

**PEOPLE ATTITUDE TOWARD PROMOTION OF AGROFORESTRY PRACTISES IN BUFFER
ZONE AREA OF MT. ELGON NATIONAL PARK,
UGANDA**

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ABSTRACT

The Agroforestry is a historical practice in Uganda where people raised trees, crops and animals together traditionally on the same unit of farmland. This study was conducted to assess the attitude of people regarding the contribution of agroforestry practices in socio-economic development in the buffer zone area of Mutushet and Kortek, Mt. Elgon National Park, Uganda.

Primary data were collected through formal household interviews with the use of a structured questionnaire administered to five percent households selected randomly in the Village Environmental Committees (VECs). In addition, key informant interviews and informal group discussions were also held. Altogether 146 households were interviewed. Data were analyzed using Chi-square test.

Results show that the attitude of people towards contribution of agroforestry practices is independent of VECs, ethnic group, settlement period, and family size and depends on occupation, literacy level, distance from National Park boundary, damage caused by wild animals, land holding size and number of livestock holding. The important policy recommendation drawn from these findings is that intensive extension and motivation programs should be launched in those areas where the majority of people have unfavourable attitude towards agroforestry practices.

Keywords: Agroforestry, attitudes, Buffer Zone, Mt. Elgon National Park

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INTRODUCTION

In the late 1980s the Ugandan Government decided to dedicate a fifth (3000 sq km) of the country's 15,000-sq-km forest estate to be managed as a Strict Nature Reserves (SNRs) for the protection of biodiversity. The Forest Department subsequently undertook a 5-year programme of biological inventory and socio-economic evaluation to select appropriate areas for designation. Sixty-five of the country's principal forests (including five now

designated as National Parks) were systematically evaluated for biodiversity, focusing on five 'indicator' taxa (woody plants, birds, small mammals, butterflies and large moths). A scoring system was developed to compare and rank sites according to their suitability for nature reserve establishment and 11 key sites were identified, which, when combined with the country's 10 national parks, account for more than 95 per cent of Uganda's species.

Forest buffers, either planted or natural are probably the oldest known buffer zone created for exploitation purposes. In most cases this involved converting natural forests into planted forest estates. The reminders (natural forests) were later often treated as core zones. Cases of forest buffers are softwood plantations in Uganda's Mt. Elgon and Kibale National Parks. Uganda has declared several Forest Buffer Zone Areas (FBZ), covering an area of 3230 sq km. A BZ is the area surrounding a park or reserve encompassing forests, agricultural lands, settlement, villages, open space and many other land use forms (Howard, 1991). Mupada (2002) defines Forest Buffer Zone (FBZ) as a zone peripheral to a national park or equivalent reserve, where restrictions are placed upon resource use or special development measures are undertaken to enhance the conservation value of the area. While parks and protected areas (PA) have been the traditional efforts to conservation, many are rapidly being depleted as the lands around them are converted to alternative, often incompatible uses. The BZ concept was first developed by UNESCO to provide an additional layer of protection around PAs. In the Ugandan context, BZ has been developed to focus on the special needs of the local community who are likely to be adversely affected by conservation measures. It has adopted the 'Impact Zone' concept cited in Scott (1998).

The people of Eastern Uganda in general have a long tradition of farming with trees, and fodder and agriculture are the essential components of rural livelihood. Tree fodder provides about 40% of all animal feed but it is in short supply in the dry season. The fodder from the community forests is not sufficient for sustaining the present livestock population. Yet, only a few farmers grow fodder trees on their farmland, the rest use agricultural by-

products as a major alternative (Gombya-Ssembajwe et. al., 2001). Forests are an integral part of the farming system and the farmers heavily depend on forests including those in buffer zone for essential supply of fodder, fuelwood, and construction materials.

As a system, the main components of agroforestry are trees and shrubs, crops, pasture and livestock, together with the environmental factors of climate, soils and landforms (Djinde et. al., 1988). Agroforestry practices are more suited to maximizing per unit productivity through increased water availability, bund conservation, reduced soil erosion, availability of more organic manure, increased livestock and crop production, and reduced dependence on FBZ and core area resources. Crops grown together with trees improve the farmer's economy. Agroforestry practices can significantly contribute to maximize land use for food production as well as to soil and water conservation (Franzel et. al, 2001). Therefore, there is a great need to promote agroforestry to sustain rural livelihood and to move forward in addressing the twin goals of development and conservation. Nearly 67% of fuelwood and 58% of timber consumed by the people residing in the buffer zone comes from the buffer zone itself. Therefore, to keep the FBZ intact, it is high time that agroforestry should be applied in the buffer zone (Howard, 1991).

The overall objective of the study was to assess the attitude of people towards the contribution of agroforestry practices in their farmland for their socioeconomic benefit in buffer zone. The research hypothesis was that the attitude of respondents towards the contribution of agroforestry practices in their farmland was a function of: presence of Village Environment Committee (VEC), occupation, ethnic group, literacy rate, distance from national park boundary, damage suffering from wildlife,

settlement period, land holding status, number of livestock unit owned and family size.

RESEARCH METHOD

Study site

Mt. Elgon National Park (MENP) (1°N and $34^{\circ}30^{\circ}\text{E}$) is situated approximately 100 km Northeast of Lake Victoria on the Kenya - Uganda border. The protected area covers 2045 km² with 114 km² comprising Mt. Elgon National Park on the Ugandan side. The park boundary is 211 km in length. According to Scott (1994), Mt. Elgon is one of the oldest volcanoes in East Africa. It rises to a height of about 4,320 m above sea level. The mean annual rainfall ranges from 1500 mm on the eastern and northern slopes to 2000 mm in the south and the west. On lower slopes, the mean maximum temperatures decrease from 25^o C to 28^o C and mean minimum temperatures are 15^o C to 16^o C.

The National Park spreads over three districts in eastern Uganda, namely Mbale, Sironko and Kapchorwa. The study was conducted in Mutushet and Kortek Parishes, Kabei Subcounty, Kongasi County, Kapchorwa District (see Figure 1). Mutushet had collaborative management with UWA while Kortek did not.

Data collection and analysis

Primary data was collected through household survey of five percent households selected randomly in these VECs. Altogether 146 households were interviewed. In addition, key informant interviews were conducted with the wardens, rangers, community mobilizer and Mount Elgon National Conservation and Development Project (MECDP) staffs and formal and informal group discussions were also held. Secondary data was collected from various sources such as Uganda Wildlife Authority

(UWA), National Environment Management Authority (NEMA), National Forest Authority (NFA) and Makerere University libraries.

The data was analyzed by using Chi-square test. The attitude toward agroforestry practice was rated as negative, moderately favourable, and strongly favourable based on percentage of farmers adopting particular agroforestry management practice. If the percentage of farmers adopting particular agroforestry practice was higher than 75 percent it was rated as favorable, 50 to 75 percent as moderately favourable, below 50 percent as negative. Respondents showing negative, moderately favourable, and strongly favourable attitudes on agroforestry were assigned values 1, 2, and 3, respectively.

The hypothesis that the attitude of people to promote agroforestry was independent of the VEC, ethnic group, settlement period, family size, occupation, literacy level, distance from NP boundary, damage caused by the wild animals, land holding size and number of livestock holding was tested.

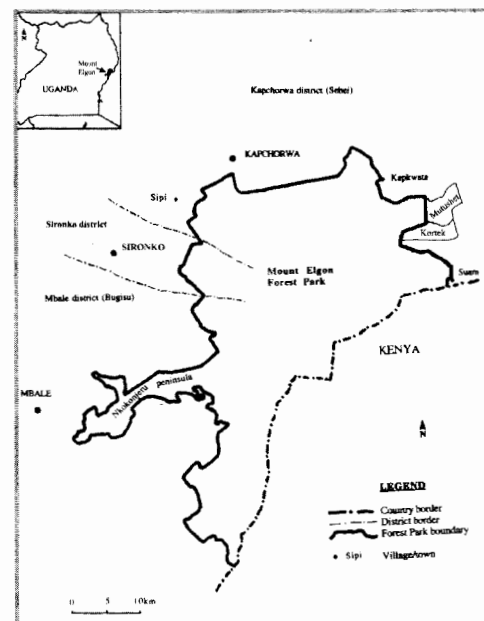


Figure 1. Map of Mt. Elgon showing study areas (Mutushet and Kortek), Uganda

RESULTS AND DISCUSSION

Results show that the attitude of the people towards agroforestry is independent of VEC, ethnic group, settlement period, and family size (Tables 1, 2, 3, and 4, respectively). The results reveal that attitude of people to promote agroforestry does not depend on ethnic groups such as the Bagisu (Bamasaba) of Mbale and Sironko Districts and Sebei (Sabiny) of the Kapchorwa District. The Ndorobos (Benets), an ethnic dwelling community in the northeastern part of the mountain were allowed to graze and reside inside the reserve. 28% of Ndorobos community has negative attitude towards promotion of agroforestry as compared to 9% for Bagishu. This might be due to low literacy level in Ndorobos community.

The Bagishu of Mbale and Sironko Districts live on the western and southern slopes of the mountain. They are agriculturalists and live by cultivating the fertile volcanic soils of the mountain. They are known in East Africa for the production of high quality Arabica coffee. The Sebei (Sabiny) of Kapchorwa District on the other hand reside on the northern slopes of the mountain. They are primarily pastoralists. They grazed (this is no longer applicable) their cattle, sheep and goats on the pastures within the forest and moorlands. Today they have incorporated agriculture in their lives and are known for cultivation of maize and wheat (Uganda Wildlife Authority, 2002).

Table 1. Attitude towards agroforestry by VEC as shown in frequency (f)

VEC	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Calculated	X ² Tabulated
Mutushet	24	32	18	74	1.939	5.991
Kortek	31	28	13	72		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is accepted)

Table 2. Attitude towards agroforestry by ethnic group as shown in frequency (f)

Ethnic Group	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Calculated	X ² Tabulated
Ndorobos	29	34	24	87	7.05	9.49
Bagishu/Sabiny	22	20	4	46		
Others	4	6	3	13		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is accepted)

Based on these finding, the hypothesis that the attitude of people to promote agroforestry was independent of ethnic group is, therefore, accepted. Similarly, the attitude depends neither on settlement period (ranging from less than 10 years to more than 20 years) nor on family size (less than five persons to more than 10).

Table 3. Attitude towards AF by settlement period as shown in frequency (f)

Settlement Period	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Calculated	X ² Tabulated
<10 years	11	7	4	22	5.42	9.49
10-20 years	13	14	9	36		
>20 years	31	39	18	88		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is accepted)

Table 4. Attitude towards AF by family size as shown in frequency (f)

Family Size	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Calculated	X ² Tabulated
<5 persons	9	7	4	20	1.64	9.49
5-10 prsns	26	29	12	67		
>10 prsns	20	24	15	59		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is accepted)

Statistically, the hypothesis that the attitude of people to promote agroforestry was independent of the family size is therefore accepted.

The attitude of people towards agroforestry is dependent on occupation, literacy level, distance from NP boundary, damage caused by wild animals, land holding size and number of livestock holding (Tables 5, 6, 7, 8, 9, and 10, respectively). As regards to occupation of people, it is interesting to note that 26% people with agriculture as the main occupation

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have negative attitude towards agroforestry whereas the positive attitude was by service holders and business people. Similarly, 38% of illiterate and 17% of people with education under post-primary education level (PPL) have negative attitude towards agroforestry.

Table 5. Attitude towards AF by occupation as shown in frequency (f)

Occupation	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Cal-culated	X ² Ta-bulated
Agriculture	33	57	26	116	28.37**	12.89
Service	10	0	0	10		
Business	7	1	0	8		
Others	5	2	5	12		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

Table 6. Attitude towards AF by literacy level as shown in frequency (f)

Literacy Level	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Cal-culated	X ² Ta-bulated
Illiterate	9	27	27	58	27.31**	9.49
Under	22	23	9	54		
PPL or over	24	10	0	34		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

There were many factors which affected the attitude of people on agroforestry promotion. Business people, service holders, literate and educated people, people residing near the wards adjoining the National Park boundary were in favour of promoting agroforestry. Similarly, people suffering from wildlife damage, people with more than 0.33 ha of land and more than 6 livestock unit (LU) have a positive attitude towards promotion of agroforestry practices in buffer zone.

The attitude towards agroforestry differed with distance from the NP boundary. A negative attitude was shown by 11% people residing in adjoining wards of NP and by 32% residing in non-adjoining wards. It was interesting to note that only 15% people whose crops have been damaged by wild animals showed negative attitude towards agroforestry

practice as compared to 41% people whose crops have not been damaged.

Table 7. Attitude towards AF by distance from national park boundary as shown in frequency (f)

Distance from NP	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Cal-culated	X ² Ta-bulated
Adjoining	31	36	8	75	10.44**	5.99
Non-adjoining	24	24	23	71		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

Table 8. Attitude towards AF by damage caused by wild animals as shown in frequency (f)

Crop Damage	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Cal-culated	X ² Ta-bulated
Damage	44	51	17	112	10.94**	5.99
No Damage	11	9	14	34		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

It was generally observed that crop damaged in village/wards bordering NP was higher than in the village/wards that were away from National Park boundary. As fodder, fuelwood and grazing area is not sufficient in both VECs, people directly or indirectly depend on NP to fulfill their needs. This has added more pressure on the forest resources of core areas.

Table 9. Attitude towards AF by land holding size as shown in frequency (f)

Land Holding (ha)	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Cal-culated	X ² Ta-bulated
<0.33	2	6	9	17	13.48**	12.59
0.33-0.66	15	14	5	34		
0.66-1.0	20	20	7	47		
>1.0	18	20	10	48		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

It is noteworthy that 53% of people with less than 0.33 ha land showed negative attitude towards agroforestry promotion. The findings that illiterate, people having less than 0.33 ha of land and less than 6 LUs with negative attitude towards promoting agroforestry in buffer zone areas is quite noteworthy,

especially for planners and concerned programme executing agencies.

Table 10. Attitude towards AF by number of livestock unit (LU)

Number of LU	Strongly in favour of AF	Moderately in favour of AF	Opposed to AF	Total	X ² Calculated	X ² Tabulated
<3	18	26	16	60	11.49**	9.49
3-6	23	27	15	65		
>6	14	7	0	21		
Total	55	60	31	146		

(Note: X² tab. (P>0.05) > X² cal. (P>0.05), hypothesis is rejected)

Farmers have adopted different structural and biological land management practices inherited from their forefathers, developed and promoted by line agencies, aid agencies, NGOs and developed by them from their own experiences to offset the negative effect of land degradation in both 'project' and 'non-project' watersheds.

The militaristic approach employed by Uganda National Parks created substantial conflicts between the park authorities and the local people when they were given the responsibility to manage the new Mount Elgon National Park and five other former forest reserves. However, gradually, initiatives were taken to change their management style to one that was less confrontational. This was achieved through formation of Park Management Advisory Committees (PMAC) comprising representatives from local communities from each County surrounding the Park and was funded by Mount Elgon Conservation and Development Project (MECDP) (UWA, 2002).

Farmers in both MECDP and non-MECDP areas have adopted several types of biological land management practices. Evolved over past several centuries, these practices have contributed to control land degradation at relatively low cost. Confronted with miniaturizing landholdings and dwindling forest fodder and fuel-wood supply caused by deforestation and restriction on free access to forest, farmers in

both watersheds have increasingly practiced alley cropping to fulfill subsistence requirements. Planting fodder trees including palatable species like *Artocarpus lakoocha*, *Ficus auriculata*, *F. lacor*, *F. nemoralis* and shrubs on edge of terrace risers began in the early 1950s. During the 1980s large tree species were gradually replaced by nitrogen fixing, dwarf, high fodder yielding and deeply rooted shrub species, including *Leucaneaia leucocephala*, and *Morus indica*, as crop yield under the shade of tall trees declined. In MECDP, some exotic species, including *Leucaneaia leucocephala* have been promoted, while in non-MECDP areas mostly indigenous species are found. Overall adoption of alley cropping is low in MCDEP and poor in non-MCDEP area.

Table 11. Adoption of different land management practices by farmers

Land Management Practices		MECDP Watershed (N=155)	Non-MECDP Watershed (N=145)
Structural	Terraced farming	High	High
	Waterways	High	High
	Gully control	Low	Poor
	Retention walls	Low	Poor
	Check dams	Poor	Poor
Biological	Alley cropping	Low	Poor
	Bamboo plantation in gullies	High	High
	Vegetative measures for landslide control	High	Medium
	Mulching	Medium	Low
Application of Fertilizer	Farmyard manure	High	High
	Compost	Poor	Low
	Green manure	Low	Poor
	Legume cultivation	Low	Low
	Chemical fertilizer	High	Medium

Farmers were increasingly using vegetative measures for landslide control in both watersheds. Farmers in both watersheds pile 50-80 cm long logs of fast propagating tree species, including *Erythrina stricta*, *Vitex negundo* and *Alstonia scholaris* for the construction of terrace risers, retention walls and check dams. After few months, roots and shoots sprout out of these logs and steadily grow. Roots growing vertically and horizontally on the ground

reinforce the foundations of terrace risers, retention walls and check dams. Lands affected by landslides are re-vegetated with several tree and shrub species as they facilitate speedy recovery. Farmers in both watersheds are increasingly adopting this measure, but the adoption is high in project area and medium in non project areas.

CONCLUSION AND RECOMMENDATIONS

The attitude of the people towards promotion of agroforestry practices was independent of VECs, ethnicity, family size and duration of settlement period. However, the attitude was dependent on occupation, literacy rate, distance of settlements from the national park boundary, crop damage pattern, land holding size and number of livestock owned by the people.

Intensive extension and motivation programme should be launched in those areas where majority of the people have unfavourable attitude towards agroforestry practices. Income generating activities should be incorporated in the agroforestry practice for drawing attention of these people.

Acronyms

AF	Agroforestry
FBZ	Forest Buffer Zone
LU	Livestock Unit
MECDP	Mount Elgon National Conservation and Development Project
MENP	Mt. Elgon National Park
NEMA	National Environmental Management Authority
NFA	National Forestry Authority
NGO	Non-Government Organization
PA	Protected Area
PPL	Post Primary Level
SNR	Strict Nature Reserve
UBOS	Uganda Bureau of Statistics
UWA	Uganda Wildlife Authority
VEC	Village Environment Committe

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