

**DYNAMICS OF ACCESS TO FOREST AND TREE RESOURCES FOR RURAL  
LIVELIHOODS IN RAKAI AND LUWEERO DISTRICTS**

**BY**

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**DECLARATION**

I, Fred Yikii hereby declare that this research work is original, done by myself and has never been submitted by any person for the award of any qualification in any institution of learning.

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## **DEDICATION**

This study is dedicated to family members and friends.

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## ACRONYMS

CFM	Collaborative Forest Management
CFMC	Collaborative Forest Management Committee
CFMG	Collaborative Forest Management Group
FAO	Food and Agricultural Organisation of the United Nations
FCND	Food Consumption and Nutrition Division
FMG	Forest Management Group
LSP	Livelihood Support Programme
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MNRASA	Management of Natural Resources and Sustainable Agriculture
MWLE	Ministry of Water, Lands and Environment
NEMA	National Environment Management Authority
NEPAD	New Partnership for Africa's Development
NORAD	Norwegian Agency for Development Cooperation
NRA	National Resistance Army
UBOS	Uganda Bureau of Statistics
UWA	Uganda Wildlife Authority
WP	Working Paper

## ABSTRACT

The dynamics of access to forest and tree resources was assessed in Rakai and Luweero districts of central Uganda between November 2007 and July 2008. The study aimed at addressing a gap in knowledge of forest and tree resources access by poor and female-headed households in an attempt to formulate sustainable poverty alleviation strategies for improved livelihoods and sustainable resource management. Village meetings, focus group discussions and key informant interviews guided by check lists were used to collect data on the communities. Semi-structured questionnaire was used to carry out a household survey. Data at community level were qualitatively analysed through content analysis. A logistic regression analysis was carried out to establish the influence of socio-economic and demographic characteristics of households on livelihoods as well as the relationship between access to forest and tree resources and livelihoods. A chi square test of independence was carried out to determine the association between awareness about the rules to access forest and tree resources, sanctions for breaking the rules and livelihoods. Results of the study indicated that women and poor men have access rights to resources from the forest and woodlands mainly for domestic use. Men had access to tree resources on-farm but allowed women domestic use of the resources. Resources from wild spaces were accessed according to ones relation with the owner. Households mainly depended on firewood, herbal medicine, water and palm leaves from the forest and woodland; fruits, firewood, shade and bark cloth from the farm; firewood, grass, herbal medicine and water from the wild/marginal spaces outside the forest and woodlands. Favourable laws, availability of resources on farm, proximity to resources and knowledge about the resources were the main opportunities to access forest and tree resources. Unfavourable laws, attacks by wild animals, long distance to forest, risks of getting injured and crop raiding were the main constraints to access forest and tree resources. The community in which the household lived, period for which a household lived in the community, marital status of household head, number of years spent in school by household head and ethnicity of the household positively influenced household livelihoods as a result of access to forest and tree resources ( $P < 0.05$ ). Herbal medicine and water collected from the forest and woodlands and firewood from the farm also positively influenced household livelihoods ( $P < 0.05$ ). The age of household head and timber obtained from the wild/marginal spaces negatively influenced household livelihoods ( $P < 0.05$ ). Generally, commercial use of forest and tree resources like palm leaves after value addition was allowed. Dependence on resources such as firewood, herbal medicine and water that are all essential for household well being was high. Advocacy of land rights for women was recommended to improve their access to forest and tree resources. Sustainable use of resources for commercial purposes be encouraged, conservation and tree growing promoted and alternative income generating activities supported.

**1.1 Background to the study**

Forest and tree resources play a crucial role in the livelihoods of people especially the rural poor. In developing countries, rural households subsist on forest and tree resources often supplied from managed tree stocks and natural forests (FAO, 2001). Forests and trees also serve as reserves upon which the poor can fall back for subsistence and income, especially in times of crop failure, unemployment and other kinds of hardship. These products are mainly used to meet dietary needs of the poor during shortfalls in particular seasons (FAO, 2001; World Bank, 2003). Besides enhancing food security, forests and trees outside forests also play significant roles in meeting other needs of the rural poor such as medicine, shelter and energy for domestic use.

In developing countries, natural resources such as soil, water and biodiversity support poor people's livelihoods as much as tangible assets such as money and property (Sayer and Campbell, 2004). They argued that conservation concerns in developing countries arise from the evidence of poverty, famine and natural disasters that result from the degradation of ecosystems. This implies that the benefits that accrue to poor people from natural resources at times of scarcity compel them to conserve the resources. According to Nabanoga (2005), local use and management of forest and plant species does not only improve their livelihoods but also serve a goal to achieve forest conservation. In difficult situations where crop failures are frequent, diseases are rampant and infrastructure are broken down, the poor people cope by sharing the scarce financial, human or natural resources through their social networks (World Bank, 1999). Such networks may not sustain livelihoods for a long time. Mechanisms that sustain a natural

resource base that can provide the poor several opportunities for better quality of life are therefore required.

The right of access to resources by the poor people partly determines their means and security of livelihoods (World Bank, 1999). Poor people normally have the opportunities to raise income and acquire essential household subsistence needs like medicine, fuel wood and water when they hold the rights of access to these resources (World Bank, 1999). Absence of rights to these resources may burden individuals, but the resultant impact may rest on households or even communities. For example, restriction of access to forest and tree resources increases the workload of women and female children in Uganda (MWLE, 2001). This in turn may affect the nutritional status of their families. Landlessness and low incomes that are common among the poor and women therefore, call for social and institutional mechanisms that provide and guarantee access to these resources even if the resources are owned, controlled and/or shared with others.

In Uganda, 35 % of the poorest people comprise unemployed youth, women and the elderly who lack land and productive assets (MWLE, 2002). As a result, they heavily depend on forest and tree resources for their livelihoods. Traditionally, men are predominantly involved in commercial forest and tree products and women are mainly involved in the usage of these products within households. Consequently, the livelihood security of rural women is based on the household economy which is mainly subsistence while men rely on the cash economy. Nevertheless, an increasing interest is being registered in the involvement of women in commercial activities. These include saw milling, pit sawing and charcoal burning (FAO, 2001).

## **1.2 Statement of the problem**

Poor households mostly the smallholder farmers, female-headed families, widows and women heavily depend on forest and tree resources for such products as fodder, green manure, firewood, wild food and medicine (MWLE, 2001). The livelihoods of the rural poor without access or with limited access to these resources are vulnerable. This is because in the absence of access to the forest and tree resources, poor people face difficulties in obtaining food, accumulating wealth and recovering from natural and market shocks (Shimizu, 2006). Access of the poor to forest and tree resources helps rural households to diversify their livelihoods and reduces their exposure to risks. FAO (2001) noted that when households have access to forest and tree resources, they are likely to move to a different livelihood stage where the inputs from forests and trees have a reduced role. This means that access to these resources may initially stress the resource base, but can eventually lead to their conservation in the long run. However, in central Uganda, it is not known whether the rights of access to forest and tree resources are guaranteed to the poor households and female-headed households who need the resources most. Changes in forest and tree resources access regimes and how they affect as well as change the livelihoods of the people are also hardly documented. This study therefore attempts to examine the dynamics of forest and tree resources access and livelihoods among poor households and female-headed households in Rakai and Luweero Districts.

## **1.3 Objectives of the study**

### **1.3.1 Overall objective**

The overall objective of the study was to address the gap in knowledge of the dynamics of forest and tree resources access by poor and female-headed households in an attempt to formulate

sustainable poverty alleviation strategies for improved livelihoods and sustainable resource management in central Uganda.

### **1.3.2 Specific objectives**

Specifically, the study was carried out to:

- (i) investigate women and poor men's current rights of access to forest and tree resources;
- (ii) determine the poor household's and female-headed household's livelihood dependencies on forest and tree resources;
- (iii) identify the poor household's and female-headed household's opportunities and constraints to access forest and tree resources; and
- (iv) examine the relationship between access to forest and tree resources and livelihoods of poor households and female-headed households.

### **1.4 Justification of the study**

Access rights of poor households and female-headed households to forest and tree resources are not clearly known. Clear definition and knowledge of the rights of access can provide the basis for promoting these rights. This will help to improve the livelihoods of the poor and the women. If the defined and/or known access rights are secure, the poor households and female-headed households can be motivated to sustainably use and hence conserve the forest and tree resources. Knowledge of the livelihood dependency of poor households and female-headed households on forest and tree resources can be used to develop strategies and formulate policies that reduce poverty in poor households and female-headed households. This can inspire recognition of the rights of access to forest and tree resources.

## **1.5 Research questions**

The study was guided by the following research questions:

- (i) What are the women's and poor men's current rights of access to forest and tree resources in central Uganda?
- (ii) What is the level of dependency of poor household's and female-headed household's livelihoods on forest and tree resources?
- (iii) What are the opportunities and constraints faced by poor households and female-headed households in accessing forest and tree resources?
- (iv) What is the relationship between access to forest and tree resources and livelihoods of poor households and female-headed households?

## **1.6 Scope of the study**

The study was a component of a larger project (Relationship between Access to Forest and Tree Resources and Livelihoods) in the Department of Community Forestry and Extension, Makerere University. It was a case study designed to generate information to bridge the knowledge gap between the dynamics of access to forest and tree resources by poor households and female-headed households and their livelihoods. The study was carried out in two communities living adjacent to a forest/woodland or within a forest enclave in Rakai and Luweero districts of central Uganda.

## **1.7 Structure of dissertation**

This dissertation is divided into six chapters. The current chapter describes the back ground to the study, gives the statement of the problem and the objectives of the study. It also covers the

justification of the study, the research questions, hypothesis and scope of the study. Chapter two contains review of literature on access to forest and tree resources and livelihoods dependency on them. Chapter three describes the study areas and the basis of their selection. It also contains the design of the study and methods used for data analysis. The results of the study are presented in chapter four and discussed in chapter five. The last chapter contains the conclusions drawn from the study and the recommendations made on its basis.

### 2.1 Forests and tree resources for rural livelihoods

Human livelihoods, especially in the rural areas, largely depend on natural resources of which forests and trees are part (FAO, 2001). The dependence of the rural poor on forest and tree resources is partly determined by their availability and access to the people who need them. In the context of agricultural research, Ehui *et al.* (2004) defined the availability of a resource as the physical existence of that resource in an environment. They argued that formal or informal juridical basis to claim a resource is essential for farmers to access resources that may even exist in their own households.

According to Scott (1998), issues of access to forest and tree resources are not homogeneous within and across households and communities. They are influenced by many factors among which are poverty, gender, ethnicity and race. Baumann (2002) defined poverty as the deprivation in capabilities, voice and power that contribute towards a lack of wellbeing. He noted that rural people are poor because they live in areas of high ecological vulnerability and low levels of resource productivity. As a result, their livelihoods are vulnerable.

Kamugisha *et al.* (1997) defined livelihood as a means of earning a living. Livelihoods do not just comprise what people do in order to make a living. They also include the resources that provide people with the capability to build a satisfactory living and the risk factors that they must consider in managing their resources (Ellis and Allison, 2004). The institutional and policy context in which people make a living also constitute their livelihoods. This is irrespective of whether it helps or hinders them in pursuit of a viable or improved living. More precisely, a

livelihood comprises the capabilities, assets (including both material and social resources) and activities required for earning a living (Baumann, 2002). However, many livelihoods in poor societies are not sustainable because they are in competition with each other (Kamugisha *et al.*, 1997). A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base. Livelihoods that are not sustainable are therefore vulnerable. Baumann (2002) defined vulnerability as the external environment in which people pursue their livelihoods and their exposure (risk) to the negative effects of the external environment, as well as their resilience in resisting and recovering from external shocks and trends.

There exists a close relationship between access to resources and vulnerabilities (Baumann, 2002; Johnson, 2002). In rural areas where natural resources form the basis of livelihoods, access to natural resources is a principle means of reducing people's vulnerabilities (Baumann, 2002). Poor people need natural resources such as land and forest resources to earn a living due to their limited livelihood opportunities. In situations where households lack enough land for agricultural production, collection of resources from the forest may prove to be beneficial because non-agricultural livelihood sources may be subject to seasonal variations (Dev *et al.*, 2003). However, due to concerns for conservation and sustainability of these resources (Sunderlin *et al.*, 2005; Vedeld, 2007), the vulnerable people continue to be restricted from having access to these resources.

## **2.2 Forest and poverty relationships**

One of the key issues common about poverty and forests is the high number of poor people that live in and adjacent to forests (Sunderlin *et al.*, 2005; Wunder, 2001). There is a tendency for severe rural poverty and remaining natural forests to share over-lapping spaces. Sunderlin *et al.* (2005) observed that reciprocal links have emerged from the forest-poverty relationships such that rapid transformation of rural livelihoods takes place at the cost of the quality and quantity of forested landscapes.

Even though most rural households are absolutely poor, variations in the levels of wealth among the poor exist within and among communities (World Bank, 2004). In the forested areas, these variations tend to favour the better endowed members of the community or the powerful. In cases where access rights of the poor to forest resources are open or informal, it becomes difficult and conflictive to protect their rights (Wunder, 2001). Consequently, the poorest members find themselves excluded from using the forest resources. The situation is worse if powerful people with commercial interests find it profitable to utilise forest resources (World Bank, 2004). Without harmonisation of the rules of access to the forest resources, the needs of the poorest and the poor will continue to be masked by those in better socio-economic and political positions in their communities.

As part of the remedies for forest related poverty, the World Bank (2004) suggested provision of judicious assistance to the people dependent on forests and those who live near the forests. The bank claimed, this would help the people to better service the forest product markets. It also warned that if such help is not provided, or not properly done, competition for forest resources

can ensue leading to exclusion of access of the poorest of the poor to essential forest products and disruption of communal forest resource management systems.

### **2.3 Contribution of forest and tree resources to rural livelihoods**

Forests and tree products are a source of a portion of the income for many people, thus increasing their total incomes (Arnold, 1998; Vedeld, 2007). The forest and tree resources also supplement farm produce and serve as sources of subsistence for the rural poor (FAO, 2001; Arnold, 1998). The subsistence and income dependence are a reserve during periods of shock hence reducing vulnerability. In particular, natural forests provide vital safety-net functions in terms of famine foods, medicine from medicinal plants and by filling income gaps (Wunder, 2001).

Forests and trees also have non-consumptive contribution towards rural people's livelihoods. For instance, trees on farm and in woodlands can improve site productivity through soil and crop protection (Arnold, 1998). This means that the ecological support provided by trees may increase agricultural production and improve food security and household incomes. Scott (1998) strongly linked forest use with cultural practices. She for example reported the performance of cultural rituals such as circumcision by local people in the Mt. Elgon forest.

### **2.4 Access to forest and tree resources**

Access to natural resources refers to one's traditional and legal rights and ability to enter resource domains (such as forested landscapes, pastures and water resources), to utilise the resources to make useful products and/or to consume or sell them in the market (Biggs and Messerschmidt, 2003). This includes the rules about how and when certain resources may be

harvested, treated, used, modified or marketed because they determine whether access to these resources are equitable or not (Howard and Nabanoga, 2007; Nabanoga, 2005). Biggs and Messerschmidt (2003) observed that poor people may be given physical ‘access’ to a forest but may not be allowed to harvest certain resources, or have equitable access to markets for forest products, or have an equitable share of ‘value added’ forest products. In Rakai district, Uganda, traditional mat weavers are required to weave one mat for the owner of raw materials before they are allowed to gather extra raw materials to make one mat for their family (Johnson, 2002). Such conditions become too costly for the women undertaking mat weaving for income generation.

The access to forest resources is influenced by many factors among which are gender (Rocheleau and Edmunds, 1997; Nabanoga, 2005), age and wealth (Scott, 1998). The gendered access to resources varies with time and space. Rocheleau and Edmunds (1997) described the exclusion of women from accessing and controlling land, forest and tree resources as a worldwide phenomenon. Despite this global facet, Fafchamps (2001) observed that the gendered access to productive resources is determined both within and outside households.

#### **2.4.1 Household access to forest resources**

Kamarah (2001) defined a household as a group of persons generally bound by ties of kinship who live together, who may or may not share the same cooking pot, who are immediately or directly answerable to the same head and comprise a common economic production unit. According to Mamo *et al.* (2007), a household is a unit whose members live, cook and eat together. Though it is agreed that households are mostly composed of more than one person, in some cases, however, households have their membership reduced to only one resident person either as a result of loss of life or due to migration. In line with this argument, Niehof (2004)

acknowledged that issues of labour migration present difficulties in attempts to define household membership. This is because migrants may contribute to resources of their households of origin through remittances even if they do not take part in the daily activities of the household.

Within a household, power relations influence access to productive resources (Niehof, 2004). Household heads play a key role in making decisions about access to and allocation of resources within the household. According to Katapa (2005), a household head is a person whom all members of the household consider to be their leader. Traditionally, households were categorized to be male and female headed. However, in some societies, the HIV/AIDS scourge that has left many orphans with little or no option other than assuming headship of households after the demise of their parents defied the tradition (Katapa, 2005). This resulted into the conceptual evolution of household headship to include child-headed households.

Male, female and child household heads do not have the same powers within their respective households and the community. For example, whether male and female dependants' access land is determined within the household while forces outside the household influence whether female-headed and female-operated households will access land (Fafchamps, 2001). This implies that even if a female household head has more powers within a household, outside that, the powers are subject to gender influences making them unequal to that of their male counterparts. It is therefore envisaged that much as female-headed households' access to these resources is determined by forces outside the household, female household heads have an upper hand in deciding who among other women and the people in the household accesses what resources.

## **2.5 Land, forest and tree tenure**

Tenure comprises the terms and conditions, under which resources are owned, accessed, managed and transferred (Gombya-Ssembajjwe *et al.*, 2001). Ownership refers to the exclusive right to enjoy and dispose of property (Christy *et al.*, 2007; Fortmann and Bruce, 1988). Clear tenure of resources like land and forests is important because it influences the way people use the resources.

Land tenure in Uganda takes three major forms namely; customary tenure, mailo-land tenure, leasehold and freehold tenure (Gombya-Ssembajjwe *et al.*, 2001). Leasehold and freehold tenure refer to the formal means by which people access land either through private or statutory leases. Customary land tenure in which an individual's access to and use of land is determined by the customary rules of the tribal or clan group to which the individual belongs (Gombya-Ssembajjwe *et al.*, 2001), is the most common type of land tenure in Uganda (Gombya-Ssembajjwe *et al.*, 2001; Mugisha, 1998). Though the Mailo and customary land tenure systems are different, in Buganda, customary rules allow the peasants to access part of the mailo-land.

Land and tree tenure are two distinct concepts though there exists a relationship between them. According to Banana and Gombya-Ssembajjwe (2000b), a person who owns land owns the trees on it. In contrast, Christy *et al.* (2007) argued that land ownership does not necessarily give one an exclusive right to own resources such as trees that are on the land. This means that access to forest and tree resources change as the rules governing land changes.

In the customary land tenure system, the customary rules and the tribal or clan group to which an individual belongs determines his/her access and use of land (Gombya-Ssembajjwe *et al.*, 2001).

The disadvantage of this system is that it does not recognize the individual ownership of land and only grants women usufruct rights. This implies that the rights to own trees are generally granted to the people who plant them even if they do not own the land. This arrangement is particularly beneficial to women who grow trees on land belonging to their husbands (Christy *et al.*, 2007; Howard and Nabanoga, 2007).

Sometimes men plant and own trees but women are allowed to collect resources such as leaves and fruits from the trees (Nabanoga, 2005). In Kabarole district of Uganda for example, it is reported that due to low market, women are given access to avocado and citrus fruit trees for family use or as gift exchanges though these are controlled by men (Rocheleau and Edmunds, 1997). People are most likely to be allowed to use customarily managed forests when and where they do not also claim ownership over the resource (Christy *et al.*, 2007). They however, pointed out that the rights granted to access and use customarily managed forest resources as a reward for not claiming ownership of the resources are usually insufficient to meet expectations because of exclusion of commercial products such as timber.

## **2.6 Restrictions on forest and tree resources access**

Restriction of access to forest resources in Uganda noticeably began when forests were reserved by the colonial government in accordance with the 1929 Forest Policy. That time, the forest products local people were allowed to collect were restricted (Gombya-Ssembajjwe *et al.*, 2001). Despite the designation of some forests as reserves, forest adjacent communities continued to harvest resources from these forests. As pointed out by Dev *et al.* (2003), this could have been because access rights to forest resources are not always totally rejected but a user group may simply be marginalised from using the resources. However, local people had privileges to

harvest products for domestic use although commercial exploitation required a permit (Turyahabwe and Banana, 2008).

Utilisation of forest and tree resources can be consumptive and non consumptive. The level and type of consumptive utilization of forest resources depends on the security of tenure of the local residents and the level of rule enforcement concerning the forests. Banana and Gombya-Ssembajjwe (2000a) argued that without the security of tenure to use forests, individual users will compete for the resources in order to benefit from them before the resources are used up by others. In this case, the resources can easily be depleted. A similar scenario occurs if the rules governing resource use are not adequately implemented or enforced.

Consumptive utilization of a variety of forest resources by the local people in central Uganda is both legal and illegal. Local harvesting of forest products in reasonable quantities for subsistence and non consumptive uses is allowed (Banana and Gombya-Ssembajjwe, 2000a). Licensing is required to permit commercial use of the forest resources (Banana and Gombya-Ssembajjwe, 2000a). In this situation, failure to comply with the rules governing forests takes the following forms: First, people who are not regarded as locals use both the consumptive and non-consumptive resources for subsistence or commercial purposes without permission. Second, the locals either harvest the permitted products in 'unreasonable' quantities or they harvest the restricted resources without license. The implication of illegal access to some resources despite permission to harvest others could be that dependence on forest resources is not entirely determined by the rights of access to these resources but also the need for them if and when there are no available and affordable alternatives.

## **2.7 Livelihood dependency on forest and tree resources**

The dependence on forest resources varies on spatial and temporal dimensions. Following Sunderlin *et al.* (2005), “dependence” refers to reliance on forests-in a manner that is either difficult or impossible to replace-for a portion of environmental services, subsistence needs, safety net and gap filler functions as well as opportunities for poverty elimination. Scott (1998) noted that dependence on forest resources is both extensive and intensive besides being culturally linked and as a source of income. She observed that a large proportion of local people depend on forests for a range of products and services.

Mamo *et al.* (2007) pointed out that little research has been done on the level of dependence on forest resources across different socio-economic groups. However, households respond differently to the use of forest resources depending on their socio-economic characteristics. This is because, different households have different production capabilities, utilise forest resources in different ways and recover from shocks and stress differently. Vedeld *et al.* (2007) noted that poor people often depend on non cultivated forest resources. This comprises the gazetted and non-gazetted forests. Nevertheless, due to the restrictive use of resources from forests, farmers have planted trees on private lands to supplement these resources (Malla *et al.*, 2003).

### 3.1 Study Area

The study was carried out in Rakai and Luweero districts of Central Uganda. The specific study areas were Kanabulemu and Bweyeyo parishes of Rakai and Luweero districts respectively. The biophysical attributes of the two districts are summarized in Table 3.1.

**Table 3.1 Summary of the biophysical attributes of Rakai and Luweero districts**

Attributes	District	
	Rakai	Luweero
Size of district (km <sup>2</sup> )	4,989	2577.49
Distance from Kampala city (km)	190	64
Altitude above sea level (m)	1402-1520	1219-1524
Latitude	0°S	2°N
Longitude	31°E	32°E-33°E
Mean annual rainfall (mm)	750 -2125	1300
Temperature (°C)	15 -25	15-30

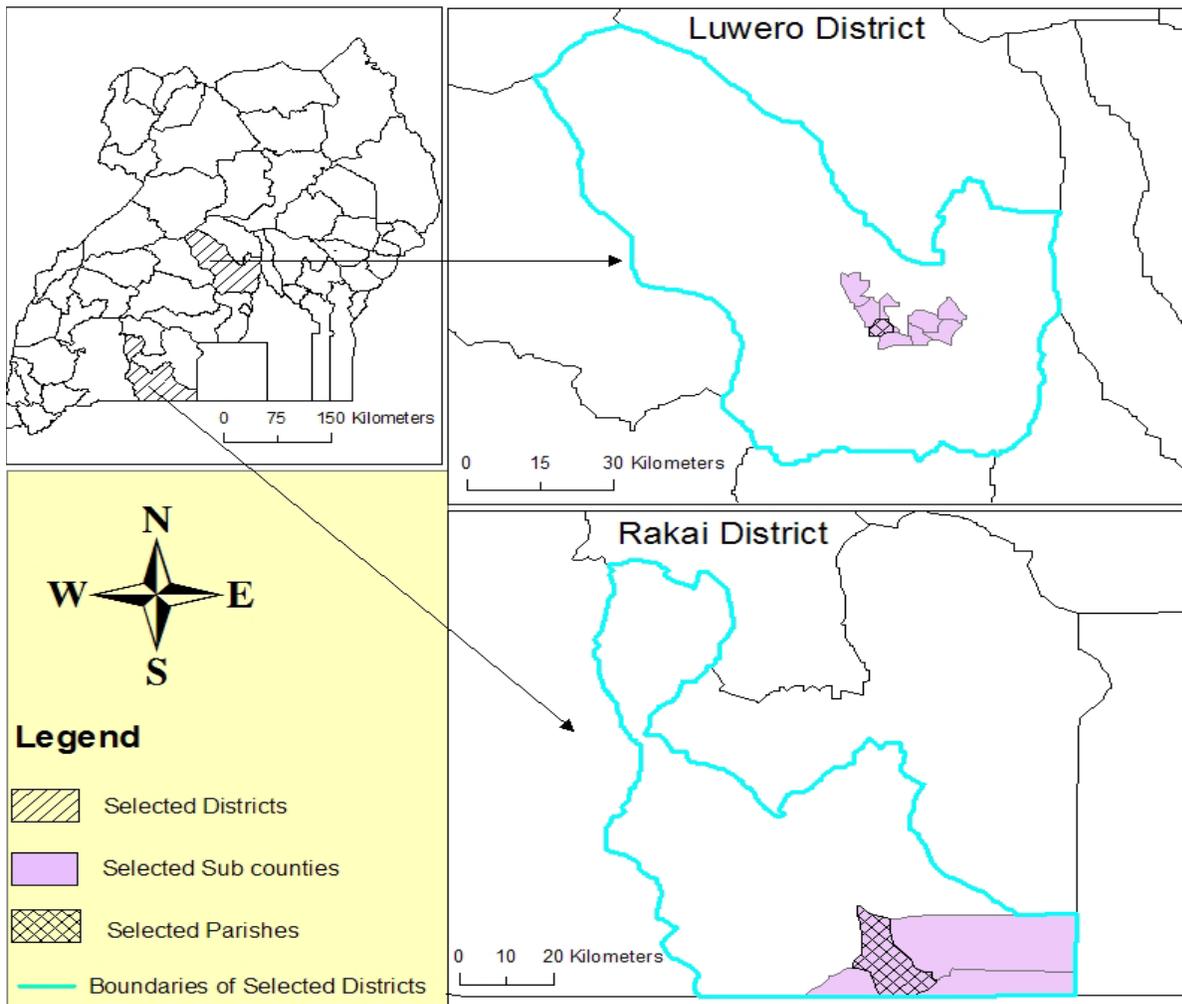
*Sources: NEMA, 2005; UBOS, 2007a; UBOS, 2007b*

#### 3.1.1 Location and size

Rakai district is located in the Central region (UBOS, 2007b) at a distance of about 190 km from Kampala, the capital city of Uganda (Figure 3.1). The district lies at an approximate altitude of between 1402 m and 1520 m above sea level and at a latitude of 0°S and longitude 31°E (NEMA, 2005). Rakai district is bordered by Mbarara district in the West, Masaka district in the North, Sembabule in the North West, Kalangala district in the South East and Tanzania in the South (Mugisha, 2005). The district covers an area of about 4,989 km<sup>2</sup>.

Luweero district is located in Central Uganda at a distance of about 64 km from Kampala (Figure 3.1). The district lies at an approximate altitude of between 1,219 m and 1,524 m above sea level

and between latitude 2°N and longitude 32°E and 33°E (UBOS, 2007a). It is bordered by Mukono and Wakiso districts in the South, Nakasongola district in the North, Kayunga district in the East and Nakaseke district in the West. Luweero district covers an area of 2,577.49 km<sup>2</sup>.



**Figure 3.1 Map of Rakai and Luweero districts showing the location of the study area**

### 3.1.2 Rainfall and temperature

The mean annual rainfall in Rakai district varies between 1,350 mm and 2,125 mm in the wet areas and between 850 mm and 750 mm in the drier areas (NEMA, 2005). The mean annual

maximum temperature in the district is 25°C while the mean annual minimum temperatures are 17.5°C and 15°C to the East and West respectively.

Rainfall in Luweero district is well distributed throughout the year with an annual average of 1,300mm. The mean annual maximum temperature varies between 27.5°C and 30°C while the mean annual minimum temperature is between 15°C and 17.5°C (UBOS, 2007).

### **3.1.3 Soils and vegetation**

Soils in Rakai district are mainly (over 75%) feralitic with little or no mineral reserves. The sandy soils are poor just with exception of heavy clays. The vegetation in Rakai district is characterised by medium altitude forests on the shores of Lake Victoria through swamps and savannahs (NEMA, 2005). The most predominant land cover (use) is tropical high forest (fully stocked and degraded portions) and grasslands (MWLE, 2003). Other forms of land cover in the area are wetlands, small scale non-uniform farmlands and woodlands. Land cover in Luweero district is characterised by small scale non-uniform farmland, woodland and grass land.

### **3.1.4 People and the economy**

The dominant ethnic group in Rakai and Luweero districts is the Baganda. The total populations of Rakai and Luweero districts according to the 2002 Uganda Population and Housing Census were 404,326 and 341, 317 respectively (UBOS, 2007b). Other population characteristics of the districts are indicated in Table 3.2.

**Table 3.2 Population characteristics of Rakai and Luweero districts, Uganda**

Characteristic	District	
	Rakai	Luweero
Population density (per sq. km)	100	132
Average annual population growth rate (%)	1.7	2.5
Sex ratio (males per 100 females)	95	97
Proportion (%) of children below 18 years	52.2	59
Proportion (%) of children below 15 years	50	52
Average household size (persons)	4.4	4.5

*Source: UBOS, 2007b*

The livelihoods of people in the two districts depend on natural resources such as land, forests, water, wildlife, fisheries and minerals (NEMA, 2004). The main economic activity is largely arable farming. Portions of the population that reside in the drier areas of the districts (65% of Luweero and 25 % of Rakai) are cattle headers (NEPAD, 2004). About 75% of the households in Rakai and 66% of those in Luweero are dependent on subsistence farming (UBOS, 2007b). Other income generating activities include charcoal burning, firewood selling, brick laying, sand mining and small animal hunting.

## **3.2 Methods**

### **3.2.1 Reconnaissance survey**

A reconnaissance survey was conducted in the two districts prior to the study. This was done to select appropriate study sites and respondents. It also helped to pretest tools used in the study. Preliminary results obtained at this phase were used to make modifications where necessary and are not included in this study.

## **3.2.2 Research design**

### **3.2.2.1 Selection of the study areas**

Rakai and Luweero districts were purposively selected based on their high poverty levels and the presence of forest and/or woodlands that were sufficient to reasonably support livelihoods. The poverty levels in the two districts are high due to loss of property caused by war (Luweero) and the HIV/AIDS pandemic (Rakai) in the 1980's. The loss of lives in Rakai and Luweero districts due to HIV/AIDS pandemic and war respectively, increased the number of orphans and hence child-headed and female-headed families in the two districts. A study carried out in the four districts worst affected by HIV/AIDS in Uganda revealed that a third of the households (30.4 %) in Rakai were female-headed due to loss of the husbands to HIV/AIDS epidemics (MAAIF, 2002). Out of the 76,014 households in Luweero district, 22,728 (29.9 %) were female-headed (UBOS, 2007). This could be attributed to the NRA bush war in the 1980's.

In each district, one sub-county where there is a natural forest and/or woodland was purposively selected giving a total of two sub-counties for the study. In each sub-county, two near-by villages were purposively selected from the same parish to represent a community defined by both territorial and relational components (Kusel, 1996).

### **Selection of respondents**

The target respondents comprised the communities, households and individuals. Dewi *et al.* (2006) recommended that at least two sampling levels should be considered when selecting respondents for livelihoods studies.

Generally, poor rural communities living within forest enclaves or adjacent to natural forest and tree resources that provided essential support to livelihoods were purposively selected. Wealth ranking was conducted in these communities at village level to understand the context of poverty as a basis for selecting respondents.

Households were selected on the basis of their poverty/wealth status and household headship. Thus, households that were either poor and/or female-headed were selected. Stratified random sampling was used to sample the households. Four strata consisting of poor male-headed households, child-headed households, poor-female headed households and better-off female-headed households were formed for sample selection. Following Sarantakos (2005), sample frames for each of the four categories were developed in the villages with the help of the village authorities (Local Councils) and other key informants using locally developed criteria (Table 3.3). At least 30 % of the households in each village that fell in each stratum were selected for the study (Vuuren and Maree, 1999).

Although a number of criteria were used to determine household wealth groups, the interaction of these criteria as understood by the local people was the basis of placing households in the different wealth groups. The criteria used to group households are summarized in Table 3.3.

**Table 3.3 Household wealth groups**

<b>Wealth group</b>	<b>Criteria</b>
Poor male-headed household	Headed by a man, lacks or has shortage of land, temporary or small house, little or no income, hardly meets basic needs (food, shelter, clothing, medical care), mainly rear poultry and pigs or no livestock, household members uneducated or not going to school, comprising adults with little or no labour force, no support from relatives, at least with six dependants
Child-headed household	Headed by children, most likely orphans, no adult guardian or relatives at home, deemed not mature enough physically or mentally to manage a home.
Poor female-headed household	Headed by a woman most likely a widow, lacks or has shortage of land, temporary or small house, little or no income, hardly meets basic needs (food, shelter, clothing, health care), mainly rear poultry and pigs or no livestock, members uneducated or not going to school, comprising adults with little or no labour force, no support from relatives, at least with six dependants.
Better off female-headed household	Headed by a woman, owns land, has reasonable income and reliable income source, enough food to eat, affords medical care, has at least a semi permanent house, educates children, members dress appropriately, owns livestock or has some business.

### **3.2.3 Data collection**

Data were collected within a period of five months from December 2007 to June 2008. Both primary and secondary data were collected. Primary data were the basis of the study complemented with secondary data. The information collected comprised: the local context of poverty in the communities; livelihood strategies; socio-economic characteristics of households; current rights of access to forest and tree resources and livelihood dependence on forest and tree resources.

#### **3.2.3.1 Data collection methods and tools**

##### **Primary data**

Primary data were collected at community and household levels. The methods used to collect data at the community level were village meetings, focus group discussions and key informant

interviews. A survey using a semi-structured questionnaire was conducted to collect data at household level.

### **Village meetings**

Meetings were organised in each village to introduce the study and establish rapport with local people. The meetings also generated information about: the socio-economic activities carried out in the villages; the local understanding of poverty; the livelihood strategies of the people and use of forest and tree resources. The numbers of respondents in the meetings are presented in Table 3.4.

**Table 3.4**      **Number of respondents in village meetings held in Rakai and Luweero districts**

<b>District</b>	<b>Parish</b>	<b>Village</b>	<b>Men</b>	<b>Women</b>	<b>Total</b>
<b>Rakai</b>	Kanabulemu	Mujanjabula	13	7	20
		Mugamba	22	4	26
<b>Luweero</b>	Bweyeyo	Bweyeyo	13	9	22
		Tebalyala	12	10	22

### **Focus group discussions**

Focus group discussions guided by checklist generated information at the community level. This included information on forest and tree resources harvested, the rights of access of the poor and women to these resources and the opportunities and constraints to access forest and tree resources by the poor and women. At least 8 people were involved in each focus group discussion session following May (2001) as shown in Table 3.5.

**Table 3.5** Number of respondents in focus group discussions held in Rakai and Luweero districts

District	Village	Men	Women
Rakai	Mujanjabula	8	14
	Mugamba	13	8
Luweero	Bweyeyo	9	12
	Tebalyala	13	>14

The participants were selected with the help of key informants that included the Local Councilors (Nabanoga, 2005; Howard and Smith, 2006). Separate focus group discussions were organized for men and women in each village. This arrangement enables each sex to express their views without reservations especially in areas where women are unable to freely discuss issues in the presence of men (Nabanoga, 2005).

### **Key informant interviews**

Key informant interviews focused on access to forest and tree resources in the area. At least two key informants were interviewed in each village. These included local council members, village elders and leaders of forest resources user groups. The key informant interviews generated information on conditions in the community such as main livelihood activities, issues of resource tenure, opportunities and constraints, community services and other institutions following Dewi *et al.* (2006). This information was then used to triangulate data generated from other sources such as focus group discussions and household survey.

### **Household survey**

Households were surveyed using a semi-structured questionnaire (Appendix 3). The household was the unit of analysis but the household head and/or other informed persons in the household

served as the respondents following Babbie (2004). The household survey generated information about the socio-economic and demographic characteristics of households, their livelihoods activities and rights of access to forest and tree resources. Information on the livelihoods dependence on forest and tree resources, opportunities and constraints to access forest and tree resources were also collected. Besides generating data at household level, the household survey also generated data on other individuals within households following Howard and Smith (2006). The numbers of households surveyed per wealth group and per village are presented in Table 3.6.

**Table 3.6** Number of households surveyed according to village and wealth groups in Rakai and Luweero districts N=152

District	Village	Wealth categories				Totals
		Poor male-headed households	Child-headed households	Poor female-headed households	Better-off female-headed households	
<b>Rakai</b>	Mujanjabula	26 (17)	0 (0)	8 (5)	1 (1)	35 (23)
	Mugamba	20 (13)	2 (1)	19 (13)	0 (0)	41 (27)
<b>Luweero</b>	Bweyeyo	11 (7)	3 (2)	19 (13)	7 (5)	40 (26)
	Tebalyala	18 (12)	1 (1)	12 (8)	5 (3)	36 (24)
<b>Totals</b>		<b>75 (49)</b>	<b>6 (4)</b>	<b>58 (38)</b>	<b>13 (9)</b>	<b>152 (100)</b>

*N=Total number of households surveyed*

*Figures in parentheses are percentages of households surveyed*

### Secondary data

Secondary data were obtained from the review of literature from journals and text books. Public documents in the various government agencies such as NEMA, UBOS and MWLE were also accessed and used to complement the primary data. Secondary data provided general information about population, socio-economic characteristics and geographical contexts which were useful for the design and analysis of the study.

### 3.2.4 Data analysis

Data were analysed both qualitatively and quantitatively. Data generated at the community level using village meetings, focus group discussions and key informant interviews were qualitatively analysed mainly through content analysis. This involved description of access to forest and tree resources for women and poor men. Data generated from the household survey were entered into the Statistical Package for Social Sciences (SPSS 10.0). Cross tabulations helped to discern the opportunities and constraints to access forest and tree resources according to community. The logistic regression analysis was used to establish the influence of socio-economic/demographic characteristics of households on livelihoods. The household livelihood status as a result of access to forest and tree resources was used as the dependent variable. Household response to whether access to forest and tree resources improved the quality of life of the people in the household was used as a *proxy* to determine household livelihood status. Any response that access to forest and tree resources improved the quality of life was given a value of 1 and assigned a 'yes' (implying improvement in livelihood) and a response that access to forest and tree resources had not improved the quality of life of the people in the household was given a value of 0 and assigned a 'no' (implying no improvement in livelihood). The independent variables are presented in Table 3.7.

**Table 3.7 Independent variables for the influence of socio-economic/demographic characteristics of households on livelihoods**

Independent variables	Description	Expected sign
Community (district)	1=Rakai, 2=Luweero	+
Sex household head	1=Male, 2=Female	+
Age of household head	Natural logarithm	+
Religion of household head	1=Catholic, 2=Protestant, 3=Others	+
Occupation of household head	1=Small scale farmer, 2= Not small scale farmer	+
Number of years spent in school	Natural logarithm	+
Marital status of household head	1=Single, 2=Married, 3=Widow, 4=Widower, 5=Divorced	+
Ethnicity of household head	1=Baganda, 2=Not Baganda	+
Period of time lived in community	Natural logarithm	+
Proximity of household to forest	Natural logarithm	+

*Expected sign indicates whether the expected influence of independent variable on dependent variable is positive or negative*

The logistic regression analysis was also used to establish the relationship between the products and services harvested/used by households and their livelihoods. Similarly, the household livelihood status as a result of access to forest and tree resources was used as the dependent variable. The independent variables are presented in Table 3.8.

**Table 3.8 Independent variables for the relationship between the products and services harvested/used by households and their livelihoods**

Independent variables	Description	Expected sign
Firewood	0=No, 1=Yes	+
Herbal medicine	0=No, 1=Yes	+
Water	0=No, 1=Yes	+
Palm leaves	0=No, 1=Yes	+
Poles	0=No, 1=Yes	+
<i>Marantochloa</i>	0=No, 1=Yes	+
Fish	0=No, 1=Yes	+
Fruits	0=No, 1=Yes	+
Shade	0=No, 1=Yes	+
Bark cloth	0=No, 1=Yes	+
Soil conservation	0=No, 1=Yes	+
Wind break	0=No, 1=Yes	+
Pasture	0=No, 1=Yes	+
Timber	0=No, 1=Yes	+
Others	0=No, 1=Yes	+

*Expected sign indicates whether the expected relationship of the independent variable to the dependent variable is positive or negative*

The logistic regression model used for the analysis in both cases was of the form:

$$P(E) = \frac{e^z}{1+e^z} \dots\dots\dots(i)$$

Where;

P (E) is the probability of an event, e is the base of natural logarithms, z represents the linear combination of the independent variables such that  $Z=\beta_0+\beta_iX_i$  where;  $\beta_0$  is the intercept,  $\beta_i$  is the slope (coefficients of the independent variables) and  $X_i$  refers to the independent variables ( $i=1,2,3,\dots\dots n$ ). The linear combination can then be expressed as;

$$Z= \beta_0+ \beta_1X_1+ \beta_2X_2 + \beta_3X_3 +\dots\dots\dots+ \beta_nX_n$$

Therefore,

$$P(E) = e^{\beta_0 + \beta_1 X_1} / 1 + e^{\beta_0 + \beta_1 X_1} = e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n} / 1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n}$$

For interpretation of the logistic regression coefficients, the logistic regression model can be written in terms of the odds of an event occurring (Bhatti *et al.*, 2006).The odds of an event occurring is the ratio of the probability that the event will occur to the probability that the event will not occur. Since P (E) is the probability of an event occurring, 1-P (E) will be the probability that the event will not occur. Therefore, in terms of the log of odds, the logistic regression model can be defined as:

$$\ln \frac{P(E)}{1-P(E)} = Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n \dots\dots\dots(ii)$$

For easy interpretation of the results in terms of the odds rather than log odds, the model is written in terms of the odds as:

$$\frac{P(E)}{1-P(E)} = e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n} \dots\dots\dots(iii)$$

The  $e$  raised to the power  $\beta_i$  which is  $\text{Exp}(\beta)$  is the factor by which the odds change when the  $i^{\text{th}}$  independent variable changes by one unit.

A chi square test of independence was carried out to determine the association between household awareness about rules to access forest and tree resources, sanctions for breaking the rules and livelihoods. The household livelihood status was used as a dependent variable. The livelihood status was still determined by household response to whether access to forest and tree resources improved the quality of life of the people in the household. A no response meant there was no improvement in livelihood while a yes response meant there was improvement in livelihood. The independent variables are summarized in Table 3.9.

**Table 3.9 Independent variables for the association between household awareness about the rules to access forest and tree resources, sanctions for breaking the rules and livelihoods**

<b>Independent variables</b>	<b>Description</b>
Household is aware about any formal rules to access forest/woodland resources	0=No, 1=Yes
Household is aware about any informal rules to access forest/woodland resources	0=No, 1=Yes
Household is aware about any sanctions for breaking formal rules to access forest/woodland resources	0=No, 1=Yes
Household is aware about any sanctions for breaking informal rules to access forest/woodland resources	0=No, 1=Yes
Household is aware about any rules to access forest and tree resources from wild/marginal spaces	0=No, 1=Yes
Household is aware about any sanctions for breaking rules to access forest and tree resources from wild/marginal spaces	0=No, 1=Yes

#### **4.1 Socio-economic and demographic characteristics of households in Rakai and Luweero districts**

About 53% of the households were male-headed. Catholics constituted 53% of the households followed by Protestants (37%). The majority (80%) of the Catholics were in Rakai while most of the respondents in Luweero (58%) were Protestants. The main occupation of the households was small scale farming. Forty one percent of the households were headed by married couples and 33% by widows (Table 4.1).

The study villages were multi-ethnic with immigrants from neighbouring countries like Tanzania, Burundi and Kenya. The Baganda were the dominant ethnic group constituting 67% of the respondents. Other ethnic groups included Bafumbira, Banyarwanda, Kakwa, Muha (Tanzania), Banyoro, Banyankole, Bakiga, Baluya (Kenya), Badama and Bakenyi that comprised 15% of the respondents (Table 4.1).

Of the 49% of households that lived in temporary houses, 59% were in Rakai and 38% in Luweero. About 68% of the households were tenants on Mailo land and 22% owned land with titles. Only 33% of the households had members who belonged to some group or organisation promoting forestry activities.

**Table 4.1 Socio-economic and demographic characteristics of households in Rakai and Luweero districts**

Variable	% of respondents		
	Rakai (N=76)	Luweero (N=76)	Total (N=152)
<b><i>Sex of household head</i></b>			
Male	63	43	53
Female	37	57	47
<b><i>Religion of household head</i></b>			
Catholic	80	26	53
Protestant	16	58	37
Others (e.g. Islam, Born again etc)	4	16	10
<b><i>Occupation of household head</i></b>			
Small scale farmer	84	95	90
Not small scale farmer (e.g. trader)	16	5	10
<b><i>Marital status</i></b>			
Single	17	8	13
Married	52	30	41
Widow	25	41	33
Widower	3	4	3
Divorced	3	17	10
<b><i>Ethnicity of household head</i></b>			
Baganda	76	58	67
Not Baganda	24	42	33
<b><i>Type of house</i></b>			
Temporary	59	38	49
Semi permanent	29	37	33
Permanent	12	25	18
<b><i>Ownership of land used by household</i></b>			
Owns land with title	13	9	22
Tenant on Mailo land	32	36	68
Uses land owned by relatives	3	3	6
Other sources	3	1	4
<b><i>Membership to FMG</i></b>			
Yes	44	21	33
No	55	79	67

#### 4.1.1 Sources of household livelihoods in Rakai and Luweero districts

The common sources of household livelihoods were crop production (42%) and livestock rearing (24%). About the same proportion (7%) of all the households depended on casual work and retail businesses. Other sources of household livelihoods are summarized in Table 4.2.

**Table 4.2 Sources of household livelihoods in Rakai and Luweero districts**

Sources of livelihood	% of responses		
	Rakai (N=76)	Luweero (N=76)	Total (N=152)
Crop production	21	21	42
Livestock rearing	12	12	24
Casual work	3	4	7
Retail business	5	2	7
Mat weaving	3	1	4
Produce trade	1	1	2
Alcohol brewing	2	0	2
Fishing	2	0	2
Boda-boda cyclist	1	1	2
Hand outs	0	1	1
Carpentry	1	0	1
Brick making	0	1	1
Others	3	2	5

*N=number of respondents; Total counts of multiple responses=348*

*Others included: Salary, Sales of tree seed, Tree planting, Blacksmith, Welding, Bark cloth making, Rope weaving, Construction, Tailoring and Herbalism*

#### 4.1.2 Crops grown by households in Rakai and Luweero district

The most common crops grown by households were sweet potatoes (18%), cassava (18%), banana (17%), beans (14%), coffee (13%) and maize (10%). Other crops grown by households are summarized in Table 4.3.

**Table 4.3 Crops grown by households in Rakai and Luweero districts**

Crops grown	% of responses		
	Rakai (N=76)	Luweero (N=76)	Total (N=152)
Sweet potatoes	9	9	18
Cassava	9	9	18
Banana	9	8	17
Beans	6	8	14
Coffee	5	8	13
Maize	3	7	10
Ground nuts	3	1	4
Sugarcanes	0	1	2
Yam	1	1	1
Others	1	1	2

*N=number of respondents; Total counts of multiple responses=767*

*Others included: Tomatoes, Millet, Pumpkins, Sorghum, Passion fruits, Vegetables, Irish potatoes, Pine apples and Simsim*

#### 4.1.3 Livestock reared by households in Rakai and Luweero district

About 37% of all the households reared chicken, followed by pigs (31%), cattle (14%) and goats (12%). Only 1% of the households reared rabbits and ducks (Table 4.4).

**Table 4.4 Livestock reared by households in Rakai and Luweero districts**

Type of livestock reared	% of responses		
	Rakai (N=76)	Luweero (N=76)	Total (N=152)
Chicken	19	18	37
Pigs	19	12	31
Cattle	5	9	14
Goats	9	3	12
Sheep	0	3	3
Rabbits	1	1	2
Ducks	1	0	1

*N=Number of respondents*

*Total counts of multiple responses=186*

## 4.2 Access rights of women and poor men to forest and tree resources

### 4.2.1 Access rights of women and poor men to forest/woodland resources

Water, dry firewood, herbal medicine, grass and fruits were the only resources both women and poor men could harvest from the forest/woodland. Apart from water, access to these resources was subject to regulations described in Table 4.5.

**Table 4.5 Rights of women and poor men to access forest/woodland resources in Rakai and Luweero districts**

Resources	User group		Regulations/controls for resource use according to community	CA
	Women	Poor men		
Firewood	√	√	Supposed to first seek permission from the owner but illegal use taken quite lightly, not for sale, no cutting of live.	***
Palm leaves	√	-	Mainly needed by women, have to get permission to harvest, must harvest in groups if one does not pay for it, only allowed for domestic use but cannot be punished if sold in form of a value added product such as a mat.	*
Timber	×	×	Completely not allowed in the forest reserve, use in private areas of Luweero depends on owner; even government does not license them to harvest timber.	**
Fruits	√	√	Seek permission before use.	***
Water	√	√	Free for all, users only pay fee for cleaning arrangements in Luweero.	***
Herbal medicine	√	√	Allowed to harvest only in the company of the CFM committee member in charge of herbal medicine to ensure best harvesting practices, harvest in groups in Rakai. Permission taken lightly in Luweero.	***
Pasture	×	×	Grazing in forest reserve (Sango-bay) is prohibited because grass lands in the reserve are now used by private farmers for growing pine under the SawLog Production Grant Scheme (SPGS).	*
Grass	√	√	Not so much restricted but options are available in other wild spaces	***
<i>Marantochloa Spp</i>	×	-	Mainly needed by women, have to get permission to harvest, must harvest in groups if one does not pay for it, only allowed for domestic use but cannot be punished if sold in the form of a value added product.	*
Fish	-	×	Must pay before being allowed to harvest from the forest reserve.	*
Bush meat	-	×	Strictly forbidden especially in the Sango-bay forest reserve	*
Poles	×	×	No living trees to be cut. First seek permission from CFMC/ owner.	***
Clay and sand	-	×	Excavation not allowed as it destroys vegetation and leads to erosion of soil, brick from clay in the forest means a need for firewood.	***
Charcoal	×	×	Prohibited in forest reserves but condoned by private woodland owners.	***

√ Allowed to harvest resource; × Not allowed to harvest resource; - Not commonly used; CA Community in which regulations apply; \*Applies to Rakai community; \*\*Applies to Luweero community; \*\*\* Applies to both Rakai and Luweero communities

Out of all the forest/woodland resources, palm leaves and *marantochloa spp.* were mainly used by women. They were allowed to harvest the resources in groups and sale, if any, in the form of value added products. Poor men were most interested in fish, bush meat, clay and sand. Harvesting of all these resources was prohibited in Sango bay forest reserve but excavation of clay and sand were allowed and regulated in Luweero (Table 4.5.).

Timber, poles, grazing of animals and charcoal burning were prohibited for both poor men and women in Rakai. Harvesting of these resources was accepted on the terms of the owner in Luweero. Poles, fish and pasture were allowed after getting permission from the CFMC and at fees that were not specified. Some laxity was reported in the enforcement of the ban for domestic use of poles. Timber was only accessed in Luweero. In both districts, women and men were all interested in securing land from the forest/woodlands for cultivation. To get permission for cultivating in Luweero's private woodlands, landlords required cash payment or mutual agreement to share the farm produce.

#### **4.2.2 Access rights of women and poor men to on-farm tree resources**

Firewood, fruits and water were the on-farm resources accessed by both women and poor men (Table 4.6). Timber and poles were only accessed by poor men. The rights to access these resources were based on tree species that ranged from fruit trees such as *Mangifera indica*, *Persia americana*, *Artocarpus heterophyllus*, *Psidium guajava*, *Carica papaya* and *citrus species*. The rights also applied to tree species for firewood, herbal medicine and other 'less valued' resources used mainly for domestic purposes. These tree species included *Ficus natalensis*, *Moringa oleifera*, *Melia azedarach*, *Azadarachta indica* and *Sena spectabilis*.

**Table 4.6 Rights of women and poor men to access on-farm tree resources in Rakai and Luweero districts**

Resources	User group		Regulations/controls for resource use according to community	CA
	Women	Poor men		
Firewood	√	√	Free to use resources on their farm so long as it is for the benefit of the entire household, use of dry branches promoted for women, women have to consult spouses to cut branches of living/green trees especially timber species.	***
Timber	×	√	Women only have rights in female-headed households where there is no heir or where the woman has married the man at her home.	***
Fruits	√	√	Household members free to use, use allowed when fruits are mature, some can be sold for household benefit, use for fodder restricted to people in selected households	***
Water	√	√	Free for all, may only pay fee for cleaning arrangements.	**
Herbal medicine	√	√	Free to members	***
Poles	×	√	Mostly used by men. Women can be allowed on request except for female-headed households.	***

√ Allowed to harvest resource; × Not allowed to harvest resource; - Not commonly used; CA Community in which regulations apply; \*Applies to Rakai district; \*\*Applies to Luweero district; \*\*\* Applies to both Rakai and Luweero districts

#### **4.2.3 Access rights of women and poor men to resources in the wild spaces outside forests/woodlands**

Access to most resources by women and poor men from the wild spaces depended mainly on the relationship between the user and the owner (Table 4.7). Both women and poor men were allowed to harvest resources such as firewood, fruits, water, herbal medicine, pasture and grass free for domestic use. Harvesting of timber, poles and charcoal burning from wild spaces required payment of fees to the owner. Access regulations were alike for both poor men and women in the two communities except for water that was free.

**Table 4.7 Rights of women and poor men to access resources from wild spaces outside of forests/woodlands in Rakai and Luweero districts**

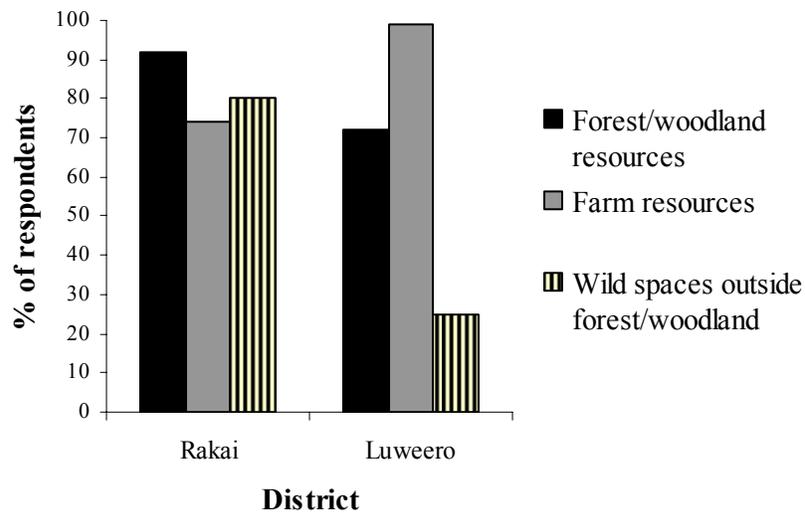
Resources	User group		Regulations/controls for resource use according to community	CA
	Women	Poor men		
Firewood	√	√	Seek permission from owner, mostly allowed for home use	***
Palm leaves	√	-	Can harvest with consent of owner, final use determined by owner.	***
Timber	×	×	Poor men and women have to both seek permission and pay to be allowed to get tree resources, depends on ones relationship with the owner.	***
Fruits	√	√	Seek permission from owner, allowed for consumption only.	***
Water	√	√	Free for all, may only pay fee for cleaning arrangements.	**
Herbal medicine	√	√	Can be harvested free by all after getting permission, permission granted on the basis of the relation with the owner.	***
Pasture	√	√	Need to get the consent of the owner.	***
Grass	√	√	Can be allowed depending on quantities needed and relations with the owner.	***
Poles	×	×	Have to get permission from owner and meet the necessary demands	***
Charcoal	×	×	Can buy trees in the wild owners to burn charcoal.	**

√ Allowed to harvest resource; × Not allowed to harvest resource; - Not commonly used; CA Community in which regulations apply; \*Applies to Rakai district; \*\*Applies to Luweero district; \*\*\* Applies to both Rakai and Luweero districts

Commercial harvesting of on-farm resources and resources from wild spaces outside forest/woodlands by women in male-headed households required prior consultation of men. Women had more rights of access to tree resources in female-headed households where the women married the men. In households headed by widows, women had decision making powers over management and use of tree resources. In cases where a heir was deemed mature enough to take over family responsibilities, major decisions regarding use of highly valued tree resources for commercial purposes were taken by women in consultation with the heir. In poor male-headed households, men took decisions on the use of tree resources and only delegated domestic affairs to women. Decisions on timber tree species such as *Albizia coriaria*, *Milicia excelsa*, *Maesopsis eminii* and Pine species grown on private land were made by men. Timber tree species grown on Mailo land belonged to the land lords irrespective of who planted them.

### 4.3 Dependence of households on forest and tree resources in Rakai and Luweero districts

Forests/woodlands constituted the main source of forest and tree resources in Rakai district (Figure 4.1). Household farms were the main source of tree resources in Luweero district. Resources from the wild spaces outside of forests/woodlands were more commonly used in Rakai than Luweero districts.



**Figure 4.1 Household dependence on forest and tree resources from various landscapes**

At least 70% of the households in Rakai district depended on resources from forests/woodlands, farms and wild spaces outside forests/woodlands. Forest/woodland and farm resources were used by at least 70% of households from Luweero district. Almost an equal proportion of households harvested on-farm and forest/woodlands resources in Rakai and Luweero districts.

### 4.3.1 Household dependence on forest/woodland resources

The dependence on forest/woodland resources was higher in Rakai (66%) than Luweero district (34%). The most commonly used forest/woodland resources were firewood (32%), herbal medicine (17%) and water (15%) (Table 4.8). Herbal medicine, palm leaves and poles were mainly used in Rakai district while water, grass and land for farming were commonly used in Luweero district. Other resources harvested from the forest/woodlands are presented in Table 4.8.

**Table 4.8 Resources households collected/used from the forest/woodlands in Rakai and Luweero districts N=152**

Resources	% of responses										Overall
	Rakai (N=76)					Luweero (N=76)					
	PM	CH	PF	BF	Total	PM	CH	PF	BF	Total	
Fire wood	17	1	11	0	29	15	3	17	4	39	32
Herbal medicine	13	1	6	0	20	5	1	6	1	13	17
Water	7	0	6	0	13	8	2	8	2	19	15
Palm leaves	7	0	4	0	11	3	0	1	1	4	9
Poles	6	1	1	0	8	2	0	0	1	3	6
<i>Marantochloa</i>	3	0	3	0	6	0	0	0	0	0	4
Grass	1	0	0	0	1	4	0	4	1	9	4
Fish	4	0	0	0	4	0	0	0	0	0	3
Land	0	0	0	0	0	1	0	1	3	5	2
Climbers	2	0	0	0	2	0	0	0	0	0	1
Pasture	1	0	0	0	1	0	0	1	1	2	1
Charcoal	0	0	0	0	0	1	1	0	1	3	1
Clay	0	0	0	0	0	1	0	1	1	3	1
Others	5	0	0	0	5	0	1	1	1	3	4

*N= Number of respondents; Total counts of multiple responses=353*

*PM (poor male-headed households), CH (Child-headed households), PF (Poor female-headed households), BF (Better-off female-headed households)*

*Others included: Timber, Sticks, Off Cuts, Tree Seeds, Fruits, Bush Meat, Papyrus and Sand*

### 4.3.2 Household dependence on on-farm tree products and services

Households were more dependent on fruits (39%), firewood (13%), shade (11%) and bark cloth (7%) (Table 4.9). Household dependency on on-farm tree resources was higher in Luweero (59%) than in Rakai (41%). Households in Rakai used on-farm tree services such as soil conservation and wind break more than their counterparts in Luweero district (Table 4.9). There was more use of poles (8%) and herbal medicine (7%) from household farms in Luweero than Rakai district.

**Table 4.9 On-farm tree products and services used by households in Rakai and Luweero districts N=152**

Resources	% of responses										Overall
	Rakai (N=76)					Luweero (N=76)					
	PM	CH	PF	BF	Total	PM	CH	PF	BF	Total	
Fruits	20	2	10	0	32	14	2	14	6	35	34
Firewood	10	1	6	0	17	10	2	9	4	24	21
Shade	10	0	3	0	13	1	0	7	2	10	11
Bark cloth	8	1	7	0	16	1	0	0	0	1	7
Soil conservation	2	0	1	0	3	1	0	4	3	7	5
Poles	1	0	1	0	2	3	2	5	0	8	5
Herbal medicine	1	0	2	0	3	3	0	3	2	7	5
Wind break	5	0	3	0	8	0	1	1	1	2	4
Timber	1	0	3	0	4	2	0	3	1	5	4
Others	4	0	0	0	4	1	1	1	0	2	3

*N=Number of respondents; Total counts of multiple responses=333*

*PM (poor male-headed households), CH (Child-headed households), PF (Poor female-headed households), BF (Better-off female-headed households)*

*Others included: Fodder, Charcoal, Conducive environment, Washing Materials, Stakes for vanilla and Live fence*

### 4.3.3 Household dependence on resources from wild spaces outside forests/woodlands

The main resources obtained by households from the wild spaces outside forests/woodlands were firewood (24%), grass (23%), herbal medicine (22%) and water (11%) (Table 4.10). With the exception of herbal medicine, nearly all the resources were highly harvested in Rakai than

Luweero. More resources from the wild spaces outside forest/woodlands were used in Rakai (80%) than Luweero (20%). Other resources used by the households from wild spaces outside of forest/woodlands are summarized in Table 4.10.

**Table 4.10 Resources harvested/used by households from wild spaces outside forest/woodlands in Rakai and Luweero districts N=152**

Resources	% of responses										Overall
	Rakai (N=76)					Luweero (N=76)					
	PM	CH	PF	BF	Total	PM	CH	PF	BF	Total	
Firewood	17	1	8	0	25	10	3	7	0	20	24
Grass	17	0	9	0	26	3	3	3	0	10	23
Herbal medicine	13	0	5	0	19	13	10	10	0	33	22
Water	7	2	3	0	12	3	3	0	0	7	11
Poles	2	1	1	0	3	0	0	7	0	7	4
Pasture	3	0	1	0	3	3	0	0	0	3	3
Timber	2	0	1	0	3	0	0	0	0	0	3
Palm leaves	1	0	0	0	1	0	3	0	0	3	1
<i>Afromomum</i>	1	0	0	0	1	0	3	0	0	3	1
Sand	1	0	0	0	1	0	0	3	0	3	1
Fruits	1	0	0	0	1	0	0	3	0	3	1
Others	4	0	0.8	0	5	0	3	3	0	7	5

*N= Number of respondents; Total counts of multiple responses=149*

*PM (Poor male-headed households), CH (Child-headed households), PF (Poor female-headed households), BF (Better-off female-headed households)*

*Others included: Charcoal, Reeds, Papyrus, Land, Clay, Mushrooms, Brooms and Coffee seedlings.*

#### **4.4 Opportunities for households to access forest and tree resources in Rakai and Luweero district**

The main opportunities to access forest and tree resources were favourable laws (19%), availability of tree resources on-farm (14%), proximity to the resources (12%), knowledge of the resources (11%) and availability of the resources (11%). Other opportunities to access forest and tree resources are summarised in Table 4.11.

**Table 4.11 Opportunities for households to access forest and tree resources in Rakai and Luweero districts N=152**

Opportunities	% of responses										Overall
	Rakai (N=76)					Luweero (N=76)					
	PM	CH	PF	BF	Total	PM	CH	PF	BF	Total	
Favourable laws	21	1	9	1	32	2	1	3	1	7	19
Has resources on farm	0	0	0	0	0	10	2	11	5	27	14
Proximity to the resource	15	0	5	0	20	0	1	2	1	4	12
Knowledge of the resources	11	1	3	0	15	3	1	2	1	7	11
Availability of the resources	11	0	2	0	13	3	0	4	1	8	11
Availability of market	1	0	0	0	1	1	1	5	1	7	4
Member of CFM group	4	0	4	0	8	0	0	0	0	0	4
Banana and coffee need trees	0	0	0	0	0	2	1	3	1	8	4
Can buy some resources	1	0	0	0	1	2	0	4	0	6	3
Fertile soils	0	0	0	0	0	1	0	3	1	6	3
Children help to fetch resources	0	0	1	0	1	2	0	1	1	4	2
Has energy to collect resources	1	0	1	0	2	1	0	1	0	2	2
Private forest are alternatives	1	0	1	0	3	0	0	0	0	0	1
Relative of resource owner	0	0	0	0	0	1	0	2	0	3	1
Sensitized on use of resources	1	0	0	0	1	0	0	1	0	1	1
Gets seedlings from the forest	0	0	1	0	1	1	0	1	0	3	1
Others	1	1	1	0	4	1	0	4	1	7	5

*N=Number of respondents; Total counts of multiple responses=299*

*PM (Poor male-headed households), CH (Child-headed households), PF (Poor female-headed households), BF (Better-off female-headed households)*

*Others included: Presence of means of transport, Presence of tools for harvesting, Plans to plant more trees, Variety of tree species in forest, Owns part of the resource, Not being a member of CFM, Secretly grazes in forest, Having skills in carpentry.*

On-farm tree resources, soil fertility and good relationship with resource owners helped households to access the resources in Luweero district. Availability of market for forest/woodland and tree resources and the ability to buy these resources were key opportunities for accessing forest and tree resources in Luweero district.

#### **4.5 Constraints faced by households in accessing forest and tree resources in Rakai and Luweero districts**

The main constraints to access forest and tree resources were unfavourable rules (25%), attacks by wild animals (13%), crop raiding (7%), risks of getting injured (7%), fear of being arrested

(6%), and resource scarcity (6%). Other constraints to access forest and tree resources are shown in Table 4.12.

**Table 4.12 Constraints to household access to forest and tree resources in Rakai and Luweero districts N=152**

Constraints	% of responses										Overall
	Rakai (N=76)					Luweero (N=76)					
	PM	CH	PF	BF	Total	PM	CH	PF	BF	Total	
Unfavourable laws	16	2	11	0	29	4	3	9	3	19	25
Attacks by wild animals	14	0	3	0	17	3	1	3	0	7	13
Long distance to forests	3	1	2	0	6	1	1	7	1	11	7
Risks of getting injured	6	0	1	0	7	3	0	1	3	7	7
Crop raiding	3	0	0	0	3	1	0	9	3	13	7
Fears of being arrested	6	1	1	0	7	0	0	4	1	5	6
Resources being scarce	5	0	3	0	8	0	0	3	1	4	6
Difficulties in getting permission	4	0	2	0	6	0	0	1	0	1	4
Heavy rains/floods	3	0	1	0	4	0	0	0	1	1	3
Lacks energy to collect resources	0	0	0	0	0	3	0	4	0	7	3
Lack of clear paths into the forest	3	0	1	0	4	0	0	0	0	0	3
Theft of resources on the farm	0	0	0	0	0	0	0	4	3	7	3
Lack of money to buy resources	0	0	0	0	0	1	0	4	1	7	3
Not being a CFM member	2	2	1	0	4	0	0	0	0	0	3
Poor management	0	0	1	0	1	0	0	3	1	4	2
Competition for resources	1	0	2	0	2	0	0	0	0	0	2
Seasonality of resources	1	0	1	0	2	0	0	0	1	1	2
Others	0	0	2	0	2	4	0	1	1	7	4.

*N=Number of responses; Total counts of multiple responses= 203*

*PM (Poor male-headed households), CH (Child-headed households), PF (Poor female-headed households), BF (Better-off female-headed households)*

*Others included: Lack of market for resources, Lack of planting materials, Lack of work force, Lack of time for collecting resources, Lack of trees on-farm*

Households in Rakai were less favoured by laws and experienced more attacks by wild animals than their counterparts in Luweero. Crop raiding was more common in Luweero (13%) than Rakai (3%).

#### 4.6 Relationship between access to forest and tree resources and livelihoods dynamics in Rakai and Luweero districts

About 86% of the respondents agreed that access to forest and tree resources affects the quality of life in the household. Eighty eight percent of them said the life of the people in their households had improved as a result of access to forest and tree resources. Fifty three percent of the households reported that their livelihood was worse than it was five years ago compared to 38% who reported otherwise (Table 4.13).

**Table 4.13 Relationship between access to forest and tree resources and livelihoods**

Variable	Responses	% of respondents		
		Rakai (N=76)	Luweero (N=76)	Total (N=152)
Access to forest and tree resources affects quality of life in the household	Yes	84	88	86
	No	16	12	14
Life in the household has improved due to access to forest and tree resources	Yes	82	95	88
	No	18	5	12
Life of the people in the household is better or worse than it was five years ago	Better	51	24	38
	Worse	37	70	53
	No change	11	7	9
	Does not know	1	0	1

##### 4.6.1 Logistic regression analysis of the relationship between the socio-economic /demographic characteristics of households and their livelihoods

The logistic regression analysis (Table 4.14) shows that the community in which the household lived, the period of time the household has lived in the community and the number of years spent in school by the household head significantly and positively influenced household livelihoods as a result of access to forest and tree resources ( $P < 0.05$ ). The marital status of the household head and the ethnicity of the household head also significantly and positively influenced household

livelihoods as a result of access to forest and tree resources ( $P < 0.05$ ). Households in Luweero district were 12.82 times more likely to have improved livelihoods as a result of access to forest and tree resources than households in Rakai. An increase by one year in the period of time lived by a household in their community increased the odds for the household to improve its livelihood through access to forest and tree resources by 1.075 times. For every additional year spent in school by a household head, the probability for such a household to improve its livelihood through access to forest and tree resources increased by 1.508 times.

**Table 4.14** Logistic regression analysis of the relationship between the socioeconomic /demographic characteristics of households and their livelihoods

Variable	B	S.E.	Wald	Sig. (5%)	Exp(B)
Community	2.551	1.109	5.296	.021*	12.820
Sex of household head	.856	1.150	.554	.457ns	2.354
Age of household head	-.124	.037	11.269	.001*	.883
Religion of household head					
Catholic (Ref.)			3.067	.216ns	
Protestant	-.537	.943	.324	.569ns	.585
Others	-2.079	1.187	3.067	.080ns	.125
Marital status of household head					
Single (Ref.)			7.036	.134ns	
Married	.833	1.044	.636	.425ns	2.300
Widow	3.558	1.508	5.564	.018*	35.083
Widower	.965	1.571	.377	.539ns	2.624
Divorced	.369	1.378	.072	.789ns	1.446
Period of time lived in the community	.072	.030	5.913	.015*	1.075
Proximity of household to forest/woodland	-.313	.227	1.895	.169ns	.731
Number of years spent in school	.411	.163	6.326	.012*	1.508
Main occupation of household head					
Small scale farming (Ref.)			2.317	.509ns	
Trading	-2.165	1.594	1.846	.174ns	.115
Carpentry	-1.153	1.772	.424	.515ns	.316
Others	-.635	1.380	.212	.645ns	.530
Ethnicity of household head	2.729	1.157	5.562	.018*	15.325
Wealth status of household	1.836	1.799	1.042	.307ns	6.269
Constant	.645	2.326	.077	.781ns	1.907

\*=Significant at 5%, ns=Not significant at 5%, Ref. =Reference category, livelihoods= a binary categorical dependent variable showing household livelihood status (either improvement in livelihood or no improvement in livelihood) as a result of access to forest and tree resources

Households headed by widows were 35.083 times more likely to improve their livelihoods through access to forest and tree resources than households headed by singles. Households headed by non-Baganda compared to those headed by Baganda were 15.325 times more likely to improve their livelihoods through access to forest and tree resources than those not headed by Baganda.

Age of a household head significantly but negatively influenced household livelihoods ( $P < 0.05$ ). An increase of one year in the age of a household head decreases the households' chance of improving its livelihood through access to forest and tree resources by 0.883 times.

Contrary to expectations, the study showed that the sex of household head, occupation of the household head, the wealth status of a household and proximity of a household to the forest/woodland did not significantly influence household livelihoods as a result of access to forest and tree resources. Although it is commonly perceived that gender directly affects livelihood options, there is no significant relationship between the sex of household head and livelihoods as a result of access to forest and tree resources. This could be because of the HIV prevalence in Rakai which has made sex not a significant factor. Most occupations of household heads were on small scale, involving low capital and basically from the private sector. The results could have been different if there were occupations obtaining high wages. The wealth status of households was not significantly related to livelihoods because most of the households were homogeneous in respect to source of revenue and earnings. Majority of the households were farmers and petty traders who fell within the same income quartile. It was also expected that the closer a household is to the forest, the more the level of dependence on the forest. Since

forests are regarded as open access, there is little or no initiative for the household to search for alternative livelihood sources and hence have poor livelihoods/standards of living. The findings of this study are therefore upheld.

#### **4.6.2 Chi square tests of the association between household awareness about rules to access forest and tree resources and livelihoods**

Households' awareness about any informal rules to access forest/woodland resources was significantly associated with the livelihoods of the households ( $\chi^2=8.378$ ,  $df=1$ ,  $p<0.05$ ). Among households that were aware about any informal rules to access forest/woodland resources, more household that registered improvement in livelihoods (71) were observed than expected (65) (Appendix 4).

Household awareness about sanctions for breaking any informal rules to access forest/woodland resources was significantly associated with households livelihoods ( $\chi^2=8.046$ ,  $df=1$ ,  $p<0.05$ ). Among households aware about any sanctions for breaking informal rules to access forest/woodland resources, significantly fewer of those who did not register improvement in livelihood were observed (2) than expected (8) (Appendix 4).

**Table 4.15 Association between household awareness about rules to access forest and tree resources and livelihoods**

<b>Independent variables</b>	<b>Pearson's Chi square</b>	<b>P value</b>
Household is aware about any formal rules to access forest/woodland resources	3.143	0.076
Household is aware about any informal rules to access forest/woodland resources	8.378	0.004*
Household is aware about any sanctions for breaking formal rules to access forest/woodland resources	2.269	0.132
Household is aware about any sanctions for breaking informal rules to access forest/woodland resources	8.046	0.005*
Household is aware about any rules to access forest and tree resources from wild/marginal spaces	0.037	0.848
Household is aware about any sanctions for breaking rules to access forest and tree resources from wild/marginal spaces	0.056	0.814

*\*=Significant at 5%, df=1*

#### **4.6.3 Logistic regression analysis of the relationship between the forest and tree products and services harvested/used by households and their livelihoods**

The use of herbal medicine and water from the forest/woodlands and firewood from farm significantly and positively influenced household livelihoods ( $p < 0.05$ ) (Table 4.14). Households that collected herbal medicine from forest/woodlands were 51.153 times more likely to improve their livelihoods than those that did not harvest herbal medicine from forest/woodlands. Households that collected water from forest/woodlands compared to those that did not collect water from forest/woodlands were 29.454 times more likely to improve its livelihoods. Households that collected firewood on-farm were 66.296 times more likely to have improved livelihoods than those that did not harvest firewood from their farms.

**Table 4.16 Logistic regression analysis of the relationship between the commonest products and services harvested/used by households and their livelihoods**

<b>Landscape</b>	<b>Products/services</b>	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>Sig. (5%)</b>	<b>Exp (B)</b>
Forest/woodlands	Firewood	2.186	1.165	3.521	.061ns	8.902
	Herbal medicine	3.935	1.501	6.873	.009*	51.153
	Water	3.383	1.481	5.214	.022*	29.454
	Palm leaves	-1.849	1.369	1.823	.177ns	.157
	Poles	-.208	1.089	.036	.849ns	.812
	Marantochloa	-.616	1.895	.106	.745ns	.540
	Fish	-2.965	1.750	2.871	.090ns	.052
	Others	1.353	1.576	.737	.391ns	3.869
Farm	Fruits	.960	.906	1.122	.290ns	2.611
	Firewood	4.194	1.621	6.693	.010*	66.296
	Shade	3.889	2.602	2.235	.135ns	48.881
	Bark cloth	-1.310	1.574	.692	.405ns	.270
	Soil conservation	2.495	1.508	2.737	.098ns	12.126
	Herbal medicine	2.705	1.912	2.001	.157ns	14.954
	Wind break	-1.143	1.462	.611	.434ns	.319
	Others	2.125	1.731	1.506	.220ns	8.371
Wild spaces outside forest/woodlands	Firewood	-.807	.957	.712	.399ns	.446
	Herbal medicine	1.157	1.133	1.043	.307ns	3.180
	Water	-1.544	1.631	.897	.344ns	.213
	Pasture	-3.298	1.791	3.391	.066ns	.037
	Palm leaves	-3.285	2.131	2.377	.123ns	.037
	Timber	-6.655	2.374	7.856	.005*	.001
	Constant	-1.879	1.285	2.139	.144ns	.153

\*=Significant at 5%, ns= Not significant

Harvesting of timber from the wild/marginal spaces outside of forests/woodlands also significantly but negatively influenced household livelihoods ( $p < 0.005$ ). Households that collected timber from wild/marginal spaces outside of forests/woodlands were 0.001 times less likely to have improved livelihoods than those that did not harvest timber from wild/marginal spaces outside of forests/woodlands.

## **5.1 Introduction**

The main sources of household livelihoods were small scale crop production and livestock rearing. This is characteristic of subsistence farming. Although farming was the main source of livelihood, households also carried out some off-farm activities such as casual work, retail business and craft making for diversification. Apart from coffee, most of the crops grown by the households were predominantly the traditional food crops. This implies that they mainly served subsistence purposes. Despite banana being the staple food in Central Uganda, sweet potatoes and cassava were more common food crops. This can be attributed to banana pests and diseases such as banana weevil and banana wilt respectively that have hit the region. The relatively low production of banana can also be associated with the poor soils that do not support its production especially in Rakai. Households could also be motivated to grow cassava and sweet potatoes because of their short rotation period and less labour demands. Chicken and pigs were also commonly reared perhaps due to their fast growth and availability of market for them besides the ability of the poor households to afford them.

## **5.2 Access rights of women and poor men to forest and tree resources**

### **5.2.1 Access rights to forest/woodland resources**

Water was the only resource freely accessed from the forest/woodlands. This is because water is a basic life support resource for everybody and people cannot do without it. Like in many other communities, there are norms that specifically protect local access rights to basic drinking water (Meinzen-Dick *et al.*, 1997). Water also constituted an important resource for households because of the pastoral activities around the forest reserve. Cases where permission for firewood

for domestic use was not granted were not reported and neither was that possibility ruled out. Despite the regulations, many women who illegally harvested firewood were not punished. In the private woodlands in Luweero district, women harvested firewood only after getting permission from the owner. Anybody attempting to collect firewood without permission was labeled a thief and hence reported to local authorities. Men mostly harvested firewood for sale with the exception of widowers and singles who mainly conditionally take up the role of collecting firewood for domestic use.

Palm leaves and herbal medicine were commonly used by women. According to Gausset *et al.* (2005), women are keenly interested in the medicinal value of plants and trees because the health and hygiene of their families especially children is in their care. Unlike the commercial users, women who harvested for domestic purposes were only allowed to go to the forest in groups to regulate use of the resources. The women who organised themselves to harvest herbal medicines in groups were assigned a guide by the CFMC to reduce damage and train the users on best harvesting practices. As noted by Howard and Nabanoga (2007), rights regimes to certain plants or its parts are put in place to contain damages caused by users of the resources. Women also engaged in grass harvesting mainly for use as carpets in living rooms but also for thatch and mulch. Much as *Marantochloa species* was coveted by women, its harvest without permission was not allowed to regulate use.

Unlike women, poor men were mainly interested in exploitation of timber, poles, fish, bush meat that had commercial potential. Access to these resources was not granted in Rakai because Sango-bay is a protected Central Forest Reserve. Gausset *et al.* (2005) argued that women may

not necessarily be denied access to resources with high commercial value. They, however, noted that women just tend to focus on resources that have high use-value to the households because of their roles in house upkeep. Timber harvesting was banned and licenses were not issued in both study areas as a measure to mitigate unsustainable harvesting. Focus group discussions revealed that harvesting of poles for domestic use such as construction was allowed but most people used tree resources from their farms, wild spaces outside forests/woodlands and less so from the forest. This is because cutting of live trees was prohibited and the process of getting permission was cumbersome.

### **5.2.2 Access rights to farm tree resources**

Most of the on-farm resources were accessible to both women and poor men for domestic use. For commercial use, women required permission from their husbands. Unfortunately, most tree resources required by women such as palm leaves and *marantochloa* are rarely found on-farm. Howard and Nabanoga (2007) noted that 98% of palms used by women occur on common lands or in state forests. This is partly because these resources survive well in less disturbed environments. The resources are also not the priorities of men who mostly own the farm land and could therefore be removed when men want to use their land. Such resources could also be left to be exploited by other interested parties in case they occur on landscapes the owners/men consider to be marginal. As noted by Banana and Gombya-Ssembajjwe (1998), granting access rights to people can motivate them to conserve and sustainably manage resources. The poor men mainly had the rights to use tree resources for timber and poles. This excludes women who privately owned the land with the trees on the land. However, in the Mailo land, tenants, whether male or female never owned on-farm timber tree species irrespective of who planted them. This

is because trees on Mailo land are culturally perceived to belong to the land owner. The implication of this type of tenure is that tenants who constituted about 68 % of the respondents may solely depend on timber tree resources from other sources because they do not have the incentives to grow them on-farm.

### **5.2.3 Access rights to resources from wild spaces outside forest/woodlands**

Women and poor men had equal access rights to plant resources from wild/marginal spaces because of the private ownership of the landscapes. Where resources are meant for sale, gendered differences seemed to have been ignored by resource owners unlike when the resources are demanded free. In all cases, relations with resource owners played a key role especially in negotiating terms of access. For example, one (a woman or a man) can be allowed to harvest fruits but only for consumption, an act which Howard (2003) described as a fundamental constituent of exchange and hospitality. She asserted that many traditional societies use food as an organising principle. This implies that in multi-ethnic societies, food sharing can help to establish good relations with new members and their subsequent integration into society. While free access to timber, poles and charcoal from wild spaces is denied to both women and poor men, demands by the latter are perceived to suggest intent for better use than the former. The reason for this could be inclined in the traditional roles of men and women in which resources like timber, poles and charcoal with high commercial value are assumed to be men's domain.

### **5.3 Household dependence on forest and tree resources**

There was a difference between household dependence on wild resources outside forest/woodlands in Rakai and Luweero. This can be attributed to the differences in landscapes

from which the resources were obtained. Being adjacent to Sango-bay forest reserve, the landscapes considered to be marginal in the community in Rakai are richer in forest and tree resources than those in Luweero. Due to the private ownership of woodland and tree resources in Luweero district, it is not uncommon for tenure laws to curtail access to these resources. The availability of market for the resources in Luweero possibly led to their protection for commercial use.

### **5.3.1 Household dependence on forest/woodland resources**

The findings showed that firewood, herbal medicine and water were the most commonly used resources from the forest/woodlands. This is an indication of their necessity to households because the resources are either obtained from privately owned landscapes or a protected Central Forest Reserve. According to the World Bank (1999), forest and tree resources serve poor people with such essential household needs when they have the rights to access them. Howard and Nabanoga (2007) also noted that plant resources commonly used are those for which everyone has rights of access. Most of the resources were mainly depended upon in Rakai than Luweero. It is likely that the resources were more abundant and diverse in Sango-bay forest reserve than the woodlands of Luweero. This explains why *Marantochloa species*, fish and climbers were exclusively harvested in Rakai. No household on the other hand used land for cultivation and excavated clay from Sango-bay forest because of the strict rules that prohibited encroachment.

### **5.3.2 Household dependence on farm tree resources**

There was a high dependence on on-farm tree products such as fruit, firewood and bark cloth. This implies that the households desire to own the tree resources they require. Discussions with

the local people revealed that households attempt to guarantee themselves access to the tree resources they require most by growing them on-farm. This is because households cannot determine their access to tree resources owned by others since they have no control over those resources. For example, *Ficus natalensis* trees are planted purposely for making bark cloth for such uses as table cloths and as a means of cultural identity among the Baganda. They are also an important tree component in the coffee-banana farming system in central Uganda and hence are common on-farm. This contrasts with the assertion by Ipulet (2007) that fig trees rarely decline with exploitation because they are difficult to harvest thus making them ubiquitous.

Most fruits and firewood obtained on-farm were used in Luweero. This is because of the absence of alternatives resulting from tenure limitations. This is also partly due to the tendency of the households in Rakai to rely on forest/woodland resources than cultivated ones. Being small scale farmers in a place adversely affected by the HIV/AIDS scourge, there could be limited productive labour to be allocated for tree growing. As noted by Buyinza *et al.* (2008), farmers who depend on agriculture for income may not have incentives to allocate labour for tree growing. With the exception of bark cloth, most of the on-farm tree products and services were used in Luweero. This is attributed to the private ownership of the woodland resources which could have provided incentives for tree growing.

### **5.3.3 Household dependence on resources from wild spaces outside forest/woodlands**

There was a high dependence on firewood, grass, herbal medicine and water from wild spaces in Rakai than Luweero. This is because the wild spaces outside forests in Rakai have more of the resources than those in the woodlands of Luweero. Besides, most of the wild spaces in Luweero are more useful to households since they are not allowed to use resources from the woodlands.

This can be proven by the fact that timber and pasture can be obtained from the wild spaces in Rakai.

#### **5.4 Opportunities for households to access forest and tree resources**

The main opportunities to access forest and tree resources were favourable laws, presence of resources on-farm, proximity to the resource and knowledge about the resources (Table 4.11). Although Sango-bay is a Central Forest Reserve, households claimed the laws to access forest and tree resources were favourable. Possibly, through Collaborative Forest Management (CFM), the laws governing resources access were eased especially for harvest of certain resources such as dry firewood and water for domestic use. Mwangi and Markelova (2008) acknowledged that individuals and groups may have access to resources that they do not own completely. It is thus apparent that the laws governing access to these resources were not favourable for households in Luweero due to the private ownership of the woodlands. In contrast, households in Luweero could have resorted to growing trees on-farm which they exclusively viewed as their opportunity to access these resources.

While proximity to resources, knowledge of the resources and availability of the resources were major opportunities in Rakai, these were less so in Luweero. This is because being close to a private resource one is not allowed to access is not beneficial to potential users. This therefore means that no matter how close or further away a resource may be, access is mostly determined by tenure of the resource. Proximity to a resource can thus best serve as an opportunity when access is granted. Similarly, without access rights, knowledge about tree resources cannot facilitate legitimate dependency on them. Accordingly, Larson *et al.* (2007) found out that the

legal right to access a resource is the first step to act on that right and to acquire the resource or benefit from it.

Market availability for the resources was highly considered an opportunity. This is mainly due to availability of infrastructure for trade in woodland and tree products. Proximity to the forest, knowledge about the resources and availability of the resources were also added opportunities for them to access resources. Therefore, favourable laws and proximity to resources provide chances for one to become knowledgeable about the resources.

### **5.5 Constraints to household access to forest and tree resources**

Unfavourable rules were the main constraints to access forest and tree resources in Rakai district. This is because of the restrictions on use of resources from Sango-bay Central Forest Reserve by law. There are also Collaborative Forest Management Groups in which some local people are not members. As expected, those who were not members felt that rules set to govern the forest under collaborative arrangement limited them more than members. On the other hand, some of the people who were members also felt that they were expected to obey the rules as role models hence denying them the opportunity for unlawful use of the forest resources. This meant to the members that in the event of being caught harvesting resources illegally, the punishments administered to members were more severe than for non-members.

Being a forest reserve with rich biodiversity (Nyakaana, 2008), crop raiding and attacks by wild animals were common in the Sango-bay area. Hunting that used to be a means of controlling vermin was also prohibited. Some of the animals that attacked people did so in attempts of being

chased especially by children and women. Although households were not allowed to use violent means to deter the animals, UWA (2004) attributed the raids and attacks to farming and settlement close to protected areas. The resources needed by households were also dwindling in size. This means that if use was not controlled, the resources would be exploited and even totally depleted.

#### **5.5.1 Influence of socio-economic/demographic characteristics of households on status of household livelihoods as a result of access to forest and tree resources**

Results showed that households that lived in Luweero were more likely to improve their livelihoods through access to forest and tree resources. This was mainly due to the availability of market for the products in Luweero town which is not very distant from the community. According to Bwalya (2004), demand for forest products and proximity to urban centers determines the amount of incomes from forest resources. Since the woodlands resources in Luweero are privately owned, the owners can allow commercial access unlike Rakai where law enforcers even reluctantly allow domestic resource use.

As the age of the household head increased, the probability of the household to improve its livelihood through use of forest resources decreased. This can be explained by the fact that older people may not be strong enough to walk long distances to collect and carry resources like firewood especially from deep inside the forest. A study by Faham *et al.* (2008) revealed that people's level of participation in forestry activities reduced with increase in age. As such, elders may not have sufficient tree resources on-farm or may not take the available on-farm resources to markets for sale.

There was a positive relationship between the marital status of a household head and livelihoods. Households headed by widows had a higher chance of improving livelihoods by using forest and tree resources. Widows who considered themselves disadvantaged may extraordinarily value forest and tree resources partly due to limited livelihood options. Such situations can provoke good decision making on the use of the resources accessed. As noted by Barany *et al.* (2001), improvement in access to resources by women is an important factor in saving household labour for other productive activities. Furthermore, rules concerning resources such as palm leaves, herbal medicine, water and firewood mostly collected by women appear more relaxed either out of sympathy or because these resources are essential to the entire households. Therefore, women and female-headed households have the privilege to gradually harvest and openly use forest and tree resources. In contrast, the poor male counterparts struggle either by choice or due to restrictions to perhaps illegally get prohibited resources like timber and bush meat. Even resources extracted in such manner may not provide expected satisfaction because trading in forest and tree resources in local informal markets in most cases turn out to be less profitable.

The number of years spent in school also significantly and positively influenced household livelihoods. As the number of years spent in school increased, the more likely a household improved its livelihood through access to forest and tree resources. Increases in the level of participation in forestry activities with the level of education (Faham *et al.*, 2008) suggest that households headed by educated people understand and appreciate management and use of forest and tree resources for livelihood improvement. This is also because households headed by educated people can easily cope with the rigor of processing documents needed to provide access to resources. They can also easily assess the profitability of investment in tree resources.

The duration for which a household had stayed in their community also positively influenced household livelihoods. The longer a household lived in their community, the more likely forest and tree resources helped to improve its livelihood. This implies that adequate time is needed for households to establish relations and social ties to access resources from wild spaces and the farms of other households. Such relations may help the households to put the resources to better use particularly for commercial purposes. It is also possible that households that plant trees on their farm have to wait for a long time before they begin to benefit from valuable products like timber. It was expected that since the Baganda are the natives, households headed by them would have a higher chance of improving livelihoods through access to forest and tree resources than those households headed by other ethnic groups. However, this was not the case partly because other ethnic groups are attracted to the forest/woodland adjacent area to earn a better living. These groups thus make best use of the resources given that the majority may not have access to private land on which to grow/collect the tree resources. A similar study by McElwee (2008) reported that migrants in Vietnam earned higher incomes from sale of wood products and significantly high incomes from overall sale of forest resources than non migrants because they solely depended on the forest resources for their livelihoods.

### **5.5.2 Association between rules, actions and beliefs to access forest and tree resources and household livelihoods**

There was a significant association between household awareness about any informal rules to access forest and tree resources and livelihoods (Table 4.15). According to Biggs and Messerschmidt (2003), the rules associated with resources constitute an important aspect of access to the resources. It is thus perceived that awareness about informal rules to access forest and tree resources helps abiding households to openly use resources and avoid conflicts. Since

these are informal rules, once broken, good relations with the local people can be ruined and ties with community members potentially cut off. Households that were aware about any sanctions for breaking the informal rules to access forest and tree resources had a tendency of improving livelihoods through access to forest and tree resources. People who are sanctioned due to bad practices face isolation in their community given that some of the sanctions may be humiliating. Households aware about the sanctions may choose to avoid bad practices which save them from paying penalties.

### **5.5.3 The relationship between the forest and tree products and services harvested/used by households and their livelihoods**

There was a significant relationship between harvesting of herbal medicine from the forest/woodlands and livelihoods. Households that harvested herbal medicine from the forest were more likely to have improved livelihoods than those which did not. Besides contributing to the health care needs of households, Barany *et al.* (2001) also emphasized the importance of commercially using herbal medicine in improving the purchasing power of households. In the Rakai community where there is no nearby health centre coupled with the health care needs of the people especially due to high prevalence of HIV/AIDS and its associated illnesses, reliance on herbal medicine is high. This suggests that herbal medicine partly helps HIV/AIDS victims to live productive lives and saves the affected households' in terms of time, labour loss and costs of medical treatment and hence can attain improved livelihoods. Barany *et al.* (2001) thus recommended consideration of forest and tree resource in the mitigation of the socio-economic impacts of HIV/AIDS among rural households.

There was a higher chance for households that fetched water from the forest/woodlands to improve their livelihoods. The Rakai community for example lacked protected water sources and relied on water from the forest, private land and harvested rain water. The people walk long distances to fetch water when the seasonal wells dry out. Firewood from the farm also improved household livelihoods. This is because firewood was the main source of energy for cooking for at least 90% of the households (Table 4.14). Contrary to the expectation that timber harvesting would improve livelihoods, households that collected timber from the wild spaces were 0.1% less likely to improve livelihoods than those that did not. It is therefore envisaged that the costs involved in processing the timber and the social relations it takes to be allowed to get timber make the venture less profitable.

## **5.6 Summary of the significant outputs of the study**

The study has contributed to the body of knowledge in the following ways:

- The uniqueness in its design where by poor households and female headed households were considered to be heterogeneous as opposed to many previous studies that assumed rural households to be homogeneous. This study specifically targeted the poor households and female headed households to get a true representation of the rural households for whom forests and tree resources constitute an important aspect of their livelihoods. The stratified random sampling followed based on poverty/wealth status and household headship ensured a representative sample for the study. This explained the contradictions in the results such as the failure to generate a significant relationship between some of the socio-demographic characteristics of households

(gender, occupation, wealth status) and livelihoods as a result of access to forest and tree resources.

- The study showed the current proportion of forest and tree resources used by households as opposed to most previous studies that showed the proportion of households accessing and/or depending on forest and tree resources.
- While access rights to forest and tree resources may be determined by gender, this study revealed that the negative influence of gender can be off set by promoting ownership by all gender.
- Although traditional access to forest and tree resources for commercial use was restricted, access was allowed when the resources were commercialised after value addition especially for non timber forest products.
- The association between awareness about informal rules to access forest and tree resources, sanctions for breaking the rules and livelihoods most likely means better compliance to rules rooted in the good aspects of local tradition for sustainable forest and tree resources use and management.

**6.1 Conclusions**

The following conclusions can be drawn from this study:

- (i) Women and poor men have access rights to forest and tree resources that are considered as 'minor' or essential to the household mainly for domestic use.
- (ii) Rights of access to the resources from forest reserves are granted by the State but reinforced by Collaborative Forest Management arrangements especially for members.
- (iii) High value trees like the timber species are owned by Mailo land owners even if planted by tenants whether male or female.
- (iv) Households mainly obtain essential forest and tree resources for domestic consumption.
- (v) The main opportunities for the poor households and female-headed households to access forest and tree resources were favourable laws, availability of the tree resources on farm and proximity to the resource.
- (vi) Unfavourable rules, attacks by wild animals and long distance to forest were the main constraints to access forest and tree resources.
- (vii) Access to forest and tree resources such as herbal medicine and water from the forest/woodlands and firewood from the farm improved the livelihoods of the poor households and female-headed households through provision of resources for health care and energy.

## **6.2 Recommendations**

The following recommendations were made from the study:

- (i) Women need to be given rights of access to land so they can conserve and sustain the resources they need or value.
- (ii) There is a need to promote value addition as a prerequisite for commercial use of forest/woodland resources.
- (iii) There is a need to develop market infrastructure that allows households to sell their value-added products profitably.
- (iv) There is a need to promote conservation, domestication and growing of medicinal plants on-farm.
- (v) Land and tree tenure policies and laws need to be revised to enable tenants on Mailo land to at least own trees they plant themselves.
- (vi) Institutional mechanisms need to be devised to balance traditional resources use customs and norms in order to ensure equitable access to forest and tree resources.
- (vii) Further research need to be carried out on the market potential of commonly used resources such as firewood, herbal medicine, palm leaves, poles and fruits to enhance household incomes.

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## APPENDICES

### APPENDIX 1

#### CHECKLIST FOR FOCUS GROUP DISCUSSIONS

**A) Types of landscapes/niches in the area**

1. Define/categorise the different landscapes/resources in the area?
2. Who owns the different landscapes?
3. Who manages the landscapes?

**B) Livelihood sources (farm and off-farm)**

1. What are the main sources of livelihood in the village?
2. What are the key income generating activities in the village?
3. Who is involved in which activity (men/women, young/old, rich-poor)?
4. How many households and individuals depend on them?
5. Where and when do these activities take place?

**C) Access rights to forest resources**

1. What forest and tree resources do people in the village harvest from the different landscapes?
2. Do people in this village have equal rights of access to forest resources in this community?
3. Who has the rights of access to forest resources in this village?
4. For what purposes are you allowed to access forest and tree resources?
5. Are there any conditions attached to poor men's access to forest resources in this community?
6. Do women have the right to access forest resources in this community?
7. What kinds of women are allowed to access these resources? (widow, married, divorced)
8. Are there any conditions attached to women's access to forest resources in this community?
9. What forest and tree resources are people not allowed to access from forests and other landscapes?
10. Why are they not allowed to access these resources?
11. What factors limit women's access to forest and tree resources?
- 12.

**D) Dynamics of access to forest and tree resources**

1. Are there any changes in access to forest and tree resources from the various lands? (over the last 10 years)
2. What changes have you noted?
3. Over what period of time the changes have occurred?
4. How has the change affected the people in this village (livelihood, health, etc)?
5. Who is responsible for the changes?

## APPENDIX 2

### CHECKLIST FOR KEY INFORMANT INTERVIEWS

#### **Profile of community**

1. How many households are in the community?
2. How many individuals are in the community?
3. What is the gender and age structure?
4. What is the ethnic/cultural composition of the community?
5. When did different groups settle/have been using the area?
6. What services are available, and not available in the community?
7. Who can access them?

#### **Forest and tree resources**

1. What are the available sources of forest and tree resources to community?
2. Who uses them, who benefits, who does not benefit, why?
3. Who protects/conserves them, how, why?
4. How are they used?
5. Where are they?
6. When are they available, accessible?[season]
7. What is their state, change over time, future if present use continues?
8. What was traditional use?
9. What role forest sources play, which forest resources are most important?
10. What are the terms of accessing these resources?
11. What are the constraints and opportunities to access these resources?

#### **Local institutions**

1. Which institutions (groups/organisations) exist in the community?
2. Which of these institutions (groups/organisations) are relevant to forest management (use, protection etc)?
3. In what ways are they relevant to forest management (use and protection)?
4. Who is affected by them, how?
5. What are the formal rules that regulate use of forest resources in the community?
6. What are the informal rules that regulate use of forest resources in the community?
7. Have there been any changes of institutions that manage forest resources and why?
8. Where is the market for forest and tree resources?
9. What are the market prices for the various forest products?
10. What is the average labour cost for men, women and children?
11. What are the different forms of land, forest and tree resources tenure in the community?

## APPENDIX 3

### QUESTIONNAIRE FOR HOUSEHOLD SURVEY

#### Research questionnaire for poor households and female headed households

#### **Dynamics of Access to Forest and Tree Resources for Rural Livelihoods: A Case of Poor Households and Female Headed Households**

Questionnaire number.....  
District.....  
County.....  
Sub county.....  
Parish.....  
Village.....

#### **I) Socio-economic characteristics of Households**

1. Household Headship.....
2. Age of household head (HHH).....
3. Religion.....
4. Occupation.....
5. Number of years spent in school by HHH .....
6. Highest education level of HHH.....
7. Marital status.....
8. Ethnicity .....
9. Period of time lived/resided in the area.....years
10. Proximity of HH to forests.....km
11. Proximity of HH to market.....km
12. Number of resident people in household.....
13. Number of people interviewed in household.....
14. Type of house
  - a) Temporary
  - b) Semi permanent
  - c) Permanent
15. Does this household own land?.....
16. If no, who owns the land you live on? .....
17. What is the size of the land?.....
18. If yes, what is the size of the land you own? .....Ha
19. Source of energy for cooking.....
20. Source of energy for lighting.....
21. Membership to forest management group/organization .....

#### **II. Livelihood sources**

1. List in order of importance the main sources of livelihoods (ways of earning a living) for your household?
2. List in order of importance the activities you carry out on the land you live on?
3. List in order of importance the crops you grow on your farm?

4. Why do you grow these crops?
5. Do you have livestock?
6. If yes, which livestock do you keep?
7. Why do you keep these livestock?
8. Do you get enough food from your farm?
9. If not, from where do you get additional food?
10. Do you earn enough income from your farm?
11. If not, from where do you get additional income?
12. What is your average monthly income?

### III. Access rights to forest and tree resources

#### Access rights to forest resources

- a) What resources can you collect/use (allowed to collect/use) from the forest?
- b) For what purposes are you allowed to collect/use these resources from the forest?
- c) Who regulates the use of these resources?
- d) What are the **FORMAL AND INFORMAL** rules/regulations to access these resources?
- e) What are the sanctions for breaking the **FORMAL** rules/regulations?
- f) What are the sanctions for breaking the **INFORMAL** rules/regulations?
- g) When are you allowed to collect these resources?

#### Access rights to on farm tree resources

- h) Which of these resources (in (b) above) can you collect from your farm?
- i) For what do you collect them?
- j) Who regulates/controls the use of these resources from the farm?
- k) What are the **FORMAL AND INFORMAL** rules/regulations to access these resources?
- l) What are the sanctions for breaking the **FORMAL** rules/regulations?
- m) What are the sanctions for breaking the **INFORMAL** rules/regulations?
- n) When are you allowed to collect these resources?
- o) Apart from the forest and farm tree resources, where else can you collect/harvest these resources?
- p) For what do you collect them?
- q) Who regulates/controls the use of these resources from the farm?
- r) What are the rules/regulations to access these resources?
- s) What are the sanctions for breaking these rules/regulations?
- t) When are you allowed to collect these resources?

**IV. Livelihood dependencies on forest and tree resources**

**Dependence on forest resources**

- a) List in order of importance the resources you actually collect/use from the forest?
- b) What is the purpose for which you get these resources?

Resources	Number of HH members collecting from forest	Time (hrs) taken in the forest to collect resource	Number of times resources are collected from the forest/week	Quantity collected per visit	Remarks
1	Men				
	Women				
	Children				
2	Men				
	Women				
	Children				
3	Men				
	Women				
	Children				
4	Men				
	Women				
	Children				
5	Men				
	Women				
	Children				
6	Men				
	Women				
	Children				
7	Men				
	Women				
	Children				
8	Men				
	Women				
	Children				

- c) What resources would you like to get from the forest but are **NOT** allowed to collect them?
- d) Why are you **NOT** allowed to collect these resources?

**Dependence on farm tree resources**

- e) Do you plant/grow any trees on your farm?
- f) If yes, which trees do you keep on your farm?
- g) Why do you keep these trees on your farm?
- h) What tree products and services do you get from your farm?

- i) If no, why don't you keep tree resources on your farm?

**Dependence on wild trees and resources out side of forests** (*grasslands, woodlands, rangelands and wetlands not categorized as forests*)

- j) Do you get tree and related resources from the wild places outside of forests?  
 k) If yes, what resources do you get from the wild places out side of forests? (*Specify landscapes*)  
 l) If no, why don't you get resources from the wild places out side of forests?  
 m) Apart from the forest, your farm, and spaces in the wild out side of forests, where else do you get tree resources from?
- n) How do you rank the contribution of forest resources from the different landscapes to the household food requirements?

Landscapes	Rank
Forest	
Farm	
Wild spaces outside forests	
Others	

- o) How do you rank the contribution of forest resources from the different landscapes to the household income?

Landscapes	Rank
Forest	
Farm	
Wild spaces outside forests	
others	

**V. Opportunities and constraints to access forest and tree resources**

- a) What opportunities are there to accessing forest and tree resources?  
 b) What constraints do you face in accessing forest and tree resources?

**VI. Relationship between access to forest and tree resources and livelihoods.**

- a) Does access to forest and tree resources affect the quality of life in this household?  
 b) If yes, has the life of the people in this household improved as a result of access to forest and tree resources?  
 c) If yes, how has it improved?  
 d) If no, why?
- e) In your view, is the life of the people in this household better or worse than it was five years ago?  
 f) What is the reason for your view in (e) above?  
 g) What in your opinion is the current state of demand of forest resources in your household?  
 h) What in your opinion is the current state of supply of forest resources in your household?

## APPENDIX 4

### SPSS OUTPUTS FOR THE CHI SQUARE TEST OF INDEPENDENCE

#### Crosstab

		Household awareness about any informal rules to access forest/woodland resources			
		No	Yes	Total	
Whether the life of the people in the household has improved as a result of access to forest and tree resources	No	Count	15	3	18
		Expected Count	9.2	8.8	18.0
		Residual	5.8	-5.8	
		Std. Residual	1.9	-1.9	
	Yes	Count	63	71	134
		Expected Count	68.8	65.2	134.0
		Residual	-5.8	5.8	
		Std. Residual	-.7	.7	
Total	Count	78	74	152	
	Expected Count	78.0	74.0	152.0	

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.378 <sup>a</sup>	1	.004		
Continuity Correction <sup>b</sup>	6.987	1	.008		
Likelihood Ratio	9.106	1	.003		
Fisher's Exact Test				.005	.003
Linear-by-Linear Association	8.323	1	.004		
N of Valid Cases <sup>b</sup>	152				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.76.

b. Computed only for a 2x2 table

**Crosstab**

		Household awareness about any sanctions for breaking informal rules to access forest/woodland resources		Total	
		No	Yes		
Whether the life of the people in the household has improved as a result of access to forest and tree resources	No	Count	16	2	18
		Expected Count	10.4	7.6	18.0
		Residual	5.6	-5.6	
		Std. Residual	1.7	-2.0	
Yes	Count	72	62	134	
	Expected Count	77.6	56.4	134.0	
	Residual	-5.6	5.6		
	Std. Residual	-.6	.7		
Total	Count	88	64	152	
	Expected Count	88.0	64.0	152.0	

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.046 <sup>a</sup>	1	.005		
Continuity Correction <sup>b</sup>	6.669	1	.010		
Likelihood Ratio	9.337	1	.002		
Fisher's Exact Test				.005	.003
Linear-by-Linear Association	7.993	1	.005		
N of Valid Cases <sup>b</sup>	152				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.58.

b. Computed only for a 2x2 table