THE RELEVANCE OF AGROFORESTRY PRACTICES IN KALUNGU SUB COUNTY, MASAKA DISTRICT, CENTRAL UGANDA

BY

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DECLARATION

I, Hashim R. Hatibu, hereby declare to the best of my knowledge and belief, except for the literature cited, that this research report is my original work and has never been presented to any University or any other institution or higher learning for any academic award.

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Date 07/06/2010

APPROVAL

I, certify that the research report submitted by the candidate was done under my supervision. His work is ready for submission for award of the degree of Bachelor of Science in Environmental Management.

.....

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Date 07/06/2010

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ABSTRACT

Agroforestry practices and technologies have been developed as one way of solving the problems of land and forest degradation and the resultant problems of poverty and food insecurity in the rural areas of most developing countries, Uganda inclusive.

This dissertation was an effort which was undertaken to assess the importance of Agroforestry practices and technologies in Kalungu sub county, Masaka District, Central Uganda and their contribution towards improving the welfare and livelihoods of the local farmers.

Variables assessed and analyzed were the Agroforestry practices, technologies and household income. Primary data was obtained from farmers through an interview schedule using a questionnaire which was based on a structured and semi-structured questionnaire. A total of sixty (60) respondents were chosen by the lottery method, in which thirty (30) were affiliated with the Vi project and thirty (30) non Vi farmers.

The main source of household income in Kalungu sub county is agriculture, that is, crop production and livestock keeping. Farmers in Kalungu sub county engage in Agroforestry practices which include improved fallows, orchards, trees on boundary, alley cropping, home gardens, shelter belts, wind breaks and live fences/hedges. Orchards and homegardens were the most common practices in Kalungu sub county. Plant products harvested from homegardens and orchards improve family's nutritional status, health and food security. Some of the plant products are sold in local and regional markets thus improving the household's financial status.

The results of this study demonstrated that Agroforestry is one of the most feasible methods of increasing production on the lands and ameliorating the environmental problems of deforestation existing in the area hence improving the household welfare. This is evidenced by the multiple benefits obtained from trees by the farmers which will be a motivation for practicing and scaling up Agroforestry practices.

The study recommended for more research, training and sensitization in order to improve on their existing traditional AF practices and also to adopt the modern AF practices and improve their household income and welfare.

LIST OF ACRONYMS

AF	Agro forestry
AFRENA	Agro forestry Research Networks for Africa
DSOER	District State of the Environment Report
ICRAF	International Centre for Research in Agro forestry
NARO	National Agriculture Research Organization
NBS	National Bureau of Standard
NEMA	National Environmental Management Authority
NFA	National Forestry Authority
SPSS	Statistical Package for Social Sciences
UBOS	Uganda Bureau of Statistics
UWA	Uganda Wildlife Authority

DEFINITION OF TERMS

AF: Agroforestry is a dynamic, ecologically based natural resource management practice that, through the integration of trees on farms and in the agriculture landscape, diversifies and sustains production for increased social, economic and environmental benefits.

AF practices: Multifunctional land use systems in which there is a deliberate and systematic integration of either planted or already existing woody perennials with food crops, cash crops and animals on the same piece of land, and in which there is ecological and economic interaction between the components in both time and space, resulting in an increased land productivity for a long period of time without degrading the total environment

AF technology: Is the specific structural arrangement of trees in the system and the associated management practices. It is an intervention, innovation or improvement which specifies the functions (roles), location, arrangement and management of multipurpose trees and the associated crops or livestock in order to address a specific problem of land use.

Agrosilvicultural system: are AF systems that consist of trees or shrubs and agricultural crops.

Agrosilvopastoral systems: are AF systems that consist of trees or shrubs, agricultural crops, pastures and livestock.

Farming system: it is a manner in which particular sets of farm resources are assembled for the production of a primary agriculture product.

Fodder: refers to plant or parts of plants including trees and shrubs that are eaten by livestock and wildlife.

Multipurpose trees or shrubs (MPTs): woody perennials, grown to provide more than one product or service.

Home garden: a complex collection of woody and herbaceous plants deliberately grown in or near the home compound, often associated with the production of small domestic animals.

Orchard: a pieces of land on a farm set aside for fruit growing which could either be of single or mixed species.

CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Agroforestry is a dynamic, ecologically based natural resource management practice that, through the integration of trees on farms and in the agriculture landscape, diversifies and sustains production for increased social, economic and environmental benefits. Approximately 1.2 billion people-20% of the world's population depends to a large extent on Agroforestry products and services for their survival (ICRAF, 2001).

Agroforestry is different from forestry and from conventional agriculture. The discipline of Agroforestry focuses on trees in forests and commercial tree plantations. Agroforestry is a form of agriculture that involves planting trees in crop and livestock farming systems. Although the term is fairly new, the practice of Agroforestry is based on a vast store of indigenous knowledge developed by farmers since the dawn of agriculture. Researchers began to link this knowledge to modern science only twenty years ago. Agroforestry is now providing powerful technological and policy innovations that are rapidly spreading in Africa, Asia, and Latin America and more recently in several developed countries. Agroforestry is one of the more successful options available to improve the livelihoods of the poor while protecting the natural resources base (ICRAF, 2001).

Agroforestry is a form of natural resource management. Other forms include fisheries, forestry and water management. Natural resource management can be defined as the management of natural capital that produces flows of desirable products and services at local, national, regional and global scales. Natural capital is the stock of resources generated by natural biogeochemical processes and solar energy that produce such flows in time and space. This is different form other kinds of capital such as manufactured, financial, human and social capital.

Incorporating trees into farming systems leads to greater prosperity at the farm level. Trees provide farmers with marketable products such as lumber, building poles, firewood, animal

fodder, fruits and medicines-all of which earn extra income. They improve soil fertility by fixing nitrogen from the air and recycling nutrients from the soil thereby helping to increase crop yields and helping to ensure stability of future production.

1.1 Statement of the problem

Uganda's economy is mainly dependent on its natural resources with about 80% of the population living in rural areas and engaged in agro-pastoralism and shifting cultivation (especially in the eastern and central districts of Uganda) for food and income (NEMA, 2001). Low and declining land productivity has led to poverty, food insecurity and inadequate supply of food and this food insecurity has in turn contributed to land degradation. Poor and food insecure households cannot afford to keep land to fallow, invest in land improvements that put some portion of land out of crop production or are more expensive to construct and maintain or use costly inputs such as fertilizers (Walaita, 2002).

Given the poor state of many of the developing world's rural areas, it will not be easy to address these problems of social and environmental constraints. Sustainable agricultural growth is the overall target because it leads to income generation and food security. Agroforestry can help because it increases agricultural growth and strengthens the natural resource base at the same time.

One of the most important issues confronting Uganda today is the issue of fuel wood. It is expected that Uganda's population will continue to depend on fuel wood as a renewable source of energy for the foreseeable future. As a result of deforestation off farm sources of fuel wood have become scarce in many places in Uganda including Kalungu sub county. According to NFA (2005), Uganda has lost about 1.2 million ha since the last decade.

One certain way of reversing this unsustainable supply of forest products and environmental degradation is through growing the trees on private lands, largely in AF systems. AF has a high potential in the production of woody biomass, for example wood biomass production from three years old Alder (*Alnus acuminate)* in Kabale was 23.7 tons/ha to 32.4 tons/ha respectively at Kafu Research Station in Mukono (Raussen and Wajja, 1998). Therefore understanding the importance of AF systems and practices will be an important milestone in achieving the goal of

environmental, social and economic prosperity to the local farmers. This was the major area of focus of this study.

1.2 Objectives of the study

1.2.1 General objective

The general objective of this study was to assess the Agroforestry practices and importance to the local farmers in the improvement of their welfare and livelihood.

1.2.2 Specific objectives

i. To find out the Agroforestry practices and technologies in Kalungu sub county.

ii. To assess the contribution of Agroforestry practices to household income and welfare to the local farmers.

iii. To make recommendations on how to improve the Agroforestry practices so that their household income and food security can be improved through agriculture production.

1.2.3 Research Questions

i. What were the Agroforestry practices and technologies in Kalungu sub county?

ii. What was the contribution of Agroforestry practices to household income and welfare to the local farmers?

iii. How could Agroforestry practices be improved so as to improve the household income and food security through agriculture to the local farmers?

1.3 Justification of the study

As reported by ICRAF (2004), too little research attention has been given to how successful AF systems observed in the tropics can be widely expanded for the benefit of smallholders living in remote areas with poor market infrastructure. It is therefore important that AF research and development now focus on land management interventions that reach the poorest and most vulnerable land users especially the women and on understanding of the problems they face

(ICRAF, 2004). Previous studies have put little attention on the benefits of AF to the rural small-scale farmers. Most research studies have targeted biophysical aspects of AF technologies, for example soil fertility management and impact of AF on soil fertility. AF research should focus more on the socio-economic issues (gender, land size and ownership, culture, income) of the target rural farmers, emphasizing what AF can do to meet their daily needs for food, income, shelter and as such AF research must be increasingly relevant to the intended beneficiaries (Ssekabembe, 2006). This study on the importance of AF practices and technologies would be of great importance in contributing to the most needed researches in AF geared towards liberating the local farmers from poverty and environmental constraints which hinder their agriculture production and prosperity.

CHAPTER TWO

LITERATURE REVIEW

2.0 Importance of Agroforestry

The term AF describes farming system in which tree, agricultural crops and livestock or pastures are produced simultaneously or sequentially on the same unit of land. All AF systems include a tree or shrub component deliberately planted or retained on farmland to provide a variety of products and services or ecological benefits. Usually there is biological and economical interaction between the component species in the system, and at least two products or services (Hoskins, 1987 and Lundgren, 1987).

All the components of AF systems serve to satisfy the basic needs of the land user through providing products and services. These include food (fruits, nuts, and leaves for vegetables), shelter (construction poles), energy (fuel wood) and medicines (bark, leaves) and cash. One of the major aims of AF is to stabilize the production of these commodities but in a flexible manner (for instance by producing fuel wood, forage, timber or poles according to the needs of the specific farmers) and with minimum use of external resources such as chemical fertilizers (Baumer, 1990, Ssekabembe, 2006). Tree components are responsible for sustaining the productivity of AF systems, for example through addition of organic matter and nutrients to the soil (Ssekabembe, 2006).

In addition to the above benefits, livestock if included in the system also benefit from the presence of trees by feeding on fodder from palatable and nutritious multipurpose trees or shrubs. Examples of these in Africa include indigenous species like various *Acacia species, Ficus exasperata, Prosopis cineraria, Sesbania sesban and Sesbania grandifora.* Examples of exotic fodder species include *Gliricidia sepium, Leucaena leucocephala* and *Tamarindus indica* (Lundgren, 1987, Ssekabembe, 2006).

Trees and shrubs are particularly important in mitigating soil degradation which is spreading widely in the tropics and is probably the most important single factor limiting agricultural production in Africa (Lynam *et al.,* 1998). Hence, one major objective of AF is to conserve soil,

the natural resource base on which to a very large extent plant production depends (Sanchez, 1995).

Agroforestry is widely recognized as an approach to land use that helps to maintain or improve soil productivity, enabling sustainable crop production. At the same time it helps farmers to meet some of their basic needs in ways that may alleviate rural poverty. There is a strong relationship between AF and sustainable land use. Young (1990) emphasized that sustainable land use is that which achieves production combined with conservation of the resources on which that production depends, thereby permitting the maintenance of productivity.

Sustainability=Productivity+ Conservation of resources

The most direct and primary requirement for sustainability is to maintain soil fertility (Young, 1990). The objective of sustainable land use is the continuation of production over a long time.

The importance of Agroforestry is rapidly increasing for several reasons:

- A growing body of scientific evidence of the effectiveness of Agroforestry leading to increasing demand.
- Global trends in urbanization, democratization, decentralization, market liberalization and trade strengthens Agroforestry opportunities.
- Growing concerns about climate change, biodiversity, deforestation and desertification strengthens Agroforestry.
- Emerging market opportunities for tree products facilitates the intensification and diversification of small-scale farms.
- An increasing recognizing of the importance of improved livelihoods in development.
- Agroforestry is on the verge of widespread adoption in developing countries, and large-scale impacts-providing benefits to millions of agricultural poor people-lie just ahead.

Agroforestry provides one solution in a nutshell. Agroforestry-growing trees on farms-is a key path to prosperity for millions of developing-country from families, leading to extra income, greater food and nutritional security, and meeting other basic human needs in a sustainable

manner. A key advantage of Agroforestry, however, is that it provides private benefits for poor farmers in developing countries and global environmental payoffs.

Table 2.1 The principal economic and ecosystem functions of Agroforestry trees at different geographical scales

Geographical scale	Products and services
Farm	Food production High value products Nutrient capture and cycling Erosion control Water cycling Genetic diversity Micro-climate regulation Boundary delineation
Watershed/Village/Landscape	Decreased poverty Rural industries Better use of common property resources Decreased migration to cities Erosion and sedimentation control Water cycling Landscape patches (refugia, pollination, biocontrol

National/Regional	Decreased poverty More access of trees products to the urban poor Agriculture as the engine of growth Decreased deforestation ad desertification Export of high-value tree products Biodiversity conservation and use Better access to water resources Decreased atmospheric pollution (smoke and haze)
Global	Carbon sequestration Greenhouse gas regulation Biodiversity conservation

2.1 Home gardens as a sustainable Agroforestry system

The significance of home gardens to rural livelihood is well appreciated throughout the world (Fernandes and Nair 1986; Soemarwoto 1987; Torquebiau 1992; Jose and Shanmugaratnam 1993; 2006). The home garden has been described as an important social and economic unit of rural households, from which a diverse and stable supply of economic products and benefits are derived (Christanty 1990; Campbell et al. 1991; Shackleton et al. 2008). Plant products harvested from home gardens improve family's nutritional status, health and food security. Some of the plant products are sold in local and regional markets, thus improving the family's financial status. The marketing of home garden products by rural households has been small scale farmers has been identified as a potential means of poverty alleviation (Garrity 2004;Shackleton *et al*

2008). A home garden is, therefore, part of a household livelihood strategy and has gained prominence as a natural asset through which sustainable use of resources, particularly for the livelihood of the poor, may be achieved. Homestead gardening and Agroforestry systems provide an important contribution to sustainable agricultural production because of their potential to meet economic, social, ecological and institutional conditions for sustainable livelihoods (Nair, 2006).

Sustainable livelihoods comprise the cap abilities, assets (including both material and social resources) and activities required to achieve a means of livelihood. 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 (Ellis 2000; Dalal-Clayton et al. 2003. Although this has been recognized in the home gardening literature, interdisciplinary studies addressing these issues are few, particularly in southern Africa (Shackleton et al. 2008).

2.2 Indigenous/traditional knowledge in AF

To improve traditional AF practices and to develop new ones, traditional or indigenous knowledge must be tapped first. However the indigenous knowledge must be well traced because it is dynamic and it has evolved over a very long time (Ssekabembe, 2006). With local knowledge (indigenous knowledge), local farmers have better understanding of the local agro-ecosystems, knowledge that will increasingly be needed by scientists to develop appropriate AF interventions for location specific conditions. Local ecological/socio-economic knowledge or indigenous knowledge can be collected through household interviews, focus group discussions and it is crucial in the development of AF practices (Ssekabembe, 2006).

Rocheleau, 1988 and Okojia, 1996 noted that the people who live in an area and use its resources possess valuable knowledge about their land and its uses, therefore field workers can develop successful AF systems if they are able to learn from and improve upon indigenous knowledge and practices, combining their own efforts with local experimenters. Before developing an Agroforestry extension and training programs there must be thorough compilation, synthesis and analysis of current or indigenous knowledge on the existing AF practices (Workman et al., 2003). This knowledge should gradually be combined with AF knowledge of multipurpose exotic trees for example Neem (*Azadirachta indica)* and Moringa (*Moringa Oleifera*) trees such

that farmers feel secure that the new knowledge is not aimed at eliminating their own traditional practices. Given the tremendous variations in perception or attitudes to AF among different landowners, this analysis has to be conducted at every location where the technology is deemed to have significant potential (Workman et al., 2003).

When carrying agriculture extension or promoting new methods of AF the local knowledge possessed by farmers should be taken seriously if such a technology is to be accepted. This is because farmers have been practicing AF for a long time and have important relevant information about the different local tree species. For example, in the Buganda region farmers have been planting *Ficus natalensis* (mutuba in Luganda vernacular) for bark cloth and protection of bananas against excessive sunlight; therefore they have a lot of information to offer through experience on the advantages and disadvantages of this tree species. Using the traditional knowledge to identify and select indigenous species is important because it has been observed that indigenous species are more resistant to local pests and diseases than exotic types (Ssekabembe, 2006).

It has been reported in Kabale, that farmers fear that some trees may attract birds (for example weaverbirds) that may damage their crops (Okullo, 1996). Through experience the farmers have discovered that some trees, for example eucalyptuses drain the water from the land. Therefore promotion of planting eucalyptus on dry land if not well explained may not be successful. The local people have a lot of indigenous knowledge in as far as herbal medicine from trees is concerned. This knowledge could be taken advantage of in order to retain or plant more of such multipurpose trees. For example shrubs like *Vernonia amygdalina*-"mululuza"- could be promoted as herbal medicine for both human and animals, as a shade tree and for firewood.

2.3 Review of the economic benefits and costs of AF, both short and long term.

Although it is very difficult for the farmers to put a financial cost and benefit from the economic point of view, sometime farmers decision on tree planting are based primarily on such economic benefits rather than economic concerns (Ssekabembe, 2006).

Review of the economic benefits and costs of AF is important because farmers have to realize an economic benefit from planting trees because scaling up of AF will require that farmers have

income for buying inputs like seeds, seedlings, inputs for the tree nursery and additional hired labour when required.

Arnold, (1987); and Hoekstra, (1989) observed that AF is n efficient means of using available resources to meet the desired production goals. Even the traditional shifting cultivation based on long fallow periods is efficient in utilizing resources especially labour. Improved fallows have several economic advantages in reducing risks for farmers when compared from AF with fertilizers in maize production.

Foliage from some fodder species such as *Calliandra* and *Acacia angustissima* can be processed into storable feeds for use in ruminant production, although their palatability declines by about 5% within processing. In addition the animals in return provide farmyard manure, which when used appropriately can contribute to the sustainability of both trees and food crop production (Ssekabembe, 2006). At Embu in Kenya, the AFRENA-ECA'S flagship location for research on tree fodder and livestock in AF systems, researchers identified *Calliandra calothyrsus* as a suitable fodder tree for raising milk production of stall fed dairy cows. A farmer could replace or substitute commercial concentrate dairy meal with Calliandra fodder, with positive effects on milk production and profitability; 3kg of caliandra can replace 1kg of dairy meal. Research from 24 farmers in peri urban and urban areas of Shinyanga indicated that milk yields are generally very low ranging from 5 to 10 litres of milk per day per cow in the wet season and even dropping further to below 3 litres per day during the dry season. However the inclusion of concentrate plus one kilogram of Leucaena supplement significantly increased milk yields from 4.9 to 6.2 litres per day. Increasing the Leucaena supplement from 1kg to 2kg per day resulted in a further significant increase from 6.2 to 9.9 litres per day. These results are in the line with the results achieved in Kenya at Embu and in Zimbabwe (ICRAF, 1996). Farmers at Embu in Kenya observed that the cost of collecting the fodder is minimal because most of the fodder is grown near the homesteads, thus reducing the cost of transport.

An experiment was conducted in Kenya to compare the effects on maize production on a planted *S. sesban* fallow, a natural uncultivated fallow and continuous maize cropping and the financial benefits of each, for a period of seven seasons. Removal of *Sesbania sesban* wood resulted in export of 177kg of nitrogen per hectare and 8.2kg of phosphorus per hectare. Nitrogen

mineralization in the soil was much greater following *Sesbania sesban* fallow than after either natural fallow or continuous unfertilized maize. In the three months after the fallow, the increase in inorganic nitrogen in the top 1 metre of soil was 126kg of nitrogen per hectare following *Sesbania sesban,* as compared with 33kg of nitrogen per hectare following natural fallow and 31kg of nitrogen per hectare following continuous maize (ICRAF, 1996).

A substantial increase in yields of crops has been found to occur from crops planted under the canopy of *Acacia albida,* averaging 56%. Trials that were concluded in the Hararghe Mountains in Eastern Ethiopia showed that maize yields rose by 76% under the canopy of *Acacia albida* compared with maize grown in the open, producing 3.39ton/ha against 1.92ton/ha, respectively. For sorghum, the improvement was 36% producing 2.13 tonnes per hectare under the trees compared to 1.57tonnes per hectare in the open (Mann, 1995).

Agroforestry systems are often more profitable than monocultures because they use fewer resources to produce the existing level of outputs or produce higher levels of outputs with the existing level of resources (Hoekstra, 1989, Ssekabembe, 2006). Agroforestry practices can be profitable, for example when low levels of inputs such as when organic manures from multipurpose trees substitute for inorganic fertilizers, or when shading by multipurpose trees' canopies reduces labour input for weeding or the need for herbicides (Ssekabembe, 2006).

However, project experience by AFRENA/ICRAF in Uganda shows that there are also costs involved in AF development both short term and long term. AF development involves giving up some land for both food crops and cash crops which provide income throughout the year. Therefore AF brings about uncertainty for farmers because many of the AF practices take a long to yield benefits. Also the nutrients taken in by trees sometime reduce the yields of both the food and cash crops.

The labour required for AF is also an additional cost to the farmers, for example the costs involved in buying seedlings and other extension services which are not readily available.

CHAPTER THREE

STUDY AREA AND METHODS USED IN THE STUDY

3.0 Description of the Study Area

3.1.1 Geographical location

The study area (Kalungu Sub County) is located near Masaka town, in Masaka district. Masaka district lies between latitude 0° N and 0°, 44¹ S and longitude 31°,1¹ E and 32°,5¹E. The district covers a land area of about 3320 km² and water bodies cover an areas of about 1,470 km² (total of 4,790 km²); with a parameter of 428 km (Planning Unit, Masaka District, 2003).

Kalungu sub county is located about 35 km from Masaka municipality, the main town in the area. The population of Kalungu sub county according to the 2002 population census was 47,357 that are 23,557 males and 23,801 females (Planning Unit, Masaka District, 2003). The average household size is 4.3 persons. The sub county has a diversity of ethnic groups with the Baganda being dominant. Other tribes include for example the Banyankole, Banyarwanda and the Banyoro.

3.1.2 Climate

Masaka district receives rainfall in two seasons a year that is (bimodal rainfall pattern); in the months of March, April and May and also in the months of September to December. The annual rainfall received in the areas ranges between 1000-1,200 mm per year. Temperatures in the area range between 15-28 degrees Celsius (NEMA, 2004). The whole area of Kalungu sub county is influenced by the presence of Lake Victoria. This zone displays comparatively small seasonal variations of temperature, humidity and wind throughout the year. There are two relatively short dry seasons (December-March and June-July) District State of the Environment Report DSOER), Masaka (NEMA, 2004).

3.1.3 Temperature

Mean annual maximum temperature is 27.5°C while average annual minimum temperature is 15°C and 16°C in all parts of the sub county. Mean annual pressure (vapour pressure) is 18-20

millibars (mb). Mean monthly evaporation ranges between 125 and 150 mm (DSOER), Masaka (NEMA, 2004).

3.1.4 Vegetation

Over the years, considerable changes have occurred on the extent of vegetation cover in Masaka District and Kalungu sub county in particular. In Masaka district there are different types of forests and woodlands under different types of management. The rate of vegetation degradation has increase as a result of increase in population. Ninety eight percent (98%) of all the households depend on fuel wood for cooking. The deforestation in Kalungu sub county stands at about 31%.

3.2 Site selection

Kalungu Sub County was selected as the study area because Vi AF had worked there for at least five years at the time of this research. Vi AF (Swedish Cooperative Centre-SCC-Vi) is an organization which promotes AF to the local farmers through its AF Project. Trees on farmers gardens planted through the Vi project were expected to have matured and farmers already obtained tangible benefits from them. It was important to interview farmers at household level, because farmers were able to identify the AF practices they had been practicing, technologies and the benefits they obtained form these practices. Conducting interview to the farmers who were participating in the Vi Project and those who were not involved in this project was important because majority of the farmers who practice AF were those in Vi Project as compared to non Vi Project farmers.

3.3 Sampling method

Random sampling method was used where sixty (60) farmers were chosen by the lottery method of sampling (Amin, 2005). Thirty farmers chosen were those affiliated to the Vi Project while another thirty farmers were chosen from those not affiliated to the Vi Project. The list of the farmers was taken where the name or number was written on the tag that identified names of the farmers to be sampled. The name tags were placed in a container and well stirred. A tag (name tag) was then drawn from the container and the process was repeated until the required number of tags was obtained (Amin, 2005).

3.4.1 Data collection

Primary data was obtained from farmers through an interview schedule using a questionnaire. It was based on a structured and semi-structured questionnaire schedule to ensure validity and consistence of the data collected. The questionnaire was designed to obtain a data set that would differentiate the two groups of farmers, that was Vi and non Vi farmers.

Other sources of data were published and unpublished reports on AF in the world with specific emphasis on information in the tropics and more specifically on Uganda. NARO, NFA, ICRAF, NEMA provided good information on the past situation and present situation on the importance of AF to the local farmers in Uganda.

3.5 Data analysis and presentation

The questionnaire was coded at the design stage for easy and efficient analysis of the data. Coding is the process of assigning numerals to answers so that responses can be put in a limited number of categories or classes. To make coding easy, most of the questions were closed ended. For the quantitative analysis of the data, the computer software called the Statistical Package for the Social Sciences (SPSS) was used. The presentation and description of the data was done using the SPSS program. Data was also summarized in tabular form, for example frequency distributions and percentages.

CHAPTER FOUR

RESULTS OF THE RESEARCH

4.1 Major AF systems and practices in Kalungu sub county

Table 4. 1: AF systems and practices in Kalungu

AF practice	% Vi farmers	% non Vi farmers
Improved fallow	03	07
Orchards	24	10
Trees on boundary	17	13
Taungya	07	10
Alley cropping	16	13
Home gardens	23	24
Shelter belts, wind breaks and live fences/hedges	10	23
Total	**100**	**100**

4.2 Agrisilvicultural system (Crop and Trees)

4.2.1 Improved fallow

This is where exhausted land is allowed to rest for some time to allow it regain its fertility and during this period the land is planted with trees which have the ability to fix nitrogen, provide green manure from leaf litter which later decompose to form humus. Fallow period normally depend on land sizes and population (varies from place to place). While natural fallows refers to when land is allowed to rest under natural vegetation cover. In Kalungu sub county, this AF practice was practiced at a low level as indicated in the Table 4.1 above since many farmers could not afford to rest the farm because agriculture is their main source of livelihood. The fallow plants which were used by the farmers affiliated with the Vi project were *Cajanus cajan, Calliandra callothyrsus, Sesbania sesban and Crotalaria spp.* At the end of the fallow period,

the shrubs, trees or herbaceous legumes are cut down and the biomass incorporated into soils while the land is being prepared for the next crop.

4.2.2 Orchards

These are pieces of land on a farm set aside for fruit growing. Orchards can be of either single or mixed species. Species grown in Kalungu include mangoes, oranges, pawpaws and avocado. The study indicated that it was the farmers affiliated with the Vi project (24%) who mostly practice this AF practice as orchard were found around their farm lands. Most of the fruits obtained from the orchards were exclusively used for household consumption and some are sold in the local market as a source of income to the households.

4.2.3 Trees on boundary

These are trees planted on the boundary of farm lands as demarcations or any other purpose. Such trees include *Grevillea, Maesopsis.* Trees that do not compete with food crops are most suited for boundaries. They should have an open canopy. Both these features are especially important if the land borders another farmer's land, to ensure that the trees or shrubs to not negatively affect the crops on the neighbouring farm. The study found out that some fruit trees were also planted along farmland boundaries. There was no significant difference in percentage between the Vi and non Vi farmers who practice this AF practice (only 4%).

4.2.4 Alley cropping (hedge row inter cropping)

Alley cropping refers mainly to the crops grown in the trees while hedge rows are mainly dealing with the trees. Trees grown provide green manure, mulch and thus improve crop yields. Alley cropping is normally for soil fertility improvements although other products like fuelwood can also be obtained. After harvesting, the branches are spread in the alleys and allowed to dry for a few days and then the leaves are shaken off and incorporated into the soil while the dry branches are used for other purposes. It was found out that; this AF practice is mostly practices by the farmers affiliated to the Vi project (16%) as a fertility improvement method. Only a small percentage of the non Vi farmers (13%) practice alley cropping and the study also found that they have little information on this particular AF practice.

4.2.5 Home gardens

A home garden is an Agroforestry practice in which different types of trees, crops, grasses and herbs are grown together as a garden. This is a deliberate combination of trees, shrubs, animals and crops grown around the home. Usually high value, short term rotation crops like Amaranthus, cabbages, carrots, cucumber, onions, pumpkins, and tomatoes are grown. They are normally composed of small plots 1-2m wide and 5-10m long. Trees are normally fruit trees. Through participant observation and interviews with respondents in Kalungu sub county, home gardens were found to produce supplementary staple crops and also served as sources of income for several households. The diversity of crop species and production cycles in home gardens enables year-round production of different products, reducing the risk of production failure (Abebe et al. 2006).

4.2.6 Shelter belts, wind breaks and live fences/hedges

These are structures for controlling damage by strong winds. Shelter belts have up to six times of trees while wind breaks have only three. While live fences are permanent or semi-permanent rows of trees or shrubs grown farm lands and homesteads managed to form a barrier. They keep away intruders as well as add beauty to the homestead. Species which were identified during the study used in Kalungu included *Cupressus lustanica.*

4.3 Agroforestry practices and household income

The main source of household income in Kalungu sub county is agriculture, that is, crop production and livestock keeping. The table below indicates that 83% of the Vi farmers against 91% non Vi farmers mentioned that they obtained their income from their farms. Only 17%, Vi farmers against 9% non Vi farmers mentioned that they obtained some income from off farm activities. There was no significant difference observed in sources of household incomes between Vi and non Vi farmers. Respondents who indicated that they obtained their incomes from the farm said this was the only method of survival because off farm sources of income were very competitive and there were few opportunities in the area.

Table 4.2 Sources of household income to the farmer in Kalungu sub county.

Source of household income	% for Vi farmers	% for non Vi farmers
On-farm	83	91
Off-farm	17	09
Total	**100**	**100**

4.3.1 On-farm enterprises that bring in income for the household

As indicated in table below, there are a number of enterprises from which the farmers obtain their incomes. The majority of the farmers (both Vi and non Vi) indicated that cash crops, food production, livestock production, poultry products, sale of fuel wood, beer brewing, fruit production are the main income sources. This finding supports the Masaka State of Environment Report of 2003 that cash crops for example coffee are the main sources of income.

Table 4.3 On-farm enterprises that bring in income for the household (n=30)

Sources of on farm income	Vi farmers %	Non Vi farmers %
Cash crops (Coffee)	22	20
Livestock	13	10
Food crops	20	13
Poultry products	13	13
Vegetables	03	03
Fruits	10	06
Beer brewing	06	13
Sell fuel wood	13	22

It was ascertained from the survey that most of the food crops and livestock products are tradable. For food crops about 90% of the seasonal harvests are sold at the end of the planting season on average. For food crops, this has caused a problem to the household food security because farmers sell all their produce at the end of the season in order to get some income and do not store enough to take them through the prolonged dry seasons, because of they are also discouraged to store because they fear to lose over 20% of the produce through storage pests.

Findings indicate that many trees have been cut in the area and this has worsened during the prolonged dry seasons when cash and crop yield are low. Sale of fuel wood has replaced some of the income from cash crops and this is continuing at an increasing rate. Charcoal, bricks and fuel wood in Kalungu sub county has become a new "cash crop" similar to the situation observed by Okullo (1996) in Apac and Okojia (1996) in Arua district. This has led to more trees being cut in Kalungu Sub county. Cutting of more trees in the sub county has resulted in the increasing demand for and increasing prices of wood products and therefore has motivated farmers to plant more trees because of the high prices compared to some food crops.

Expansion of markets for tree products for example fruits, fuel wood and charcoal has increased the importance of trees as cash crops in the area. More farmers are now engaged in planting eucalyptus woodlots than before, for example a five year old pole of eucalyptus is sold at 1000shs on the farm which was 350shs in the early nineties. This information confirms earlier findings by Chauhan, 2000, where he observed that the increasing demand for and high prices of wood, poles and pulp, unlike agricultural products such as coffee, banana and vanilla whose prices fall frequently, is one of the major reason for farmers to plant more trees in association with cereals or pulses. Worldwide variation in prices of major cash crops for example coffee is also a major challenge to the farmers.

4.4 Annual income for Vi and non Vi farmers

The low income of respondents, as shown in the table below indicates that the majority of the households were very poor. This was indicated by quality of housing, that is grass thatched houses for the very poor and iron roofed semi-permanent houses for the middle class and iron roofed permanent houses for the rich. Ownership of a bicycle and livestock in the home was also

used to assess the amount of income in the home. It was observed that poor farmers cannot afford to buy the inputs required for tree planting, for example exotic tree seedlings and they find it easier to plant crops for their daily survival rather than planting trees that take a long time to mature. Poor farmers cannot afford to forego crop production in favour of planting trees that take a long time to yield the benefits. This observation in Kalungu sub county is in the line with the Uganda Second Participatory Poverty Assessment Project (UPPAP 2) in 2001/2002 which indicated that access to land is increasingly becoming a problem for poor people (MFPED,2003). Land tenure is also an issue with the poor farmers because for some of them in Kalungu sub county it is not secure and are threatened to be evicted by the wealthy farmers. In Kalungu sub county, the poor farmers cannot afford to hire labour for example planting of woodlots which usually require additional labour in addition to the family labour.

Table 4.4 Approximate annual income for Vi and non Vi farmers

Income level (shs) per planting season	Vi farmers %	Non Vi farmers %
<10,000	0	05
10,000-50,000	21	53
50,000-100,000	64	36
100,000-200,000	09	04
>200,000	06	02

Note: There are two planting seasons in a year.

These results indicate that 92% of the respondents are below the poverty line because they earn less than one thousand shillings per day. There are number of reasons why low income levels exist among the farmers. They include low food and cash crop production in the area due to changes in climatic and market conditions. Results indicate that 53% of the farmers who do not practice modern Agroforestry are in a very low income category of 10,000-50,000 shillings per year whereas a higher percentage, 64% of those farmers affiliated to the Vi project belong in a higher category of 50,000-100,000 shillings. It was difficult to get accurate income because many of the farmers did not keep records.

CHAPTER FIVE

DISCUSSION OF THE RESEARCH FINDINGS

5.1 Agroforestry systems and practices

An Agroforestry system refers to a land use that is specific to a locality and is described according to the biological composition and arrangement, level of management and socio-economic functioning.

Categories of AF systems

i. Agrisilvicultural systems

This is when crops e.g. vines, shrubs and tree crops are integrated with trees on the same land management unit at the same time.

ii. Silvopastural systems

This is when pasture for animals are integrated with trees on the same land management unit at the same time.

iii. Agrosilvopastural systems

Is the integration of crops animals and trees on the same piece of land at the same time.

iv. Agroforestry practices

This is a distinction arrangement of components i.e. crops, animals and trees in time and space.

5.2 Attitudes of farmers toward AF and perceived environmental effects (both negative and positive)

5.2.1 Benefits of trees in AF systems

During the interviews farmers were asked to rank the different benefits accrued from AF practices. The ranking was based on the number of both Vi and Non Vi farmers who mentioned the benefits from AF. One (1) was the highest rank that the one with the highest number of farmers and 11 was the lowest as shown in the table below. All the farmers agreed that trees are important on their gardens. However Vi and non Vi farmers had different rankings as far as benefits accrued from trees are concerned. Firewood was the benefits ranked most highly by the respondents. This observation confirms results from the national biomass study (1995), which indicated that the majority of the farmers are depending on biomass mainly trees as a source of fuel. Agroforestry is a viable option in the provision of fuelwood sources for the increasing population in the area. Even the AFRENA Uganda Project Report (1998), agrees that Agroforestry has great potential as a source of fuel wood, fodder, and fruits in the Kigezi highlands, lakeshore region, central region and other parts of Uganda.

As far as Vi farmers are concerned, their rank in their order of importance by rank 1 to 4 is provision of firewood (10), erosion control (9), provision of shade (6) and improved soil fertility (5). For non Vi farmers, the factors ranked by the majority of the farmers in their order of importance by rank 1, 2, 3 and 4 are: provision of firewood (11), building poles (9), shade (6), and provision of cash (4). Results from the ranking of benefits indicate that those farmers affiliated to Vi project are more aware of the environmental benefits of trees, for example, erosion control, provision of shade and improved soil fertility.

5.2.2 Negative impacts of integrating trees in farmlands

The findings indicate that the main negative impact of trees for 37% Vi farmers was that trees deprive crops of enough soil moisture. The most dominant negative factor mentioned by 40% non-Vi farmers was that trees lower crop yields due to deprivation of enough sunlight leading to etiolated crops and also leads to increased incidence of diseases due to the increase in humidity. Other negative impacts of integrating trees in farmlands mentioned were that trees are a habitat

for pests and parasites as mentioned by 13% Vi farmers and 17% Non Vi farmers. The most common pests are the birds which feed on cereal crops and monkeys.

Table 5.1 Negative impacts of integrating trees in farmlands

Negative impact	% of Vi Farmers, n=30	% of Non Vi farmers, n=30
Lower crop yields due to lack of enough light(too much shade)	26	40
Habitat for crop pests and parasites	13	17
Harbour birds and animals that are dangerous	07	10
Deprive crops of soil moisture and light	37	30
No problem observed	17	03

Of thirty Vi farmers interviewed, 17% mentioned that they did not see any negative impact of integrating trees on their farmlands while only 03% non Vi farmers mentioned there is no problem observed. Seven percent of the Vi farmers and 10% of the non Vi farmers mentioned that trees harbor animals that are dangerous in the destruction of crops for example monkeys and squirrels. The findings indicate that as more fruit trees and other trees are planted on the farm, they take in water and minerals salts that would have been used by crops, and this has a big negative effect on the crops especially during prolonged dry seasons. Respondents indicated that as more trees were planted on their farms shade problems emerged. Farmers began cutting back and chopping trees in order to open up the shade canopy and enable the main crops of bananas and coffee to receive sunlight. Some farmers reported that if there is too much shade in their banana gardens the yields are reduced.

5.3 Local trees and indigenous AF knowledge in Kalungu sub county

It was observed from the study that farmers had a lot of indigenous knowledge in as far as the importance of trees in concerned. In the Baganda communities, there is a well developed classification of tree uses and their relationship with crops and animals. There were those trees regarded as of high priority compared to others. It is important that extension workers tap the indigenous knowledge of the farmers in order to promote AF. Beliefs and attitudes of farmers towards particular trees in Kalungu sub county has got an effect in AF practices. It was observed during the study that farmers in Kalungu sub county have a well developed classification of tree relationships and uses which are very important in furthering development of AF in the area. The farmers in the area have local knowledge on scientific management such as biological control of pests and disease, for example treatment of malaria by *Vernonia amygdalina* (mululuza). This information supports Nair, 1993 where he indicated that by using indigenous knowledge farmers in India have been able to use the neem tree (*Azadirachta indica)* to control crop pests. The fact that farmers can give some views about some tree species supports the argument by Rocheleau, (1988) in Okullo, (1996) that, researchers and development workers can learn from the local community by studying their formalized knowledge about AF systems or by observing and recording their actual practices and it also confirms that rural people have a great deal of useful information to contribute to AF development as consumers. Indigenous knowledge is also important in order to identify local priorities and preferences. Information about local preferences and uses of tree products has helped the Vi AF project workers to identify the appropriate species for introduction in the area and also to identify the most important qualities to seek through the indigenous trees (P. Asiimwe pers. Comm, 2004). Some of the important trees identified by farmers in Kalungu sub county and their usefulness are indicated in the table below:

Table 5.2 Common types of indigenous trees, local names and uses as identified by farmers in Kalungu sub county.

Latin name	Local name (Luganda)	Uses
Ficus branchipoda	Mukokowe	Fuel wood
Ficus natalensis	Mutuba	Barkcloth/firewood
Ficus exasperate	Luwawu	Fuel wood
Erythrina abyssinica	Girikiti	Medicinal
Dracaena fragrans	Luwaanyi	Boundary marker
Coffea canephora	Mwanyi	Beverage
Cocos nucifera	Munazi	Fruits
Citris sinensis	Mucyungwa	Fruits
Canarium schhweinfurthii	Muwafu	Timber/food
Bridelia micrantha	Katazamiti	Fuelwood/timber
Blighia unijugata	Nkuzanyana	Fuelwood
Artocarpus heterophyllus	Ffene	Fruits/timber
Garcinia huillensis	Nsaali	Fruits/medicinal
Maesopsis eminii	Musizi	Timber
Mangifera indica	Muyembe	Fruits/timber
Markamia platycalyx	Nsambya	Poles/medicinal
Oxyanthus speciosus	Kamwanyimwanyi	Poles/fuelwood
Phoenix reclinata	Nkindukindu	Mat making
Polyscias fulva	Setaala	Drum making
Sapium ellipticum	Musasa	Fuelwood/medicinal
Securinega virosa	Lukandwa	Medicinal
Trema orientalis	Kisiisa	Fuelwood
Syzgium cuminii	Jambula	Fruits/fuel wood
Vernonia amygdalina	Mululuza	Medicinal
Vangueria apiculata	Mutugunda	fruits

It is also important that indigenous knowledge concerning any AF technology is considered when promoting new technologies. It was observed from the discussions that many farmers are still doubtful about the newly introduced trees. They still prefer to plant the local trees of which they are aware of the importance and the negative impacts. Some of the local trees found in Kalungu sub county were essential for meeting domestic needs and cultural heritage such as *Ficus natalensis* for bark cloth, live fence and fodder.

This information confirms earlier information from Kerkhof, (1990) where he indicated that local knowledge and attitudes must be taken into consideration before introducing any new technology. Farmers will accept new techniques that are related to their indigenous knowledge and gradually you can introduce the completely new techniques because the local poor farmers are usually unwilling to take major risks as regard to their survival, by trying out the new technologies. There is need to encourage the farmers in Kalungu to collect the multipurpose local tree seedlings which are available free of charge in the area. Let them start with the local trees, and then gradually introduce them to the improved tree species. Improved agronomic practices can be introduced to improve the local knowledge, for example modern tree nursery management can be one of the technologies to begin with.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

From the results of the research, the following conclusions can be made:

1. Ninety five percent of the sixty farmers interviewed practiced subsistence agriculture, whereby their main aim of production was to produce food for their households. All the farmers practiced some form of AF practices on their farms; where by local trees were left to grow with their crops through natural regeneration. The majority of the heads of the household in Kalungu sub county are female, which is women headed 42 households and men headed 18 households. However, in some households women headed temporary when their husbands went to the city and towns for work. The majority of the farmers were in the middle age and the average age of the farmers is between 40-44 years.
2. Results indicated that the majority of the farmers preferred to plant trees from which they could obtain multiple benefits, for example fruits, wood fuel, poles, bark cloth and shade. In the households it was mainly the men who took the responsibility for the tree products for sell, whereas it was the women who mainly tended to the young trees in the garden.
3. Results from the study indicated that sensitization of the farmers about AF practices in the sub county is still modest. There is need to train more farmers trainer of trainees (TOTS) in order to promote farmer to farmer extension. Low morale by the government extension workers is also a problem in the area. Many farmers lack AF extension probably because a single district officer cannot be able to extend extension services to all parts of the district.
4. The agricultural and assistant agricultural extension workers have concentrated mainly on crop extension without particular emphasis on promotion of AF practices in the households because many of the extensionists deployed at the sub county levels have an academic bias of crop science but not forestry.
5. Results indicate that firewood is the main source of household energy in Kalungu sub county as mentioned by 13 Vi farmers and 18 non Vi farmers. Crop residues and remains

were second as mentioned by 09 Vi farmers and 07 non Vi farmers. Charcoal was the third in terms of popularity, as mentioned by 08 Vi farmers and 05 non Vi farmers. It has been concluded that fuel wood and crop residues are more popular in rural areas as sources of energy and charcoal becoming more popular in trading centres in the sub county.

From this study, I conclude that AF is one of the most feasible methods of increasing production on the lands and ameliorating the environmental problems of deforestation existing in the area hence improving the household welfare. This has been evident by the multiple benefits obtained from trees by the farmers which will be a motivation for practicing and scaling up AF practices. However, extension coverage is still very low in the area. There are very few extension workers to address on the AF practices and their importance in improving agriculture production.

6.2 RECOMMENDATIONS

In order for more farmers to improve on their existing traditional AF practices and also to adopt the modern AF practices and improve their household income and welfare, the following recommendations are made for the benefit of the researchers, extension workers both government, NGOs, CBOs and the policy makers at the local levels;

(a) There is need for increased training and sensitization of the farmers especially in those areas where the Vi project has not yet reached. There is a need to form an integrated team of extension workers and community development workers to establish AF demonstration centres and household demonstrations to increase the rate of AF adoption. Even schools and other institutions in the area should be included in the extension programs. This approach should be adopted by the non-governmental organizations in the area for example the Vi-Agroforestry and World Vision.

(b) On-farm AF research in the area should be encouraged at household level to test how the new technologies perform. This is important in order to produce the technologies that are socially acceptable and more female friendly to the farmers before they are tried out at a larger scale.

(c) Extension workers should not only concentrate on promotion of new technologies, however existing traditional AF practices should be improved by linking them to the modern methods putting into consideration the agro-ecological and the existing institutional context.

(d) Government departments, NGOs and community-based organizations involved in promotion of sustainable agriculture should be encouraged to collaborate in order to avoid duplicating of services. Community based AF initiatives should be encouraged, for example tree planting days and competitions.

(e) Farmers should be encouraged to engage in livestock production because this is the only way they can realize maximum benefits from the fodder obtained from the multipurpose trees.

(f) It is important that farmers are trained and encouraged to plant and maintain the introduced AF technology with the available local resources, indigenous knowledge and skills because in many households there are socio-economic limitations. The AF technologies promoted should be flexible in management in order not to be regarded as a burden to the farmers.

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APPENDICES

Appendix (i)

INTERVIEW GUIDE
RESEARCH QUESTIONNAIRE

SECTION A: GENERAL INFORMATION

1. Sex

i. Male ☐

ii. Female ☐

2. Age of respondent

i. 18-25 ☐
ii. 26-30 ☐
iii. 31-40 ☐
iv. 41-45 ☐
v. 46-50 ☐
vi. 50> ☐

3. Marital status

i. Married ☐
ii. Single ☐
iii. Widowed ☐
iv. Divorced ☐

Occupation of the respondent

i. House wife/house husband ☐
ii. Business man ☐
iii. Farmer ☐
☐

iv. Agriculture labour

v. Retired ☐

vi. Other (Specify) .....

5. Working status on farm

i. Full time ☐

ii. Part time ☐

iii. Not working ☐

SECTION B: FARMER'S AFFILIATION TO THE Vi-PROJECT

1. Are you a member of the Vi-Agroforestry Project in Masaka?

i. Yes ☐

ii. No ☐

2. What benefits to you receive from Vi-Agroforestry project?

i. Supply of tree seedlings ☐

ii. Supply of crop seeds ☐

iii. Extension support ☐

iv. Other (specify) .....

3. How long have been affiliated to Vi-Agroforestry project?

i. 0-2years ☐

ii. 3-4 years ☐

iii. >4 years ☐

4. Do you consider farmers under Vi-Agroforestry Project better off?

i. Yes ☐

ii. No ☐

5. Do you hope to join Vi-Agroforestry Project?

i. Yes ☐
ii. No ☐

SECTION C: FARMERS AND AGROFORESTRY

1. What are the Agroforestry practices and technologies do you practice?

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2. What are the positive (good effects) and negative (bad effects) of Agroforestry on crop, animal production, fuel wood production, soils and other environmental benefits?

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3. Do you have any knowledge about the role of trees and their contribution towards crop and animal production and other environmental benefits?

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4. What are the advantages of planting trees on your farm?

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5. Do you think Agroforestry contribute to your household income and welfare? Explain.

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6. What are your sources of energy, mention them.

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7. Do you think AF is important to the wellbeing of your household? Give reasons for your answer.

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8. How much income do you earn from selling the trees you planted and their products in your Agroforestry system?

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9. What do you think should be done in order to improve Agroforestry practices and technologies?

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THANK YOU FOR YOUR COOPERATION

Appendix (ii)

Work Schedule

It was expected that, this work would be done in one month depending on the availability of the materials.

S/No	Activity	Duration
1	Gathering of secondary information and proposal writing	January
2	Presentation of the research proposal to the supervisor	February
3	Preparations and organizing materials for survey. This will include:- ▪ Questionnaire design ▪ Transport hiring ▪ Household interviews □ Literature reviewing in libraries, internet and other institutions.	February to March
4	Data analysis	March to April
5	Report writing	April
6	Presentation and submission of the research report	May

Appendix (iii)

Budget

S/N	Responsible	Cost (Tshs)	Total Cost (Tshs)
1	-Researcher's meal allowances	20,000/= @ 30 days	600,000/=
	-Soft drinks and bites for interviewees	60 people X 5,000/=	300,000/=
2	Materials • Stationery • Maps • Photocopy and secretarial service	Its total cost will be 200,000/=	200,000/=
3	Logistics • Transport and communication • contingency	Its total cost will be 200,000/=	200,000/=
Total budget			**1,300,000/=**