

**ON SOURCES OF INCOME AND INCOME INEQUALITY IN RURAL  
UGANDA: A DECOMPOSITION ANALYSIS AND IMPLICATIONS FOR  
POVERTY**

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**Abstract**

This proposal aims at investigating the sources of income and their effects on overall inequality and poverty in rural areas of Uganda. The data will come from three major surveys conducted in Uganda, the 1992/93 Integrated Household Survey, the 1999/2000 and 2002/03 National Household Surveys. The data from the National Household surveys is comprehensive and covers household social and economic characteristics such as expenditure, income, assets, education and entrepreneurship. The analysis will aim at decomposing the sources of income into five major groups and determine the contribution of these sources to inequality. Further, the study proposes to use the results of the decomposition analysis to explain how important the different types of income sources are to poverty. The study also aims to do a panel analysis of the changes in sources of income and inequality. It is expected that rural incomes are not only associated with agriculture, but with other sources such as non-farm income and remittances. Finally, the findings of this study will help policymakers in Uganda to identify and take specific measures to improve income distribution and the income earning potentials of the different groups of people or location

**Introduction**

Uganda is a poor land locked country with high endowment of natural resources such as fertile land and high rainfall. It is also highly vulnerable to adverse shocks, including terms of trade (only one commodity accounts for over 50% of exports) and other exogenous shocks. Uganda's economy is largely agricultural based: over 80% of its active population derive their livelihood from agriculture and this sector accounts for more than 40% of Gross Domestic Product (GDP); it relies on export of traditional commodities, mainly coffee, for its foreign exchange earnings. It is more food abundant than many other developing countries and is among the fastest growing economies in sub-Saharan Africa. Today, most macroeconomic indicators paint a favourable picture of Uganda's growth performance after its

successful implementation of structural reforms. The average annual rate of growth (GDP) was about 5% over the past 5 years. Inflation has been reduced from three digit levels in the 1980's to single digit levels just over 5%.

Yet, despite its high rate of economic growth and successful implementation of the reforms, the country still faces sizeable income inequality, poverty and unemployment. Although the overall incidence of poverty is said to have declined from 56% in 1992 to 35% in 1999, it remained relatively high in the rural areas implying that the growth realised has been mainly derived from the non-agricultural sector and hence the majority of the rural people have not benefited. Also, the inequality indices have unproved between 1992 and 1999, but remain higher in the rural areas (Appleton, 2001). Uganda has one of the lowest per capita incomes in Sub Saharan Africa (about US \$320), and even by the Human Development Index (UNDP, 2002), it is classified among the poorest countries in the World. Its status as a low-income country connotes that income inequality and poverty are still very acute problems.

The persistence of income inequality and widespread poverty in rural areas raises some key questions about the plight of the poor and some concerns about the sources of income, inequality and poverty in Uganda. Particularly questions like, why do some people receive higher incomes than others' do with similar abilities and resources? Why do certain sources of income, such as income from off farm labour and agricultural crops, go to different people or areas? What is the impact of the different sources of rural income on income inequality and poverty? What steps can be taken to reduce the wide differences in income earned, so that the number of people living below the poverty line can be reduced?

Few studies in developing countries have attempted to answer these questions (House, 1991; Glewwe, 1986 and 1991, Adams and Jane 2001 and Fei 1980). These studies attempted to explain the contribution of different sources of income to total inequality. Nugent and Walther (1982) use panel data in ungrouped (disaggregated) form to examine sources of rural income inequality in India. Adams and He (1995) show that agricultural income is not the most important source of income in Egypt. In Sudan, House (1991) identified lack of diversification of production and limited income- generating opportunities as key determinants of rural poverty. These studies are based on other countries and decompose income inequality by economic sector, income source or family characteristics. The case of similar studies in Uganda is very strong since no study on the sources of income and how they affect income inequality and poverty has been done for the rural areas in Uganda. This proposal aims to fill this gap. Understanding the sources of income and income inequality and their implications for poverty is important in designing effective poverty reducing programs and policies, and may prove particularly important to the rural Ugandan context of widespread poverty and inequality amidst high levels of growth.

### **The Problem Statement**

In the past, the rural economy of developing countries was viewed as being synonymous with agriculture. This view suggested that rural households depended

on production of food and export crops for their livelihood. However, recent literature shows that there is growing recognition that rural households receive income from diverse sources and among these are the rural non-farm sector (commerce, services and government), rental sector and livestock sector and transfers. This view is due to the changing concept of the broader relationship between agriculture, the rural non-farm sector and the poor; and the fact that income earned from the rural non-farm sector represents the agent of positive change for the poor in the rural economy, rather than income earned from the traditional agricultural sector. The changing structure of the rural economy justifies the need to understand the sources of income and their impacts on overall inequality and poverty.

In the past, studies on income inequality and poverty in Uganda have based on explaining the incidence and trends of poverty and inequality using cross sectional data. These studies have been able to discover the important socio-economic or regional patterns in incidence of poverty and inequality and in changes over time. However, most of these are based on one-year sample surveys and do not analyse the relationship between the sources of income, inequality and poverty or their stability over time. Yet it is of crucial importance to know the various sources and types of income in rural areas and understand their effects on observed changes in inequality and poverty. This is useful for policy makers who want to address the problems of inequality and poverty in Uganda.

### **Study Objectives**

This study seeks to attain the following specific objectives:

- i. Use standard decomposition techniques to decompose the sources of income among rural households,
- ii. Analyse the contribution of different sources of income to rural income inequality in Uganda.
- iii. Analyse the impact of various sources of income on inequality,
- iv. Use the results of the decomposition analysis to explain the usefulness of different sources of rural income for the poor.

### **Study Significance**

The persistence of inequality and poverty, especially at a time when the country is experiencing high rates of growth, is the emphasis in the Poverty Reduction Strategy Paper (PRSP) and the Poverty Eradication Action Plan (PEAP) for Uganda. The PRSP, PEAP and other poverty studies provide useful information on the changes in poverty and inequality. However, besides information from qualitative surveys on the causes of poverty, there is no empirical information on the sources of rural income and their effects on inequality and poverty in Uganda. Yet, without this information, identifying the factors that are important in influencing changes in overall income and poverty becomes difficult. Hence, with this kind of information, policy makers can devise specific policy measures to help improve the distribution of rural incomes, including the design of effective poverty reduction strategies.

## **Literature Review**

### **Inequality and Poverty in Uganda**

The results from the different studies on poverty and inequality (Appleton 2001, Okwi et al. 2000, UPPAP 2000) in Uganda have wide ranging conclusions and are not easy to compare because either the poverty lines used were not always constant or due to other methodological differences. However, there is little correspondence of results across the studies. The studies based on survey data collected by Uganda Bureau of Statistics show some similarity while the other studies have some contrasting findings. Estimates of the prevalence of poverty range from 66 percent to 44 percent in 1997. Recent results from Appleton (2001) show that poverty has declined to 35 percent and inequality has remained more or less the same at Gini of 0.38. All the studies clearly show that rural areas suffer from higher prevalence of poverty and inequality than do the urban areas. This situation holds even after adjusting for the cost of living differentials. This is not a surprising finding given that in many other developing countries the situation is the same. However, there may be some bias, in favour of overestimating rural relative to urban poverty in all the studies. The reason is that income and expenditure are more accurately measured in urban areas; and therefore systematic under measurement of these variables in rural areas is likely. Without a concerted effort to measure all income and expenditure accurately, the degree of overestimation of rural inequality and poverty cannot be accurately known. Despite this bias, the studies universally conclude that the prevalence, depth and severity of poverty are greater in rural Uganda.

### **Farm and Non Farm Income**

The literature on income distribution is thwarted with several definitional problems and inconsistencies. In this study non-farm refers to those activities that are not primary agriculture or forestry or fisheries but includes trade or processing of agricultural products (even if they take place on the farm). It does not matter where the activity takes place, at what scale or with what technology as opposed to those activities that are not primary agricultural or fisheries or forestry. On the other hand farm income includes incomes from agriculture, forestry or fishing.

In many rural areas of Africa, agriculture alone cannot provide sufficient household support. Therefore, households have to resort to non-farm activities to supplement income from agriculture. Rural non-farm income can play a potentially significant role in reducing rural inequality and poverty and numerous studies indicate the importance of non-farm enterprise to rural income. Newman and Canagarajah (1999) point to a large body of recent research which indicates that the rural non-farm sector is now thought to be dynamic and important man previously believed. In Africa, the average share of rural non-farm income as a proportion of total rural income, at 42%, is higher than in Latin America and Asia (Reardon et al., 1998). Most evidence shows that rural non-farm activities in Africa are fairly evenly distributed across commerce, manufacturing and services, linked directly or indirectly to local agriculture or small towns and is largely informal rather than formal Reardon, (1999). Haggblade et al. (1987) found services, commerce and restaurants to be the fastest growing non-farm sectors.

There have been a few studies of how rural incomes and activities affect income distribution. Adams et al (1995) in their study in rural Pakistan find that agricultural income is not the most important source of income. In a similar study in Egypt they divided total income for rural households into five sources: agricultural, non-farm, transfer, livestock and rental income and analysed the contribution of each of categories to overall income and income inequality. Their findings show that non-farm income reduces poverty and improves income distribution. Growth in the rural non-farm sector may reduce inequality if income from such activities disproportionately favours the poor, Gordon and Craig (2001). However, income distribution may worsen if the better off benefit from rural non-farm activities to a greater extent than the poor may. The evidence on the relationship between the share of non-farm income in total household income and the level of income is mixed. In his study of rural non-farm activities in Africa, Reardon (1997) finds a strong and positive relationship showing that rural non-farm income was more important to the higher income households. However, there were also examples where the opposite was true (e.g. Central Kenya) or where there is a U-shaped relationship, indicating comparable importance of rural non farm income in total income to both the poorest and least poor households (e.g. in Northern Nigeria). On the other hand, Adams and He (1995) find that in Pakistan, non-farm income as a whole reduced income inequality, but when it was disaggregated into skilled labour, self-employment and government employment, only the first category decreased income inequality.

Nonetheless, there are many ways in which rural non-farm activities and incomes generally are important to the poor in Africa. Women in rural areas are able to combine income-generating activities with other tasks such as food preparation and childcare (Lanjouw and Lanjouw, 1997; Gordon et al, 2000). Examples in rural Uganda include beer brewing, fish processing, pottery, rice husking, food kiosks and other activities that can be carried from home or nearby. Participation in rural non-farm activities allows people to smooth out or offset fluctuations in agricultural income that might occur on a seasonal basis or as a result of unexpected events. This is especially the case where savings, credit or insurance mechanisms are not available for this purpose, as is the case in many rural areas of Uganda and Africa. Where the agricultural sector is dominant, non-farm income opportunities are likely to echo trends and shocks in agriculture, but may nonetheless be somewhat more stable. Reardon et al (1992) studied three regions in Burkina Faso and found that total income was considerably more stable than cropping income alone.

### **Sources of Income, Inequality and Poverty**

The link between the sources of income, inequality and poverty is undisputed in the literature. There are a number of ways in which the sources of income in the rural areas affect income distribution and poverty. For example, unequal access to rural non-farm income to a large extent echoes inequality in access to land, an effect that is mediated through both capital and labour markets. Thus, those with better access to land (or access to better land) are likely to be wealthier and more educated. They are also likely to be better connected. Education and contacts improve prospects in the rural non-farm labour market considerably, Gordon and

Craig, (2001). Also inequality in non-farm income may exacerbate inequality in land endowments, where those with non-farm income are able to purchase land under distress conditions. Francis and Haddinott (1993) document some examples of this process.

Mwabu and Thorbecke (2001) find that in Kenya, income diversification, wealth, earnings and consumption are positively correlated. They note that increasing livelihood diversification may not reduce poverty. An interesting finding in this study was that the asset-poor households tend to engage in low return activities that ensure food security without increasing incomes. In some instances, diversification is adopted as a strategy for coping with poverty rather than a mechanism for escaping from it. These findings present a very interesting case study of rural areas in Uganda where the other conditions are not totally different from Kenya but socio-economic set up and natural endowments differ.

In Burkina Faso, Fofack (2002) investigates the determinants and dynamics of poverty in the 1990's. The results show that the nature and dynamics of poverty determinants are influenced by the spatial location of households, He also finds that the most significant determinants of poverty over the growth period in the 1990's include the burden of age dependency, human and physical assets, household amenities and spatial location. Though they do not examine the determinants of inequality, their results pose a very good example for Uganda, which has similarly had high growth rates over the past decade and also has high variations in socio-economic groups and regions. Still in Burkina Faso, Fofack et al (2001) include inequality in their investigation and did their analysis in a cross-section of socio-economic groups and geographical regions. Again, the results show that besides the determinants of poverty, there are numerous determinants of income inequality which include wage disparities, unequal access to productive assets and disparities in educational attainment (also see Birdsall and Londono, 1997; Fofack and Zeufack, 1999).

Unequal distribution of assets across socio-economic groups and regions, where the poor in the rural areas have significantly much lower access to assets, could also be among the reasons for the continued persistence of large urban-rural bias and regional disparities Fofack et al (2001). Unequal distribution of assets especially human capital has negative effects on the poor Birdsall et al (1995). Also the direction and relative strength in the association between education, inequality and poverty, and between asset ownership, inequality and poverty may be important aspects to consider.

There are numerous aspects, which act as sources of inequality and poverty among households. Broadly, these include human capital variables like education, health, vocational training, personal vision and age. On the social front, gender, networks, family size and structure are important. The physical aspects include roads, electricity, and telecommunication while the financial determinants could be basically related to credit. Also natural factors such as water and land are important. This study therefore seeks to make three important contributions. First, we propose to decompose the sources of income and, second we try to understand

the contribution of the different sources of rural income to overall income inequality (Gini coefficient). Lastly, we estimate how the various sources of household income affect household poverty and their dynamics. This kind of decomposition provides a flexible and efficient way for quantifying the role of various sources of household income in "determining" the level of overall inequality and poverty.

## **Conceptual Framework**

### **Sources of Income**

The concept of income used in this study is as comprehensive as possible subject to the limitations of data collected in each survey. We categorize the sources of income into five groups: agricultural income, non-farm income, rental income, livestock income and transfers. Non-farm income includes wage earnings from non-agricultural labour, government and private sector employment plus net revenue from non-farm enterprise. Agricultural income includes net income from all crop production including imputed values from home production plus wages received from agricultural labour, and livestock income is represented by returns from traded livestock and livestock products. Remittances constitute transfer earnings (including pensions and securities) while rental income including rents received from ownership of assets as land or housing.

Disaggregating these sources of income enables us to analyse income as finely as possible. Adams and He (1995) find that non-farm income is the leading source of income for the poor households in rural Pakistan. They also find that different sources of income tend to affect income inequality. For instance, agricultural income makes the largest contribution to overall income inequality and livestock income makes the smallest. These findings support the view by other studies that; additional rounds of agricultural growth can and often do benefit the poor. In Kenya, Kimalu et al (2001) find that non-farm activities play an important role in enhancing households' welfare in semi-arid areas, yet non-farm households in these areas face serious credit shortages, trade restrictions and lack of business skills.

This kind of decomposition allows us to understand that the number of poor people in rural areas exceeds the capacity of agriculture to provide sustainable livelihood opportunities (Gordon and Craig, 2001). This indicates a potentially important role for rural non-farm income in reducing poverty and inequality in rural areas. The other sources of income may absorb surplus labour in the rural areas, help farm based households reduce risk, offer more remunerative activities to supplement or replace agricultural income, offer income potential during the agricultural off season and provide a means to cope or survive when farming fails. Further indirect effects occur where rural non-farm income enables poor households to overcome credit and risk constraints on agricultural innovations Ellis (1998).

The definition of poverty has varying implications depending on the context. There is a large literature on both the concept and measurement of poverty in the developing countries and it can be noted that the definition of poverty may have an

important bearing on the identification of the poor. In this study, we do not dwell on how to measure and define poverty, since that is not our primary focus. We shall instead adopt a general definition of poor households as those living in the lowest income quintile and use this definition to relate to the sources of income and inequality. This definition, like all other definitions of poverty has shortcomings and strengths. For example, income is believed to be an unreliable measure of welfare in developing countries compared to consumption expenditure. This does not entirely mean that consumption expenditure data is a better indicator of poverty than income as some authors' have shown that "current consumption is not in general a better indicator of chronic poverty than income. Both perform better than other common indicators.

### **The Axiomatic approach to Inequality Measurement**

The literature on inequality cites five basic properties (Forster et al, 1985) namely: **Decomposability** - decomposability allows inequality to be partitioned either over sources, regions or socio-economic groups. Decomposability requires overall inequality to be related consistently to constituent parts of the distribution, such as population sub-groups. In this proposed study, our interest is on the decomposability according to sources and an inequality measure can be regarded as source decomposable if total inequality can be broken down into a weighted sum of inequality by various income sources. However, because activities that influence a particular source of income are likely to have an effect on other activities that compose total income, any inequality measure that is source decomposable must address the problem of covariance among the income sources. Some measures of inequality such as the Generalized Entropy class of measures, are easily decomposable into intuitively appealing components of within- and between-group inequality:  $I_{total} = I_{within} + I_{between}$ . Other measures such as the Gini coefficient are only decomposable if the partitions are non-overlapping, that is the sub-groups of the population do not overlap in the vector of incomes;

**Population homogeneity (Dalton, 1920):** This principle requires inequality measures to be invariant to replications of the population. That is merging two identical distributions should not alter inequality. This principle will hold only if decreasing or increasing the population size across all income levels will have no effect on the level of inequality;

**Symmetry or Anonymity:** This axiom requires that the inequality measure be independent of any characteristic of individuals other than their income. It will hold if the measure of inequality remains unchanged when individuals switch places in the income order;

**Pigou - Dalton transfer sensitivity** - will hold if the measure of inequality increases whenever income is transferred from a poorer person to a wealthier one. Consider a vector  $y'$  which is a transformation of the vector  $y$  obtained by a transfer of  $p$  from  $y_j$  to  $y_i$  (that is, from individual  $j$ 's budget to individual  $i$ 's budget) where  $y_i > y_j$ , and  $y_i + p > y_j - p$ . The transfer principle is satisfied if and only if, for a given inequality indicator,  $I(\cdot)$ ,  $I(y') \geq I(y)$ . Most measures of inequality in

the literature, with the main exception of the logarithmic variance, satisfy this principle (see Cowell, 1995) and;

**Mean independence (Income Scale Independence)** - holds if a proportionate change in all incomes leaves the measure of inequality unchanged. Each of these properties has its implications on inequality measure.

According to Shorrocks (1982), decomposing any inequality measure depends on the decomposition procedure. In the absence of restrictions, for any inequality measure the inequality of total income can be allocated in many ways between the components of total income. Several measures of inequality meet some or most of these properties but the index we adopt in this study - the Gini coefficient - meets all the five properties. The decomposition of the Gini coefficient is presented in the methodology section.

### **Hypotheses**

The following hypotheses will be tested.

- i. The share of overall income inequality contributed by each income source is significantly different in Uganda,
- ii. Non-farm income contributes more to the total per capita income of the poor households than other sources of income.

### **Methodology**

#### **Data Type and Adjustments**

The data will come from three major household surveys, which were conducted in 1992/93 (Integrated Household Survey (IHS)) and 1999/2000 and 2002/03<sup>1</sup> (National Household Survey (NHS)), by the Uganda Bureau of Statistics (UBOS). Each of these surveys covered a nationally representative sample of households - about 10,000 households. Between these two major surveys there are welfare monitoring surveys, which covered about 5,000 households each. There were in addition community surveys covering about 1700 communities. The sampling frame for these surveys was drawn from the 1991 Population and Housing census. The surveys collected detailed information on consumption expenditure, income, employment, assets, basic needs and other socio-economic characteristics of the household. Although, over the years the methodology of data collection changed a little, some adjustments in the data have been made to make them comparable over time.

In addition, the survey design consisted of a rotating panel. Each year, 50% of the households in the monitoring survey were designed to come from the enumeration areas previously surveyed in the IHS and half of these were designed to be the same households. The other 50% of the households were replaced. Thus, in principle, the survey yields four overlapping panels of 344 households each. However, the number of households in the panels should have been more, but in practice, the construction of the panels encountered a set of practical problems mainly due to inadequacies of household information. Whereas the 1999/2000 survey had a panel of about 1400 households which, were sampled in the 1992/93 survey, the most recent survey 2002/03 does not have any panel element.

Therefore our study will include cross sectional analysis for each of the main surveys and panel analysis for the two surveys of 1992/93 and 1999/2000.

### Empirical Strategy

In this section, we concentrate on source decomposition of the Gini coefficient by adopting an approach used by Adams, (1995) and use the notation of Stark et al to show it.

First, we define the Gini coefficient of total income (G) (Pyatt, Chen and Fei, 1980) as

$$G = \frac{2}{n\mu} \text{cov}(y, r) \quad (1)$$

where n is the number of observations,  $\mu$  is the mean income, y is the series of total incomes, and r is the series of corresponding ranks. The Gini coefficient takes on values between 0 and 1 with 0 interpreted as no inequality.

From the definition of the Gini coefficient, we can obtain the Gini coefficient of the  $K^{\text{th}}$  source of income and this can be expressed as

$$G = \frac{2}{n\mu} \text{cov}(y_k, r_k) \quad (2)$$

In equation 2,  $y_k$  and  $r_k$  are used to refer to the series of incomes from the  $k^{\text{th}}$  source and corresponding ranks, respectively. Thus, the total income Gini (G) as a function of the source Gini coefficients can be derived from equations 1 and 2. This derivation is based on the fact that the source incomes combined form the total income. Therefore

$$G = \sum_{k=1}^k R_K G_K S_K \quad (3)$$

where

$G_K$  is the Gini coefficient measuring the inequality in the distribution of income component K within the group,

$S_K$  is the share of source K of income in total group income,

$R_K$  is the Gini correlation of income from source k with total income defined as

$$R_K = \frac{\text{cov}(Y_K, r)}{\text{cov}(Y_K, r_K)} \quad (4)$$

From equation 4, we can derive the effect of source K of income on overall income inequality and it can be disaggregated into:

- i) the correlation between source k income and total income as measured by  $R_K$
- ii) the share of income components k in total income (captured by  $S_K$ )
- iii) the inequality within the sample of income from source k (as measured by  $G_K$ )

From this decomposition, we can tell how much of overall income inequality is due to a particular income source. It is also possible from this decomposition to determine whether an income source is inequality-increasing or inequality-decreasing based on whether or not an enlargement in the share of income source leads to an increase or decrease in overall inequality. From equation 3,

$$g_k = R_k \frac{G_k}{G} \quad (5)$$

where  $g_k$  is the relative concentration coefficient of income source  $k$  in overall inequality. From equation 5 it follows that income source  $K$  is inequality increasing or inequality- decreasing according to whether  $g_k$  is greater or less than unity.

We apply the Gini coefficient because it should provide a robust basis for analysis of contribution sources of income to overall inequality and for comparison of inequality overtime and across socio-economic groups.

### **Effects on poverty**

On the effects of the sources of income on the poor, we propose to rank households by income quartiles and assess the distribution of sources by group. In this kind of analysis, we explain how much of the fluctuations in income by the poor quartiles can be explained by changes in their income sources. More specifically, we estimate how changes in mean total per capita household income are affected by changes in the various sources of income. We estimate this using regression analysis following an approach by Alderman and Garcia (1993). This approach is defined by reference to a simple regression equation:

$$Y = X\beta + \varepsilon \quad (6)$$

Where  $Y$  represents the changes in mean per capita income of the poor households,  $X$  represents the changes in various sources of income (say physical assets),  $\beta$  are the respective coefficients and  $\varepsilon$  is the error term.

This kind of analysis is very useful for policy especially in cases where we want to understand how changes in sources of income of the poor affects their poverty status. This may help in the design of effective safety nets for the poor.

The analysis in this study will not address many of the issues surrounding the methodology of measuring inequality and poverty. These issues are explored in a number of theoretical and empirical studies of poverty (see e.g., Appleton 1999, Ravallion and Bidani (1994) and Deaton (1997)).

### **Policy Implications**

This study will help policymakers understand the major sources of income and the how much they contribute to overall income inequality and poverty in Uganda. The findings of this report will suggest ways in which future policies designed to reduce inequality and alleviate poverty should recognize that the poor depend on sources of income not only from agriculture but also outside agriculture. Equipped with such information, policymakers can take specific measures to improve income distribution and the income earning potentials of different groups of people or regions.

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