Income Distribution and Livelihood Analysis among Horticulture Farming Households in Nyeri District, Kenya

Ndambiri H. K.[1], Okello J. J.[2], Ng'ang'a S. I.[1],
Ritho C.[2], Minyacha S. O.[1], Omboto P. I.[1,] Kubowon, P. C.[1]

[1]Department of Quantitative & Entrepreneurship Studies, Moi University, Eldoret, Kenya
[2]Department of Agricultural Economics, University of Nairobi, Nairobi, Kenya

Abstract

The objective of this study was to analyze the distribution of income and livelihood strategies among the horticulture farming households in Nyeri District, Kenya through the estimation of the Gini Coefficient. The study used secondary data obtained from a National Household Survey carried out in 2007 by Tegemeo Institute of Agricultural Policy and Development. The estimated Gini coefficients indicated that there is variability in the distribution of incomes among the households in totality and across different farm enterprises. Income from non-farm activities had the highest Gini value of 0.6804. This implies that the distribution of income from non-farm enterprises was more inconsistent across households compared to other farm enterprises that had lower Gini values. This among other reasons explains why households in Nyeri District have varied livelihood strategies leading to varied livelihood outcomes. It is suggested that to improve the distribution of income and standards of living of the households, better interventions such as education targeting the most vulnerable or the marginal household groups needs to be put in place so as to enhance household earnings. In addition, the creation of an "equal opportunity" policy for the people is suggested so that vulnerable people in the society like women, the old, the disabled and children among others can be given a priority.

Key words: Income Distribution, Livelihoods, Gini Coefficient, farm enterprises, household.

Background Information

Despite the unprecedented economic growth in recent years, global income inequality is probably greater than it has ever been in human history (Rizvi, 2005). Currently, the richest 1% of people in the world receives as much as the bottom 57%. The ratio between the average income of the top 5% in the world to the bottom 5% increased from 78 to 1 in 1988 to 114 to 1 in 1993 (Milanovic, 1999). In his 1999 study based on household surveys, Milanovic (1999) found that the richest 25% of the world's population receives 75% of the world's income, even when adjusting for Purchasing Power Parity. The poorest 75% of the population shared just 25%. The reason given for the occurrence is that a large proportion of the world's population lives in the poorest countries, and within the poorest regions of those countries, particularly in the rural areas of China, rural and urban India and Africa.

The greatest contributors to world income inequality, according to Quah (1997) are the large countries at either end of the spectrum. One pole represents the 3.5 billion people whose mean income is less than $1,000 per year and includes people living in India, Indonesia and rural China and Africa with 42% of the world's population; this group receives just 9% of the world income. The other pole is the group of 500 million people whose income exceeds $11,500. This group includes the US, Japan, Germany, France and the UK. Combined, they account for 13% of the world's population yet garner 45% of the world income. Quah (1997) observes that the gap between these two poles is so large that it comprises the major component of the world's income inequality. Populous countries with middle income, such as Brazil, Mexico and Russia, do contribute to world income inequality, but to a much smaller degree.

In the last 25 years, some regions of the world have raised their average income per person, while others have suffered a decline in income.

The United Nations Development Program (UNDP) (2002) identifies the regions where there has been growth or setbacks in income inequality and notes that: there has been continued rapid economic growth in the already rich countries of Western Europe, North America and Oceania, relative to most of the rest of the world; there has been a decline in real income of Sub-Saharan Africa and Eastern Europe and; that there has been relatively modest gains in Latin America and the Arab States. All these findings provide another example of how inequality increases worldwide. Even though each of these regions saw an increase in income, it was modest compared to the gains made by the high-income countries.

Statement of the Problem

Agriculture plays a major role in the economy and society of most African countries and increased productivity in the sector is considered to be the very basis for the continents economic and social development. Small-scale farm households in particular have an important role to play in combating poverty and creating widespread growth.
In Kenya, agriculture plays a crucial role in economic development and its dominance in the economy is well articulated in government policy documents such as the Poverty Reduction Strategy Paper (2001), Economic Recovery Strategy for Wealth and Employment Creation (2003-2007), Strategy for Revitalizing Agriculture (2004-2014) and now the Vision 2030. Key priority areas of the agricultural sector are highlighted as promotion of food security, generation of income and creation of employment opportunities among the people.

An important component of the Kenya's agricultural sector is the horticulture industry which in the last ten years has seen significant growth albeit general decline in growth of most other agricultural sectors. This industry is engaged in production, processing and marketing of horticulture products.

In Nyeri District, horticulture activities are at the level of production where various crops such as snow peas, tomatoes; french beans, onions, cabbages among other crops are produced and then sold to various suppliers/brokers for marketers at the airport for the export market. Horticulture farming is mainly carried out by two groups of persons: a) The owners of land who also provide all the other factors of production – labour, capital and entrepreneurship and are therefore rewarded for all factors of production and b) The labourers who mainly provide the labour resources and are therefore rewarded with the wages/salaries.

From the review of literature, it was discovered that there is a dearth of information about how incomes are distributed among different farming households in Kenya and the variety of strategies the households engage in so as to meet their livelihoods. Considering the importance of horticultural activities in Kenya and Nyeri district in particular, the study purposed to analyze the distribution of income among the horticulture farming households and also examine how the incomes had influenced their livelihoods. This was premised on the hypothesis that there was income inequality among the farming households in the district and a result varied livelihood strategies and outcomes would be apparent.

The Objectives of the Study

The following were the specific objectives of the study:
a) Assess the levels of income inequality in Nyeri District and estimate the Gini coefficient.
b) Determine the livelihood strategies among the households in the district.
c) Establish the livelihood outcomes among the farm households in the district.
d) Recommend policies to help improve the distribution of income and livelihood in the district.

The Hypotheses
The study was based on the following hypotheses:
a) That income in Nyeri district is unequally distributed among the farming households.
b) That the current livelihood strategies and outcomes are to a considerable extent explained by the unequal distribution of income among the farm households in the district.

Theoretical Underpinnings
Ellis (1998) and Barrett *et al*. (2001) note that rural households earn income from diverse allocations of their natural, physical and human capital assets among other income generating activities.

There are many reasons why such diversification occurs, namely: diminishing returns on increasing investment in certain activities; economies of scope among distinct activities; missing markets that compel self-provision of goods or services the households yearn for own consumption and; to cope with an unexpected shock or to minimize risks by participating in activities that generate imperfectly correlated returns, among others. Households would choose such patterns of diversification so as to achieve the best possible standard of living that is broadly defined. Ellis (1998) observes that the chosen combination of activities and household assets is referred to as the household's 'livelihood strategy' which encompasses not only activities that generate income but also many other kinds of choices, including cultural and social choices that come together to make up the primary occupation of a household.

Although the concept of a livelihood strategy has become central to development practice in recent years, Douglas *et al*. (2006) contend that it is not always clear what constitutes a distinct livelihood rather than the different mix of activities undertaken by a household. Moreover, a precise operational definition of livelihood remains elusive, as does an associated method for identifying livelihoods in quantitative data. They believe that the ability to operationalise the concept of a livelihood strategy is especially important when one speaks of 'improving' livelihoods. Implicit in the concept of 'improvement' is the suggestion that certain strategies offer households a higher return on their assets, not least of which is household labour. They however, portend that if boundaries between distinct livelihood strategies cannot be demarcated, how then can one distinguish the graduation to an improved livelihood from improvement in the performance of a given livelihood, perhaps due to improved technical or allocative efficiency of practice or technological progress? How then can one distinguish permanent from transitory gains? Jansen *et al*. (2003) however, note that development programmes today have assumption that there exist discernible orderings of distinct livelihood strategies that can effectively facilitate a graduation to a more desirable livelihood strategy that is associated with improved well-being of household members.

Douglas *et al*. (2006) and Jansen *et al*. (2003) articulate that there are several different methods of characterising household livelihood strategies. Most commonly, economists group households by shares of income earned in different sectors of the rural economy. For instance, Barrett *et al*. (2005) analyzed the relationship between overall household income and the proportion of income earned in on-farm and off-farm activities in several African countries, noting how these proportions changed across income quartiles. Dercon and Krishnan (1996) used income share composition to examine the relationship between income, household characteristics and barriers to entry into higher return activities. Other researchers have only dealt with the potential determinants of diversified income portfolios for rural smallholders (Reardon *et al*. 1992).

There are other livelihood strategies analyzed through direct examination of the individual household's asset endowment. The amount of income earned and even the type of activity undertaken by a household is taken as a stochastic function of the assets it controls. Certain activities may be beyond the reach of households without access to the required financial, natural, physical, human or social capital. This asset-based approach makes it possible to map a household's asset endowment into its chosen livelihood strategy and then into its logically subsequent stochastic income realization (Carter and Barrett, 2006). Households with similar bundles of assets might be limited to similar livelihood strategies, but in any given period realize quite different incomes, although they are structurally identical. This study employed both approaches in an attempt to unveil inequality based on incomes and also the asset endowment.

Overview of Reviewed Literature

There are different opinions about the best pattern of distribution. An excessively equal income distribution can be bad for economic efficiency. For instance, the experience of socialist countries, where deliberately low inequality with no private profits and minimal differences in wages and salaries, is that people get deprived of the incentives needed for their active participation in economic activities for diligent work and vigorous entrepreneurship (Richardson, 1995).

Giovanni (2001) observes that high inequality reduces the pool of people with access to the resources such as land or education that is needed to unleash their full productive potential. Thus a country deprives itself of the contributions the poor could make to its economic and social development; it threatens a country's political stability because more people are dissatisfied with their economic status which makes it harder to reach political consensus among population groups with higher and lower incomes.

As such, Political instability increases the risks of investing in a country and so significantly undermines its development potential; it discourages certain basic norms of behaviour among economic agents (individuals or enterprises) such as trust and commitment and; it creates higher business risks and higher costs of contract enforcement that impede economic growth by slowing down all economic transactions.

Quah (1997) asserts that land ownership inequality is widely considered to explain high levels of income inequality in agriculture-dominated developing economies. But the key issue here is whether land ownership inequality can help explain recent trends of widespread rises in income inequality. For many countries, there is unlikely to be a direct link. Indirectly, however, land inequality may help explain current rises in income inequality by depressing minimum wages in both the urban and rural sector. The relatively egalitarian growth paths of the East Asian economies can be partially understood as the result of their relatively equal initial distribution of land.

Countries well endowed with natural resources especially mineral resources such as oil, diamonds, and copper and so on tend to have a higher income and asset inequality than other types of economies (Carter and Barrett, 2006). This is often due to the capital-intensive nature of the production processes and the concentration of ownership in this sector. It is also due to the greater facility with which the elites are able to appropriate the mineral rent. However, the dominance of natural resources hardly explains the widespread surge in inequality observed over the last two decades even for resource rich countries. The resource rent/Gross Domestic Product (GDP) ratio has generally fallen in resource-rich economies and was lower in 1994 than in 1970 in every case. Also, changes in the resource rent/GDP ratio could clearly not explain the rise in inequality in many resource-poor economies (Ibid.).

Whether or not educational disparities help explain the trends of rising income inequality has remained a key question over the last decade. Study findings by Reardon and Matlon (1992) indicate that there is a strong negative linkage between average years of education and measured income inequality. Increases in average years of schooling should lead to reduced inequality. However, an interesting finding was that the relationship between income inequality and average years of schooling appears like an inverted U, with the turning point at 6.5 years. Thus, increases in average levels of schooling from very low levels may actually exacerbate inequality. The most likely explanation involves the interaction between the educational choices of the population and jobs creation by firms. When the average educational level of the population is low, the few highly educated people are likely to obtain very high salaries. But, as more educated people enter the labour market, the speed of technological innovation goes up, followed by skilled job creation. More people earn higher wages and as a consequence income inequality starts declining. Increases in average education attainment in this context, while beneficial in their own right, could potentially add to increases in inequality (Ibid.).

Many developing countries implemented adjustment programmes in the 1980s and 1990s that were not only intended to enhance efficiency and growth, but implicitly to raise farm incomes relative to urban incomes. Urban-rural inequality should have fallen and therefore have tended to reduce overall national inequality and poverty (UNDP, 2002). But, factors associated with globalization, liberalization or adjustment may have led to increases in rural-urban income inequality (Rizvi, 2005). Urban populations, due to higher standards of education, are better placed to exploit new economic opportunities in the wake of price liberalization. While some evidence points to a persistent urban bias, the study findings show no overall tendency for within-country rural-urban inequality to increase or decrease since the 1980s in developing and transitional countries (UNDP, 2002 and Rizvi, 2005).
Rising wage inequality has often been ascribed to technological change. Reardon and Matlon (1992) observe that new technologies generate a demand for skills and an earnings distribution more skewed than that emanating from existing technologies. This favours higher-skilled workers over lower-skilled ones and leads to increasing wage differentials between skilled and unskilled workers. New technologies also tend to replace labour and in this way affect the functional distribution of income.

Richardson (1995) and Rizvi (2005) have observed that globalization in general and trade liberalization in particular are publicly perceived to have had a negative impact on income inequality. The impact of globalization on poor countries has acquired particular significance because of the popular demonstrations that have occurred at the recent meetings of the WTO. Trade liberalization was thought to account for the decline in inequality in the fast growing developing country exporters of manufactured goods.

According to this explanation, an expansion of labour intensive manufactured exports in 'poor' countries raises the demand for unskilled (but literate) labour relative to that of other types of labour and thus reduces the wage differential between skilled and unskilled workers. Nevertheless, there has been a rise in inequality in the Asian countries that rapidly expanded their manufacturing exports in the 1980s.

Methodology

Data Sources and Variables

This study used secondary data obtained from a National Household Survey carried out in 2007 by Tegemeo Institute of Agricultural Policy and Development. Components covered in the data include socio-economic characteristics of the farm households; their crop enterprises and income from crop enterprises; livestock enterprises and income from livestock enterprises; off-farm activities and income from the non-farm activities and; livelihood strategies and outcomes such as the assets acquired and/or other uses of household income, among the farming households in Nyeri District.

Data Analysis

Data on the socio-economic characteristics of the farmers was analyzed using the descriptive statistics. Variables relating to other components of the data were subjected to the Lorenz curve and the Gini Coefficient analysis. The Lorenz curve and the Gini Coefficient analysis were used to evaluate the study objectives and the hypotheses. This was done with the help of Microsoft Excel v.2007 and STATA v.10 software.

Model Specification

The Gini Coefficient was derived from a statistical formula expressed as:

$$\boldsymbol{G = 1 + \frac{1}{n} - \frac{2}{n^2\bar{y}}\{y^1 + 2y^2 + 3y^3 + \cdots + ny^n\}}$$

Whereby:

$\boldsymbol{y^1 \ldots y^n}$ = **individual income in decreasing order of size**.
$\boldsymbol{\bar{Y}}$ = **mean income**.
n = number of individuals.

The model shows the degree of evenness or unevenness of any set of numbers as a number between 0 and 1. A Gini Coefficient of 0 indicates equal income for all earners. A Gini Coefficient of 1 would mean that one person has all the income and nobody else has any. Thus, lower Gini Coefficients indicate more equitable distribution of income among the households, while higher Gini Coefficients mean that income is concentrated in the hands of fewer people.

Results and Discussion

The Hypotheses Tested

The study had two hypotheses to be tested. One of the hypotheses was that income in Nyeri district was unequally distributed among the farm households. Notably, income and wealth distribution patterns in the study area revealed that there was inequality in the distribution of income among horticulture farm households. The estimated Gini Coefficients indicated variability in the distribution of incomes among the households in totality and across different farm enterprises. Study results showed that incomes from non-farm activities, with a Gini value of 0.6804, had more inconsistent distribution across households. This was followed by total asset value whose distribution scored a Gini value of 0.5499. As such the study failed to reject the hypothesis that there was inequality in income and wealth distribution among horticulture farm households in the district.

The second hypothesis that the study purposed to test was that livelihood strategies and outcomes in the district were to a considerable extent linked to the unequal distribution of income and wealth among the farm households. Analysis from study showed that horticulture farming in the district was a crucial economic activity from which people derived their livelihoods.

In the 2006/2007 farming period, horticulture activities yielded a total of Kshs. 20,621,328 worth of farm income from various enterprises with a mean income was Kshs. 229,125.90. Income from the crop enterprises in the same period (2006/2007) was valued at Kshs. 12,816,845 with a mean income of Kshs. 142,409.40. The main types of crops grown were snow peas; others were French beans, tomatoes, cabbages, butternuts, pigeon pea, and chick pea among others. Income from the livestock enterprises in the same period (2006/2007) was Kshs. 2,039,943 with a mean income of Kshs. 22,666.05. Farmers reared and sold various animals like sheep, goats, donkey, cows, chicken and rabbit among others. Income from the non-farm enterprises in the same period (2006/2007) was valued at Kshs. 5,764,540 with a mean income of Kshs. 64,050.45. Some of the off farm activities that people engaged in were mainly business like such as shops, transport business, labourer and professional works among others.

The study also found that a series of livelihood outcomes had emanated from the economic ways of life of farm households in Nyeri district. The outcomes led to increased financial ability of the households to:

a) Acquire more land for farming.
b) Starting businesses.
c) Hire more land for cultivation.
d) Put up toilets.
e) Roof houses with iron sheets.
f) Put up stone walls in their houses.
g) Pay cooperative fees.
h) Improve floor material of their houses.

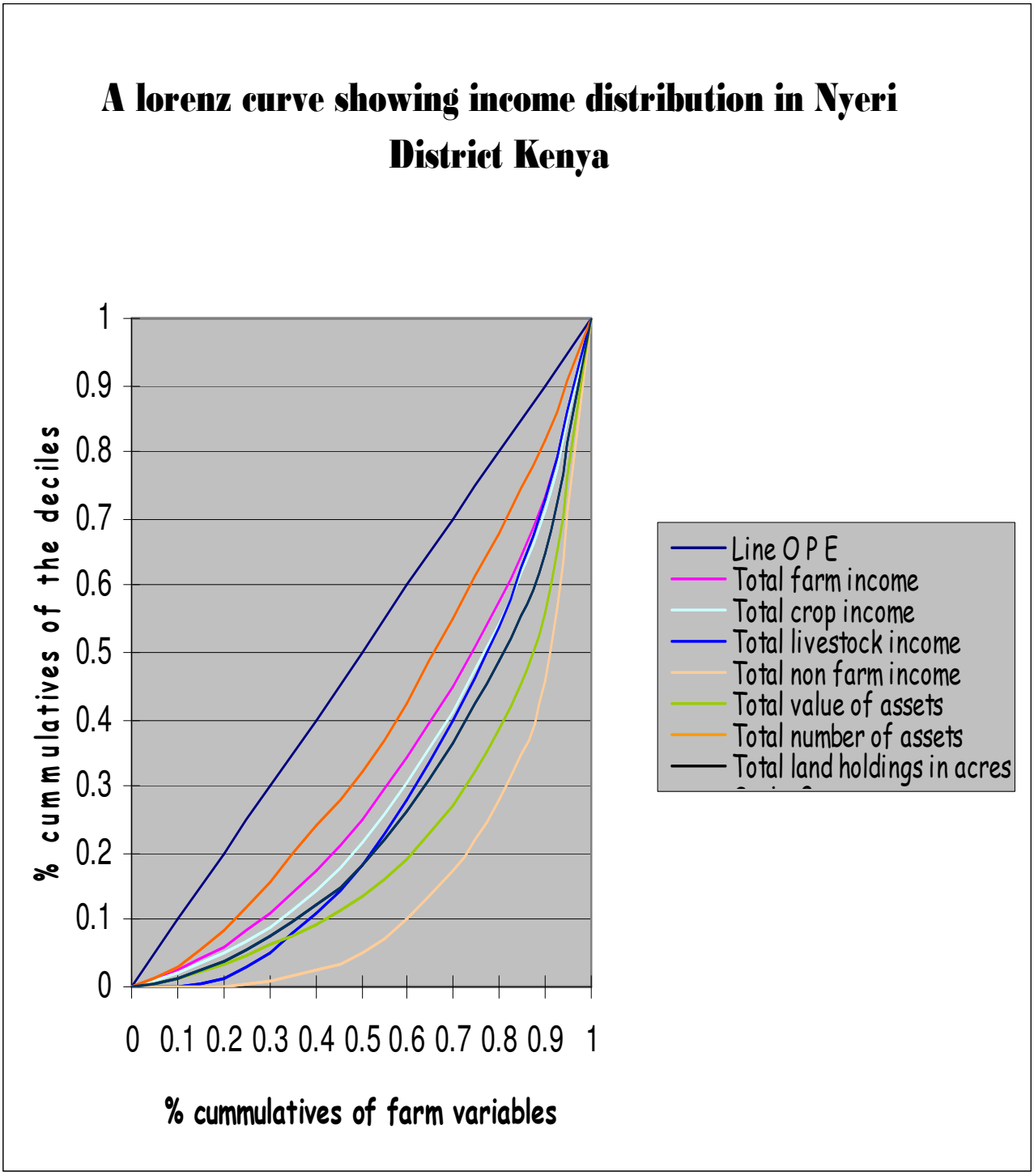
With the afore information, the study also failed to reject the hypothesis that livelihood strategies and outcomes in the district were to a considerable extent linked to the unequal distribution of income and wealth among the farm households. The diagrams that follow summarize the study results on income and wealth distribution among the farming households in Nyeri district.

Table 1: **Gini Coefficients of Various Farm Variables under Study**

Type of Enterprise	**Gini Value**
Total farm income	0.3552
Total crop income	0.4008
Total livestock income	0.4413
Total non farm income	0.6804
Total value of assets	0.5499
Total number of assets	0.2409
Total land holdings	0.4619

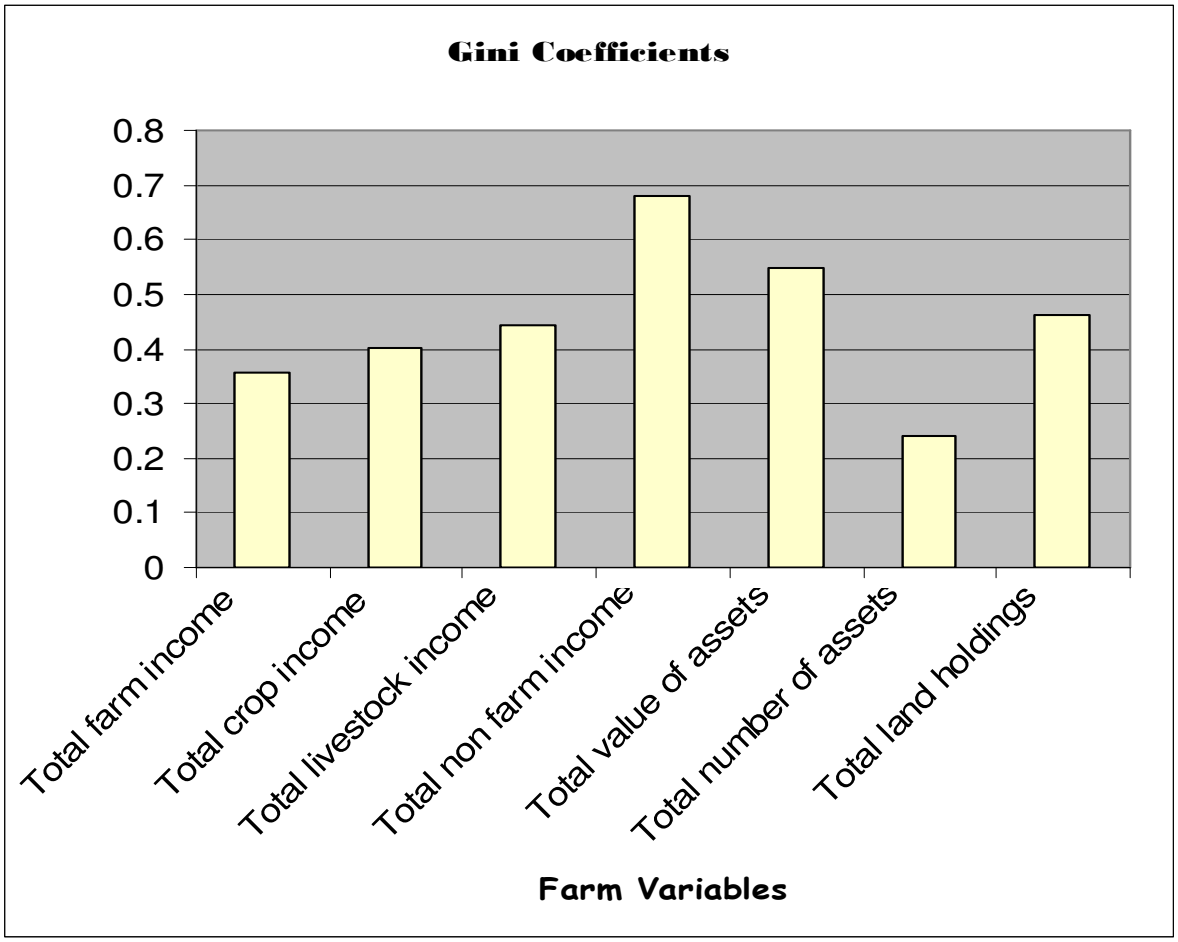
Source: Field Data, 2007.

Figure 1: Lorenz Curves of Various Farm Variables under Study



Source: Field Data, 2007

Figure 2: A Bar Graph of Gini Coefficients of Various Farm Variables under Study



Source: Field Data, 2007

Conclusions

As hypothesised, the study concluded that indeed there is inequality in the way income and wealth is distributed among the horticulture farm households in Nyeri district. This explains why there are varied livelihood strategies and outcomes that characterize the households in question in the district. Although inequality is not as acute to warrant emergency measures, something however, needs to be done to reduce the existing inequality.

Recommendations

The Gini Coefficients derived from the study indicate that there is inequality in income and wealth distribution among the farming households in Nyeri District. As such, the following suggestions are offered:

a) Better interventions targeting the most vulnerable or the marginal groups should be put in place e.g. minimum casual wage, education and agricultural extension services which can enhance household earnings.
b) Create all inclusive opportunities so that vulnerable people like women among others can be able to meet their livelihoods.

Further Areas for Research

The study used cross-sectional data to study income distribution and analyze livelihoods of the people in the district in question. The study recommends the use of panel and/or time series data to study income distribution and livelihoods of the farming households as this is likely to unveil how inequality in income and hence livelihoods have been changing across observational units and overtime.

References

Barrett, C. B., Bezuneh, M., Clay, D. and Reardon, T. (2005). Heterogeneous Constraints, Incentives and Income Diversification Strategies in Rural Africa. Quarterly Journal of International Agriculture 44 (1), 37–60. In: Douglas, R. B., Emma C., S., Ouma, O. J., Murithi, M. F. and Barrette, C. B. (2006). Livelihood Strategies in the Rural Kenyan Highlands AFJARE, Vol. 1 No 1 December 2006.

Barrett, C.B, Marenya, P. P., McPeak, J. G., Minten, B., Murithi, F.M., Oluoch-Kosura, W., Place, F., Randrianarisoa, J. C., Rasambainarivo, J. and Wangila, J. (2006). Welfare Dynamics in Rural Kenya and Madagascar. Journal of Development Studies, 42 (2), 248–77.

Barrett, C. B., Reardon, T. and Webb, P., (2001). Non-Farm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics and Policy Implications. Food Policy 26 (4), 315–31. In: Douglas, R. B., Emma, C. S., Ouma, O. J., Murithi, M. F. & Barrette, C. B. (2006). Livelihood Strategies in the Rural Kenyan Highlands AfJARE, Vol. 1 No. 1 December 2006.

Bebbington, A. (1999). Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty. World Development, 27 (12), 2021–44.

Carter, M. R. and Barrett, C. B. (2006). The Economics of Poverty Traps and Persistent Poverty: An Asset Based Approach. Journal of Development Studies, 42 (2), 178–99.

Central Bureau of Statistics. (2004). Geographic Dimensions of Well-Being in Kenya. Government of Kenya, Nairobi. In: Douglas, R B., Emma, C., S., Ouma, O. J., Murithi, M., F., and Barrette, C. B. (2006). Livelihood Strategies in the Rural Kenyan Highlands AfJARE, Vol. 1 No 1 December 2006.

Chianu, J., Ajani, O. and Chianu, N. (2007). Livelihoods and Rural Wealth Distribution among Farm Households in Western Kenya: Implications for Rural Development, Poverty Alleviation Interventions and Peace, AJAR Vol. 3 pp 455-464.

Davidson, R. and Duclos, J. Y. (1997). Statistical Inference for the Measurement of the Incidence of Taxes and Transfers. Econometrica, 65 (6), 1453–65.

Dercon, S. and Krishnan, P. (1996). Income Portfolios in Rural Ethiopia and Tanzania: Choices and Constraints. Journal of Development Studies, 32 (6), 850–75.

Department for International Development (2001). Sustainable Livelihoods Guidance Sheets. London: Author.

Douglas, R. B., Emma, C. S., Ouma, O. J. Murithi, M., F. and Barrette, C. B. (2006). Livelihood Strategies in the Rural Kenyan Highlands AfJARE, vol. 1 No. 1 December 2006.

Ellis, F. (1998). Household Strategies and Rural Livelihood Diversification. Journal of Development Studies, 35 (1), 1–38.

Giovanni, A. C. (2001). Inequality, Growth and Poverty in the Era of Liberalization and Globalization - A Policy Brief. UNU/WIDER and UNDP.

Institute for Economic Affairs (2002). The Little Fact Book: The Socio-Economic and Political Profiles of Kenya's Districts. Nairobi: IEA.

Jansen, H. G., P, Damon, A., Pender, J., Wielemaker, W. and Schipper, R. (2003). Policies for Sustainable Development in the Hillsides of Honduras: A Quantitative Livelihoods Approach. A Discussion Paper. Environment and Production Technology Division. Washington, DC: International Food Policy Research Institute (IFPRI),

Milanovic, B. (1999). True World Income Distribution, 1988 and 1993: First Calculation Based on Household Surveys Alone. World Bank.

Obasi, P. C. and Onyenweaku, C. E. (2002). Income Distribution among Households in Owerri Agricultural Area of Imo State, Nigeria. IJARD, Vol. 3 28-36.

Omiti, J. O. and Manyengo, J. U. (2004) Policy Constraints in the Marketing of Vegetables in Kenya. IPAR, Discussion Paper Number 061/2004.

Reardon, T. Delgado, C. and Matlon, P. (1992). Determinants and Effects of Income Diversification amongst Farm Households in Burkina Faso. Journal of Development Studies, 28 (2), 264–96.

Richardson, D. J. (1995). Income Inequality and Trade: How to think, what to conclude. Journal of Economic Perspectives, Summer 1995, 9(3), pp. 33-56.

Rizvi, H. (2005). Globalization Driving Inequality - Social and Economic Policy - Global Policy Forum.

Scones, I. (1998). Sustainable Rural Livelihoods: A framework for analysis. University of Sussex. IDS (Institute of Development Studies) Working Paper No. 72.

UNDP (2002). Human Development Report 2002 – Deepening Democracy in a Fragmented World. New York: Oxford University Press.

Wangila, J. Nambiro, E., Ouma, J., Simiyu, D. and Murithi, F. (2005). USAID BASIS CRSP Project on Rural Markets, Natural Capital and Dynamic Poverty Traps in East Africa: Embu Site Baseline Study Report. Mimeo.

Whitmore, G. A. and Findlay, M. C. (1978). Stochastic Dominance: An approach to decision-making under risk. Toronto: Lexington Books.