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Land Tenure and Soil Conservation Practices on the Slopes of MT Elgon National Park, Eastern Uganda

Frank Mugagga and Mukadasi Buyinza
[1]Department of Geography, Geo Informatics and Climatic Sciences,
[2]Directorate of Research and Graduate Training, Makerere University,
P.O. Box 7062 Kampala, Uganda

Abstract: Property rights have been noted to increasingly play a central role in the use, management of natural resources and land resources form the main asset for the derivation of livelihoods by most rural communities. This study examines the implications of land tenure on soil conservation on the slopes of Mt Elgon, Eastern Uganda. Primary data were obtained through household interviews with key informants and field observations conducted in Tsekululu Sub County, Bubulo County, Manafwa District, Eastern Uganda between September and December 2012. The sampled parishes were stratified according to their distance from the park boundary. SPSS (16) was used to compute descriptive statistics such as frequencies and percentages. Check dams and gulley controls were the most common structural measures adopted by farmers in all the three sites although, overall the level of adoption within park-adjacent communities was lower compared to the further away sites. The reluctance to invest in long term conservation techniques by park adjacent communities emanates from the separation of ownership from cultivation of the land while the high adoption rate by distant communities is attributed to the transferability, alienability, exclusivity and enforceability rights that secure private land. It can thus be concluded that land tenure and insecurity variables are very important determinants to soil conservation. Thus, a policy environment that guarantees the security of land occupancy by park adjacent farmers could help in generating the right incentives for investing in soil conservation thereby, improving both farm productivity and land quality while protecting the remaining forest from encroachment in search of fertile agricultural lands. Success thereof will be achieved if the politicians, park authorities and local communities jointly participate in their design and implementation.

Key words: Land tenure, Mt. Elgon, soil conservation, park adjacent communities, politicians, local communities, Uganda

INTRODUCTION

Property rights have been noted to increasingly play a central role in the use management of natural resources (Neef, 2001; Nkoya *et al*., 2001; Deininger *et al*., 2006; Kabubo-Mariara, 2007; Kahsay, 2011) and land resources form the main asset for the derivation of livelihoods by most rural communities. Nearly 80% of the Ugandan population relies on land and agriculture for their primary livelihoods (NEMA, 2007; Mugagga *et al*., 2010, 2012). However, the agriculture resource base has been both shrinking and degrading with the increasing population pressure and marginal lands with very steep slopes increasingly being brought under cultivation. This has led to intense land degradation due to soil erosion on mountain slopes. Resulting from this is low and in many cases declining agricultural productivity (Mugagga *et al*., 2010). Highlands occupy 25% of Uganda's total land area and contain 40% of the country's population However, little attention has been paid to the conservation of these ecosystems despite being the main sources of montane peoples' livelihood (Buyinza *et al*., 2007). Recent studies such as Buyinza *et al*. (2007) investigated site specific conservation strategies around Mt. Elgon while other researchers including Mugagga *et al*. (2011) characterised soils on Mt. Elgon slopes as vertic which are extremely susceptible to erosion particularly debris and mudflows, warranting careful conservation techniques if they are to continue supporting the high population which depend on them for their livelihoods (Mugagga *et al*., 2010). This

Corresponding Author: Frank Mugagga, Department of Geography, Geo Informatics and Climatic Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda

paper examines the implications of land tenure on soil conservation on the slopes of Mt Elgon, Eastern Uganda.

MATERIALS AND METHODS

The study was conducted in Tsekululu (The three parishes that make up this sub county (including Bunamulunyi, Bunambale and Bumumali) were until 2007 part of Buwabwala Sub County. Through the decentralization policy, government elevated them to sub county status as a way of improving service delivery in Bubulo County), Sub County located on the slopes of Mount Elgon in Bubulo County, Manafwa District, Eastern Uganda.

The Sub County lies adjacent to MENP (1°25'N and 34°30'E) which is situated approximately 100 km Northeast of Lake Victoria on the Kenya-Uganda border. Mt. Elgon, a solitary volcano is one of the oldest in East Africa. It rises to a height of about 4,320 m above sea level. The region receives an approximately bimodal pattern of rainfall with the wettest months occurring from April to October.

The mean annual rainfall ranges from 1500 mm on the Eastern and Northern slopes to 2000 mm in the South and the West. Mid-slope locations at elevations between 2000 and 3000 m tend to receive more rainfall than either the lower slopes or the summit.

On the lower slopes, the mean maximum temperatures increases from 25-28°C and mean minimum temperatures are 15-16°C (Scott, 1994). According to the 2002 census, the Sub County had a population of 28,836 persons (14,582 males and 14,254 females) with a corresponding population density of 588 persons per km^2, compared to 126 persons per km^2 for Uganda as a whole. The mean household size was 4.6 persons per household (UBOS, 2002).

The population has been steadily increasing over the years with a growth rate of 3.3% per annum (Republic of Uganda, 2011). This is attributed to the high birth rates and the limited immigration. Up to 95% of the population lives in the rural areas. The number of females almost equals that of males with the indigenous population comprising Bamasaba (95%). The other tribes include Banyole, Iteso, Babukusu and Sabaot.

The Ugandan side of Mt. Elgon National Park (MENP) was formerly gazetted as a natural forest reserve in 1938 with a variety of wild animals. In October 1993, the Government of Uganda declared the area a National Park, in an effort to strengthen the conservation status of the ecosystem. Decimation of forest for cultivation into the National Park is a major threat to the Mt. Elgon ecosystem (Mugagga *et al*., 2011) with virtually all of the forest cover below an elevation of 2000 m removed (Malpas, 1980; UWA, 2000; Mugagga *et al*., 2011).

Data collection: Three study parishes including Bunamulunyi, Bunambale and Bumumali were stratified according to their distance from the Mt. Elgon National Park boundary (Fig. 1). Bunamulunyi is adjacent to the park boundary whilst Bunambale and Bumumali are 4 and 15 km away, respectively. Five villages or Local Council1 (LC1 (Local Council1 refers to a village executive and is the smallest administrative and decision making unit in Uganda)) were randomly selected from each of the parishes.

The 30, 55 and 65 households were randomly selected from Bunamulunyi, Bunambale and Bumumali, respectively. The lower number of sampled households from Bunamulunyi is attributed to the hostility between communities adjacent to the park boundary and the National Park Authorities hence their reluctance to engage with outsiders, especially in matters concerning land. Key informants included local leaders, clan elders, household heads and Uganda Wildlife Authority (UWA) staff. Household interviews were coupled with own field observation of soil conservation techniques being practiced.

Data analysis: Primary data collected through the household survey was analyzed using the Statistical Package for Social Scientists computer package (SPSS Version 16) and descriptive statistics such as frequencies and percentages.

In order to determine the degree of adoption of soil conservation, the present study adopted Buyinza *et al*. (2007) methods that based on the number of farmers adopting a particular soil conservation practice thus; over 80% (high), 40-80% (medium), 20-40% (low) and below 20% (poor).

To determine the overall adoption of soil conservation techniques, first 11 common conservation strategies were selected thus terraced farming, water ways, gulley control, check dams, alley cropping, vegetative measures, composit, green manure, legume cultivation and chemical fertilisers.

A score of 1 was assigned to the practice adopted by farmers and 0 was assigned to the practice not adopted. Then, all scores were aggregated and divided by 11 to obtain a composite index of adoption of soil conservation.

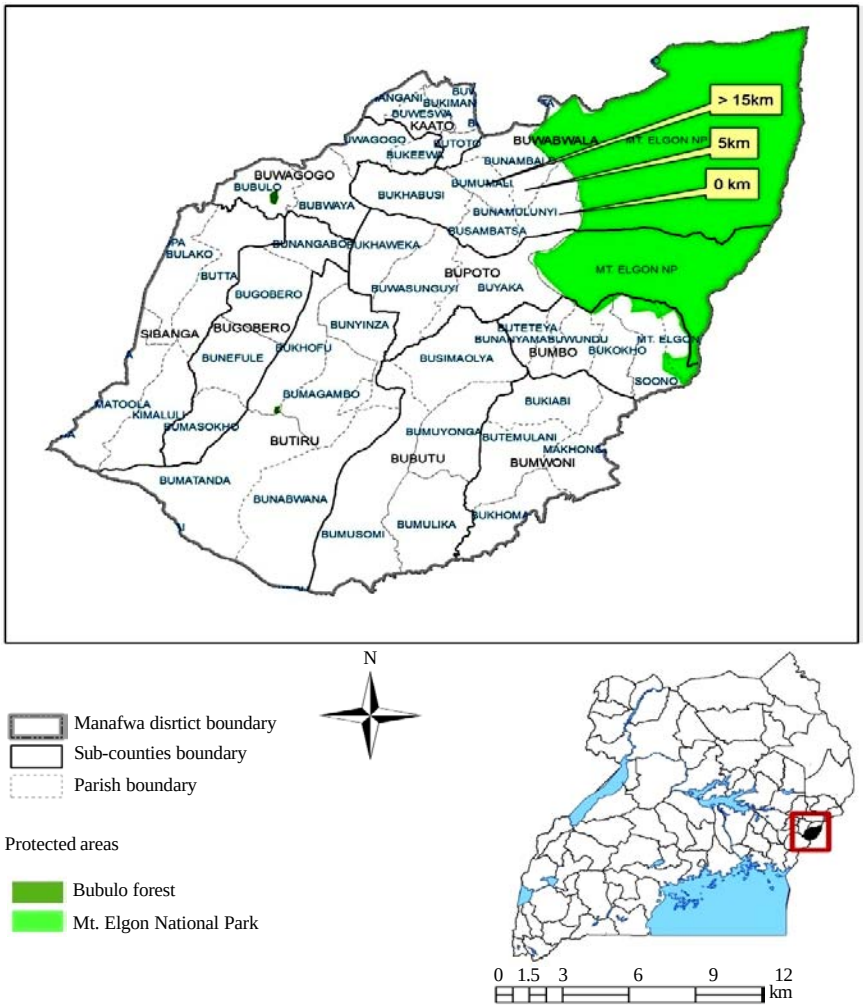

Fig. 1: The study area showing the three sampled parishes

RESULTS AND DISCUSSION

Common conservation techniques: Check dams and gulley controls were the most common structural measures adopted by farmers in all the three sites although, overall the level of adoption within Bunamulunyi was lower compared to the other two sites. Likewise, terraced farming and construction of water ways were less adopted in Bunamulunyi while they were widely practiced in the other two sites. As reported by Buyinza *et al.* (2007), farmers on the slopes of Mount Elgon use structural measures to cope with surface run off which when uncontrolled, damages terrace risers and removes fertile soils form the farmlands eventually aggravating crop yield and increasing the cost of terrace maintenance (Table 1). Much as the biological interventions were not widely used in all the three sites, their adoption in Bunamulunyi was very low compared to the other two areas. Vegetative measures such as planting wind brakes require time input and the trees take time to

Table 1: Common soil conservation techniques adopted by farmers in the three study sites

	Rating		
Conservation measures	Bunamulunyi (adjacent to park boundary)	Bunambale (4 km away)	Bumumali (>15 km away)
Structural			
Terraced farming	Low	High	High
Water ways	Low	High	High
Check dams	Medium	Medium	Medium
Gulley controls	Medium	High	High
Biological			
Alley cropping	Low	Medium	Medium
Vegetative measures	Low	Medium	Medium
Mulching	Low	Medium	High
Application of fertilizers			
Composit	Low	Medium	High
Green manure	Low	Medium	High
Legume cultivation	High	High	High
Chemical fertilizers	Low	Low	Low

mature yet farmers close to the park boundary are insecure in terms of long term land access rights. Thus, it is not surprising that despite their effectiveness in controlling soil erosion such measures are not popular in these areas.

Chemical fertilizers are not common in the three sites which could be attributed to the cost of procuring them when compared to the other cheap and available options. The most common way of restoring fertility is by planting legumes such as beans which do not only serve this purpose but are major cash crops coming from the area. Legumes increase soil organic matter, improve soil porosity, recycle nutrients, improve soil structure, decrease soil pH, diversify the microscopic life in the soil and break disease build up and weed problems of grass-type crops. Composit and green manure from plant residues are the other soil replenishers. Plant stalks are normally left to dry and rot from the garden as farmers prepare for the next growing season. However, the escalating fuel wood crisis in the region is rendering this method less relevant as the stalks are instead harvested to be used as firewood for domestic use.

Land tenure and soil conservation on the slopes of Mount Elgon: As noted by Feder and Feeny (1991), the basic rights bestowed upon the individual owner of land under private property regimes including exclusivity, transferability, alienability and enforceability are regarded as forces generating security of tenure and in conjunction with a well-functioning market give the right signals that lead towards efficient allocation of resources.

Communities adjacent to the Mt. Elgon National Park boundary face severe restrictions from the Uganda Wildlife Authority as regards their landuse practices. For example, farmers in Bunamulunyi mentioned that they are only allowed to plant short term annual crops such as beans and maize that take a short time to mature. Moreover because the communities are resident within gazetted areas they lack the incentive to invest in long-term soil conservation initiatives. Much as the present study did not attempt to investigate soil conservation practices on customary and private land regimes, the willingness to invest in long soil conservation measures is generally higher in Bunambale and Bumumali owing to the secure land tenure. This is attributed to the transferability, alienability, exclusivity, enforceability rights that secure private land tenure (Lee, 1980; Feder and Feeny, 1991; Platteau, 1996; Todaro and Smith, 2003; Deininger *et al*., 2006; Kabubo-Mariara, 2007; Kahsay, 2011) whilst the reason for tenure insecurity in Bunamulunyi seems to emanate from the separation of ownership from cultivation of the land thereby disincentivizing the farmers to invest in long term soil conservation (Jansen and Roquas, 1998; Maxwell and Wiebe, 1999; Esser *et al*., 2002; Wannasai and Shrestha, 2008).

Feder and Feeny (1991) further note that if for example, land ownership and user rights can be transferred from the holder at any point in time by forces outside his/her control and without his/her consent; it follows that the landholder would have little incentive to invest in land quality improving structures. As a result, the ability of a farmer to hold on to a given farm in the future, namely, tenure security becomes an important factor which if missing, stifles farmers' initiatives to invest and biases their activity towards a more intensive exploitation of land (Place and Otsuka, 2002).

CONCLUSION

This study has demonstrated that generally farmers on the slopes of Mt. Elgon participate in soil conservation although, with varying degrees depending on the distance from the park boundary. Land tenure insecurity was identified as the main deterrent to investment on soil conservation, especially for those communities adjacent to the national park boundary. It can thus be concluded that land tenure and insecurity variables are very important determinants to soil conservation. Thus, a policy environment that guarantees the security of land occupancy by park adjacent farmers could help in generating the right incentives for investing in soil conservation, thereby improving both farm productivity and land quality while protecting the remaining forest from encroachment in search of fertile agricultural lands. Success thereof will be achieved if the politicians, park authorities and local communities jointly participate in their design and implementation.

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