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Land tenure and soil conservation practices on the slopes of Mt Elgon National Park, Eastern Uganda

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Property rights have been noted to increasingly play a central role in the management of land resources. This paper examines the implications of land tenure on soil conservation on the slopes of Mt Elgon, Eastern Uganda. Primary data were obtained through household surveys 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 by park-adjacent communities was lower compared to distant ones, whose reluctance to invest in long term conservation techniques is attributable to the tenure insecurity, while the high adoption rate by distant communities is owed to the transferability, alienability, exclusivity and enforceability rights that secure private land. Thus, a policy environment that guarantees tenure security of park adjacent farmers could help in incentivizing investment in soil conservation. 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, 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; Gebremedhin and Swinton, 2003; Deininger and Jin, 2006; Kaburo-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; Mugagga et al., 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 andcontain 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 scholars including Mugagga et al., (2011) characterised soils on Mt Elgon slopes as vertic which are extremely

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

The management of Mount Elgon National Park: A past-present perspective

The history of control of forests by the government for conservation purposes in Uganda dates back to the colonial period (UWA, 2000). By 1908, the colonial government had put all the major forest areas in the country under the control of the government. The colonial government emphasized that "the public good was best served through the protection of forests and water resources, even if this meant the displacement of the local communities" (UWA, 2000). In 1929 to 1930, a first attempt was made to establish boundaries around Mount Elgon to prevent people from extending the cultivation further upslope.

This initiative was however dropped due to community resistance. In 1937, a boundary was finally demarcated and Mount Elgon Crown Forest was gazetted under the authority of the Forest Department (Legal Notice 100 of 1940). In 1948, the area was regazetted as Mount Elgon Central Forest Reserve (Legal Notice 41); it was regazetted yet again in 1951 as a Demarcated Protection Reserve. Changes in District names, excisions and more accurate mapping resulted in further changes of the boundary until 1968 when it was promulgated as comprising 120,000 hectares (Synnott, 1968; GoU, 1996).

The Forest Department management however collapsed in the 1980s, due to political instability during that period, resulting in widespread encroachment of all forests in Uganda. In January 1988, a new Government Forestry Policy was proclaimed, which clarified the role of forestry as not only providing timber, fuel, pulp and poles but to also address broader environmental values. The president announced that forest reserves would revert to their 1963 boundaries, which meant that all encroachers had to be evicted.

In 1991 a ban on felling indigenous trees and the production of charcoal in Forest Reserves was imposed but it proved difficult to control the trade in indigenous timber, because there was no regulation of sales (Malpas, 1980; UWA, 2000).

In 1988, a Forestry Rehabilitation Programme was initiated with the support of several donors. The European Community was mostly involved in the natural forest sector to help the Forest Department regain full control over its 1.4 million hectare estate and to rehabilitate encroached areas with fast growing trees. The programme did not aim at total protection, but rather development of management systems to preserve 50% of the natural high forest whilst allowing controlled timber harvesting in the other half. In 1987 the idea to designate all natural forest areas over 100 sq.km as ‘Forest Parks’ was originated. This name was changed to ‘Conservation Forests’ after a dispute with Uganda National Parks in 1992. Within these conservation forests, total protection areas (including nature reserves and sites of special scientific interest) were to be gazetted and there was a proposal to establish semi-independent Boards for the Conservation Forest. A Park Manager and other staff for Mount Elgon were appointed in 1993.

In preparation of an interim management plan for Mount Elgon Conservation Forest, it was proposed to set aside a ‘community zone’ of 500m from the boundary. Pending longer term management planning, all extractive activities were banned as well as cultivation, hunting and grazing. In the interim management plan for 1992-1994, even the collection of minor forest products for subsistence, including bamboo, was only allowed for permit holders.

Despite efforts to protect the Park boundary and restore previously encroached lands, encroachment continues to be a management problem. Incidences of infringement have continued to occur for a variety of reasons, including a strong community desire for more agricultural land, declining land productivity in some areas, high population pressure, political interference and connivance with National Park Staff. In addition, problems with identifying and marking the correct Park boundary have occurred in a number of areas, with different boundary surveys over the years producing different outcomes, either as a result of lack of information or because of manipulation of the true boundary by the surveyors due to community pressure. The most recent boundary survey carried out between 1993 and 1996 found that land already used for cultivation was in fact within the gazetted park boundary, thus creating conflict with the community who consider the land as theirs (Scott, 1998; UWA, 2000).

Access to Mt Elgon National Park forest resources is regulated through the Collaborative Forest Management (CFM) initiative between Uganda Wildlife Authority (UWA) and the park adjacent communities though access to certain parts of the forest is allowed during specific periods of the year. Resource extraction quotas are

imposed as a way of ensuring sustainability. Under the same arrangement, mechanisms and practices have been put in place by UWA with a view of having communities and Park staff share in the benefits and responsibility for the management of the Park ecosystem. However, illegal access to restricted zones and lack of adherence to resource harvesting quotas are still major management problems posed by the communities. The conflict between resource users and resource conservers has been the greatest hindrance in the conservation of Mt Elgon (Scott, 1998). The ever increasing illegal access to the Park is partly a result of local leaders who are more inclined to tolerate encroachment and exploitation of protected areas due to local political pressures and economic interest than conservation.

The Study sites

The study was conducted in Tsekululu[1] Sub County located on the slopes of Mount Elgon in Bubulo County, Manafwa District, Eastern Uganda. The Sub County lies adjacent to MENP ($1^{\circ}25^{1}$N and $34^{\circ}30^{1}$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 2,000 and 3000 metres tend to receive more rainfall than either the lower slopes or the summit. On the lower slopes, the mean maximum temperatures increases from 25° C to 28° C and mean minimum temperatures are 15° C to 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 square kilometer, compared to 126 persons per square kilometer 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 (GoU, 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 (Manafwa Local Government, 2007).

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 metres removed (Malpas, 1980; UWA, 2000; Mugagga et al., 2011).

MATERIALS AND METHODS

Data collection

Three study parishes including Bunamulunyi, Bunambale and Bumumali were stratified according to their distance from the Mt Elgon National Park boundary. Bunamulunyi is adjacent to the park boundary, whilst Bunambale and Bumumali are four and fifteen kilometres away respectively. Five villages or Local Council1 (LC1[2]) were randomly selected from each of the parishes. 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 and Uganda Wildlife Authority (UWA) Staff. The clan elders provided historical information that was relevant in explaining people's varied choices regarding soil conservation in respect of land tenure security. The local leaders and UWA staff described their roles and current policies regarding access to Park resources and the relationship between them and Park adjacent communities. Household interviews were coupled with own field observation of soil conservation techniques being practiced (Figure 1).

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; thus; over 80% (high), 40 to 80% (medium), 20 to 40% (low) and below 20% (poor). To determine the overall adoption of soil conservation techniques, first 11 common conservation strategies were selected thus; terraced

[1] 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.

[2] Local Council1 refers to a village executive and is the smallest administrative and decision making unit in Uganda

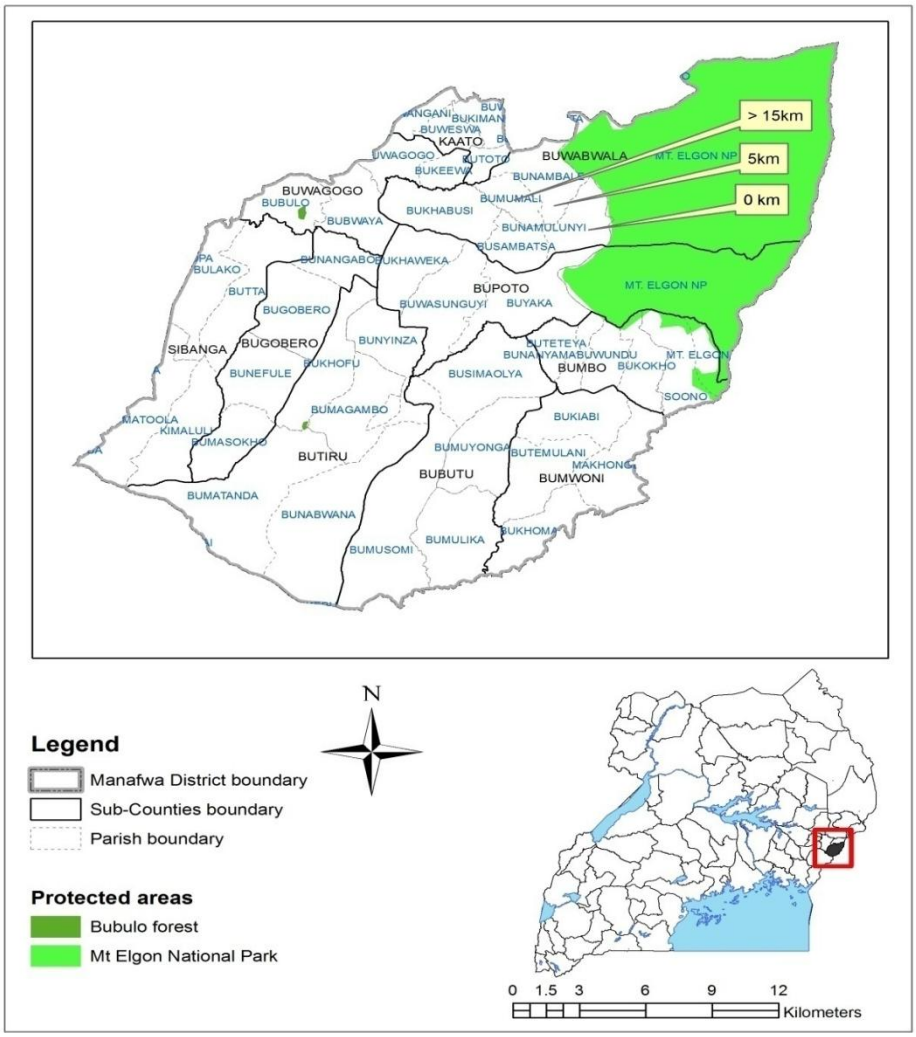

Figure 1. The study area showing the three sampled parishes.

farming, water ways, gulley control, check dams, alley cropping, vegetative measures, composit, green manure, legume cultivation and chemical fertilisers.

A score of 1.0 was assigned to the practice adopted by farmers and 0.0 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.

RESULTS AND DISCUSSION

Prevailing land tenure and implications for soil conservation

The dominant land tenure system in the study area was customary (49%), with the majority of respondents having inherited the land from their parents. This was followed by private lease owners (24%). Twenty three percent were landless and therefore were encroaching on the National Park land. Three percent were either renting or borrowing land from neighbours for a specified time period. Crop harvest share systems and non wage labour contracts were the main modes of land rental. More land degradation forms were observed on the encroached land than on inherited and privately owned land. Farmers on encroached plots were noted to be reluctant in investing in soil and water conservation measures citing the uncertain future and short term periods on rented

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

Conservation measures	Bunamulunyi (adjacent to Park boundary)	Bunambale (4 kms away)	Bumumali (> 15 kms away)
	Rating	Rating	Rating
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

land. Owners of purchased land may have more incentive to produce cash crops and apply inputs to be able to recoup the costs of their investments. In fact, land management practices including mulching were more pronounced on privately owned land, thus further strengthening the argument that private owners are more likely to invest in land and soil conservation measures. As will be noted in the next section, the communities around Mt. Elgon National Park have a strong social and cultural dependency on the park, an issue that calls for appropriate conservation approaches to ensure sustainability.

Environmental resources from Mt. Elgon National Park

The Park contains a wide range of environmental resources which are of great value to the communities living around it. These resources include; medicinal plants, firewood, fodder for livestock, sticks for hoes, poles for building, vegetables, thatch grass, wild fruits and craft material. About 35% of the respondent use the park resources for domestic purposes, 33% for agricultural purposes and 30% are looking for grazing land, while 2% seasonally visit the park in search of particular plant species, soil and honey for socio-cultural reasons notably circumcision rituals. Buyinza and Teera (2008) found out 31.3% of the total environmental income for Mt Elgon adjacent communities was derived from firewood much of which was from the National Park. Vedeld et al. (2005) found out that for households in the vicinity of forests, considerable livelihoods are derived from the collection of forest products for subsistence and commercial uses. In the next section, we present some of the common soil conservation practices by the farming communities and how adoption varies with land tenure security (Table 1).

Common soil conservation techniques and the role of land tenure security

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

Figure 2. Terraced farming using contour bands to control soil erosion. Despite requiring tangible input in terms of construction and maintenance, such techniques are very common in areas that are distant from the Park Boundary and on privately owned farmlands.

removes fertile soils from the farmlands eventually aggravating crop yield and increasing the cost of terrace maintenance.

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 (Figure 2). Vegetative measures such as planting wind brakes require time input and the trees take time to 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.

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.

UWA restricts communities working within the buffer zone to short term 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.

The pronounced soil conservation under private land

tenure can be attributed to the transferability, alienability, exclusivity, enforceability rights that secure such land holdings (Lee, 1980; Feeder and Feeny, 1991; Platteau, 1996; Gebremedhin and Swinton, 2003; Todaro and Smith, 2003; Deininger and Jin, 2006; Kaburo-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).

Feeder 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 (Meredith et al., 2000; 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 a key 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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