EFFECTS OF GOVERNMENT BAN TO HARVEST TREES IN AGROFORESTRY FARMS ON HOUSEHOLD INCOME IN MOSHI DISTRICT, TANZANIA

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A DISSERTATION SUBMITED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN RURAL DEVELOPMENT OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA

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ABSTRACT

This study was conducted with the objective of assessing the social economic effects of Government´s ban to harvest trees in agroforestry farms on household income in Moshi District, Tanzania. The study was carried out in four villages in four wards in Mamba and Mwika Divisions. The findings show that 84% of villagers agreed that there is social and economic effects caused by the Government´s ban to harvest trees on peoples income. The study found that villagers had lost hopes on environmental protection supervised by Village Environmental Committee (VEC) as they had failed to stand on the main objectives of the ban. The force that had been used by VEC on fines and issuing harvesting permits is so great compared to tree planting efforts. This situation endangered sustainability of trees in agroforestry farms which were considered to be a key for rural development. There had been a rapid fall of Moshi District income from 40 million Tsh in 2011/12, to 3.5 million in year 2013/14 while in the year 2014/15 was expected to be 12 million. The ban also resulted into valuable trees being converted to firewood and construction poles which fetched low market price compared to sawn timber. Leaving felled trees on the ground for long time while waiting for permit also reduced the quality of timber and market price. This study recommends that the VEC should concentrate more on educating villagers on the importance of tree planting and supervise tree planting rather than issuing permits and policing tree cutting in agroforesrty farms. The Government should relax the ban by encouraging sustainable harvesting of mature trees only, this will encourage villagers to plant more trees in their farms, improve their livelihood and protect the environment.

DECLARATION

I ERICK ELISAMIA LYIMO declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work and that it has never been submitted for a degree in any University.

_____ _____

ERICK ELISAMIA LYIMO **Date**

(M A Candidate)

The above declaration has been witnessed by

_____ _____

PROF. W .S ABELI **Date**

(Supervisor)

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DEDICATION

I would like to dedicate this work to my father, the late Mr Elisamia Lyimo and my mother, Mrs Theodora Elisamia Lyimo who built the foundation of my education.

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ABBREVIATIONS

DSI	Development Studies Institute
KINAPA	Kilimanjaro National Parks
MA	Masters of Arts
MDGs	Millennium Development Goals
NAS	National Agroforestry Strategy
NSGRP	The National Strategy for Growth and Reduction of Poverty
PLSSP	Portable Log Sawing Steel Platform
RCC	Regional Central Committee
SNAL	Sokoine National Agricultural Library
SUA	Sokoine University of Agriculture
T P	Traditional Pit sawing
Tsh	Tanzanian shillings
VEC	Village Environmental Committee
VG	Village Government
GDP	Gross Domestic Product

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

In many developing countries agroforestry contributes significantly to household income in rural and urban areas (Pye-Smith 2010). Agroforestry system has been practised in many parts of the world including Tanzania. People practicing agroforestry have enjoyed the benefits of integrating tree species in their farms by harvesting mature trees that have contributed to the improvement of their household income (Baets *et al*, 2007).

Agroforestry has become a focal entry point for household income generation, environmental stewardship, climate change adaptation, mitigation and ecosystem sustainability through transformation of livelihoods and landscapes (Pye-Smith, 2010). In Tanzania, agroforestry systems have been practised in Moshi with Chagga homegardens popularly known as Kihamba system, Pare with Ndiva system, Ngoro or Matengo pits in Mbinga District, spice agroforestry system in Eastern Arc Mountains, the maize Faidhebia system in southern Tanzania as well as traditional silvopastoral system and Ngitili system in Western Tanzania (Aichi *et al,* 2013). In Moshi District, agroforestry is practised by growing banana, coffee, yams, beans, maize, cassava and potatoes together with trees such as *Grevillea robusta, Olea capensis sub sp. Hochstetteri, Cordia africana, Albizia gummifera* and others in the traditional agroforestry farms (Kweka, 2007).

Due to environmental changes, rainfall has been declining (among other things) and fluctuating in different parts of Tanzania. In order to deal with threats to

desertification and meet the Millennium Development Goal number 7 on environmental sustainability, the Government in Kilimanjaro Region has banned tree harvesting in agroforesrty (MPEE, 2006). Tree harvesting ban has stopped or made it difficult for farmers to harvest planted trees in their own farms (Pye-Smith, 2010). It is argued that before the ban has been introduced, the cost for house construction, payment of school fees and hospital bills, were mainly paid through harvesting and selling of trees and tree products. Household income is considered to be monetized value of the flow of goods and services (Kumar, 1989). Income in the rural areas is contributed largely by agriculture including tree planting. Since agroforestry is the main employer of a large number of people in Moshi District, ban of tree harvesting in agroforestry is likely to increase poverty at household level.

1.2 Problem statement

Before the ban, tree harvesting in agroforestry farms used to be an important source of income for many households in Moshi District. The income generated from tree harvesting was used to cover household needs. The contribution of agroforestry to poverty reduction has declined recently due to tree harvesting ban in these farms. The extent to which this ban has reduced household income is not yet known. The future of agroforestry is endangered as farmers are no longer planting new trees due to the fact that they are not able to harvest them freely when they need income to meet their basic needs. Currently, the Local government is restricting the issuing of harvesting permits and concentrating on administering penalties to offenders. Few studies have been done on tree harvesting in agroforestry farms in Tanzania. An example include Kweka (2007), who conducted a study on design, development and

testing of environmentaly friendly portable sawing steel platform for use in agroforestry and tree farms, another one is by Nshubemuki (2009) as cited in Blomley and Iddi (2009) on the impact of joint forest management (JFM) in Ruvu North Forest reserve. However, there are hardly any studies which have documented on the effect of Government ban on tree harvesting on household income in Moshi District. This study was specifically designed to bridge such knowledge gap by generating empirical knowledge on the effects of tree harvesting ban on household income, for farmers practicing agroforestry system in Moshi District.

1.3 Justification of the study

Tanzanian Government aims at reducing poverty among its people by improving their income. In this regard, the findings of this study provide positive contributions in developing good policies, setting clear strategies and programs towards rural household income improvement. Agroforestry systems have been practiced and encouraged in rural areas (Kilimanjaro Region and specifically Moshi District) with the expectation that trees from tree farms could reduce pressure on hardwoods from the nearby natural forests (Elimsu, 1999). This study aimed at assessing the effect of Government ban on tree harvesting in agroforestry farms on households income in Moshi District. It was expected that the findings of this research would show the impact of this ban on farmer´s income and the need to relax the ban in order to encourage sustainable tree harvesting in agroforestry farms. Sustainable tree harvesting system would not only improve household income and conserve the environment but would also encourage landowners to grow more trees and earn more income.

1.4 Research objectives

1.4.1 General objective

The overall objective of this study was to assess the effect of Government´s ban to harvest trees in agroforestry on household income in Moshi District.

1.4.2 Specific objectives of the study

i) To assess how local government and village environmental committees enforces government´s ban on tree harvesting in agroforestry;

ii) To explore the significance of Government´s ban of tree harvesting in agroforestry;

iii) To determine the effect of tree harvesting ban in agroforestry farms on household income.

1.5 Research questions

i) How do Local Government and Village Environment Committees enforce Government ban on tree harvesting in agroforestry farms?

ii) What is the significance of tree harvesting ban in agroforestry farms?

iii) To what extent have household incomes been affected by tree harvesting ban in agroforestry farms ?

1.6 Conceptual framework

In contextualizing this study, the conceptual framework (Figure 1) was developed to provide a clear link from the literature to the research objectives and research questions. The conceptual framework explains variables which were examined and their relationships. It describes independent variables (tree harvesting ban) that influence dependent variables (Household income). However there are other background variables which can influence dependent variables, these include: sex, age, education, occupation, marital status and income of the respondents.

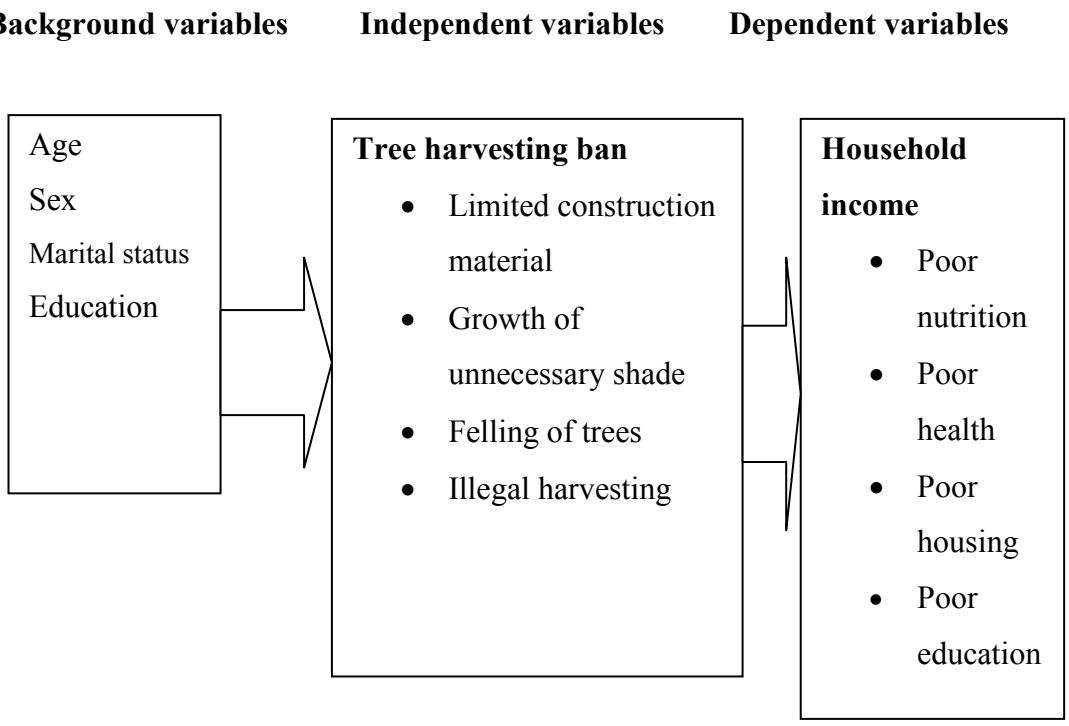

Figure 1: Conceptual framework

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 HIV/AIDs and Tree Harvest Ban

HIV/AIDs is one of epidemic diseases in Africa and Tanzania in particular Kilimanjaro region ranks number six in the country in terms of infection rate (Kitali *et al*. 2013). The spread of this disease has been greatly contributed by risky practices including unsafe sex between partners. The increased distance in searching for firewood is among the risk practices caused by the ban and that can spread this disease. Kitali *et al* (2013) found that HIV/AIDS is a behavioral disease; thus its transmission can be prevented; mostly through changes in individuals' behavior by adopting risk reduction practices.

2.2 The National Agroforestry Strategy (NAS) and the importance of agroforestry to farmers

The NAS, prepared in 2004, envisions at least four million rural households adopting and benefiting from agroforestry practices in a sustainable manner by 2025. Its goal is that by 2020, agroforestry technologies will be adopted and contributed to improved income of 60% of the resource poor households in the country. This goal complements with National Strategy for Growth and Reduction of Poverty NSGRP/MKUKUTA (Kitali *et al.,* 2010). Besides agroforestry farming system contributing to poverty alleviation and conservation of environment through its multipurpose, it increases wood resources (Medusa, 2007).

Okiting´at (1985) found that agroforestry systems can provide many benefits to farmers and the society with a good combination of tree species and food crops. Such a combination provides the direct benefits such as food, timber, fodder, fuelwood and shelter to the farmer. Additionally, indirect benefits to the farmer and the society include reduction of soil erosion, improved carbon stock, carbon sequestration, improved utilization of little amount of rainfall, improved fertility of the soil and reduction of the demand for more land to support subsistence agriculture.

Sale of timber contributes significantly to farmer´s income in agroforestry. For example a study done by Kweka (2007), showed that if the price of sawn wood at the village level ranged between TAS 250 000 to 300 000 per cubic meter.this shows that a farmer could earn about TAS 0.44 million per year from his agroforestry.

2.3 Wood fuel and household income generation

Wood fuel contributes much to the family's livelihood in terms of cooking and lighting. Incomes of many families in the rural and poor urban areas come from sales of fire wood and charcoal, and use firewood and charcoal as the main source of energy. Kangalawe and Liwenga (2007) found that in Tanzania, 80% of total energy is consumed in rural areas where the majority of Tanzanians live. In these areas, wood fuel is the main source of energy because of poor supply of other sources of energy and lack of income to adapt to alternative source of energy. Biomass particularly wood fuel constitutes to 95% of rural energy consumption. According to Kangalawe and Liwenga,2007 the balance of 5% is met by other

options such as kerosene, biogas, electricity, solar, wind and other renewable energies.

The dependency on wood fuel in Tanzania is expected to continue for the unforeseeable future (Kangalawe and Liwenga 2007), where well practised, agroforestry is the best supplier of wood fuel to the rural population. There is also some relationships between the use of wood as fuel and household income. According to Kangalawe and Liwenga 2007, people with low income depend much on fuel wood because of little investment compared to other energy sources that require some investments like gas and electric cookers.

2.4 Challenges facing tree harvesters

The traditional tree harvesting practices in agroforestry for domestic consumption or for sale in order to increase household income is being challenged or interfered by the Government´s directives not to felling trees. Since the implementation of this ban, there has been Village Environmental Committee (VEC) patrolling agroforestry farms to ensure that there is no tree harvesting. The Committee is also supposed to ensure that no chainsaw machines are used for harvesting trees in Moshi as a long term measure. Mugasha *et al.* (2002), wrote that "the challenge is not to stop forest exploitation but to exploit them sustainably". During colonialism and after independence, agroforestry farmers put much of their effort in planting trees, the Government at that time also insisted farmers to plant trees. Because of the ban, it is now a challenge to the Government to ask farmers to plant more trees in farmers agroforestry farms.

2.5 Household income and its indicators

Household income can be expressed and measured in many ways, common indicators include food, improved nutrition, shelter, educational facilities, declining mortality and illiteracy rates. Also household expenditures can be used as a good indicator for measuring income (Kumar, 1989). In Tanzania and especially Moshi District, agriculture is the main source of income in rural areas where large number of people live. Through agriculture, people are able to buy different needs and food. Wapalila (2008), found that agriculture is a source of livelihood for about 80% of people living in rural areas.

Household income consists of cash and in kind contribution to the welfare of the individual or household. It originates from livelihood activities engaged by household members (Ellis 2000). Cash in hand and cash in kind have been used in agroforestry farms for a long time. Selling tree products like poles, timber, charcoal and firewood may result to payment in cash. This is when the buyer comes to the farmer or when farmers send their products to the market. The payment in kind from tree harvesting comes when a farmer exchange a tree product for other services like firewood for school fees, firewood for food and timber for house construction.

2.6 Rules controlling trees harvesting

According to FAO (2006), forestry has a long history of Government regulations on timber harvesting. The initial timber harvesting regulations were designed to protect large forest estates. In the nineteenth century, regulations were designed to protect the best trees. While the emphasis of that time was extraction of timber from large

forest estates, in the twentieth century emphasis was on sustained utilization of forest and other environmental services. This has resulted to demands for new Government regulations. The forest policies in many developed countries have focused more on the environment, and thus these countries have introduced stringent regulations on timber harvesting systems. In developing countries too, restrictions on clear cuts or regulations ensuring selective forest management have became widespread.

As the public level continues to be more aware of the detrimental effects of forest harvest enforces more restrictions on forest harvests. The most recent regulations have included the private forestry sector which aimed at protecting the endangered species and encouraging carbon sequestration in order to protect against global climate change. All these regulations are intended to encourage the preferred behavior or discourage the opposite behavior (FAO, 2006).

Harvest restrictions occur in two basic forms. Some restrictions known as logging bans, are intended to be absolute as they halt all harvests on certain types of forests such as the remaining natural forests. Other restrictions are intended to control certain types of harvest or to limit harvests to approved levels. Some of forestry regulations specify or demand the following before and after timber harvest; demarcation of felling area, forest inventory, marking of tree for felling, actual tree felling recording of felled trees, stamping logs with property licensed mark and revenue/royalty collection (Sabah, 2007).

2.7 Timber supply and demand

Timber from natural forests is becoming less available because of conservation, environmental and social concerns. Although there are no restrictions on plantation forests, on the other hand expansion of industrial forests is limited by competition from alternative land uses. The demand for timber and other forest product has been and keeps on increasing at local, regional and international levels (Kweka 2007),

Nilson (2005) foresees a total shortage of 300 million cubic meters of industrial round wood in the year 2010 and shortage of 800-900 million cubic meters in 2020. Haynes (2003) predicts that future increase in round wood supply is expected to come from non industrial private tree owners. The non industrial private tree owners are private tree growers who are mainly agroforestry farmers. While traditional forest plantation will satisfy some of the demands, it is likely that there will be substantial increase in planting trees on farmlands. Farmers in agroforestry farms are already motivated to plant trees on their land because of benefits they get and this trend is likely to continue.

2.8 Global warming and tree planting

The world is now experiencing global warming (general rise of temperature). This rise in temperature is associated with green house gases that limit sun rays from atmosphere to move out of earths crust. Melting of ice in the polar region and increase of the water volume in the ocean is a good evidence of global warming. Yanda and Mubaya (2011) have found that global warming is the result of human activities, particularly relating to industrial pollution and land use practices. Africa

has made little contribution to the accumulation of greenhouse gases in the atmosphere. Data on per capita emission of carbon dioxide excluding land use change, indicate in most African countries emissions of carbon dioxide are less than 0.5 tones per capital. While Developed countries like Britain, Japan, Germany and United States play a big role in emission of green house gases, developing countries like Tanzania have got small amount of emissions of these carbon gases to the atmosphere. In 2011, Yanda and Mubaya found that most middle income developing countries like Brazil, India, Indonesia, China, South Korea, South Africa and Mexico to some extent contribute to emission of green house gases. These have been due to scientific and economic evolutions taking place as they attempt to compete with developed countries in terms of industrialization.

Research studies have shown that on Mount Kilimanjaro there is decrease of snow on the top of the mountain. This situation is threatening the future of this Mountain and it is worrying that in few years to come, there will be no snow at the cap of Mt Kilimanjaro if measures against global warming are not taken. Research has also confirmed that carbon gases can be reduced by planting trees that use these gases. McPherson (2007), have found that trees reduce carbon dioxide in the air, and contribute to reduction of global warming or “greenhouse” effect.

2.9 Agroforestry farm in Kilimanjaro region

Agroforestry is practiced in the highland of the Kilimanjaro region, in these areas there is availability of rainfall that support farming. The Highland and Intermediate zones are the most agricultural potential areas in the regions. They are fertile, with good reliable rains and moderate temperatures (URT 2009) Farmers in these areas

grow coffee as their main cash crops, coffee one of product in the farm have increased to the farmers for a long time. According to Kilimanjaro regional socio economic profile agriculture is the main economic activity contributing over 75 percent employment to the rural population and contributing greatly about 60% to the region's Gross Domestic Product (GDP). Apart from gross domestic product agroforest has improved the life of people according to Pye-Smith (2010) agroforestry system has increasingly become a focal entry point for rural development

CHAPTER THREE

3.0 METHODOLOGY

3.1 Research design

A cross-sectional research design was used in this study. This allowed data to be collected at one point in time and this also saved time, resources and made it easy to determine the relationships between variables (Saunders *et al*., 2005).

3.2 Description of the study area

Moshi District is one of the seven districts of Kilimanjaro Region located in the north eastern part of Tanzania Mainland. The Region lies south of the Equator between latitudes 02º and 04º and between longitudes 36º and 38º east of Greenwich. The District is located in the central part of the Region (URT, 1998). The area was selected on the basis that no study of the same nature has been conducted in this area and before the ban, tree harvesting in the agroforestry farms has been taking place for many years.

3.3 Sample size and sampling technique

The samples for this study were obtained from 4 study Wards namely Mwika North, Mwika South, Mamba North and Mamba South out of 31Wards found in the District. From the 4 Wards, one Village from each ward was selected making a total of 4 Villages namely Lole-Marera from Mwika North, Kimangaro of Mwika South, Mkolowony from Mamba North and Kotela from Mamba South. In each of the selected four villages, 30 households respondents were randomly selected as a sample for this study. Wards and villages were selected purposively to include those practicing agroforestry activities only. In addition to 120 households from the four

villages, there were nine (9) key informants who were selected purposively based on their understanding enforcement of government rules and regulation on tree harvesting ban.

3.4 Data collection methods

3.4.1 Primary data

Both structured and semi-structured interviews based on prepared interview schedules and questionnaire were used to collect primary data from heads of households who were randomly selected to be included in the study. Besides their personal data, the respondents provided information on their opinions regarding the current ban on tree harvesting in agroforestry farms, their concerns on Village Environmental Committees, social and economic effects of the Government´s ban on the agroforestry system and tree harvesting techniques. Key informants who were purposively selected included:- 4 Ward Councilors, 4 Village Chair persons and Moshi District Forest Officer (DFO). These 9 key informants were asked to provide information about the efficiency and roles of Village Environmental Committees and how the Government rules and regulations were being enforced. In addition, the Researcher also made field observations on agroforestry practices and how the ban was being implemented in the study areas.

3.4.2 Secondary data

Data on the effects of tree harvesting ban on social economic welfare of the local people and the District at large were obtained from Moshi District offices. Also, data on effects of tree harvesting ban on environmental protection were obtained

from books, research reports and Government documents from Sokoine National Agricultural Library (SNAL), Moshi District Council and from the Internet.

3.5 Data processing and analysis

Content analysis was used to analyze data collected through interviews using interview guide for key informants. The quantitative data from household heads was collected through questionnaires and analyzed using Statistical Package for Social Sciences (SPSS) software, Version 16. Descriptive analysis was done to compute frequencies, means, minimum and maximum values of both dependent and independent variables

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Socio-economic characteristics of respondents

4.1.1 Age group

Respondents´ age was divided into six age groups starting from 15 to over 65 years in order to cover household heads from young ages to the old ages of more than 65 years. The age group of between 45 and 54 years became the age group with a lot of respondents (22.5%). Out of the 120 respondents the age group with the smallest number of household heads was that of between 15 and 24 years (10%). The small number of household heads in this age group could be attributed to socio- economic and cultural factors which limit males to have family at this age (Table1).

4.1.2 Sex characteristic of respondents

Table 1 indicates that the number of females constituted 55% while that of male respondents accounted for 45% out of the 120 respondents who were involved in this study. This means that most of the respondents who were interviewed using questionnaire guide were female. This observation is attributable to the culture of the society where by women do most of the domestic tasks like taking care of children, cooking, washing clothes and taking care of livestock which make them available at home most of the time. Males are normally out of homes most of the time since they have to seek employment opportunities elsewhere. The Researcher met a large number of males on the roads riding motorbikes while others were carrying farm products to market places. This explains for the small numbers of male respondents compared to females who were in most cases found at home.

4.1.3 Marital status of respondents

The findings of this study show that out of all respondents, 59.2% were married 9.1% widows,divorced 9.2% and 4.2% widowers The propotion of single respondents was 18% out of all 120 respondents (Table 1).

4.1.4 Respondents education

About 42% of the respondents had primary education while those with secondary education constituted 34%. On the other hand those with College and University education constituted 12% out of the total 120 respondents. The remaining 11.7% had no formal education showing that the rate of literacy was relatively high.

4.1.5 The occupation of respondents

Regarding the occupation of respondents, the findings showed that the main occupations for most of the respondents was farming and keeping livestock (Table 1).Respondents doing farming and keeping livestock at the same time were74.2 % While those engaged in business or employed were 10.8% . Respondents engaged in farming alone were3.3% while those engaged in livestock keeping alone accounted for 8%. The general observation was that there was a close relationship between crop farming and animal keeping.

Table 1: Socio -economic characteristics of respondents

Age group	**Frequency**	**Percent**
15-24	12	10.0
25-34	24	20.0
35-44	21	17.5
45-54	27	22.5
55-64	14	11.7
65+	22	18.3
Marital status		
Single	22	18.3
Married	71	59.2
Divorced	11	9.2
Widower	5	4.2
Widow	11	9.1
Sex		
Male	54	45.0
Female	66	55.0
Occupation		
Farming	4	3.3
Livestock keeping	6	5.0
Farming and livestock keeping	89	74.2
Business and wage employment	13	10.8
Education level		
No formal education	14	11.7
Primary education	50	41.7
Secondary education.	41	34.2
College	11	9.2
University	4	3.3

4.2 Implementation of tree harvesting ban in agroforestry farms

4.2.1 Issuing of harvesting permits

In this study, 43% of the respondents reported that before the ban, the issuing of harvest permits took a day to be processed while 33% said that it took more than three days in other words, it took few days to get a permit. The cost of a permit per tree was 10, 000/=. Since the ban was introduced, there are no more permits issued to the villagers. This denied Village and District governments some revenue. For example, one of the Village chairmen stated that harvest permit fees together with penalty fees were used by Village government to procure stationery for Village Government office. Due to Government ban, running of Village government offices has become difficult since there are no more revenue from permit fees.

Table 2: Time it takes to get a harvesting permit

Time to get harvesting permit	Frequency	Percent
Missing	2	1.7
One day	51	42.5
Two day	23	19.2
Three days	5	4.2
More than three days	39	32.5
Total	**120**	**100**

4.2.2 Announcement of tree harvesting ban

Tree harvesting in agroforestry farms in Kilimanjaro Region was officially banned on 29 February 2012. This was after a meeting held by Kilimanjaro Regional Central Committee (RCC) chaired by Mr. Leonidas Gama (Kilimanjaro Regional Commissioner). This meeting was attended different stakeholders including by

Members of Parliament (Natural Resources Committee), Regional Defense and Security Committee, Chairpersons of all Kilimanjaro District Councils, Members from Kilimanjaro National Parks, Members from the University of Dar es salaam and members from NGOs dealing with environmental conservations in the region .

This meeting was held to discuss environmental problems in Kilimanjaro Region and deliberated on a joint report of two different environmental meetings held on 22 February 2012 and 23 February 2012. The meeting participants agreed that from the date of that meeting, tree harvesting in the region should be stopped because of environmental degradation caused by massive tree cutting. One of the interviewees in this study (Mr Msangi, the District Natural Resources Officer) said that the ban was introduced in order to curb and solve environmental problems in the region. Aerial photographs by then showed that there were few tall trees and many open spaces within farms and forest areas which had resulted to a decrease in rainfall and drought in the region. In addition, the meeting resolved that timber and firewood for the whole region had to be supplied by North (Rongai) and West Kilimanjaro Forest Plantations only. The importation of legal timber from other regions was also allowed together with a strong campaign to plant trees on farms and open spaces.

4.2.3 Supervision of the ban by village environmental committees

The Village Environmental Committee (VEC) is the committee that works hand in hand with the Village Government (VG). In this study it was found that most of the time (44%), this Committee is engaged in supervising tree harvesting operations. About 35% of the committee time is spent on patrolling illegal tree harvesting and administering penalties to those with no harvesting permits. The study also noted

that the Committee spends only 17% of their time to encourage and supervise tree planting in the respective villages (Table 3).

Some villagers also complained that sometimes VECs solicit bribes from villagers by threatening to report them to the District and interested in Regional authorities. Overall, this study found that VECs were more interested on fines than in educating and encouraging farmers to plant more trees in their farms.

Table 3: The functions of village environmental committee

Functions of VECs	Frequency	Percent
Supervise planting of trees	20	16.9
Supervise harvesting of trees	52	44.1
Patrolling for illegal harvesting	41	34.7
Negotiating prices for tree to be harvested	5	4.2
Total	**120**	**100.0**

4.2.4 Performance of village environmental committee (VECs)

When asked to assess the performance of VECs, most of the villagers ranked them low because they were expecting the VECs to deal with issues of educating and encouraging farmers to plant more trees in their farms, harvesting rainwater and participating in the promotion of intensification of agricultural technology. Results show that about 46% of villagers link or associate poor performance with VECs concentrating too much on fines so as to get money, bribes and threat to villagers. Table 4 shows why VEC was rated low in terms of performance. In addition, the study also found that timber traders had no control or influence on VECs decision as speculated by few villagers

Table 4: Causes of poor performance of VEC

Causes of poor performance of VEC	Frequency	Percent
It is there to oppress poor	26	25.2
It is associated with bribe	27	26.2
Only dealing / interesting in collecting money	47	45.6
VEC Controlled by timber trader	3	2.9
Total	**120**	**100.0**

4.3 The effect of tree harvest ban on househo4.3

There has been effect of tree harvest ban on household income this is because of rapid changes of income that agroforestry famers face. The rapid changes on source of income have been associated with increased illegal harvesting of trees, (table 8) There have been an increase of illegal activities by 55.8%. Majority of villagers used the income for paying school fees 43%, construction of new houses 37% and buying food and clothes 13%.(Table 6). The ban has come up with restriction on harvesting at the same time, needs has got no restriction, agroforestry farmer need to pay for school fees, house contruction, food and clothes.

4.3.1 The relationship between tree harvesting and household income

Table 5 indicates that about 83% of all respondents agreed that there was a relationship between tree harvesting and household income. The study found that household income came from tree products such as sawn timber, construction poles, firewood and charcoal that could be used directly at household level, sold or exchanged for money or other services.

Villagers in Moshi District use fuelwood as their main source of energy for domestic and non domestic activities like hotel business and local brew making. Since local brew and hotel business need large amounts of firewood than household needs, more trees are harvested to meet the needs of firewood in hotels. In most cases, the firewood used on other hand at household levels come from pruned tree branches rather than from felled trees.

Table 5: The relationship between household income and tree harvesting

If there is any relationship	Frequency	Percent
Yes	100	83.3
No	20	16.7
Total	**120**	**100**

4.3.2 Use of income from tree harvesting

In this study, it was revealed that income from trees harvested in the agroforestry farms was mainly used for buying food and clothes, paying school fees, construction and repairs of houses and settling of hospital bills. It could be seen that the income was basically used in meeting basic needs such as food, clothing, helth and shelter. Table 6 shows the response of villagers when asked how they used income from tree harvesting before the introduction of tree harvesting ban. Majority of villagers used the income for paying school fees (43%), construction of new houses (37%) and buying food and clothes (13%) as explained in the following sections.

4.3.2.1 Paying school fees

In this study, it was found that the majority of the villagers in Moshi District send their children into educational institutions like primary schools, secondary schools, vocational training Colleges and Universities. The money needed to contribute to village schools development and to pay for school and college fees used to come from sale of harvested trees and tree products. Since the introduction of the ban in 2012, there were indicators that there were some parents who had failed to pay school fees for their children.

Although it was beyond the scope of this study to find out the exact number of villagers who had failed to pay school fees, about 43% of the respondent said they used income from trees harvested to pay school fees for their children. This means therefore unless there is an alternative source of income, tree harvest ban is likely to retard educational development in this area.(Table 6). Decreased banana production due to diseases and decreased production of coffee due to high production cost and low market prices have contributed to less income to the local communities in the area. This explains why majority of farmers had resorted to selling/harvesting of trees in order to pay for school/college fees.

Table 6: Use of income from harvested trees before the ban

Use of income	Frequency	Percent
Food and Clothes	16	13.3
School fees	52	43.3
Construction of house	44	36.7
Hospital bills	8	6.7
Total	**120**	**100.0**

4.3.2.2 Construction of houses

Use of income for construction of houses took a second position after school fees. About 37% of respondents said that they used the money from the sale of trees and tree products (Table 6) for house construction. Having a good house shows or reflect the social economic wellbeing of an individual/household. In the study area there are two types of houses:

- Houses made of mud walls and roofed with iron sheets
- Houses made of cement block walls and roofed with iron sheets

Houses made of mud walls and roofed with iron sheets need a lot of wood for holding mud and roofing in addition to door and window frames and timber for window and door panels. Planting of trees in agroforesrty farm was meant to provide construction materials for this type of houses and the availability of building materials was very cheap by then. These types of houses belong mostly to families of low incomes who cannot afford cement block houses.

Houses made of cement blocks and roofed with iron sheets are more expensive but need few wood since timber is required only for roofing and for making doors and windows frames and panels. Construction of this type of house was not that

expensive before tree harvesting ban, but now the cost has increased tremendously since Villagers have to buy timber in the open markets and outside the villages. In other words, farmer practicing agroforesrty system are now forced to buy expensive timber to construct their houses something which was not there before the introduction of the ban.

4.3.2.3 Food and clothes

Only about 13% of the farmers stated that they used the income generated from selling of timber and other tree products for buying food and clothes. The small percent was due to the availability of many food crops grown in the agroforestry farms and dairy animals kept by farmers which save them from buying food such as maize, beans, milk, bananas, meat, fruits, and vegetables that are obtained directly from agroforestry farms. The remaining food items such as wheat flour, salt, sugar cooking oil and others were obtained from the sale of trees, tree products and agricultural crops

4.3.2.4 Hospital bills

Table 6 shows that about 7% of the respondents claimed that they used income from sale of trees and tree products to pay for hospital bills before the ban. This was typical especially for serious cases like accidents, maternal bills and referral cases to Regional hospitals. For example Mr Johnham Kisanga aged above 65 years from Shokony - Kimangaro Village in Mwika South is very much affected bythe ban on harvesting trees as he cannot raise Tsh 0.3 million required for treatment at Ocean Road Hospital in Dar es Salaam. To him “tree harvest ban is one way of killing elders who can not sell their trees and are having no money from coffee and banana

sales due to continuous fall in prices." He further claims that he planted and took care of his farm so that one day these trees could help him. Now that he cannot harvest his own trees so that he can be treated is very bitter on this ban.

4.3.3 Use of quality trees as firewood and poles instead of timber

In Moshi district no chainsaws are allowed for felling trees. Instead, only hand axes and bush knives are allowed by the Government to fell and debranch trees. This situation has resulted to a great loss of useful trees since instead of trees being sawn for good timber; they are converted into firewood and construction poles which fetch low prices compared to timber (Plate 1). This lowers household income because of little price of firewood and construction poles in the market.

Plate 1: A felled tree to be used as firewood or poles instead of timber

4.3.4 The decaying of matured trees

When the ban was introduced there were a number of matured trees which are now over mature and are rotting or decaying in the farms resulting to loss of quality trees. Trees which are mature and are now rotting in the farms include *Grevillea robusta, Cordia africana, and Albizia gummifera* (Fig 3). The rotting of mature trees is a way of wasting resources that are required by households as an income source. Tree harvesting ban has resulted to rotting and a waste of resources at the time when they are needed badly. From Table 7 it can be seen that out of the 120 respondents, 56% of them claimed that they were witnessing the decay of mature trees in their farms. Decayed trees sometimes fall on their own and are used as firewood or sometimes birds and insects eat and destroy them. This situation is caused by harvesting ban which is causing loss of resources to families which need income from these mature trees (Plate 2).

Table 7: Decaying of mature trees and loss of quality

Witnessed Decaying of matured tree	**Frequency**	**Percent**
Yes	67	55.8
No	53	44.2
Total	**120**	**100.0**

Plate 2: A dry mature tree rotting in the farm

4.3.5 Destruction of properties

In this study, it was noted that there were a number of mature trees in the area that are not harvested and thus are in danger of destroying properties especially when they dry up and there are strong winds. These trees with big dry branches near properties like living houses, electric poles and roads are dangerous to human life. Beside causing accidents and damages to the properties, non use of these trees is resulting to poverty amongst local communities. Therefore there is a need to critically look at the ban so that mature trees are harvested instead of being left to rot, dry and cause damages and accidents. For example, some villagers were complaining that some of the decaying trees were in danger of falling and destroying their houses and other properties. (Plate 3).

Plate 3: A tree which has fallen near a living house

4.4 Illegal tree harvesting after the Ban

4.4.1 Drying trees

Agroforestry farmers have discovered a new method of harvesting trees without being questioned or harassed by the Village Environmental Committee (VEC). Hard wood tree which are normally killed in this way are : *Olea capensis subsp .hochstetteri ,Cordia africana,* and *Albizia gummifera.*

This shows how desperate and frustrated these farmers have been affected by this ban. In the past, farmers used to kill trees before harvesting them by debarking the lower parts of the tree trucks to prevent nutrient flow from the roots to the branches. When interviewed Mr Goodluck Aiwinia an agroforestry farmer from Kotela (Mamba North) stated that this method of killing trees using salt has been discovered and stopped by the Village Environmental Committee (VEC).

4.4.2 Night and weekend tree harvesting

Harvesting trees during weekends is one way of avoiding being caught by the Government officials in Moshi district. Villagers use this method because they believe that during weekends there are no Government offices that are open or operating. Since both tree owners and tree fellers are held responsible if caught by VEC, tree owners ensure there is tight patrol when harvesting trees during the weekends.

Harvesting of trees at night hour is also another method used employed by villagers to avoid the strong arm of the Government. Usually between 01:00 hours and 04:00 hours villagers employ tree fellers who ensure that the task of felling and transporting timber is completed before dawn. When asked to comment on what has been the main effect of tree harvest ban in their area, 56% of the respondents said the ban has increased illegal tree harvesting (Table 8)

Table 8: Effects of ban on tree harvest in Moshi District

Effect of the ban	Frequency	Percent
Reduced number of tree harvested	26	21.7
Encouraged illegal tree harvest	67	55.8
Improved environment	27	22.5
Total	**120**	**100**

4.4.2.1 Traditional hand sawing

Traditional timber hand sawing is the m ain method that is used to produce sawn timber in Moshi District. This method called pit swing (if a pit is dug) or platform sawing has been used a for long time. It is carried out by digging a hole in the

ground or by making wooden platforms as shown in plate 4. The study found that these two methods are used in the production of timber for making both door and window frames, roofing materials, doors & window panels and furniture. The findings from this research show that 85 respondents (about 71%) confirmed that hand sawing (pit sawing /wooden frame) was the most common method of producing timber in agroforestry farms in Moshi District.

Plate 4: Wooden platform sawing site in one of the agroforestry farms

Table 9: Timber harvesting methods in Moshi district

Harvesting methods	Frequency	Percent
Traditional pit sawing, or wooden platform	85	70.8
Chainsaw machine for cutting and lumbering	35	29.2
Total	**120**	**100**

4.4.2.2 The use of Chainsaw

Chainsaws unlike hand saws are hardly used during illegal timber harvesting. This is due to sound they produce during cutting operations. Where chainsaws are used

illegally, they are used mostly at night hours in riverines when villagers are deep asleep. Chainsaws are more preferred for harvesting big size hardwoods trees which are difficult to fell with handsaws. Chainsaws take less time to complete the task than handsaws and are used mostly for harvesting hardwoods such as *Cordia africana and Albizia gummifera*. In a study by Kweka (2007), it was found that felling, crosscutting and sawing of *Grevillea robusta* using hand sawing was cheaper (Tsh 35 700 per m^3) than when cutting *Cordia africana* which was (Tsh 55 600 per m^3). This shows that harvesting of hardwoods was more time consuming and more strenuous for hand sawyers compared to when sawing softwoods. This study also found that only 29% of the respondents felt that chainsaws were used for timber harvesting in this area (Table 9).

4.4.3 Local people's alternative livelihood

When the respondents were asked if there had been an alternative income generating activities introduced in this area to compensate for the loss of income due to the harvesting ban, about 53% of villagers said that there was nothing introduced. The study found out that before implementation of the ban, the Government did not discuss with the Villagers on the alternative income sources in order to sustain their livelihoods. When they were asked to list alternative measures which the Government should have taken to curb or reduce the effect of the introduced ban, 6.7% of the respondents thought that the price of cement should have been lowered in order to enable farmers be able to construct cement block houses. About 33% of the respondents felt that new stoves should have been introduced in order to efficiently utilize the available firewood/charcoal. Lastly about 8 % of the respondents thought that the Government should reduce the price

of kerosene and electricity so that more people can afford to use them. As indicated in Table 10, about 53% of the respondent had no idea on the suggestions about the alternative income sources.

Table 10: Measures to be introduced as compensation to the ban

Alternative	Frequency	Percent
Reduced price of energies	9	7.5
Introduction of new stoves	40	33.3
Reduced price of cement	8	6.7
None of the above	63	52.5
Total	**120**	**100.0**

4.5. Sustainability of agroforestry farming system

4.5.1 Sustainable agroforestry

Sustainable agroforestry is the farming system that is used at present time and in the future. The issue of sustainable agroforesrty farming is of great importance to farmers in Moshi district. Table 11 indicates that about 71% of the respondents do not think the ban will encourage sustainable agroforestry farming in the area. Since majority of respondents are aware of the importance of sustainable farming, the Government needs to come up with policies and bylaws that will guide and encourage sustainable agriculture in agroforestry. This is because good agricultural policies will promote sustainable agriculture in the agriculture sector and improve household's income.

Table 11: The impact of the ban on sustainable agroforestry

Is the ban encouraging sustainable agroforestry?	Frequency	Percent
Yes	35	29.2
No	85	70.8
Total	**120**	**100.0**

4.5.2 Education on tree planting and tree harvesting

The study found that there was no education given to farmers in Moshi District on farming methods and on the optimum number of trees to plant in an area. Knowing the maximum number of trees to plant per acre this will guide farmers on the number of trees to harvest in an area. Beside this guideline assisting farmers to plant and harvest trees, VEC could also use these guidelines when conducting their business. Majority of the respondents (53%) thought that by providing appropriate education to agroforestry farmers, this will improve household income, ensure sustainable farming and encourage environmental protection (Table 12). This type of education needs to be conducted by Agricultural Extension Officers, Environmental and Forestry experts.

Table 12: Measuresto take in order to improve household income

What to do	Frequency	Percent
Planting of trees should be encouraged	47	39.2
Improve ban on harvesting tree	6	5.0
Modify tree harvesting permit procedures	4	3.3
Educate agroforesrty farmers on sustainable farming	63	52.5
Total	**120**	**100.0**

Local communities are likely to understand and benefit from this type of education as majority of them (88.3%) are literate (Table 1). With such high proportion of local people having primary, secondary and college education they are able to understand the importance of sustainable agroforesrty farming systems and sustainable tree harvesting techniques.

4.5.3 Impact of tree shade to agricultural crops

In the past, harvesting of trees was done to reduce shade and encourage growth of other plants or crops such as banana, coffee, yams, beans, maize, cassava, and potatoes. Introduction of the ban is likely to reduce growth of crops grown in the agroforestry farms. Pruning, which is normally done in young growing trees tend to reduce shade but no pruning is carried out in mature old trees. This means therefore for crops under shade to grow, mature trees have to be harvested in order to allow light to reach these crops. This agrees with what Ward councilor of Mwika South said “shade reduction is important for growth of other plants in the agroforestry farms.” The study also noted that the popular slogan “cut a tree, plant a tree.” is hardly implemented in this area since there is no tree that is cut to warrant tree being planting. The ban is therefore likely to result in agroforestry farms having only old mature trees, no undergrowth of crops and young trees which is contrary to sustainable forest management and sustainable agroforestry.

4.5.4 Sources of energy

The main source of energy in this areas is fuel wood, either harvested or pruned from trees and is used for heating and lighting. The traditional “three stone cookers” are common in this area for cooking using fuel wood. As shown in Table 13, fuel

wood is the leading source of energy by 85%, while gas and electricity are used by very few farmers for lighting and cooking. In order to conserve wood, modern stoves need to be introduced especially in local brew making centers' which consume a lot of wood. The traditional cooking stoves need to be improved or improved wood cooking stoves need to be introduced in this area in order to minimize wood consumption. Improved cooking stoves are likely to reduce tree cutting and trees being pruned for firewood.

Table 13: Different sources of energy in Moshi District

Energy source	Frequency	Percent
Fuelwood	102	85.0
Electricity	6	5.0
Gas	12	10.0
Total	**120**	**100.0**

4.5.5 Education on the importance of environmental conservation

The study found that most villagers in Moshi district have been educated and given knowledge on the importance of environmental conservation and reasons for tree harvesting ban. This education on environmental protection and destructions caused by cutting trees is being provided by Government organs such as Kilimanjaro National Parks (KINAPA) and Non Governmental Organization such as *Floresta, Radio Sauti ya Injili* and Religious organizations. As indicated in Table 14, majority of the respondents (88%) were aware and realized the importance of tree harvesting ban in conserving the environment. This shows that education on environmental protection had been provided adequately by the Government organizations and Non Governmental Organizations in the District.

Table 14: The importance of environmental conservation

Aware of importance	Frequency	Percent
Yes	106	88.3
No	14	11.7
Total	**120**	**100.0**

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Since the introduction of the ban on tree harvesting there has been illegal harvesting of trees that supplies local people with building materials such as timber, construction poles and woodfuel. Illegal harvesting taking place does not encourage sustainable agroforestry. Tree species being harvested illegally include *Grevillea robusta, Olea capensis subsp .hochstetteri, Cordia africana and Albizia gummifera.* When asked 70.8% of the respondents said the ban had encouraged illegal harvesting and did not encourage sustainable agroforestry farming.

Since the enforcement of this ban, a lot of effort have been on controlling timber harvest rather than encouraging farmers to plant more trees in their farm. For example there was only one Village out of the four Villages with a tree nursery showing that most of Village Environmental Committees are concentrating on policing so that they can fine farmers who are found felling trees. This to some extent encourages mul practices such as corruption between farmers and Committee members.

Besides the ban having negative impact on household income, the ban has also reduced revenue in Moshi District from 40 million in 2011/12 to about Tsh 3.5 milion in 2012/13 showing that the ban is accelerating poverty rather than reducing poverty in the rural areas. In order to run Village and District offices, Village and District authorities have introduced levies on agriculture crops and fines as an alternative source of income from the local people

5.2 Recommendations

Considering the pros and cons of tree harvesting ban, there is need to review the impact of the ban and consider/allow for restricted sustainable tree harvesting. A better way of harvesting these trees is the use of Portable Log Sawing Steel Platform (PLSSP). Portable Log Sawing Steel Platform have minimum damage to coffees plants, other agricultural crops and immature trees in the farms. Agroforestry farmers have been living with the principle of "cut a tree, plant a tree" for a long time. This principle is good and VEC should be tasked to ensure that for every tree cut there is another tree planted in order to ensure sustainability. VEC should also ensure that village tree nurseries are established so that tree seedling are available when needed. Restricted harvesting of matured tree and supply of tree seedlings from village nurseries will ensure sustainable supply of timber and other tree products which will improve the household income and environmental protection in Moshi District.

Village Environmental Committees should be educated on the importance of protecting and conserving the environment, improving agriculture production and the need to work closely with agroforestry farmers in order to improve their livelihoods. By so doing this will result to good harvest of both agroforesrty products such as coffee, bananas, yams, beans, maize, cassava, potatoes and tree species like *Grevillea robusta, Olea capensis subsp .hochstetteri, Cordia africana, and Albizia gummifera.* Villagers should be educated on the negative effects of corruptions, the importance of good governance and the need to work closely with Government apparatus. Before introducing a new policy or bylaw, it is important that Villagers are involved right from the beginning so as to have their opinions.

As far as possible, harvested trees in the agroforesrty farms should first be used for domestic/household consumptions before being sold for extra income. Since farmers need timber and poles for house construction and firewood for cooking, unless cheaper alternative sources for these services are provided, trees will continue to be harvested irrespective of the Government ban. Beside emphasizing on environmental protection , emphasis should also put on how to improve household incomes of local people if the ban is to be effective.

While the ban could have positive results in the long run, there is need to think of people who planted trees and now they wish to use them for solving their domestic problems. The study has found that there is a relationship between tree harvesting income and ability to buy food and pay for school fees, clear hospital bill and construction of new houses. Unless there are alternative sources of income the ban will reduce household income and ability to buy food, pay school fees, clear hospital bill, and construction of new houses. Improved agricultural production through provision of subsidies is one way of ensure that people or households incomes are not adversely affected by tree harvesting ban in Moshi District. This means therefore, the Government should look again on this ban so as to reduce its effects on peoples income.

There is also need to compare the difference between environmental destruction in forest plantations of West Kilimanjaro in Siha District and Rongai in Rombo District to that of nearby agroforestry farms . If there is no difference, then there is need to make reforms on the ban. This is because the number of people affected by

the ban practicing in agroforestry is large compared to the number of people in the plantation forest.

Global environment meetings like that of Kyoto 2007 have come out with agreements of reducing emission poisonous gases from industries. Implementation of these agreements should be step wise, this is because full implementation can result to economic problems. For example quick and full implementation of tree harvesting ban has resulted to decreased household income and has opened chances for corruptions and illegal harvesting.

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APPENDICES

Appendix 1: A Questionnaire for household heads

A: GENERAL INFORMATION:

Name of Interviewer……

Respondent's Name…… Questionnaire Number [ ]

Ward Name……. Village Name……

Date of Interview……

A: Respondent's socio - demographic attributes.

Tick (✓) where appropriately

1. Sex of respondent

1 [ ] Male 2 [ ] Female

2. Age of respondent

1 [ ] 15-24 2 [ ] 25-34

3 [ ] 35-44 4 [ ] 45-54

5 [ ] 55-64 6 [ ] 65+

3. What is the highest level of education?

1 [ ] No formal education 2 [ ] Primary education

3 [ ] Secondary education 4 [ ] Intermediate College education

5 [ ] University 6 [ ] Others (Specify)……..

4. Marital status of respondent

1 [ ] Single 2 [ ] Married

3 [ ] Divorced 4 [ ] Widow

5 [ ] Widower

5. What is your main occupation?

1 [ ] Farming 2 [ ] Livestock keeping

3 [ ] Farming and Livestock keeping 4 [ ] Farming and small Business

5 [ ] Salary/ Wage employee 6 [ ] Others

B. The impact of tree harvesting ban on agroforestry farming system.

6 Which of these is used as a source of energy at household levels.

1 [ ] Fuelwood 2 [ ] Solar energy

3 [ ] Electricity 4 [ ] Gas

7. Are you aware of Government `s ban on tree harvesting in agroforestry farms?

1 [ ] Yes, 2 [ ] No

8 . Who enforces the Government`s ban on tree harvesting in this village?

1 [ ] Village Environmental Committee 2 [ ] Village leaders

3 [ ] NGO's 4 [ ] others (specify)…….

9 Do you think the ban is of significance to Agroforestry activities?

1 [ ] Yes 2 [ ] No .

10. Is the Governments ban having any impact on tree harvesting?

1 [ ] Yes, go to 11 2 [ ] No

11. If yes, is the ban associated with the following ?

1 [ ] Reduced number of trees harvested

2 [ ] Encourage illegal harvesting of trees .

3 [ ] Reduced family income.

12. Is the ban encouraging sustainable agroforestry farming ?

1 [ ] Yes. 2 [ ] No

C. Implementation of tree harvesting ban by the Village Governments and Environmental committees

13. Does the Village have Village Environmental committee?

1 [ ] Yes, 2 [ ] No

14.What are the basic functions of the Village Environmental Committee?

1 [ ] Supervise harvesting of trees

2 [ ] Supervise planting of trees

3 [ ] Patrolling for illegal harvesting of trees

4 [ ] Negotiating prices for trees to be harvested

15. What is the cost (Shs) of permit per tree ?

1 [ ] 1000 to 4000/=. 2 [ ] 4001 to 8000/=.

3 [ ] 8001 to 12000/= 4 [ ] More than 12000/=

16 How long does it take to get a tree harvest permit.?

1 [ ] One day 2 [ ] Two days

3 [ ] Three days 4 [ ] More than three days

17.What is your opinion concerning the performance of the Village Environmental Committees on sustainable agroforestry?

1 [ ] It is efficient 2 [ ] It is very efficient

3 [ ] It is inefficient 4 [ ] It is very inefficient

18. If it is inefficient or very inefficient, why?

1.[ ] It is there to oppress poor 2 [ ] It is associated with corruptions

3. [ ] More interested in fines 4.[ ] Influenced by timber trades

19 Does VEC insure trees are planted soon after issuing harvest permits

1 [ ] Yes 2 [ ] No

D. The effect of tree harvesting ban on household income.

20. Before implementation of the ban, which of the following methods were used to harvest trees ?

1 [ ] Felling traditional pit sawing or use of wood frames at the site.

2 [ ] Use of chainsaw machine for cutting tree and lumbering.

3 [ ] Use of steel platforms that has little environmental impact to the farms

21. Before the implementation of the ban was the income from tree harvesting large enough to support household needs ?

1 [ ] Yes 2 [ ] No.

22 .If yes how was the income used ?

1 [ ] Buy food and clothes 2 [ ] Pay school fees

3 [ ] House construction 4 [ ] Pay hospital bills

23. Since the ban has been introduced, has the income from tree harvesting changed?

1 [ ] Yes 2 [ ] No.

24. Do you think there is any relationship between tree harvesting ban and house hold income? 1 [ ] Yes, 2 [ ] No.

25 Has tree harvesting ban influenced anything on the following ?

1 [ ] Reduced price of gas ,electricity and kerosene.

2 [ ] Introduction of new stoves (that use small amount of wood)

3 [ ] Reduced price of cement and other construction materials.

4 [ ] None of the above.

26. What do you think should be done to improve household income?

1 [ ] Planting of more trees should be encouraged.

2 [ ] Lift harvesting ban of trees

3 [ ] Modify condition on trees harvest permit

4 [ ] Educate agroforestry farmers on the importance of sustainable farming.

27. Have you seen mature trees decaying or rotting because of tree harvest ban? 1[ ] Yes 2 [ ]No

Appendix 2: Interview guide for key Informants (Village leaders Ward executive leaders and NGOs)

Respondent's Name…… Title of the respondent……..

Sex of respondent…….. M / F (Tick one)

Contacts/Phone…….. Date of interview……

1 Describe the main activities of Village Environmental Committee (VEC) in your Village.....

.....

2 Do you think the ban imposed on tree harvesting will affect economy of the people Explain how?.....

.....

3 Do you think sustainable agriculture and environmental protection will be achieved through tree harvesting ban? Explain .....

.....

4 Are there any benefits that society is getting from tree harvesting ban ? .....

.....

5 What is the main source of energy used in domestic activities in your area?

.....

.....

6 Have you noticed if there is any differences individual and village income from tree harvesting before and after introduction of the ban ?

.....

7 What is the monthly average Village income from tree harvesting?

.....

8 How do village use incomes from tree harvesting permit ?.....

.....

9 Are there any illegal tree harvesting activities going on in your area? How is done and how can it be stopped ? .....

.....