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Linkages between Rural Poverty and Land Use in Nyando and Muhoroni Sub Counties Kenya

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Abstract
This study examined the relationship between rural poverty and land use among households in Nyando and Muhoroni Sub counties in Kenya. A Cross-sectional research design involving use of both systematic random sampling and purposive sampling was used in this study. Primary data was obtained using structured questionnaires to interview a minimum of 250 household heads from the two sub counties in Western Kenya. Data analysis involved the use of descriptive statistics. The Pearson product moment correlation (r) was used to determine the strength of the linkages between rural poverty and land use. The results showed that the Maize was by far the most dominant crop grown by 95.6 percent of the households compared to other different land use practices. In addition, results also indicated a significant relationship between rural poverty and land use in the two sub counties. The study therefore concludes that policies that increase households awareness on efficient and practical land use patterns that will help them break the vicious cycle of poverty given their diminishing sizes of land.
Keywords: Rural Poverty, Land Use, land tenure, Nyando, Muhoroni

1. Introduction

Land use practices like many other environmental structures, are very multifaceted. The complexity of these practices can be attributed to the existence of diverse spatial and temporal dynamics, including the combination of a large number of interactions and different processes. A better understanding of these interactive linkages is pertinent to the sustainable development of rural communities. Land-use has been perceived as an outcome of the interactions between a society's cultural background, skills and physical needs on the one hand and the natural potential of land on the other hand (Nagamani and Ramachandran 2003). The United Nations Food and Agriculture Organization characterises land use as the arrangements, activities and inputs people undertake in a certain land cover type (FAO 2000). This suggests, that land-use reflects human activities such as the use of the land in industrial zones, residential zones and agricultural fields. Indeed, land-use dynamics will be key in driving changes in the global environment during the next decades (Baulies and Szejwach 1997).

Despite the fact that policy makers in Africa have limited resources at their disposal, they are obligated to make important decisions concerning the type of land use patterns that will prevail in the future while as well as reduce poverty levels among populations (Okwi et al, 2006). Unfortunately, available information regarding poverty and land use is often incompatible. This is because on one hand information that is available on the biophysical environment may be available while that on poverty is not. Consequently, decisions are made in a vacuum, creating a limited understanding of the dynamics relating to poverty and land use patterns (Okwi et al, 2006).

Whereas studies on land use practices have been independently carried out in the Lake Victoria Basin (LVB) where Nyando and Muhoroni Sub Counties are based, based (Swallow et al., 2001; Mahiri, 2003 and Nkonya et al., 2004), the relationships between land use practices poverty are lacking. Thus, there is inadequate knowledge on the extent and magnitude of causal relationships between land use practices and income generating activities. As a result the role of income- generating activities in LVB, with respect to poverty and environmental use is still vague (Ogutu et al., 2005).

Moreover, only few of the studies have been linked to the socio-economic conditions of the local communities and the resulting environmental health of the basin. Indeed a study conducted by Yanda et al. (2001), using mapping of land use and assessment of erosion hazards methods, in Lake Victoria basin in 22 Districts noted the different activities that were considered likely to influence changes on land use (Makalle et al, 2008). These activities included cultivation, mining, lumbering, charcoal making, livestock keeping and brewing. This is, however, a one sided link of human activities to land use change neglecting the reverse link for describing development-environment interactions taking place in a specific ecosystem. Yanda et al. (2001) acknowledged this shortfall by recommending detailed and regular socioeconomic surveys to improve knowledge of the prevailing human activities that are driving changes in land cover and associated processes in the basin. This study, sought to generate insights into the various dynamics relating to land use are and household poverty in Nyando and Muhoroni sub counties in Western Kenya. Specifically, this study describes the nature of land use practices while documenting the land tenure and land size dynamics in the sub counties. In

addition the study sought to establish linkages between the existing land use practices and household poverty.

1.2 LITERATURE REVIEW

Linkages between rural poverty and the environment in developing world have long been the subject of concern and debate for international agencies and policy makers (Angelson, 1997). Since the 1970s it has been almost universally agreed that poverty and environmental degradation are inextricably linked (World Bank, 1992). The World Commission on Environment and Development (WCED, 1987) stated that poverty is a major cause and effect of global environmental problems. The poverty environment hypothesis suggests that economic growth is needed to break the poverty-environment downward spiral; stating that policies that promote economic growth also often benefit the environment. Economic growth eventually reduces poverty, and therefore enhances environmental conservation (UNDP, 1999).

It is argued in the Brundtland Commission's report that; many parts of the world are caught in a vicious downwards spiral where poor people are forced to overuse environmental resources to survive from day to day and their impoverishment of the environment further impoverishes them, making their survival ever more difficult and uncertain (WCED 1987). Poor people are often impoverished by a declining resource base, and thus forced by circumstances to degrade the environment further. (Cleaver and Schreiber 1994; Ekbom and Bojo 1999). Although the link between poverty and environment already became an issue of discussion along with the debate on sustainable development, research trying to grasp this link achieved indecisive results (Lele, 1991; Leach and Mearns, 1992, Reardon and Vosti, 1995).

The literature that treats the linkages between poverty and the environment usually focuses on the 'vicious cycle' between poverty and environmental degradation; the circle is Malthusian in inspiration where farmers pushed by population increase and poverty extend agricultural activities onto fragile marginal lands and thus degrade them. As a result the yield is reduced and this further impoverishes farmers (Dasgupta and Maler 1994). Poor people depend on various activities for their livelihoods, including farm and non-farm activities such as agriculture, wage labour, petty hawking and trading, and provision of low- cost transportation services. In many countries, the poor are landless labourers or farmers with landholdings that are too small to serve as an adequate source of income. The environment affects the health and economic opportunities of poor people in both rural and urban areas. In most regions most poor people live in rural areas and tend to depend directly or indirectly on natural systems for income- generation. The very poor are often landless laborers who depend on various natural resources, such as soil and fisheries, for subsistence and income-generation (Pillai, et al, 2000).

A wealth of literature, however, indicates that these relationships are far more complex, and often mediated through such macro- and micro-level factors as policy measures, markets and prices, local institutional arrangements, gender relations, land distribution and tenure, and entitlements to natural resources (Leach and Mearns 1991; Ekbom and Bojo 1999). Moreover, the specific ways in which poor people depend on natural resources and are affected by environmental changes is not universal, but country- and region-specific. Any simple conclusion or easy synthesis of these relationships is further confounded by the quantity of evidence and counter-evidence favoring or undercutting different hypotheses.

2. METHODOLOGY

2.1 Study area

Nyando and Muhoroni Sub Counties are part of Kisumu County located in western Kenya it covers a total land area of 2,009.5 square kilometres and another 567 square kilometres covered by water. The Other sub counties within Kisumu County include Kisumu East, Kisumu West, Kisumu Central, Seme and Nyakach. It had a population of 968,909 people according to the 2009 national census. It has an average population density of 482 persons per square kilometre (Figure 1).
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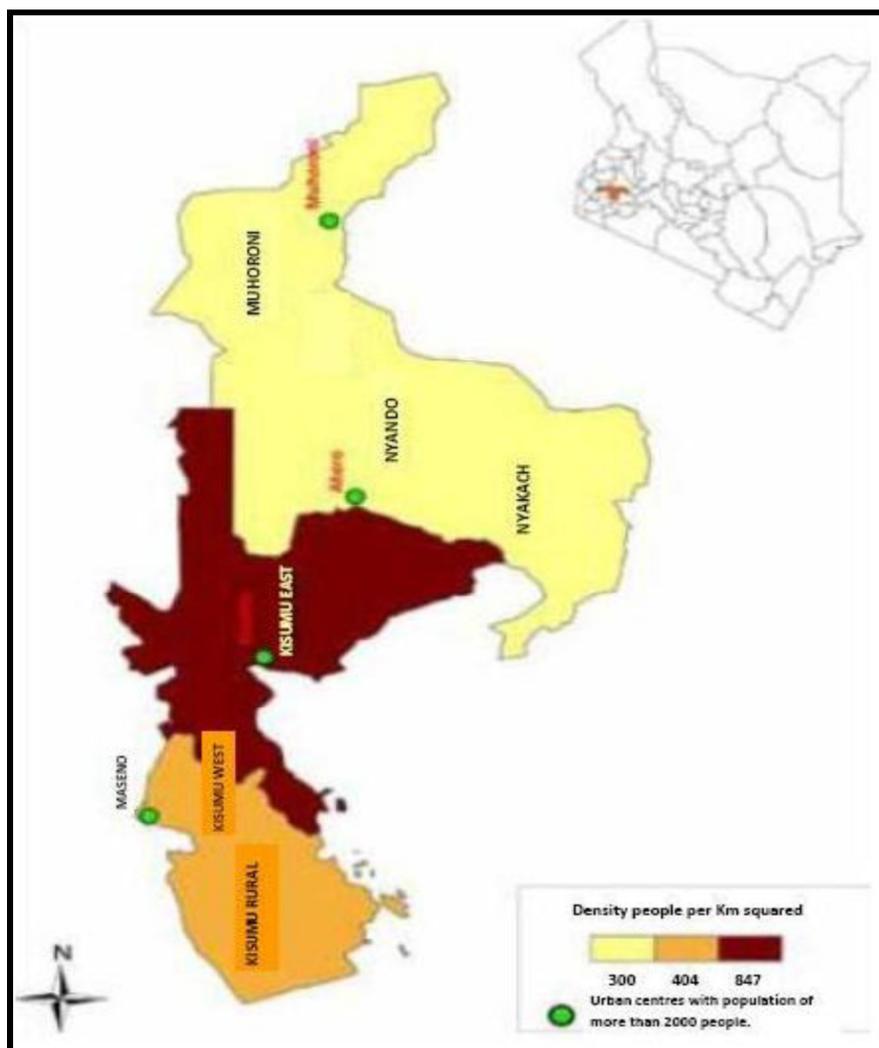
Figure 1: Nyando and Muhoroni Sub counties within Kisumu County
Source: Kisumu County Government (2013-2017 Gender Mainstreaming Strategic Plan)

2.2 Design

Cross-section research design was used in this study. It involves the collection of data at a single point in time and does not involve manipulating variables. It allows researchers to look at numerous things at once (age, income, gender) and is often used to look at the prevalence of something in a given population which in the case of this study is poverty. Furthermore, the design for it requires only a snapshot, is less time consuming and less costly than others. Kura (2012) states that the use of cross-sectional data in poverty and vulnerability assessments may be worthwhile. Indeed a detailed analysis of these data can potentially be informative about the future. The extent to which this exercise will be useful may well vary from setting to setting. This survey was appropriate due to constraints of time and finance and hence it enabled the researcher to reduce operational costs and to collect data within the shortest time possible.

2.3 Study Population and Sampling Procedure

The study used the multi-stage or cluster sampling approach to select the population in Nyando and Muhoroni Sub Counties. Each Sub County was broken down into location and sub-location levels. This approach ensured a more equitable sample distribution. Systematic random sampling was then used to select the households that were to be included in the study. The first household was chosen randomly, thereafter, other households were chosen systematically. Printed papers numbered 1 to 5 were used to pick the kth sampling unit. This method of sampling is appropriate when the population records within the district lands office are not accurate. The two Sub Counties were selected for the study because of their varied characteristics. Firstly, the Sub Counties fall in different agro-ecological zones. Muhoroni Sub County lies within the Marginal Sugarcane Zone, characterised by a long to medium cropping season, followed by a medium to short cropping season. Nyando Sub County, on the other hand, lies within the Lower Midland Cotton Zone. In addition, Muhoroni Sub County mainly

comprises large-scale sugarcane farms, while Nyando Sub County is characterised by small-scale farms.

In order to determine the suitable and adequate number of samples to be used for the study. 250 respondents were interviewed. This represented 1.5 percent of the total population which consisted of 18,000 households. This sample size was considered adequate due to the fact that, depending on the method of analysis, a sample size ranging between 30 to 100 may be large enough to assume normalcy when other statistical conditions are observed (Oluoko-Odingo, 2006; Clark, *et al,* 1986).

Both, male and female-headed households were included in the sample. Due to the major variations in population density, 150 households were sampled in Nyando Sub County while 100 households were sampled in Muhoroni Sub County; representing 60 percent and 40 percent of the sampled population respectively.

2.4 Data Collection Methods

Primary data was sourced mainly from the households through the administration of a questionnaire. The head of the household was interviewed in each case but in his/her absence the eldest son or adult in the household was targeted for the interview. This was intended to obtain correct and reliable information. Second, focus group discussions (FGDs) with village elders and women groups were used to compliment as well as supplement semi-structured questionnaire interviews in collection of primary data. Third, observation was used as a means of obtaining primary data. Observations provided rich qualitative data which supported data from interviews and discussions. In-depth investigations were conducted through observation of some of the land use activities as well as household characteristics, types of dwelling and the various assets that the households owned. Photographs were also used to augment the findings from other data collection procedures. Secondary data was sourced from among others: the District Development Plans, the Central Bureau of Statistics documentations, reviews of relevant official records, and selected publications policy documents. Purposive sampling was used to select key informants, who included the Agricultural Extension Officers for Nyando and Muhoroni Sub Counties, the District Agricultural Officer, farmers' group leaders and non-governmental organisations. An unstructured questionnaire schedule was used to derive responses from them. In addition, purposive sampling was used to identify focus groups, from target groups, some of which were identified while in the field, these included village elders and women's groups with whom informal interviews were conducted.

2.5 Data Analyses and Results Presentation

After collection, data from the field survey was processed and analysed to facilitate the answering of the research questions. This was done as follows. The questionnaires were first checked for completeness clarity and consistency. The answers were then coded before data entry. Descriptive statistics such as frequencies, cross-tabulations were used in summarizing the numerical data for purposes of describing the data and the patterns arising from the data. Besides descriptive statistics, inferential statistics were used to determine and quantify the relationships between the dependent variables such as poverty, and independent variables such as land use and agricultural production. These included the Pearson product moment correlation and the simple regression analysis

3.0 RESULTS AND DISCUSSIONS

3.1 Land Tenure Dynamics in Nyando District

Land is one of the important assets for rural households in sub Saharan Africa. It is indeed fundamental to the lives of poor rural people where they depend on it as a source of food, shelter, income and social identity (IFAD, 2012). Secure access to land reduces vulnerability to hunger and poverty. In this study, information was sought on the ownership and size of the land in Nyando and Muhoroni Sub Counties. Results indicate that all the 250 respondents in the study owned the land in which they lived. Of the respondents interviewed, 85.2 percent indicated that had acquired the land customarily through inheritance. This complies with a study by Quan (1997) who stated that throughout most of sub-Saharan Africa, land distribution remains relatively equitable, and land is held under systems of customary tenure. This which generally provide secure, inheritable rights of occupation and use to individuals and households. Only, 14 percent of the respondents stated that they had purchased the land in which they lived.

Results indicated that the mean size of the land in Muhoroni Sub County however, is 4.4 acres compared to Nyando Sub County which is 3.4 acres. This can be attributed to the commercial farming of sugarcane in Muhoroni Sub County which requires large tracts of land for cane production compared to Nyando Sub County where the farms are smaller and mainly used for subsistence farming. Indeed the land sizes have relatively become small due to redistribution and fragmentation (Wawire et al. 2002; Odenya et al. 2008). Table 4.21 shows the average land sizes in Nyando and Muhoroni Sub Counties.

Of the respondents interviewed, 51.2 percent owned land that was less than 3 acres. The figures are however higher in Nyando Sub County with 58 percent of the households having land less than 3 acres compared to Muhoroni Sub County with 40 percent respectively.

Table 1: Land Size by Sub Counties

	Sub County		
Size of Land (acres)	Nyando	Muhoroni	Total
Less than an acre	5	2	7
1 - 2 Acres	48	7	55
2.1 - 3 Acres	35	31	66
3.1 - 4 Acres	24	12	36
4.1 - 5 Acres	10	5	15
More than 5 Acres	28	43	71
Total	**150**	**100**	**250**

3.2 Land Use Patterns in Nyando and Muhoroni Sub Counties

Maize and sorghum were by far the most important food crops in the two Sub Counties. Maize was the dominant crop that was grown by 95.6 percent of the sample households. In addition sorghum and rice came in second and third respectively with 52 percent and 42 percent of the households growing it on their farms respectively. Horticultural crops were grown by 22 percent of the households. Rice farming was practiced by 9.2 percent of the households mainly in Nyando Sub County while nonfood crops were grown by a paltry 0.4 percent of the households. A small percent of the households had a diversification of activities on their farms, with 4.8 percent opting to rent out their land. Only 1.2 percent of the households had any form of business premises on their land. Table 2 shows the different land use practices in Nyando and Muhoroni Sub Counties.

Table 2: Different Land Use Practices in Muhoroni and Nyando Sub Counties

Land Use	Respondents (%)	Mean Acres	
		Nyando	Muhoroni
Maize	95.6	1.0465	1.0830
Sorghum	52.0	0.7417	0.3335
Horticultural Crops	22.2	0.650	0.1985
Fruits	0.4	0.0067	0.0000
Rice	9.1	0.0000	0.0075
Sugarcane	42	0.2450	3.3785
Non- food crops	0.4	0.1233	0.0000
Livestock	32.8	0.6980	0.0575
Rented Out	4.8	0.0700	0.1150
Business Premises	1.2	0.0117	0.0000

The vast majority of the households (98 percent) used their land for crops. Cattle, sheep and goats were the livestock that were predominant in Nyando and Muhoroni Sub Counties. Households in Nyando Sub County however had a higher number of livestock compared to the households in Muhoroni Sub County. There are also a number of households that have left their land fallow with a mean acreage of 1.2 and 1.7 acres in Nyando and Muhoroni respectively. This could be for a number of reasons including old age and the lack of labour and inputs for the farm.

Indeed agriculture is the key livelihood activity, employing 60% of the total population in Nyando district supplying over 52% of household earnings. Cropping patterns are dominated by production of subsistence crops such as maize, cassava, sorghum and sweet potatoes whereas major cash crops are rice, sugarcane, cotton and coffee. Sugarcane and rice growing are carried out both in small and large-scale. Sugarcane is however the major cash crop in the basin, its grown in Muhoroni, Miwani and parts of Nyando Sub County. Rice growing is under irrigation in Nyando and lower Nyakach. These farming activities are supported by key Industries including Muhoroni Sugar Mills and Rice Mills. Although households within the two Sub Counties kept livestock, 89 percent of those interviewed indicated that they did not derive income from livestock products such as milk, beef, skin, eggs or pork. A study by Coomes et al (2011), noted that subsistence farming constituted a major land use and poverty trap. They stated that the situation arises when poor households are limited to cropping only subsistence oriented annual crops. A land use index was used to determine the level of diversity of land use in both Nyando and Muhoroni Sub Counties. The different land uses were each assigned a score of 2. The scores were then aggregated to determine the land use diversity levels among households in both Nyando and Muhoroni Sub Counties.

3.3 The Relationship between Household Poverty and Land Use

In order to determine the relationship between the poverty levels of the household and land use in Nyando and Muhoroni Sub Counties. The following null hypothesis was tested for its validity

'There is no significant relationship between household poverty and land use'
The Pearson Product moment correlation (r) was used to measure the level of association between the two variables (Table 3).

Table 3: Correlations between poverty and Land use in Nyando District

		Household poverty	Land Use
Household poverty	Pearson Correlation	1	.180(**)
	Sig. (2-tailed)		.004
	N	250	250
Land Use	Pearson Correlation	.180(**)	1
	Sig. (2-tailed)	.004	
	N	250	250

** Correlation is significant at the 0.01 level (2-tailed).

The result r = 0.180 indicated a significant relationship between the level of poverty and land use. These results indicate that the level of household poverty greatly determines how the households use their land. A study carried out in Nyanza province by Kelly, et al, (2003) noted that parts of the province are characterized by subsistence farming, low crop yields and low household incomes and farm Chianu *et al* (2008) also noted that the average farm sizes in Western Kenya are less than 0.1 ha and has some of the highest incidences of food and abject poverty in Kenya.

Similarly, results from this study indicate that the two counties are characterized mainly by subsistence farming with maize production accounting for 95.6 percent of the total land use in the district. The households showed little signs of land use diversification. Only 0.4 percent had non- food crops while a paltry 1.2 percent had any form of business activities on their farms. This effectively means that the poorer the household gets, the more it is likely to determine how they use their land.

4. Conclusion

Results from this study have indicated strong linkages between land use and rural poverty in Nyando and Muhoroni Sub counties. Indeed, land is the primary means for generating a livelihood for households in developing countries. Coupled with the problem of, decreasing land size, a number of policy issues are raised. First, encouraging households to adopt efficient land use practices that enhance poverty alleviation. Second, priority be given to diversification of agricultural activities including land consolidation and non-farm activities in rural areas. The study concluded that poor households can transit out of poverty when they have access to the techniques of increasing the economic productivity of their agricultural lands. Thus, they are able to improve their livelihoods and conditions of living. The major concern for policy makers in their bid to alleviate poverty should be the improvement of the productivity of lands in Nyando and Muhoroni sub counties. In addition, understanding the linkages between agricultural land use changes and poverty is essential for designing policies which ultimately help to reduce rural poverty through the adaptation of sustainable land management practices in Kisumu County.

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