumption, but can also often be an important source of cash income when the produce of the animals or the animals themselves are sold in the market. The income obtained by such sales can be used to purchase not only consumption goods and services which may be required by households but also yield-increasing inputs such as "improved" seeds and fertilizer. Hence, the relative position of agricultural producers in terms of production and adequacy of food supplies can be assessed on the basis of ownership of livestock such as cattle, sheep, goats, etc.

### 5. Structure and Diversity of Production Activities

It will be found that rural production systems are neither uniform, nor static, and therefore manifest significant differences in production capacity. They have increasingly come under influences which have substantially altered their original character. National economic policies, market forces and demographic and environmental factors have brought about changes in the structure of production. Government policies have favored the commercialization of agricultural production in order to meet the food requirements of growing urban centers and to increase exports. At the same time, consumption requirements of rural people have become increasingly diversified resulting in the need to earn additional cash income in order to purchase the required goods and services. Increasing scarcity of land due to population growth and adverse environmental changes have also caused large numbers of rural producers to seek livelihood outside agriculture. As a result of these and other socio-economic changes, most African farmers today not only regularly produce cash crops, but also frequently participate in non-farm activities of various sorts. Hence, the rural production system in sub-Saharan Africa has become much more complex than has been ordinarily assumed.

Thus, farmers have become increasingly differentiated in terms of their capacities to manage successfully a system of production geared both to home-consumption and the market. According to one study made in Southern Sudan, the more diversified the production structure the higher the level of income. At the same time, those with low production and income must supplement them by means of off-farm activities.

*"Households in the top 25% of the distribution of income per adult equivalent have a more diversified structure of income sources as well as higher levels of income..."*

*"The poorest households are overly dependent on crop production, most of which is used for their own subsistence consumption. To supplement their low farm income they are forced into marginal, relatively unproductive off-farm activities. Their low harvests of individual crops leave them with little marketable surplus in excess of their own consumption requirements, with*



*the result that their accumulation of simple household assets is low, their food and protein intakes are deficient and their members' health status suffers".* (House, W. J. 1991:882).

Some more empirical information would be needed to establish whether this finding reflects the general pattern in sub-Saharan Africa.

#### 6. Gender and Other Personal Characteristics of Producers

Analysis of rural production systems has increasingly focused attention on the gender distribution of resources and division of labor which are generally assumed to be unfavorable to female producers. This situation is manifested within households or homesteads headed by males as well as in the circumstances of *female-headed* production units. Complex economic and social issues can arise regarding gender relations in traditional societies. This is not the place to dwell upon such issues. Suffice it to state that there is a general belief that females are more heavily represented among the rural poor.

Differences in the prevalence of female-headed households in various communities can indicate likely differences in overall production and income levels among such communities. Such a general indicator would however need to be verified by an analysis of the actual circumstances of female-headed households as compared with those headed by males. For, as noted by one author there is no evidence which demonstrates that all female-headed households are necessarily *poor* households.

*"Not all female-headed households are equally disadvantaged, and some may not be disadvantaged at all...The success with which female-headed households adjust to their socioeconomic context varies substantially with their socioeconomic endowments, family composition, employment, and access to basic services such as health and education."* (Rosenhouse, S. 1989:3).

As in any other type of economic activity, some farmers can also be much more productive than others solely because of the hard work and painstaking application of the time-tested practices which they may bring to bear on agricultural production. These however are not the personal characteristics of particular interest here. It is the more readily identifiable characteristics such as the ages, and the educational levels attained by producers, which are suggested as possible indicators of production potential. It might be adequate to focus attention on these personal characteristics of the household heads, who play the key role in the planning and execution of farming activities.

Although it would be difficult to establish specific age categories, it can at least be hypothesized that *ceteris paribus* the productivity levels of households headed by very young adults or persons highly advanced in age are likely to be lower than those who fall in-between. This is likely to be the case not necessarily only because of differences in labor power that can be brought to bear but also because of differences in access to productive resources and in the control of production processes. These are however admittedly factors which must be put to the test of empirical evidence.

The impact of education on agricultural production or on production in general is also hard to establish. Still, it seems reasonable to assume that producers





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with little or no education are likely to be more handicapped than those with some degree of educational achievement in the planning and management of farm activities. Education can increase access to information and services as well as facilitate the adoption of new methods of production. Gender-based socio-economic differences, for example, appear to be explained by different degrees of access to educational opportunity. Thus, in a study undertaken in Ghana, it was found that:

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*"...poverty-generating processes [appeared] to be more gender-differentiated. In Ghana, education is perhaps the most visible of these processes, and this has serious consequences for female resource mobility and access. In terms of educational achievement, females part company with males at the ages of 10-14". (Haddad, L. 1991: 15).*

It is, however, not common to find traditional agricultural producers with relatively high levels of modern education. Educational achievement beyond the secondary level is likely to stimulate desire for non-agricultural employment in the modern sector.

The foregoing general discussions provide the rationale for the choice of the various production-based indicators identified. The following section presents the findings of the rural survey which has made it possible to assess the effects of the indicators on agricultural production.

## **AN ASSESSMENT OF THE EFFECTS ON AGRICULTURAL PRODUCTION OF THE FACTORS IDENTIFIED BASED ON DATA FROM WESTERN KENYA**

### **Background on the Field Survey**

A major rural survey was undertaken by the Social Science Interface Research Unit (SSIRU) of the International Centre of Insect Physiology and Ecology (ICIPE) in Oyugis and Kendu Bay Divisions, South Nyanza District, Western Kenya during the period January-March, 1992. The primary purpose of the survey was to identify 400 "resource-poor farmers" for participation in a planned wider application of IPM technologies already introduced to a smaller number of farmers in the area from 1987 to 1990 under the ICIPE/Economic Commission for Africa Project on "Reduction of Food Losses through Insect Pest Management". No special attempt was made to define what is meant by "resource-poor farmers", a term which happened to have come into common use in relation with the planned project. It was simply assumed to mean farmers with relatively low levels of production due to a variety of causes or constraints.

The survey was made with the collaboration of the Crop Pests Research Programme (CPRP) which had the primary responsibility for the IPM technologies which included pest-resistant maize and sorghum genotypes, cultural practices of pest management, and biological control. It was determined that the participating farmers should be selected from among a much larger population of farmers concerning which detailed data should be gathered on the basis of a systematic survey. The latter were selected on the basis of a sampling procedure designed to ensure representative samples of farmers from the pertinent Locations and Sub-Locations of the two Districts.



## 14 Sampling Procedure

The procedure of selection of the farmers for the survey in each Division was as follows:

1. Identification of the agro-ecological zones suited for the introduction of the IPM technologies, based on the classification developed by the Department of Resource Surveys and Remote Sensing of the Survey of Kenya in March, 1990;
2. Identification of locations for the survey distributed at reasonable distances within each agro-ecological zone;
3. Preparation of a list of the Sub-Locations in each Location and selection of Sub-Locations for the survey based on their accessibility;
4. Preparation of a list of the villages within each Sub-Location and the random selection of a representative number of villages to be covered by the survey;
5. With the assistance of the local chiefs, assistant chiefs and village headmen, preparation of a list of all heads of homesteads within each village based on gender classification of homestead heads; and
6. Proportional random selection of homesteads stratified by gender of homestead heads.

The agro-ecological zones, Locations, Sub-Locations and numbers of villages and homesteads are shown in Table A.1. The following table provides the gender distribution of the samples from the two Divisions.

Table 3. Distribution of Samples of Homestead Heads

Division	Total Homestead Heads			Planned Number of Homestead Heads in Sample		
	M	F	T	M	F	T
Oyugis	452(62)	278(38)	730	262(61)	169(39)	431
Kendu Bay	657(71)	255(29)	882	302(69)	135(31)	437

Note: Figures in parentheses are percentages.

The actual number of homestead heads interviewed was 801 (approximately 60% male and 40% female) which was over two times the number of farmers to be selected for participation in the planned project.

### Interview Procedure

A detailed questionnaire was developed in consultation with a number of scientific staff and individuals well informed about the survey areas. The questionnaire, which contained closed and open-ended items, was field tested and then revised.

The interviewees in nearly all cases were the homestead heads. The interviewers consisted of ICIPE's field staff and extension personnel attached to the Center all of which had educational achievements of 'O' level and above and with extensive field experience. They were provided adequate training in interview procedures and their work was closely supervised throughout the interview process.



## Method of Data Analysis

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A large amount of data was collected through the interviews. These data will form the basis of a separate report. At the same time, the data relating to the indicators identified above were separately compiled and analyzed for the purpose of the present paper.

The aim of the analysis was to assess the degree to which the various factors affected agricultural production in the survey areas. For the purpose of the analysis, production data were converted into monetary terms on the basis of the prevailing market prices.

The statistical technique of analysis employed was the Multiple Regression Model expressed as follows:

$$a_1 x_1 + a_2 x_2 + \dots + a_n x_n + C = Y$$

Where  $a_1$  = Constant associated with each independent variable

$x_1$  = Independent variable

$C$  = Equation Constant (Y intercept)

$Y$  = Value of Agricultural Production

In using the Regression Model, only those independent variables which significantly (95% significance level or above) affected the mean agricultural production were retained in the model.

## The Results of The Analysis

The results of the analysis of the data from Oyugis Division showed that the three factors which significantly affected production were the size of agricultural land, amount of physical capital (including ox-ploughs, other implements, as well as oxen), and educational level in that order (Table 4).

Table 4. Main Factors Affecting Value of Agricultural Production in Oyugis

Variables	Partial $R^2$	Model $R^2$	$F$	Prod > $F$
Size of agricultural land	0.1250	0.1250	47.42	0.0001
Amount of physical capital	0.0152	0.1402	6.03	0.0146
Level of education	0.0073	0.1475	2.93	0.0878

In Kendu Bay, the factors which most significantly affected production were found to be educational level, size of agricultural land, and level of fertility of agricultural land, in that order (Table 5).

Table 5. Main Factors Affecting Value of Agricultural Production in Kendu Bay

Values	Partial $R^2$	Model $R^2$	$F$	Prod > $F$
Level of education	0.0583	0.0583	19.93	0.0001
Size of agricultural land	0.0338	0.0921	11.94	0.0006
Level of soil fertility	0.0115	0.1036	4.16	0.0422



- 16 When the data for both Divisions were analyzed in combination, the factors which significantly affected the value of production were found to be, in order of importance, size of agricultural land, educational level, number of ox-plough owned, and number of livestock owned (Table 6).

Table 6. Main Factors Affecting Value of Agricultural Production based on Combined Data for Oyugis and Kendu Bay

Variables	Partial $R^2$	Model $R^2$	Prod	Prod > F
Size of agricultural land	0.0876	0.0876	62.99	0.0001
Level of education	0.0151	0.1027	11.36	0.0008
Number of ox-plough owned	0.0096	0.1123	7.30	0.0071
No. of livestock owned	0.0069	0.1192	5.54	0.0224
Agro-ecological zone	0.0030	—	2.34	1.264

These findings must be considered in the context of the effects of the other factors. As indicated in Table 6, agro-ecological factors appear to have greater influence on production than those factors with effects of less than 95% significance level. It was not, however, possible to specify which combinations of specific agro-ecological features are most important in influencing production. Much more disaggregated data would be required for this purpose.

Gender as a factor influencing production could not be analyzed by means of the Regression Model, and therefore had to be considered separately. An examination of the raw data shows that the effect of this factor on production is likely to be highly significant. It was found that the mean value of production of female-headed homesteads was only 40–45% that of male-headed homesteads.



A number of additional comments are in order. The first concerns the impact of access to modern knowhow and productive inputs. This factor does not seem to have significant influence on production in the survey areas. The reason appears to be the fact that the vast majority of the farmers make use of little or no modern methods of production. It was found, for example, that over 86% of the respondents have rarely or never come into contact with extension agents. A related consideration is the impact of labor supply. This factor has not emerged as having significant differential effects on production likely because the relative supply levels are comparable among the production units and also because few new methods of production have been introduced which tend to give rise to labor constraints.

It should also be noted that most factors may have a linear relationship with production only within certain limits. This was revealed by graphic analyses made of some of the factors using the Harvard Graphics package. Thus, increasing levels of education of homestead heads, for example, appear to result in increasing production up to Grade 9–12, beyond which a declining trend sets in (Refer to Fig. 1). A similar pattern is evident concerning the effects of the ages of homestead heads on production (Fig. 2).

Fig. 2. Effect of age of household head on average value of Agricultural Production among farm homesteads in Western Kenya.

A related point concerns the relationship between the number of types of economic activities of homesteads and agricultural production. It was found that in addition to agriculture and livestock production, many homesteads are engaged to a limited extent in such activities as cottage industry, fishing, trading, etc. The findings show that agricultural production tended to rise with increasing diversification of homestead economic activities up to a point, beyond which increasing diversification is associated with declining agricultural production



- 18 (Refer to Fig. 3). This might be supported on simple logical grounds in that as increasing labor and other resources are applied to non-agricultural activities, income from such activities would tend to rise but at the expense of agricultural production. It must be acknowledged that such non-linear effects might invite speculation about the nature of relationship of the various factors with agricultural production. Suffice it to note that although the findings are generally not inconsistent with what can reasonably be expected, it would require more detailed analysis to confirm the pattern of the relationships and the underlying socio-economic processes which determine these relationships.

Fig. 3. Effect of diversity of economic activities on average value of Agricultural Production among farm homesteads in Western Kenya.

#### CONCLUDING REMARKS

This paper has expounded the need for developing measurable indicators for the purpose of targeting the rural poor so as to meet their development needs more effectively. Production-oriented indicators have been suggested as being appropriate in the case of agricultural producers of sub-Saharan Africa.

An attempt was also made to test the validity of the indicators identified based on empirical data generated by means of a systematic survey undertaken in Western Kenya. The findings have shown that the factors which significantly affect agricultural production in the survey area include size of agricultural land, educational level of homestead head, and the stock of capital applied, including oxen and ox-ploughs. The factor of gender appears to affect production significantly as demonstrated by the fact that the mean production of female-headed homesteads was much lower than that of male-headed homesteads. Agro-ecological factors also appear to have effects of higher levels of significance than the remaining factors considered.



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The empirical findings appear to be generally consistent with the hypotheses implicit in the discussions of the preceding section of the paper. However, it should be stressed that they ought not to be taken as being final and conclusive. Indeed, the *pattern* and the *extent* of the effects of the various factors identified may vary to one degree or another in different regions and under different socio-economic circumstances. It would however be justifiable to conclude that in the particular survey area and in areas with similar overall socio-economic features, the factors isolated can serve as a basis for identifying those farmers with relatively low levels of production from those with higher levels with an acceptable degree of accuracy.

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The main benefits of the findings of this study are twofold. First, from the practical point of view, the findings suggest that farmers with low levels of production in a particular community can be identified relatively rapidly by means of rapid rural survey tools based on the indicators pinpointed. The results can then be checked on the basis of observation or any supplementary information which may be available. Secondly, the findings constitute a contribution to the development of "typologies" of agricultural producers which can serve as a basis for designing rural development programmes generally, and agricultural technologies particularly, in order more effectively to meet the needs of particular categories of such producers. Much more research is however needed toward this end in order to be able to deduce more specific indicators, to determine the manner in which such indicators are associated with production levels of different categories of producers, and to develop the methods by which they might be measured.



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Table A.1. The Survey Samples  
A.1.1. Oyugis Division

Agro-ecological Zone Designation	Locations Sub-Locations and Villages	Total Number of Homesteads and Villages			Sample Size		
		M	F	T	M	F	T
Coffee/ Maize/ Cassava	<b>1. Loc. : WEST KASIPUL</b> Sub-Loc. : KODERA KAMIYAWA Vill. 1 : KAMIDIGO " 2 : KAONGO	20	14	34	12	09	21
Cassava/ Sorghum	<b>2. Loc. : KOKWANYO</b> Sub-Loc. : EAST KOKWANYO Vill. 3 : KAWADHULU " 4 : KAKEDE	25	10	35	15	06	21
Marginal/ Coffee/ Banana	<b>3. Loc. : EAST KABONDO</b> Sub-Loc. : KODHOCH EAST Vill. 5 : KAKOLO DOGO " 6 : KAKOLO MAMBOLEO Sub-Loc. : KOWIDI EAST Vill. 7 : ABUOYE	19	13	32	11	08	19
Coffee/ Maize/ Cassava	Sub-Loc. : KAKAN'GUTU EAST Vill. 8 : KABONYO " 9 : KAGOLA	54	34	88	31	20	51
Cassava/ Sorghum	<b>4. Loc. : CENTRAL KASIPUL</b> Sub-Loc. : KACHIEN'G Vill. 10 : RWA Sub-Loc. : KAWERE KAMAGAK Vill. 11 : ABUDHO " 12 : LWALA " 13 : BUNDE " 14 : KAUAK " 15 : KON'GONDO " 16 : OTUNGA	21	12	33	12	08	20
		29	22	51	17	13	30
		41	29	70	23	17	40
		30	27	57	17	16	33
		16	07	23	10	05	15
		13	07	20	08	05	13
		09	08	17	05	06	11
	<b>TOTAL</b>	<b>452</b>	<b>278</b>	<b>730</b>	<b>262</b>	<b>169</b>	<b>431</b>

22 Table A.1.2. Kendu Bay Division

Agro-Ecological Zone Designation	Locations Sub-Locations and Villages	Total Number of Homesteads			Sample Size		
		M	F	T	M	F	T
Cotton/ Grazing	<b>1. Loc. : CENTRAL KARACHUONYO</b>						
	Sub-Loc. : KONGWENO KOWUOR						
	Vill. 1 : LWALA KAMOLO	27	20	47	13	10	23
	" 2 : KAMBUYA LWALA	19	05	24	10	03	13
	" 3 : KAMBUYA OTOK	39	15	54	19	08	27
Maize/ Cotton/ Grazing	<b>2. Loc. : NORTH KARACHUONYO</b>						
	Sub-Loc. : KAKWAJUOK						
	Vill. 4 : NYAHERA	48	06	54	23	04	27
	" 5 : NYAMBURI	47	19	66	22	10	32
Sorghum/ Cotton	<b>3. Loc. : N/WEST KARACHUONYO</b>						
	Sub-Loc. : KOKOTH 'A'						
	Vill. 6 : OTAGO	18	05	23	09	03	12
	" 7 : OYALO	37	13	50	18	07	25
	Sub-Loc. : KOKOTH 'B'						
	Vill. 8 : LWALA	43	25	68	20	12	32
	" 9 : OGEN'GO KOYO	25	14	39	12	07	19
	Sub-Loc. : KANJIRA						
	Vill. 10 : KAROKO	50	10	60	24	06	30
	" 11 : KANYANDEGA	19	06	25	10	04	14
	Cotton/ Groundnut	<b>4. Loc. : KIBIRI</b>					
Sub-Loc. : KAWUOR							
Vill. 12 : KAMGOMA		54	25	79	25	12	37
" 13 : KOMBIJA		24	19	43	12	10	22
Sub-Loc. : KANYIPIR							
Vill. 14 : SEME		40	26	66	19	13	32
Sub-Loc. : KAWADH-GONE							
Vill. 15 : LWALA	34	09	43	16	05	21	
" 16 : SAMANGA	30	06	36	15	04	19	
	<b>5. Loc. : EAST KARACHUONYO</b>						
	Sub-Loc. : EAST KAJIEI						
	Vill. 17 : KAMINGUSA	36	17	53	17	09	26
	" 18 : KAN'GOMA	37	15	52	18	08	26
<b>TOTAL</b>		<b>627</b>	<b>255</b>	<b>882</b>	<b>302</b>	<b>135</b>	<b>437</b>

Note: The survey excluded "high potential" areas, those with relatively low incidence of pests affecting maize and sorghum, and those areas unsuitable for agricultural production.

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