THE IMPACTS OF POPULATON GROWTH ON MANAGING FOREST RESOURCES IN WEST USAMBARA, TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER'S OF ARTS IN NATURAL RESOURCE ASSESSMENT AND MANAGEMENT OF THE OPEN UNIVERSITY OF TANZANIA

2017

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled: Impact of population growth on managing forest resources in West Usambara, Tanzania in partial fulfilment of the requirements for the degree of Masters of Arts in Natural Resource Assessment and Management of the Open University of Tanzania.

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Dr. Reguli Mushy

(Supervisor)

Date ……………..………………………

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DECLARATION

I, **Simon Charles Lugazo**, do hereby declare that, this dissertation is my own original work, and that it has not been presented and will not be presented to any other University or Institution for a similar or any other degree award.

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Signature

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Date

DEDICATION

This work is dedicated to my lovely wife Mariam Mambosasa and my children Jennifer Lugazo, Jeremiah Lugazo and Jelyn Lugazo for their moral encouragement during my study time. Moreover, it is dedicated to my beloved parents, my father Mr. Charles Lugazo and my mother Ms.Margareth Semkiwa for laying down the foundation of my education.

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ABSTRACT

This dissertation set out to assess the impact of rapid population growth on forest resource management in West Usambara, Tanzania. It aimed to determine the trend of population growth in Tanzania over the past thirty years, socio-economic factors affecting forest resource uses and evaluate intervention measures on forest resources management. The field survey that was conducted in four wards Mayo, Baga, Mgwashi and Bumbuli, and employed SPSS statistical analysis to assess the impact of rapid growth of population on forest resource management. A total of sample of 100 heads of the households were randomly drawn to respond to household questionnaires. Meanwhile, a total of eight key informants, Three Forest Officers from Bumbuli District Council, TFS and TFCG, three village natural resource committee and two village leaders. The study revealed that the population of the study area has almost doubled from 246,049 in 1978 to 492,441 in 2012 with population density of 120.4 persons per square Kilometer which is above the national population density of 51 persons per square Kilometer. Furthermore, 84% of the respondents collect fire wood from the forest while 96% revealed to depend in forest for different forest products like fire wood, vegetables, fruits and medicine. About 96% revealed to practice PFM which is underperformed due to different challenges mentioned. Moreover, the study concluded that population growth contributed highly to the forest destruction. Finally it recommended that awareness rising on family planning should be promoted, land use plan developed and PFM actively established with equal benefit sharing among the actors. Likewise the policy and regulations should be reviewed to favour forest adjacent community's needs.

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LIST OF ACRONYMS

CBFM   Community Base Forest Management

FAO   Food and Agriculture Organization

FBD   Forest and Beekeeping Department

FGD   Focus Group Discussion

FORMECU   Forestry Resource, Managements, Evaluation and coordinating Units

GDP   Gross Domestic Product

JFM   Joint Forest Management

LDC   Lushoto District Council

MNRT   Ministry of Natural Resource and Tourism

MOHSW   Ministry of Health and Social Welfare

NAFORMA   National Forest Resources Monitoring and Assessment

NEMC   National Environmental Management Council

NFPs   National Forest Programme

NFPs   Non Timber Forest Product

NGO's   Non- Government Organizations

PFM   Participatory Forest Management

SPSS   Statistical Package for Social Sciences

TFCG   Tanzania Forest Conservation Group

TFS   Tanzania Forest Services

UN   United National

UN-DESA   United National Department of Economic and Social Affairs

UNFPA   United Nations Fund for Population Activities

URT   United Republic of Tanzania

VNRC   Village Natural Resource Committee

CHAPTER ONE

1.0 INTRODUCTION

1.1   Background to the Research Problem

Population increase has resulted to high pressure on natural resource in Tanzania. In many areas, there is an increasing local pressure to extend agricultural activities at the expense of forests and wildlife resources (Madulu, 2001). About 38 percent of Tanzania's total land area is covered by forests and woodlands that provide for wildlife habitat, unique natural ecosystems and biological diversity, and water catchments (World Bank, 2001). However, the existence of these natural resources is threatened by human disturbances of the ecosystem. Experiences from Forest Reserves in Tabora Region (Shishira and Yanda, 1998), Coast Region (Shishira *et al*, 1998) and Dodoma Region (Madulu, 2001) demonstrate clearly the dwindling biodiversity in most protected areas due to human interference in the ecosystems.

Estimates of forest losses in Africa and Nigeria (FORMECU, 1999) were observed to be higher in the past two decades. For instance between 1990 and 2000, the continent lost about 52 million hectares of the forest, accounting for about 56 percent of the global reduction of forest cover (Nwoboshi, 1987).

Rapid population growth has been associated with various aspects of resource degradation, including deforestation, overgrazing, soil erosion, soil nutrient depletion, and other problems (Scherr and Hazell, 1994; Kates and Haarmann, 1992). As population density increases, the supply of people who clear trees increases Kang and Wilson (1987); Southgate (1988); World Bank (1992) and the demand for

products from forest grows too. As a result of it, a larger forest area become deforested and leads to biodiversity loss. In addition to these forest changes, both the number of producers who use degrading agricultural or grazing practices increased, Repetto (1986). Likewise the demand for crops and livestock produced with degrading practices increase (Brown and Wolf, 1984).

According to the 2012 Census, Tanzania had a population of 44,929,002, compared to 34,443,603 in 2002. Population of Mainland Tanzania according to 2012 Census was 43,625,434 (compared to 33,461,849 in 2002). This means that the population of Tanzania has increased by 10,485,399 persons or 30.4% since 2002. This translates into a rate of growth of 2.7% per annum for Tanzania during the inter censual period 2002-2012, compared to 2.9% per annum in the previous inter censual period (1988-2002).

About 200 years ago the world population was less than 1 billion and today there are more than 7 billion living humans on earth (UN-DESA, 2015). This is one of the most conspicuous empirical facts about world population growth: population grew relatively slowly for thousands of years before it really began to climb.

Agricultural expansion is probably the most important human activity that causes deforestation. Between 300,000 and 400,000 hectares of forest and bush land are estimated to be cleared annually for agricultural expansion purposes (UN. 1993). An elaborate example of the Usambara Mountains suggests that almost 70 percent of the rain forests have been destroyed since 1954. While in areas like Tabora and Songea, tree felling for tobacco cultivation and curing is rampant (Shishira and Yanda, 1998),

agricultural expansion in forested areas is very common in Kondoa, Iringa, and Mufindi Districts (Madulu, 1998a, 1998b). Slash-and-burn cultivators set in motion a series of events leading to destruction of forests. These trends have several adverse consequences that include accelerated soil erosion, fuel wood scarcity, high rates of evaporation, and climatic change.

1.2   Statement of the Research Problem

Overpopulation is the major problem influencing sustainable natural resource management in the West Usambara Mountains. High growth rates now estimated at 2.2 % (Lushoto District, 2010) have led to populations higher than the carrying capacity of the district. Coupled with this is the inheritance system and ownership of parcels of land in different catchments. The impact of this is seen in increasing land scarcity, fragmentation of lands into small uneconomical plots, limited attention of parcel of lands located away from the households, wide spread cultivation on marginal lands and encroaching into forest lands (84 % of the original forest has been cleared). Based on species-area relationships such loss of original forests suggests that approximately 34 % of the species in the West Usambara have become extinct or are in a danger of extinction (Newmark, 2000).

In spite of efforts made by Tanzania government for introducing various methods of family planning to control population growth and Participatory Forest Management methods to manage the forest resources. Large influx of population growth has becoming the big challenge on managing the protected forest found in West Usambara. Therefore, the study was conducted to analyse much on the scenario of

population growth on forest resources management systems to fill the information gap of proper forest management system in Tanzania.

1.3 Objective of the Study

The main objective of this research is to assess the impact of rapid population growth on forest resource management in Tanzania. Specifically the study aim to achieve the following specific objectives:

i) To examine the trend of population growth in West Usambara over the past thirty years.

ii) To examine the socio-economic factor affecting forest resource uses in West Usambara.

iii) To evaluate the intervention measures used to manage forest resources in West Usambara.

1.4 Research Questions

i) What is the population trend over the past thirty years in West Usambara?

ii) What are the socio-economic factors affecting forest resource uses in West Usambara?

iii) What are intervention measures used to manage forest resources in West Usambara?

1.5 Significance of the Study

The research intends to look for population growth in relation to managing of forest resources. For academician this research will enable scholars on doing research as

this can be part of references for reviewing also it assists the researcher to understand the implication of population growth towards management of forest resources in West Usambara. The study will be able to identify the extent the needs of managing forest resources in West Usambara as among of potentiality areas for both socio-economic benefits which will provide way forward for government intervention through providing reliable policies that will help to realm these natural resources. Also the research intends to add more knowledge on issues relating to managing of forest resources and its application in community at all.

Furthermore the research intends to help district and communal forest department and other forest stakeholders to understand the response of their managing forest resources.

1.6   Limitations of the Study

During conducting this study some setback were encountered. These included the limitation of getting reliable data of population change in the study area. Likewise problem of respondent's memory, especially on the historical back ground of the forest uses and management. This required asking question more than once in different ways and use of key informants to make the respondents understand questions, get information and provide answers precisely. However, the financial resource and time constrained the original budget to become sufficient to full support the research in terms of intensity and coverage. This was rectified by using Tanzania Forest conservation group (TFCG) field Assistants to distribute and collects the questionnaires from their respective areas of control.

1.7   Organization of the Dissertation

This dissertation is organized in five chapters. Chapter one introduces the study by giving background to the research problem, statement of the research problem, research objectives and research questions. It also presents the significance of the study and limitation of the study. Furthermore it presents the literature review related to the study presented in chapter two by providing the definition of the key concepts, theoretical framework, empirical review, conceptual framework and research gap. Chapter three presents the research methodology adopted in conducting the study. It encompasses the introduction, research design, research area, research population, sample size and frame, sampling techniques, method of data collection and data analysis. Chapter four contains the research findings, results and discussion. Finally chapter five covers the conclusions and recommendations.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter covers review of various literatures concerning the impact of population growth on forest management. The chapter covered the description of the theoretical research review, empirical research review, conceptual framework, theoretical framework and it the research gap.

2.2 Theoretical Research Review

The study as govern by Malthusian economists, neoclassical economist and neo Malthusians theories they all discussed the human population growth and natural resource in different perspectives.

2.2.1 Human Population Growth, Food Supplies and Natural Resource Demand

Malthusians theories on relationship between population growth and natural resource traced in 1798 which stated that " The rate of population growth is greater than of the earth which is not big enough to produce food that would satisfy the present and future generation," (Malthus,1798). Moreover Malthus predicted that population growth would exceed limited supply of natural resources especially land resources (Malthus, 1798). He argued that human population grew geometrically while subsistence increased arithmetically. He also hypothesized that, while human population increases with the fast rate, foodstuff would be insufficient to feed the entire number of people. Likewise as large rapidly growing population reaches a critical point and exceeds the carrying capacity result to depletion of natural

resources including food shortages (Figure 2.1). Depletion of natural resources particularly biomass lead to natural calamities related to climatic factors like prolonged droughts, consequently, crop failure culminating in starvation, hunger and deaths. However, the human population would be adjusted below the carrying capacity of the agriculture systems by positive and preventive check. Positive check includes the increasing mortality rate due to outbreaks of diseases, famine, higher infant mortality, malnutrition and wars. Preventive check would include lowering of fertility through delays in marriage, contraception, abortion and infanticide (Malthus, 1986). Based on Malthus, theory population growth puts strain on resources and consequently increases pressure on the forest which then results to inadequate management of the forest. Therefore it employed that the increase population growth is likely to affect the forest management objectives.
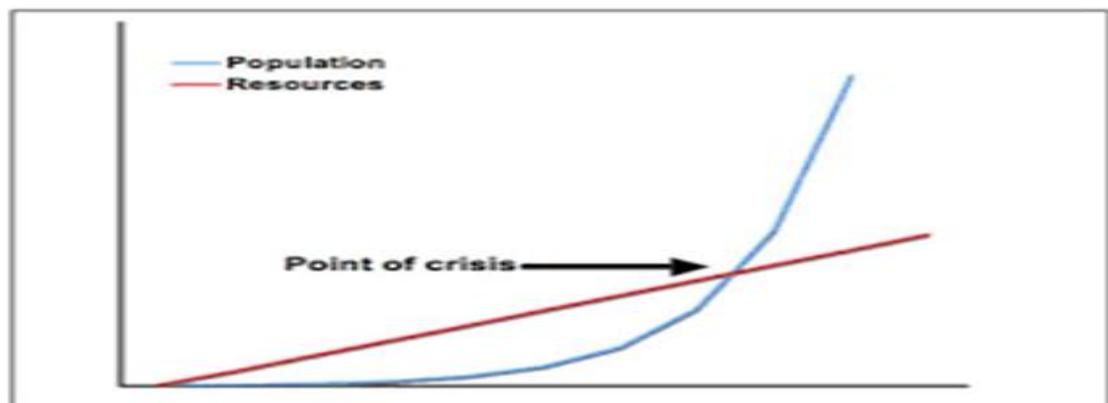
Figure 2.1: Malthus Basic theory

Source: Malthus, (1798)

Neo-classical economists Ester Boserup explained differently to Malthus views on human population pressure and natural resources (land productivity). (Buserup 1965; 1981; 1990). Buserup observed that people would actively intensify land

productivity/ increasing agricultural yields, such as multi-cropping, irrigation, soil conservation and application of better technologies all these would compensate human population growth. Boserup commented that there are no limits to human population growth that would be satisfactory to intensification of agriculture productivity (Boserup, 1965).

Another theory is from Paul Ehrlich, a biologist, which state that the rate of population growth was outstripping agricultural growth and the capacity for renewal of Earth's resources. This means that the rate of population growth will affect the capacity of the natural resource to regenerate and induced pressure to forest management effort established.

The study used the theory of Thomas Robert Malthus because it is directly related the impact of population growth to natural resource depletion which resulted from poor management of the forest.

2.3   Conceptual Literature Review

2.3.1 Trend of Population Growth around the World

According to UN DESA report of world population prospects (2015) as presented in the Table 1 shows the population trends of Tanzania and other continents over past thirty years. In which population has changed tremendous to some continents especially Africa which includes Tanzania as population rises slightly from 477 million people in 1980 to 1.6 billion in 2016 and the projection of rising to 11 billion in 2050 and 2100 respectively; these have been due to low mortality rate and high fertility rate that African countries have. Some other continents like Asia; China

population was maintained after adopting a policy of bearing one child. In Europe, North and Latin America its population has a tendency of changing gradually in line for economic recession and low fertility rate drawn from use of family planning.

Table 2.1: World Population Trend From 1986-2016 (In 'Ooo)

CONTINENT/ COUNTRY	YEARS						
	1986	1991	1996	2001	2006	2011	2016
Tanzania	22,517	26,307	30,734	34,899	40,261	47,123	53,470
Africa	565,642	648,900	738,623	834,089	943,508	1,071,200	1,186,178
Asia	2,956,960	3,260,422	3,524,866	3 760 898	3,989,937	4,215,002	4,393,296
Europe	710,711	723,079	727,890	26,454	730,152	736,316	738,442
Latin America	414,126	455,030	495,357	534,468	571,089	606,878	634,387
North America	269,333	283,505	299,199	316,914	331,600	347,017	357,838
Ocenia	25,284	27,393	29,456	31,488	33,933	37,015	39,331

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015), World Population Prospects

2.3.2 Socio-Economic Forest Resources Uses

The majority of rural people depend heavily on the forests for their survival and most of the export economy is land dependent. Forests and woodlands are recognized as an important resource base for Tanzania's social and economic development, and for provision of many basic benefits and opportunities to rural and urban communities (Mariki 2001). In west Usambara area there is an opportunity for agriculture activity due to arable and fertile land that is composed from steep from Usambara Mountain, thus encourage highly agriculture activities in this area.

According to FAO (2010c) report elaborate that; the rural population of Sudan, as well as much of its urban population, depends on forests. Trees are the main source of energy and provide timber for roofing and building. In rural Sudan, the extensive benefits derived from forests include grazing, hunting, shade, forest foods in the form

of tree leaves, wild fruits, nuts, tubers and herbs, tree bark for medicinal purposes, and non-wood products such as honey and gum. In addition, the commercial lumber industry is a small but growing source of employment. FAO report shows that; the forestry sector contributes as much as 13 percent to the gross domestic product of Sudan. The forests of Sudan have economical, ecological, and recreational values, known collectively as ecosystem services. Wood products from the forestry sector include fuel wood, sawn timber and round poles. The Forest Product Consumption Survey conducted by the FNC in Northern Sudan in 1995 found that the total annual consumption of wood was 15.77 million m³. FAO calculated that in 1987, Sudan produced 41,000 m³ of sawn timber, 1.9 million m³ of other industrial round wood, and more than 18 million m³ of firewood. Each of these categories showed a substantial increase from production levels in the 1970s.

Forests are estimated to cover approximately 48% of the total area of Central and South America, (FAO, 2010c). The forestry sector is highly important in the region's economy, given that forests supply not only timber but also fibre, firewood, and other non-timber forest products for industrial and non-industrial uses. Moreover, they provide a number of ecosystem services (habitat, biodiversity, carbon storage, etc.), which, although sometimes without direct commercial value, are essential both locally and globally.

2.3.3 Impacts of Population Growth to Forest Management

The relationship between population growth and economic development has long been debated ever since Malthus in the 18th century. Nevertheless, others have

observed that technological advances and institutional development could counter negative effects of rapid population growth on development (Kuznets 1967; Boserup1981; Simon 1981). Population growth may affect natural resource management by affecting household decisions about land use, labour or capital intensity, product choice, technology adoption, off-farm employment, migration, or fertility (Bilsborrow and Carr, 1998; Panayotou, 1994; Boserup, 1965). It may affect natural resource management by affecting community and societal decisions relating to collective management of common property resources (Baland and Platteau, 1996); development or adaptation of technology (Boserup, 1965; Hayami and Ruttan, 1985).

2.3.4 Institutional Framework Performance

The national or sub national policy framework on forests and their management aim to guide decision-making and provide a clear sense of direction over time. In the context of international commitments many countries have agreed to use 'National Forest Programmes' (NFPs) as a comprehensive framework in order to develop and implement their forest policies.

The Forestry and Beekeeping Division (FBD) of the Ministry of Natural Resources and Tourism (MNRT) is the government agency responsible for forest management issues on mainland Tanzania. It has a mandate to manage and supervise national forest reserves (NFRs); collect revenue on forest operations and harvesting; issue licenses and permits and, thereby, regulate harvesting of forest products nationally;

promote forest development; provide training in forestry; and undertake forest research (through the Tanzania Forest Research Institute).

A key element of the new Tanzanian Forest Policy (URT, 1998) and Forest Act (URT, 2002) is the devotion of ownership of land management responsibilities over forest resources to local communities. Thus community-based approaches to securing and managing forests, generally referred to as Participatory Forest Management (PFM), has become the central strategy of the Forest and Beekeeping Division (FBD) of Tanzania to ensure sustainable management and conservation of Tanzania forests.

In Tanzania there are two form of PFM: Community-Based Forest Management (CBFM) and Joint Forest Management (JFM). Each differs greatly in terms of forest ownerships and cost/benefit flows. CBFM takes place on village land or private land, and the trees are owned and managed by a village government through village natural resource committee (VNRC), a group, or individual. In this case the owner carries most of the costs and accrues most of the benefits relating to the management and utilization. The role of central government is minim while the District authorities only have role of monitoring.

On the other hand, JFM takes place on "reserve land" that is owned and managed by either central or local government. Villagers typically enter into management agreements to share responsibilities for the management with the forest owner (FBD, 2006).

2.4   Conceptual Framework
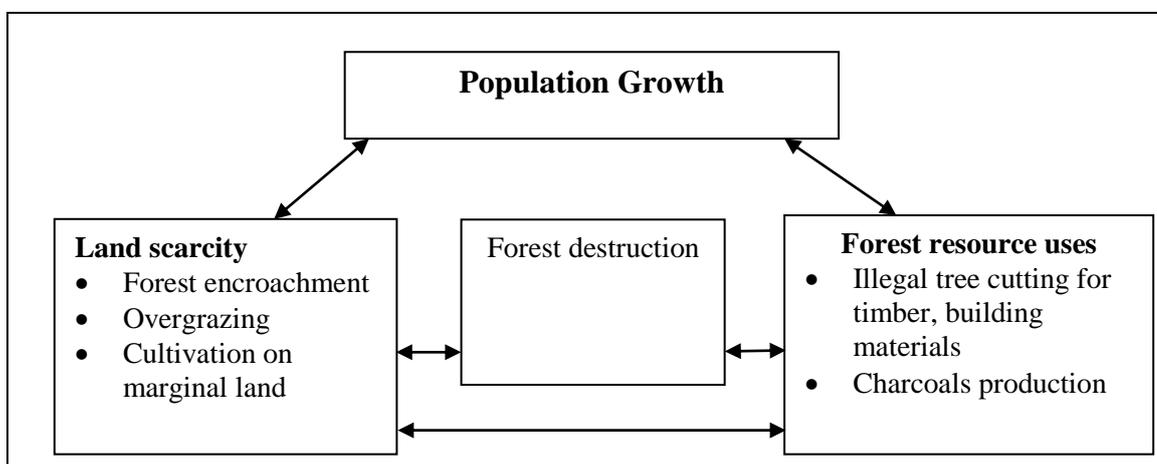
Figure: 2.2: A Conceptual Framework for Cause and Effect of Population Growth

Source: Own Construct

Forests are important assets in Tanzania, offering numerous goods and services in the national economy, to society at large, and to local livelihoods. The official forest sector contribution to the economy is between 2 and 3 percent of total GDP (Salmi and Monela 2000). The linkages between forest resources in rural areas and poverty reduction have been heavily studied in Tanzania. Monela *et al.* (2000) estimate that honey, charcoal, fuel wood, and wild fruits contribute 58 percent of the cash incomes of farmers in six villages surveyed in a semiarid region of the country. Honey alone accounted for one-third of all cash income in these villages (Figure 2.2).

Despite the significant contribution of forests to local livelihoods and the national economy, forest destruction, poor management, and environmental degradation

continue and, with it, negative impacts on marginal communities that depend on forests and forest products (Mariki 2001). Tanzania is experiencing serious environmental degradation—pressure on natural resources has progressively escalated, and ecological degradation is evident, especially in arid and semiarid areas (URT, 2001). Among the major causes of environmental degradation includes; Land clearance for small-scale subsistence farming is one of the major causing of forest cover loss, largely due to increasing populations and low-intensity agricultural practices, such as shifting cultivation. Dependence by resource-poor households on cash income from the sale of forest products, such as charcoal, honey, wild fruits, and firewood appears to be another major driver of deforestation. Commercial production of firewood and charcoal as an alternative source of income to meet urban energy demands contributes significantly to deforestation. Policy problem World Bank Environment Mission as indicated by Fottland (1993) states some reasons for deforestation in Tanzania: (a) Inadequate pricing policy: The price estimated on forest produce when collected from the forest is far below the price that is possible to obtain at the market, (b) Lack of capacity to implement policy and legislation:

The forest managers have for considerable time suffered from lack of resource to do good job. Further, the skill and dedication among the staff without the implementing capacity, both legislation and policy become useless.

Tanzania is clearly making significant progress in mainstreaming the environment into poverty reduction strategies; however, to create targeted poverty reduction policies, the contribution of forests and natural resources to livelihoods and poverty

reduction must be fully realized, which requires the information to be captured and measured. The 1998 National Forest Policy breaks new ground by explicitly recognizing the contribution made by forests to poverty reduction and human welfare. The overall goal of the National Forest Policy is to "enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources for the benefit of present and future generations."

2.5   Research Gap

Many studies have been undertaken in different regions and various research methods were applied. However, there some key issues that have not yet been addressed, concerning the rapid growth of human population in relation to forest management practices. In Tanzania's case, rapid increase of human population growth has brought challenge to resources management in some area like Tanga region particularly Lushoto district. The critical issues are on limited land and access to forest products. Family planning has not yet been achieved particularly in rural areas where the human population is high. Furthermore the forest policy contradicts itself on proper forest management practices to be applied to the community. These were the gaps in which the study addressed and suggested some potential resolution.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methods and techniques used in this study. The chapter describes the research approach, research design, study area, strategy of inquiry, limitation of the study sampling techniques, data collection techniques, data processing and analysis, presentation of the findings.

3.2 Research Approach

The study employed the qualitative research approach which is concerned with subjective attitudes, behaviours and opinions of the respondents (Kothari). It allowed the researcher to use the respondent's personal word in order to gain deeper and clear understanding of their knowledge, feelings and experiences (Creswell, 1994). The study also preferred qualitative approach to acquire in-depth understanding of the key informants view since each of them might has a different outlook about the phenomenon being studied.

3.3 Research Design

It is an arrangement of the conditions for the collection and analysis of data in manner that aim to combine relevance to the research conducted (Kothari, 2009). It consists of the blueprint of the collection of measurement and analysis of data. The research design of this study is descriptive design because the research intends to describe by relating the managing of forest resources and rapid population growth. In

this design cross-sectional was employed because it is an appropriate way of collecting data among respondents from diversified social economic characteristics, in order to show its relation.

3.4 Area of Study

3.4.1 Geographical Location

The study was conducted in Lushoto district found at West Usambara Mountain in 10 villages surrounding Baga catchment forest reserve. Lushoto District situated in the Northern part of Tanga region within 40 25' – 40 55' Latitude south of the Equator and 300 10' – 380 35' Longitude East of Greenwich. The district shares borders with Same District in the north – west, Republic of Kenya in the north-east, and Korogwe District in the south.
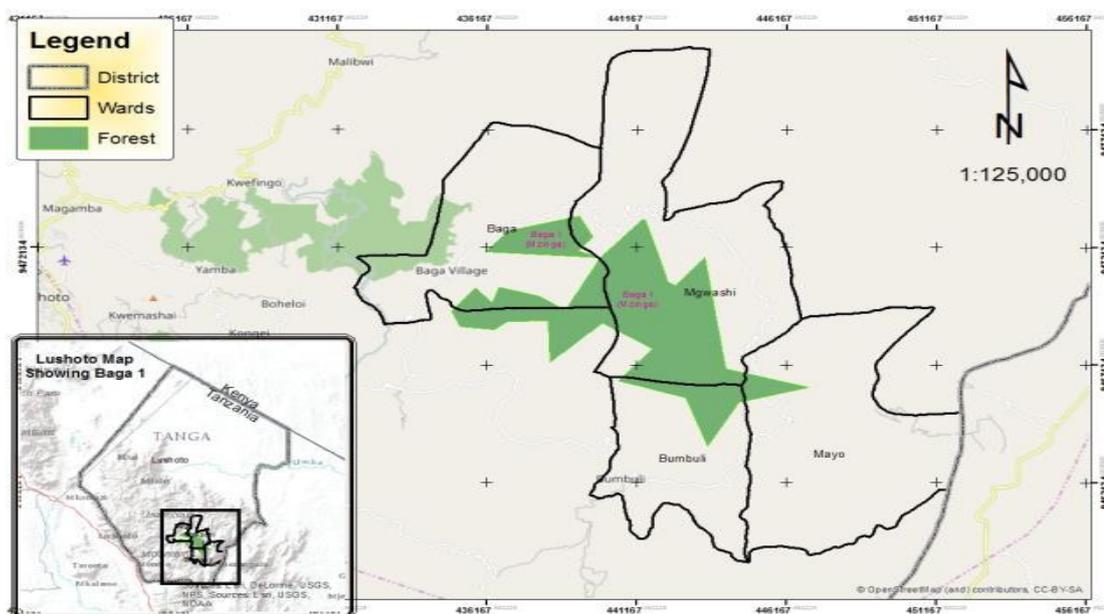
Figure 3.1: Show Map of Baga Forest Reserve and the Ward Surrounding the Forest

Source: Researcher's Own Construct (2016)

3.4.2 Area and Physical Characteristics

The District has an area of 3,500km2 and accounts for about 12.8% of Tanga Region. The main physical features of Lushoto are highlands which covered about 75% (2625 km2) of the total District area, with altitude of 1000 – 2100m above sea level, while lowlands cover about 25% (875km2) of the total District area between an altitude of 300 – 600m above sea level. The mountains and their lower slopes occupy about 90% of the total land of Lushoto district. The slopes are moderately steep and there are many narrow valleys as well as rock outcrop in the terrain.

3.4.3 Climate

The mountainous areas of Lushoto are cooler and less humid than the coastal areas of Tanga Region. The highest temperatures reached in the period between October and February and lowest during June to August. Lushoto district generally receives rainfall on a bimodal pattern, with short rains from October to December and long rains from March to June. The short rains are less reliable than the long rains. The highlands get an average of 800 – 2000mm rainfall per annum and the lowlands get about 500-800 mm per year. The District is divided into five agro-ecological zones that offer different cropping possibilities which are humid, warm, dry, hot, and cold. Lushoto District Council (2010).

3.4.4 Vegetation

The forests of the area are diverse and range from sub-montane to upper Montane in type. The vegetation is woody with luxuriant growth of trees whereas the canopy is differentiated in to strata which are the characteristic of high forests. The sub-

montane cover the vegetation of the trees which have height of 10-15m dominated by *Annonasenegalensis, Brachystegiaboehmii, B. spiciformis, Combretummolle, Diplorhyncuscondylocarpon, Markamiaoptusifolia and Pterocarpusangolensis*. The upper Montane cover the trees which are evergreen forest with *Brachlaenahuillensis* as dominant vegetation (Ruffo *et al,* 2002).

3.4.5 Population

According to 2012 Census report, the District has got population of 492,441 People, of which 230,236 were Male and 262,205 Female. The district has an overall sex ratio of 88 males for every 100 females with the average household size of 4.7 (Cencus.2012). It has the population density of 120.4 persons per square Kilometer (Lushoto District Council, 2013).

3.4.6 Socio-Economic Activities

The main economic activities in Lushoto District are farming, livestock keeping and business. The major crops grown are maize, banana, yams, paddy, Irish potatoes, sweet potatoes, cassava and legumes, while cash crops are tea, coffee, vegetables, cardamom and fruits. Livestock kept includes cattle, sheep, goats, chicken, duck, guinea, fowls, pig and rabbit (Lushoto District Council, 2013).

3.5   Sample Size and Frame

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for the

purpose of a survey. The sampling frame of this study consisted of the total number of 4268 households of the ten villages surrounding Baga Catchment forest reserve, which amounted to 20,576 people almost 4.02% of the whole Lushoto District of 492,441 populations of people, (URT 2012). Since the average households' size varies in ten villages, computation to obtain the total number of households has been made as it is shown in Table 3.1.

Table 3.1: The Study on Population for Households Size

SN	Village	Total number of Population	Average Household size	Computation to get number of household	Total number of households
1	Kizanda	2560	4.5	2560/4.5	569
2	Mbokoi	1273	4.5	1273/4.5	283
3	Tanda	1264	4.5	1264/4.5	281
4	Mtunda	621	4.5	621/4.5	138
5	Kwemanolo	1108	4.5	1108/4.5	246
6	Wanga	2339	5	2339/5	468
7	Sagara	2350	5	2350/5	470
8	Malomboi	2830	5	2830/5	566
9	Baga	3843	5	3843/5	769
10	Mziasaa	2388	5	2388/5	478
	Total population	**20,576**			**4268**

Source: Field study (2016)

The sample size formula by Kothari (2004) based on Precision Rate and Confidence Level will be used for estimating a percentage or proportion in calculating and determining the sample size needed to be representative of the given population and is given as:

n = $\underline{z^2.\ p\ .q}$

   e^2

Where

z = the value of standard deviation level score corresponding to 95% confidence interval = 1.96

p = the sample study assumed a population proportion of 50% since this would provide the maximum sample size. Therefore, the value of p = 0.5

   q = 1 − p

   e = the precision rate (+/-10%)

   n = size of sample

From: n = $\underline{z^2\ .p\ .q}$

      e^2

    n = $\underline{(1.96 \times 1.96) \times (0.5 \times 0.5)}$ = 96.04

        (0.1 x 0.1)

    n = 96 ≈ 100

But for purposes of easy computation of proportionate samples, a round figure of 100 responds was adopted.

Due study's limited resource and time budget, the sample size was drawn from household population of 4268. The **i**nterviewed households were selected as shown in Table 3.2 below.

Table 3.2: The Study Sample Size for Households Questionnaire

S/N	Village	Total number of household	100 Proportional Representative Sample (PRS) of Households	Number of Households Sampled
1	Kizanda	569	569/4268x100	13
2	Mbokoi	283	283/4268x100	7
3	Tanda	281	281/4268x100	7
4	Mtunga	138	138/4268x100	3
5	Kwemanolo	246	246/4268x100	6
6	Wanga	468	468/4268x100	11
7	Sagara	470	470/4268x100	11
8	Malomboi	566	566/4268x100	13
9	Baga	769	769/4268x100	18
10	Mzia Saa	478	478/4268x100	11
	Total	**4268**		**100**

Source: Researcher's own construct (2016)

From the computation on the table above therefore the interviewed households were 13 from Kizanda, 7 from Mbokoi, 7 from Tanda, 3 from Munda, 6 from Kwemanolo, 11 from Wanga, 11 from Sagara, 13 from Malomboi, 18 from Baga and 11 from Mziasaa. The households were randomly selected for interview. Also, with the help of village leaders, ten informants' respondents from each village were purposely selected for FGD and key informant interviews, respectively. The selection of respondents for FGD and key informant interviews focused on Village natural resource committee members and village leaders having knowledge of forest conservation. Also two staffs from forest department were interviewed, one from TFS and another one from Bumbuli District Council.

3.6   Sampling Techniques

This study employed two sampling techniques namely, simple random and purposeful sampling

3.6.1 Simple Random Sampling

The study used simple systematic random sampling (SRS) in administering a person to person interview of the 100 households. This method gave every household head in a population equal probability of getting into the sample and all choices were independent of one another. However, it gave each possible sample combination an equal probability of being chosen (Kothari, 2004). Data from Tanzania National Population Census and from Lushoto district records were used to draw a reliable household sampling frame. Simple random sampling was deployed to pick household to match the number of households selected for interview. Name of all the head for each village were written on the pieces of paper by the researcher to maintain confidentiality. The names were mixed in the box and the selected person closes his eyes and picks the names according to the sampled number for each village. The sampling units for this study were household heads or any other member above 18 years and public institutions which provided data and records on population changes and forest management.

3.6.2 Purposively Sampling

Purposeful sampling is the intentional seeking or selecting of individuals or situations likely to yield a greater understanding of phenomenon of interest (Kothari, 2004). Therefore, in this research the Lushoto District Council, Tanzania Forest Conservation group (West Usamabara) and Tanzania forest service's-Bumbuli were selected in order to obtain the information, data and records related population growth and forest management systems. These are informants who helped the study to understand the contribution of each organization toward forest management.

Moreover the key informants provide general information on challenges and success of the forest management system in the area in relation to population growth. Furthermore, their opinions were also taken to improve the situation.

3.7 Methods of Data collection

According to Krishnaswami (2002) data are facts, figures and other relevant materials, past and present that serve as bases for the study and analysis. In this study, data collection methods which were used are reconnaissance survey, documentary reviews, questionnaires, observation and satellite imagery. These different types of data were used in order to triangulate information.

3.7.1 Pre- Survey

The researcher conducted the pre-survey to provide the general picture of the research area and test the data collection tools. This visit was used to establish contact with the key informants, familiarizing with the study area and finding secondary data from the respondents.

3.7.2 Documentary Review

The documentary review in this study involved the Lushoto and Bumbuli Districts reports, Tanzania forest conservation Group reports(NGO), The Open University of Tanzania (OUT), Main library, internet, website, past thesis, journals and article, Tanzania Forest service reports and Tanzania policy and Act documents.

3.7.3 Observation

Observation is essential in making a correlation of the questionnaire response to the

actual phenomenal on the ground (Kothari, 1990). Environmental degradation was observed in term of soil erosion, soil fertility, deforestation, destruction on water catchment and fuel wood shortage.

3.7.4 Satellite Imagery

The land cover maps for Baga forest was generated from a set of historical Landsat 5 and Landsat 7 to create a cloud-free product that identifies areas that have undergone land cover transition between 2002 and 2012. For purpose of this study we only included the forest loss and excluded the forest gain class. A 3x3-majority filter applied to the loss pixels and the minimum patch was set to 0.5 hectares in order to remain consistent with the existing land cover product.

3.7.5 Questionnaire

Both quantitative and qualitative methods of data collection were employed during the study whereby structured and semi-structured questionnaire interview for households were administered. Using questionnaire, each head of the household were randomly selected and interviewed on his/her household practices and attitudes related to forest management and forest resource uses, forest management practices and impacts of population towards forest management were established.

However dependent variables on the other hand like demographic characteristics of the study population such as age, educational level, sex, marital status, number of person in the households and occupation respondent concern the forest resource management in the area were involved.

3.7.6 Focus Group Discussion

Focused group discussion (FGD) is a form of structured group discussion involving people with knowledge and interest in a particular topic. Focus groups provide an opportunity to discussion thoroughly on the desired topics (Kothari, 1990). The focus group was carried out by the researcher to group of 20 participants, comprising of 12 men and 8 women. It involved the village leaders, village natural resource committee (VNRC), influential people, religion leaders and income generating groups.

Moreover face to face interview with the key informants was also consulted whereby intensive strategic information sampling was used by people who were thought to have most and relevant information. The key informants in this study include: the District Forest Officer-Bumbuli, Forest Officer-TFS Bumbuli, Assistant Field Officer- TFCG West Usambara, village leaders and Village natural resource committee members.

3.8   Validity and Reliability of Data Collection Instrument Reflect True

3.8.1 Validity

Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested (Kothari, 2004). In order to ensure validity the structured questionnaires were deployed by 100 heads of household in order to obtain the relevant information. Validity of instruments was enhanced by using pilot study in order to assess the clarity of items administered. Modification was made where the instruments were found to be inadequate hence clear instruments were implemented during the actual field research survey.

3.8.2 Reliability

Reliability is the degree of consistency a given instrument demonstrates when it is to measure a particular phenomenon (Best and Kahn, 1998). In this study reliability is ensured by a deployed multiple sources of data including questionnaires, interview, observation and secondary data. The study increased reliability of the study through planned behaviour predictions. It also used international Business Machine (IBM)-SPSS software version: 23.0 in coding and analysing the data, and minimisation of errors and bias in the study.

3.9   Ethical Consideration

A clearance form was obtained from the Vice Chancellor of the Open University of Tanzania. Then introduced myself to the Ward Executive Officers, Village Chairman and the household of the target area. During the administration of questionnaires, interviews, focus group discussions, and documentary review, the respondents were assured that their information's are privacy. For easy clarification, respondents were liberty to discuss in English and Kiswahili. Finally recorded the notes by using the operational language, English.

3.10 Methods of Data Analysis

According to Kothari (2004), the collected raw data were edited to detect errors, omission and coded for efficient analysis. The raw data from the questionnaires were coded, analysed and entered into computer using IBM-Scientific Package for Social Scientists (SPSS) program. Ms excel and SPSS was used for analysis of information obtained in numerical form. Descriptive statistics giving frequencies and percentages

were presented in various forms particularly by using tables, graphs, charts and percentage. Different data were tabulated in order to establish their relations. The qualitative data was analysed using the content-structural analysis. The content-structural analysis was used to analyse in detail the components of verbal discussions held with key informants. This helped the researcher in ascertaining values and attitudes of respondents (Kajembe, 1994).

CHAPTER FOUR

4.0 FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter describes the analysis of data followed by a discussion of the research findings. The findings relate to the research questions that guided the study. Data were analyzed to identify, describe and explore the relationship between population and forest management. It consists of five subsections which are socio-economic characteristic, trend of population growth in the study area, impact of population growth, socio-economic use of the forest resources and forest management system practices. Data were obtained from self-administered questionnaires, completed by 100 households (n=100).

4.2 Socio-economic Characteristics of the Respondents

4.2.1 Sex and Marital Status of the Respondents

The study sample had a total of 100 households whereby 28% of the respondents were women and 72% were men see Table 4.1. The sample comprised more men than women because most of the households are headed by men. Men and women have different knowledge of, access to, and control over natural resources, and different opportunities to participate in decisions regarding natural resources use. Due to their different roles and responsibilities, women and men have varying interests and motivations to conserve, protect or manage their resources. In most regions of the world, men play a greater role than women in the exploitation of natural resources for commercial purposes, i.e., logging, grazing livestock, fishing,

hunting, mining and extracting various tree products. Men are therefore, more destructive than women but negatively affected when natural resources are depleted. Therefore due more of the respondents being men it review that most of the decision are done by men and when it come nature resource management the effect on exploitation will be higher than in the areas where most of the household are controlled by women.

The marital status of the sampled households is presented in Table 4.1. About 93% of respondents were married, 4% were single, divorced were 1% and 2% were widows. This study found that most of the households in the study area are headed and managed by married couples. This implies that there high quito marriage rate, which led to increase in birth rate by women and as a result led to increase in population.

Table 4.1 Gender and Marital Status of Respondents

Characteristic	Gender and Marital status	Respondents	Percent
	Male	72	72
Gender	Female	28	28
Marital status	Married	93	93.0
	Single	4	4.0
	Divorced	1	1.0
	Widow	2	2.0

4.2.2 Age of Respondents

The findings showed that the age of the respondents ranged from 18 to 75 years old. Table 4.2 shows respondents' age distribution of the study sample. A large number of respondent's about 69 % were aged between 40 and 59. About 9% of the interviewed respondents were over 60 and 22% were between 18 and 39.

Table 4.2: Age of the Respondents

Characteristic	Age group	Respondents	Percent
Age	18-39	22	22
	40-59	69	69
	60 and above	9	9
	Total	100	100

Source: Field Survey Data (2016).

It was, therefore, revealed from the household interviews that most of the respondents were still able bodied people, being in their early middle ages and middle age years (40-55) who could actively participate in various livelihood activities. Shackleton and Shackleton (2004) remarked that age affects the type and amount of resources utilized, and it also affects the household's labour supply, which in turn affects natural resource use and its control over labour and its products and access to natural resources.

4.2.3 Ethnicity

The study found out the study area comprised of two main ethnic groups, namely the Sambaa and the Pare. Majority of respondents (80%) were the Sambaa people, whereas the remaining 20% were the Pare (Figure 4.1). Similarly study reported that the Sambaa formed 78% of population in West Usambara (Jambia, 1998). In the recent years some town like Lushoto have been receiving other ethnic groups who rea coming for to work work and this has a significant in forest management and forest product utilization.
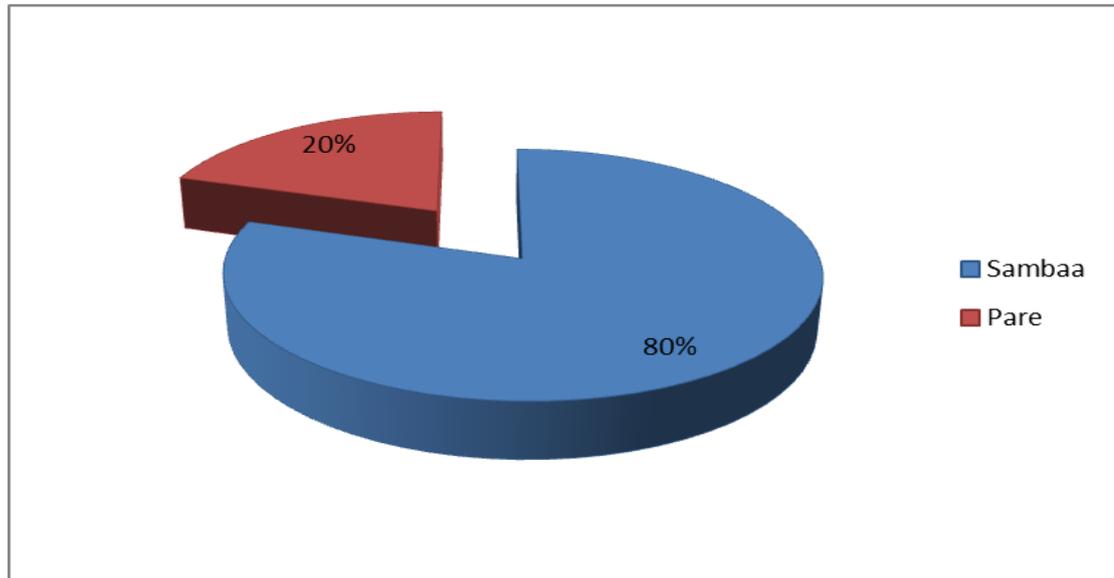
Figure 4.1: Ethnicity of the Respondent

Source: Field Survey Data (2016)

4.2.4 Household Size of the Study Area

The mean households' sizes were 7 people, with a range of 5 to 9 people (73%). (Table 4.3). According to National Population and Housing census of 2012 (URT, 2012), the mean household size in Lushoto District was reported to be 5 people. This implies that the household size in the study area is above the average reported, that means that there is high number of people per household which increases the demand for forest product.

Table 4.3 Household Size of the Study Area

Household Size	Respondents	Percent
2-5	19	19
5-9	73	73
10+	8	8
Total		**100**

Source: Field Survey Data (2016).

4.2.5 Respondents' Level of Education

The respondents' level of education varied. Figure 4.2 shows that about 89% of respondents in the study area completed primary school, 7% had secondary education and 4% had no formal education see figure 4.2 below. The illiteracy level in the study area is lower about 4% compared to national average of 19.6% (URT, 2015). This indicate that the level of understanding is high in this area because formal education can broaden the understanding of the individual when it comes to adopting useful skills and technologies for conservation that have come from outside the community. Education can promote sustainable utilization of those resources for nutritional and health status (Mbwambo, 2000). Similarly according to Katani (1999) find that the increase in education level increases the level of awareness and thereby creates positive attitudes; this is crucial at all levels in order to enhance participation of all stakeholders. Kalineza et al (2000) argued that knowledgeable farmers are expected to adopt new techniques quicker compare to those unknowledgeable.
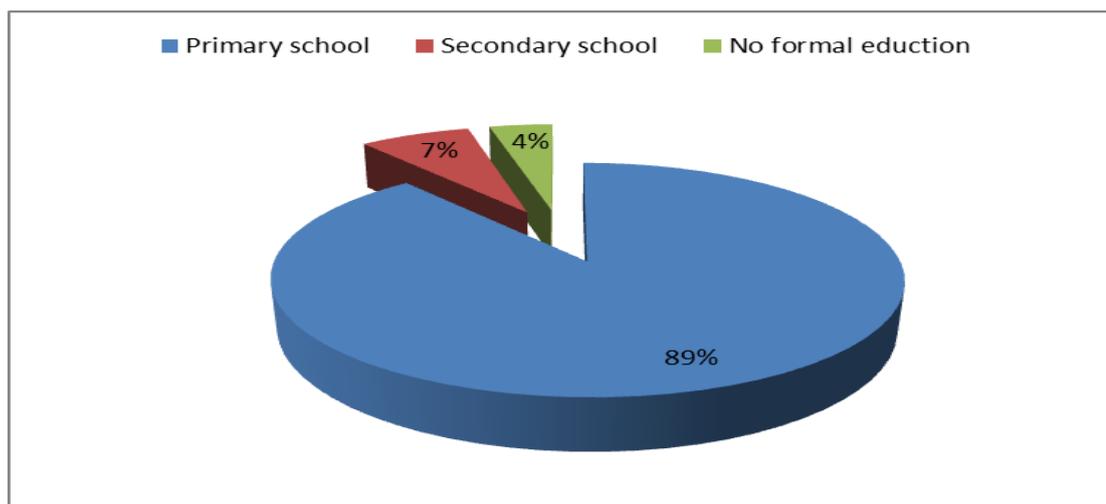
Figure 4.2: Respondents Level of Education

Source: Field Survey Data (2016)

4.2.6 Origin and Reasons for Settling in the Village

The majority of the respondents (98%) were born in the village, while 2% had migrated into the village from within the District (Figure 4.3). Those who migrated into the village (about 2%) gave one reasons for settling in the village which is marriage. The majority of the people from this area are migrating to other area due to scarcity of land, no immigrant to villages expect for the few government staffs coming for employment purposes this is due to lack of enough area for cultivation.
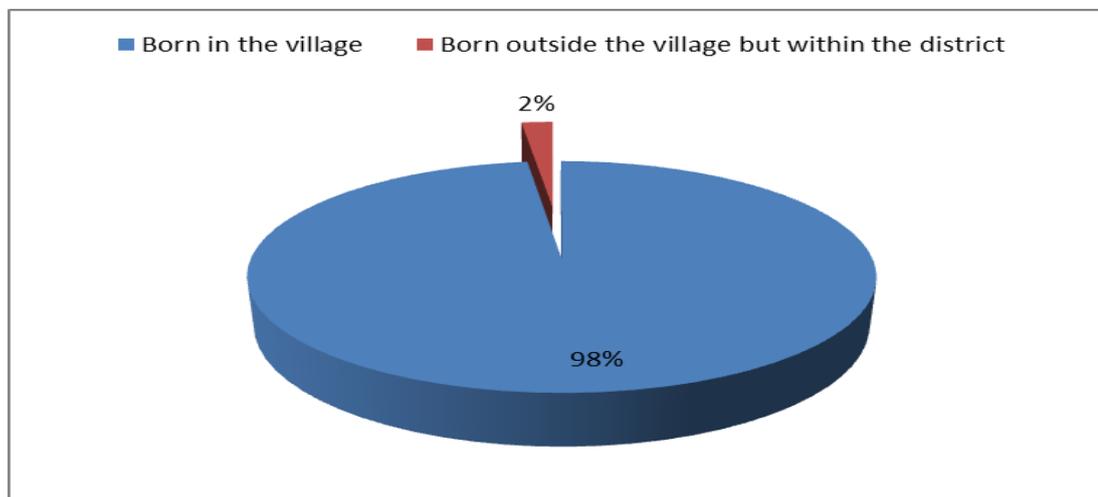
Figure 4.3: Origin of the Respondents

Source: Field Survey Data (2016)

4.2.7 Economic Activities

The study revealed that respondents in the study area were engaged in different economic activities such as crop production, wage paid casual labour and petty business. Data on occupational activities show that 94% of the respondents interviewed reported to be engaged in crop production as their first main economic activity (Figure 4.4). This implies that majority of the households depend on farming as their main economic activities. Due presence of high number of farmers in the

study area this can lead them to cultivation fragile soils such as wetland, highlands, and forests. When farmland expands toward fragile lands in order to keep pace with the needs of a growing population, it leads to deforestation, erosion, and desertification. Agriculture remains the main economic activity in West Usambara (Nambiza and Lyatura, 2013).

Furthermore casual labour, wage employed and petty business constituent of 3%, 1% and 2% respectively (Figure 4.4). This implies that very few people are employed in the study area or engaged on business this has significant effect on forest management as many people will depend on forest due to lack of employment or activity to perform. The similar study has been conducted in West Usambara whereby it was revealed that 11% own kiosk, 2% masonry, 2% food vending business, 2% selling alcohol (Nambiza and Lyatura, 2013).
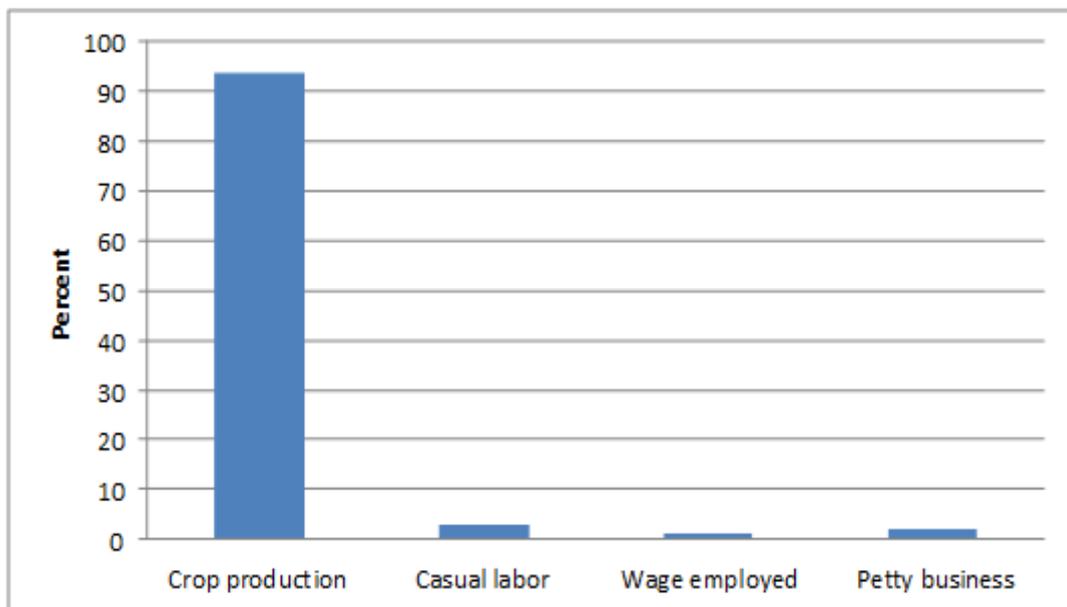
Figure: 4.4: Major Economic Activities of the Respondents

Source: Field Survey Data (2016)

4.3 Trend of Population Growth

The study intended to examine the trend of population growth the study area. It examine population change and growth rate from census records of 1978, 1988, 2002 and 2012. Moreover it revealed the impact of population growth on forest resource management and measure taken to control population growth.

4.3.1 Trends of Population Growth in the Study Area

Tanga region as revealed by 1988 population census was one of the highest in the country and Lushoto district with land area of 3,500 Sq. Km commanded the second highly populated district in Tanga Region with population density of 120.4 persons per sq km. Furthermore, Maro (1983) observed more marked variations at district and ward levels with a higher concentration of people in some regional, districts and wards than others. Figure 4.6 reviewed that population of Lushoto District had increased from 246,049 in 1978 to 492,441 in 2012 almost double the number people have been added in the district. The district has high population density of 120.4 persons per square Kilometer which is higher than the national population density of 51 Square Kilometer.(Lushoto District, 2013).
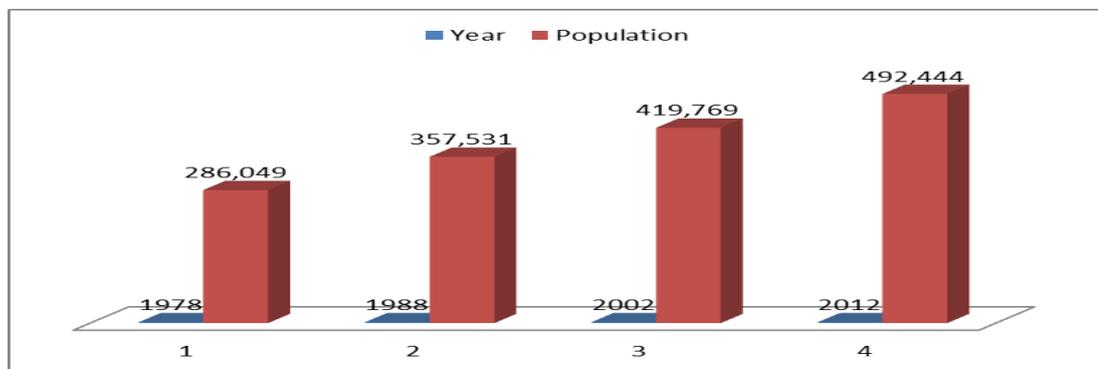
Figure 4.5: Population trend in Lushoto District from 1978 to 2012

Source: Census, (1978, 1988, 2002, 2012)

Population density in the West Usambara is high as 120.4 persons per square Kilometer (Census, 2012). This high population growth has led to increase demands for agriculture production and settlement hence results in unsustainable management of the forest. The study is similar to Soini, (2002a) who revealed that densely populated area had led to disappearance of ecological systems; the evidence is the southern slopes of Mountain Kilimanjaro which covers the part of the Moshi District Council. Recently, land use change analysis showed a vast expansion of agricultural production over marginal land downward the slopes, extending further into the uncultivated land, has caused the disappearance of vegetation cover, this is due to the clearing of forest and natural bush resulting to ecological disappearance and degradation.

Furthermore, high population growth rate in Tanzania have had significant environmental implications in many areas, the environment have been degraded to the extent that it can no longer support ecological balance and provision of necessary resources to present and future Population(UNFPA,1991; Green, 1992).

4.3.2 Impact of Population Growth In Forest Resources

The study revealed that the impacts of population growth has resulted to several forest management challenges whereby the respondents mentioned that 54% resulted to illegal forest tree cutting in the study area (Figure 4.7). The study is supported by Zahabu and Malimbwi, (1997) who reported that the most common human activities triggering degradation in Mountane forests include, clearing for new farm land, pit sowing, illegal timber harvesting, collection of building poles, cutting trees for

medicine, collecting fuel wood, and mining activities. Likewise Ndagalasi et al (2007) conducted study at Magamba Nature Reserve found that forest degradation of tree species including *Ocotea usambaransis* and *Podocarpus usambaransis* was rampant due to illegal selective commercial logging, subsistence harvesting of tree for building poles and fuel wood collection.

Moreover, the study revealed that 25% of the respondents utilized marginal land for agriculture and grazing due high population (Figure 4.7). The study is similar to that conducted to (Shishira and Yanda, 1998; Madulu, 2001) which reported that high population growth has resulted in increasing opened up of farmers in the marginal areas and even in the protected area in an effort to earn living. Furthermore Saunders et al (1991) reported that Degradation of forest edges arising from small-scale agriculture inevitably leads to fragmentation, and eventually deforestation. This deforestation results in isolation of forest patches, causing transformation of microclimate regimes.

Furthermore, the study revealed that increase in population has led to forest encroachment by 21% (Figure: 4.7). The study is supported by Shishira et al., (1998), who reported that the increasing population pressure around the forest reserve is likely to lead to encroachment into the forest reserve, hence threatening its sustainability. Likewise Madulu, 2001 reported that forest clearing for agriculture expansion has been rampant around the Swagaswaga Game Reserve in Kondoa District. Moreover Kaale (1984) reported that in 1980, about 200ha of Kilimanjaro forest reserve, a water catchment forest, were encroached by farmers.
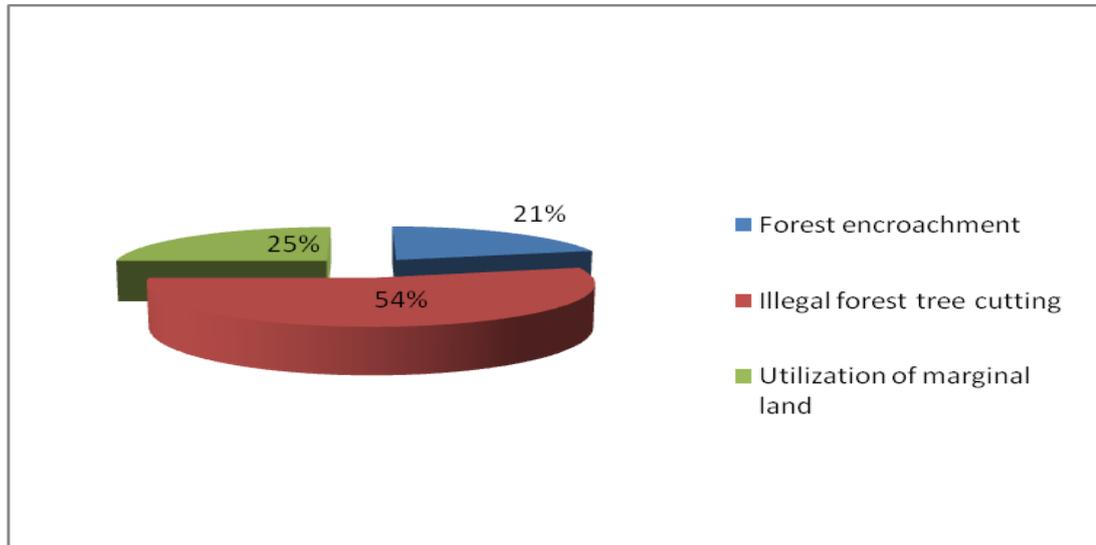
Figure 4.6: Impact of Population Growth on Forest Management

Source: Field Survey Data (2016)

4.3.3 Measures Taken to Control the Impact of Population Growth on Natural Resources

Due to the increase in population and its effect in natural resource several measure have been taken to rescue the situation. The result data from the surveyed area has revealed that 39% practiced improved agriculture and conservation techniques as the way of maximize crop production in small area reduced pressure to forest (Table 4.4). The result from end-line survey conducted by TFCG revealed that 42% of famers in West Usambara were applying conservation agriculture methods. The focus of conservation agriculture is on soil moisture management, crop rotation, permanent cover crops which apparently contributed to increased crop production (Nambiza and Lyatora, 2013). This implies that there is low adoption rate of people on use of improved agriculture practices which required more training and awareness to improve the situation.

About 32% mentioned that some of the villagers have been shifted to other Districts like Handeni where they can have enough land for cultivation (Table 4.4). Likewise many people especially youth, form Lushoto district are moving to big city like Dar-es-salaam and Arusha because they become landless due to overpopulation (Lushoto District, 2010). The similar issue happens in Kilimanjaro whereby the region has high population density that increases pressure on land resource. Recent study commented that 70% of the household in Kilimanjaro had insufficient quantities of land resources to sustain their livelihoods for agricultural activities and settlement expansion (Soini, 2002a). These forced the people of Kilimanjaro to move to other areas looking for settlement and farm field. Likewise landlessness has also been reported by Mwihomeke (2001) which has led to some people migrating to the lowlands (Johansson, 2001) and urban centres due to increase in population.

Table 4.4: Measure to Control the Impact of Population Growth on Natural Resources

Characteristics	Percent
Family planning	27
Shifting to other area	32
Improve agriculture and soil conservation techniques	39
No measure taken	2
Total	100

Source: Field Survey Data (2016)

27% revealed that they are using family planning methods to ensure the number of children matches with the available resources and 2% mentioned that there is no measure taken (table 4.4 above). Data from the two most recent demographic and health surveys indicate the use of modern family planning methods increased from

20% among married women 2004-2005 to 27% in 2010. Nevertheless 25% of married women were found to have unmet need for family planning i.e. they want to space their next birth or stop childbearing entirely but were not using contraception. In response, efforts were intensified to realize the goal of National Family Planning Costed implementation program 2010-2015 to raise contraceptive prevalence rate to 60% (MOHSW, 2013). This shows that the adoption rate of the family planning methods is almost the same as the National rate of 27% , which implies that the study area are aware on the important of family planning.

4.4   Access to and the Socio-Economic Uses of Forest Resources

This part presents the results and discussion on the access to forest products and uses in the study area. The first part covers the results and discussion on the access to forest product in the study area. The second part presents the results and discussion on the demand for forest products in the study area. The last part presents the alternative sources of forest products.

4.4.1 Access to Forest Products

The study revealed that 84% of the respondents collect fire wood from the forest (Figure 4.8). This implies that fire wood is the major source of cooking fuel in the study area. Fire wood is the cheapest source of energy in Tanzania, approximately 90% of the population uses firewood and charcoal for their cooking and heating needs (Monela, 1999). Even more so in the West Usambara where approximately 99% of the use fire wood to cook (Kaale, 1993). Lusambo (2009) reported that Tanzania energy balance dominated by biomass-based fuels, particularly wood fuel

(fire wood and charcoal) which account for > 90% of primary energy supply. The findings similar to Giliba *et al*., (2010) who reported that 92% of NTFPs collected from the forest were firewood in Mbulu and Babati districts. The finding similar to Msaliwa (2013) who reported that 98% of people in Kilolo district use firewood as the main source of energy. Furthermore, the finding similar to Mainski (2008) who reported that Malawi 97.0% of the rural house uses firewood as the major source of cooking fuel.

Plate 4.1: Firewood Collection As It Observed on the Boundary of Baga Forest

Likewise the study revealed that 9% of the respondents depend on forest for medicine (Figure 4.8). This implies that very few household depend on forest for medicine probably this is because of the availability of dispensaries and Bumbuli

Hospital which are found nearby the villages or the medicine inside the forest have been finished due to over utilization. The findings are similar to observation done by Mogaka (1992) who reported that plants from forests have significant proportion of medicine value that can be useful to surrounding population. This could probably be due to the reasons that firewood is the only cheaper, available and affordable primary source of energy in the study area.

Furthermore, the study shows that 5% of the respondents depend on forest for vegetables (Figure 4.8). This implies that very few household depend on forest for vegetable probably because the majority of the villagers are practicing vegetable farming which have observed on the side of the river line. This study is similar to Katriina (2000), who reported that the most vegetable are collected and used in four days a week on average. 2% revealed that they collect fruits from the forest (figure 4.8).
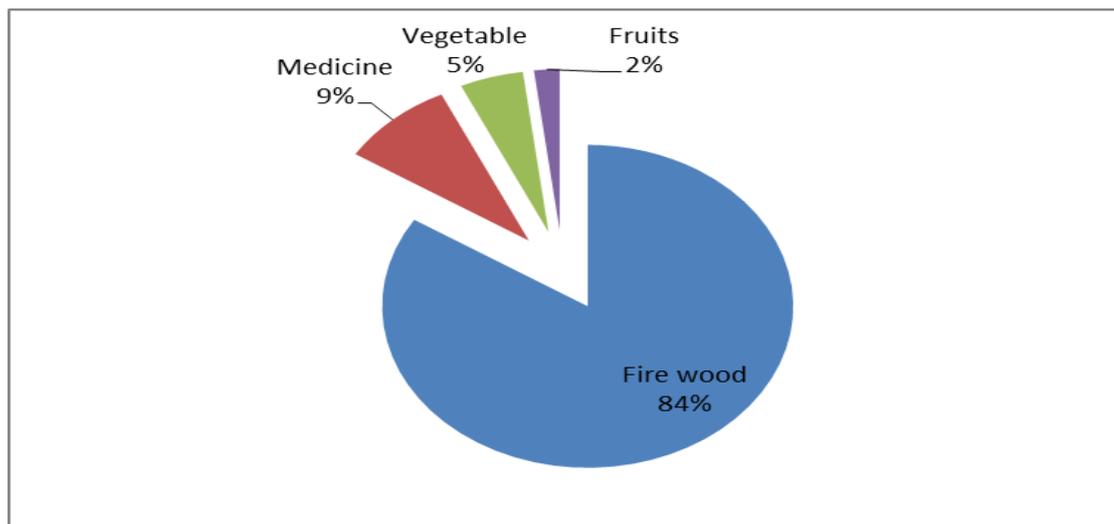
Figure 4.7: Access to Forest Products

Source: Field Survey Data (2016)

4.4.2 Demand for Forest Products

During the study, 93% of the sampled households reported that there is a high demand for forest product while 7% revealed that there were not by comparing with 10 years back (Figure 4.9). The study further reviewed the reasons for high demand is due to increase in population and illegal harvesting inside the forest reserve. The study is similar to NAFORMA (2015) reported that forest area in Tanzania has decreased from 3ha/capital in the early 1980 to 1.1 ha/capital in 2012 due to the increase in population. That means there is I m^3 of woodland per person per year available from legal accessible sources in Tanzania. In additional more forest are degraded than were in the early 1980s. This implies that there will be more demand of forest products due the increased degrading of the forest.
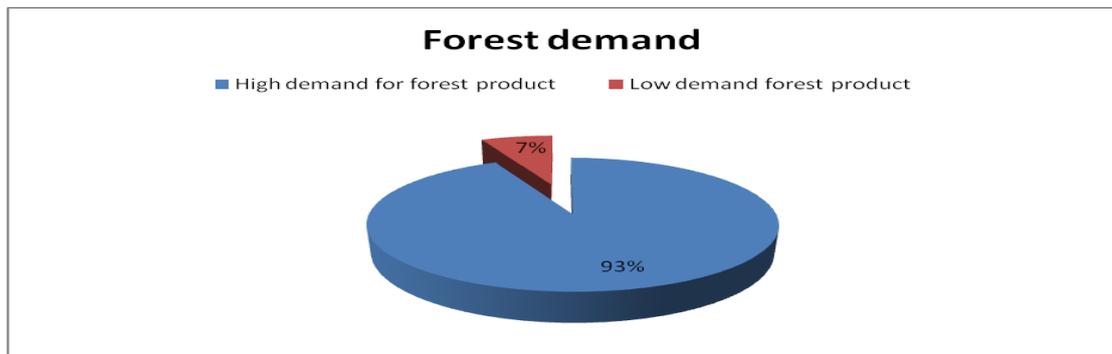
Figure 4.8: Community Forest Demand

Source: Field Survey Data (2016).

4.4.3 Alternative Sources of Forest Products

Apart from the forest other areas where they can get forest product from respondents own wood lots, small patched around their farm field and general land. The sample of respondents revealed that 72% owned small wood lots of an area of 0.5 to 3 acre while 28% of the respondents they do not own any wood lots (Figure 4.10). The

study shows that many household have woodlots in the study area. This is because the demand for forest product is very high in the area and a lot of awareness has been conducted in the study area about tree planting. Most of the planted trees in woodlots technology were exotic species like *Gravillea robusta*, *Eucalyptus* and *Acrocarpus* species. Basically, these species were introduced in order to meet critical fuel wood demands for domestic uses and maintenance of conditions allowing for sustained agriculture and livestock production (Mnzava, 1980; Kaale, 1984). The study is similar to (Indufor, 2011) who estimated that there is about 80,000 to 140,000ha in total of village (woodlots) and farm plantation in Tanzania. Furthermore, FBD (2005) reported the similar study that tree planting became an entrenched practice by people and when seedlings were not available from local authorities nurseries, residents used seedlings self-germinating under existing trees. A few individuals also established small nurseries to produce seedling for their own requirements and also for sale to other farmers. This implies the households in the study area highly motived in tree planting to offset the challenges of forest products demand.
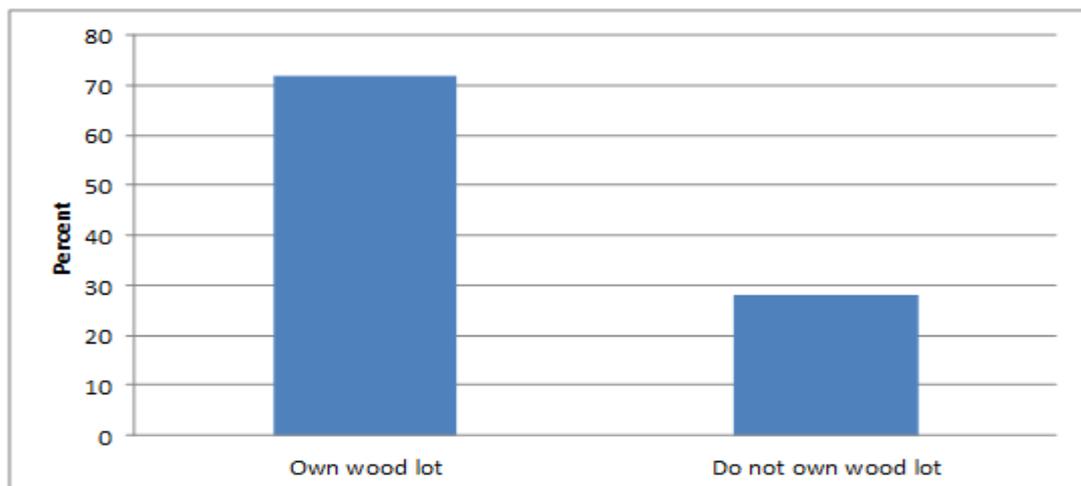
Figure 4.9: Alternative Sources of Forest Products

Source: Field Survey Data (2016)

Plate 4.2: Woodlot Planted Observes At Mayo Village, West Usambara

Plate 4.2:   Agroforestry Farm Field As Observed at Sagara village, West Usambara

4.5   Evaluate the Intervention Measures Used to Manage Forest Resources

The study identified management challenges facing the reserved forest and Forest Management system practiced in the study area.

4.5.1 Conservation Challenges Facing The Reserved Forest

The study area experienced conservation challenges on the reserved areas whereby 48% of the household respondent revealed that illegal tree cutting is the main conservation challenges (Figure 4.11). This implies that illegal tree cutting has greatly influenced the natural resource management in West Usambara. Apart from increased demand for agriculture practiced due to increase in population, shifting agriculture in the past and lack of traditional among the local people for protecting the trees are principle causes of illegal tree cutting (Huwe, 1988). It also shows that the continuous illegal tree cutting in West Usambara has led to land degradation. This attributed to poor land husbandry, increase erosion and decline of soil fertility and no limited use of fertilizer. The impact of this is declining of crops yields, increased food insecurity and reliance of food aid, poor nutrition and increased dependence on forest for livelihoods (Mwihomeke, 2002).

Rapid deforestation in West Usambara has been driven by industrial logging, small scale logging, fire wood collection, subsistence agriculture, large scale agriculture such as tea plantations as well as monocultures of exotic Eucalyptus, pines or cypress; mining and other uses (Hall *et al*. 2009). With the estimated   57% deforestation in the East Usambara mountain and 73% deforestation in the nearby West Usambara mountains over the last 150 years (Newmark, 2002). This implies

that the area experience high rate of deforestation due to high demand of forest for different uses.
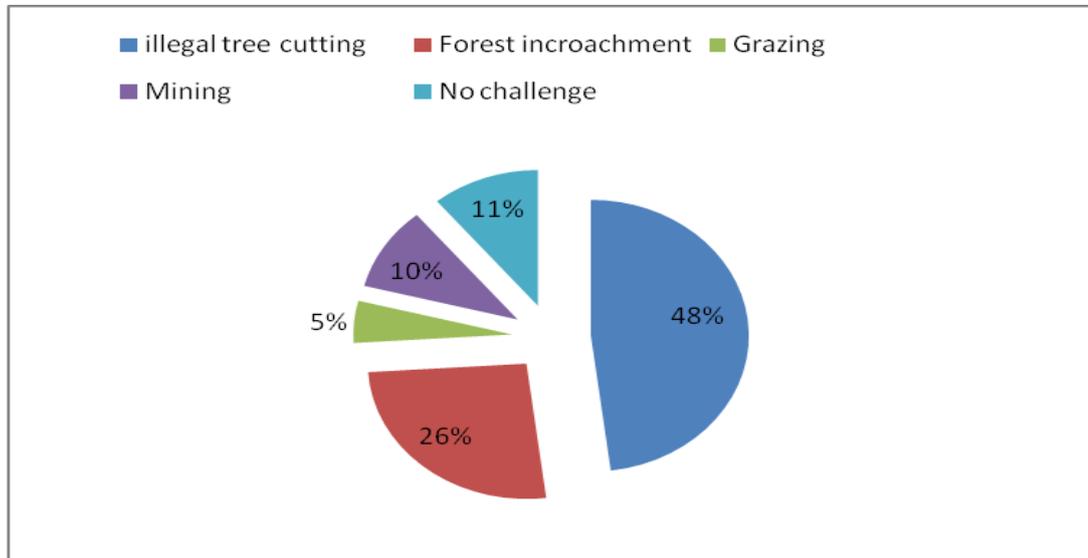
Figure 4.10: Conservation Challenges Experienced In The Study Area

Source: Field Survey Data (2016)

Plate 4.4: Illegal Tree Cutting As Observed Inside Baga Forest Reserve

Likewise the study revealed that 26% forest encroachment as the management challenges which affect the reserve area (Figure 4.11). This implies that the study area has been affected by forest encroachment and this probably happen due to high population growth and shortage of cultivation land. According to MNRT reported the similar issue that encroachment and over-utilization has been taking place in the forest reserves which are under jurisdiction of the central and local government (URT, 1997). Moreover local people considered protected or reserved areas as constraints to their livelihoods. Since it was not possible to create rigid separation between land used by local people to obtain natural resource products and those designated by governments as protected areas, encroachment, poaching, and degradation were invertible (Primack, 2002). This is also supported by Hoffmann (2002) who explained that agricultural expansion and consequent land degradation processes; that is, overgrazing and deforestation as experienced in the Southern Slope of Mount Kilimanjaro and West Usambara in Lushoto District explain why land degradation occurs in relation to population density.

The study also revealed that mining contributes to 10% of forest destruction in the study area (Figure 4.11). Small-scale artisanal miners have invaded the forests, causing severe environmental destruction by felling valuable old indigenous trees to dig up gold. Also it destroys water sources and wetlands. This is supported by Mafupa (2006) who reported that in Eastern Africa severe encroachment and exploitation of mining activities destroying the forest that occurs in fragmented patches.

Plate 4.3: Illegal Miners As Observed At Tewe Village in West Usambara

4.5.2 Forest cover change

Data from the Landsat image taken between 2002 and 2012 shows a vegetation cover change caused by deforestation by 0.87%, grassland change by 4.4% and Montane and Lowland forest 94.73% (Table 4.5). From the analysis satellite data, deforestation rate is minimum in the study area as it has shown in the Figure 4.12 below. The data obtained from satellite image differ from the obtained surveyed data which show high deforestation rate in the study area.

Table 4.5: Forest Cover Change Baga Forest Reserve 2002-2012

Land cover name	Area (Ha)	% of the total area
Montane and Lowland forest	3409.29	94.73
Deforestation	31.41	0.87
Grassland	158.22	4.4
Total	**3,598.92**	**100**

This variation is due to the fact that satellite image shows only the above tree canopy cover. Likewise field observation and discussion with the key informant revealed that that illegal harvesting are done by selective tree cutting whereby different tree species are selected according to the uses example timber, fire wood and poles which make difficult for satellite image to observe the effect under the tree canopy. This is similar to findings conducted in Eastern Arc explain eight of the top eleven most commonly cut species are known to be good sources of timber and fuel wood (Shulman et al 1998, Mbuya et al 1994).

Furthermore according to Bumbuli Forest Officer about 20 illegal tree cutting has been reported from Baga forest and 1200cm3 of timber has been confiscated between 2015 and 2016. Likewise Halter (2016) observed the stem cut density of 180 stems/ha (>20cm diameter) in Baga II forest reserve which also supported by (Schulman *et al*. 1998) who found that the stem cut density in montane forests to be 200-300 stems/ha. Study conducted by (Newmark, 1998) revealed that over 2000 year ago the forest cover for Eastern Arc Mountain has changed from 23,000 km2 to 15,000km2 by mid 1900s. Losses were greatest, relative to original cover in Taita Hills (98%), Ukaguru (90%), Mahenge (89%) and West Usambara (84%). Furthermore, based on Tabor *et al* (2010) finding deforestation rate for Tanzania

protected area are -0.05% per year whereas rate of outside the protected areas are -0.26% per year.12% of deforestation occurred inside the protected area.
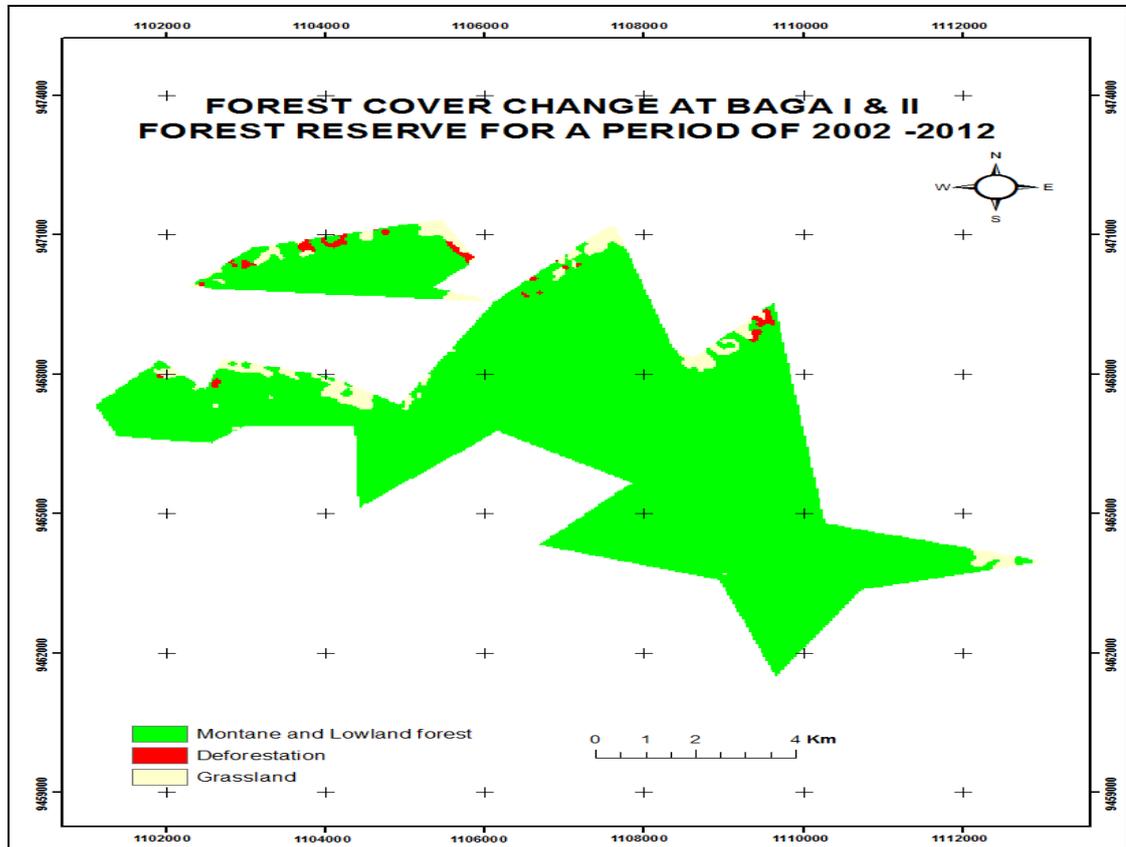
Figure 4.11: Forest Cover Change Baga Forest Reserve between 2002 and 2012

From the satellite image (Table 4.5 and Figure 4.12), it was shown that 31.41 hectare of forest has been degraded in Baga forest reserve between 2002 and 2012. This is similar to study conducted Temu and Mbwana (1984) who reported that in East Usambara for example, the Amani forest has been reduced by about 50% while in the Western Usambara, an estimated average of about 7,000ha of forest has been cleared annually between 1960 and 1980. Likewise NEMC, (1995) estimated that over 70% of the Usambara forests have been cleared since 1905. Finding by Kashaigilia *et al* (2013) in Tanzania revealed that during the period 1980-1995 and 1995-2010, closed

forest decreased by 635.5ha (-11.9%) and 1674.9 ha (31.3%), respectively. Hansen et al (2004) observed that the tree cover of the world had decreased between 1984 and 1997 and the annual deforestation rate in tropical Africa was about 0.09%. In his study to identify and map deforestation using Landsat images and Global inventory Modelling and Mapping Studies (GIMMS) data from 1980s to 2000s Wu (2011) found that Kenya still remained at the deforestation rate of about 0.3% per year. Large loss of forest area was indicated for Tanzania and Uganda, about 1.2% and 2.7% per year, respectively.

4.5.3 Forest Management System Practice

The survey revealed two types of management system which are Joint forest management system and Community base forest management system, Figure 4.13 show that 71% of respondents revealed to practices joint forest management system, 25% both community and joint forest management system, 4% Managed by Government. In 1998, Tanzania approved a National Forestry Policy, the first new forest policy since 1963 which promoted substantial change in the way forests are managed (MNRT, 1998a). The policy aims to promote participation in forest management through the establishment of VLFRs, where communities are both managers and owners of forests, as well as through JFM, where local communities co-manage NFRs or LAFRs with central and local government authorities. As it was revealed the study area practiced both Joint forest management and community forest management as it was stipulated in the Forest Policy. Participatory forest management system involves a high degree of participation of villagers in all stages of forest management planning, implementation, monitoring and evaluation and also

sharing of benefit (Bromley and Ramadhani, 2006). Participation of communities to forest management enables sustainable flow of forest products which improves the livelihoods of communities surrounding the forest through creating awareness to them (Iddi, 2002). According to Kessy (1998), recommended approaches in participatory forest management vary from one locality to another depending on group interests. Also it argued that local community interest in participatory management of forest is influenced by the need for forest product, by cultural factors and in the option of using forests as source of household food and income or employment (Kessy, 1998).
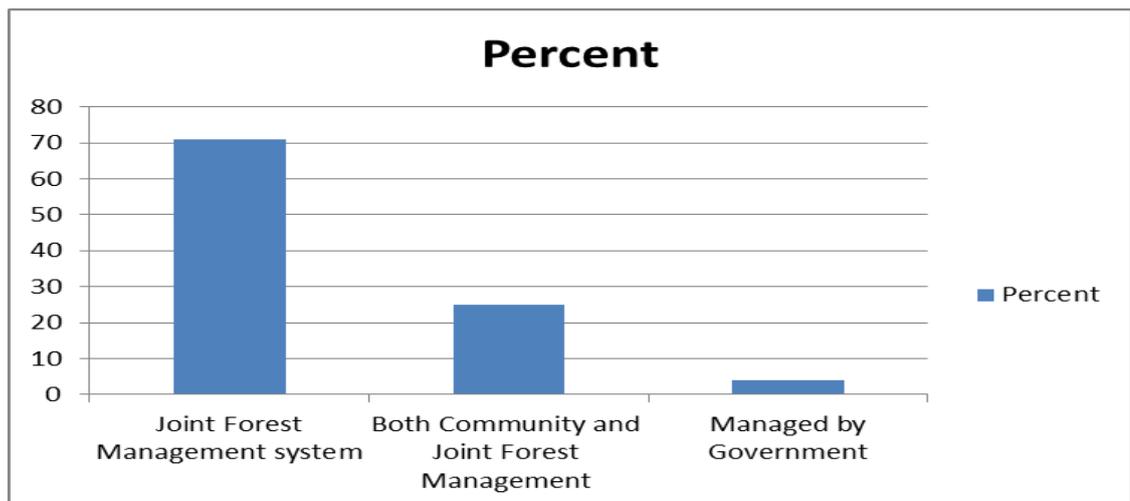
Figure 4.12: Forest Management System Practice

Source: Field Survey Data (2016).

4.5.4 Forest Management Challenges

The study area experienced several challenges regarding forest management about 36% of the respondents mentioned management plan, Joint agreement and bylaw developed were not being approved by the government (Figure 4.14).The implementation of Joint Forest Management, legalized through the signing of Joint

Management Agreements, management plan and bylaws which has been more uncertain to the study area. Only the management plan and bylaws for community and village forest reserve have been signed but none of the Joint agreement, management plan and bylaws in the forest reserve have been signed which cause problem on the implementation and management of the forest.

Likewise 28% of the respondents mentioned benefit sharing between Government and community not clear (figure 4.14).The issue of benefit sharing is not clear on the joint management agreement this is largely because of the fact that the law remains silent on how the benefits of forest management can be equitably shared with participating communities. In many cases, benefit-sharing arrangements remain in a legal limbo – with *de facto* management at the local level taking place, in return for vague promises about benefits at a later date. Clearly, this is a situation that cannot be sustained indefinitely. Without benefits reaching a level that equal or exceed the costs being borne, in terms of local forest management, the long term future of Joint Forest Management remains uncertain (Blomley and Iddi, 2009).

Furthermore, 22% mentioned poor law enforcement (figure 4.14).The study also observed the existence of weak forest management systems (in particular the lack of effective implementation of forest management laws), and the lack of a formal mandate to control the use of forest products within the village were reported to constrain the management of forest resources. For instance, it was reported by key informants (members of the VNRC) that district natural resource officers were unwilling to give them a formal mandate to enforce laws and control

the use of forest products. Thus, this constrains efforts geared at the sustainable management of forest resources, in particular by controlling deforestation caused by cutting trees for building materials and timber. This concern is also reported by Blomley and Ramadhani (2006), who asserted that those responsible for disseminating and implementing laws, such as district technical staff, may be unwilling to divest themselves of power and give it to villagers. Also Shemdoe, (2003) reported the existence of governance structures with cultural background (Informal local governance structures) and those with political background (formal local governance structures) in his study villages around Lake Manyara National Park Tanzania. Therefore, good governance is needed in order to enable community to manage forest in sustainable way.

Moreover, 10% of the respondent mentioned low awareness about forest conservation practices (Figure 4.14). Community involvement in forest management need be enhanced through increasing awareness, education and empowerment (Paulo et al.2007). Similarly Anim (1999) reported that awareness on land degradation and perception of the benefits to accrue out of the forest management practices are crucial factors for investment and adoption of conservation measures. Kajembe et al (2004) emphasized that to ensure full participation in PFM programmes, stakeholder at community level need essential skills and sensitization about their rights, responsibilities and expected return.

About 4% of the respondents mentioned low understanding about forest policy and Act (Figure 4.14) which contributed to poor management of the forest. According to

National Forest Programme (NFP) of Tanzania it emphasizes the need for awareness creation in forest management among all stakeholders to ensure effective involvement in the implementation of the National Policy and Forest Act (Iddi, 2003).
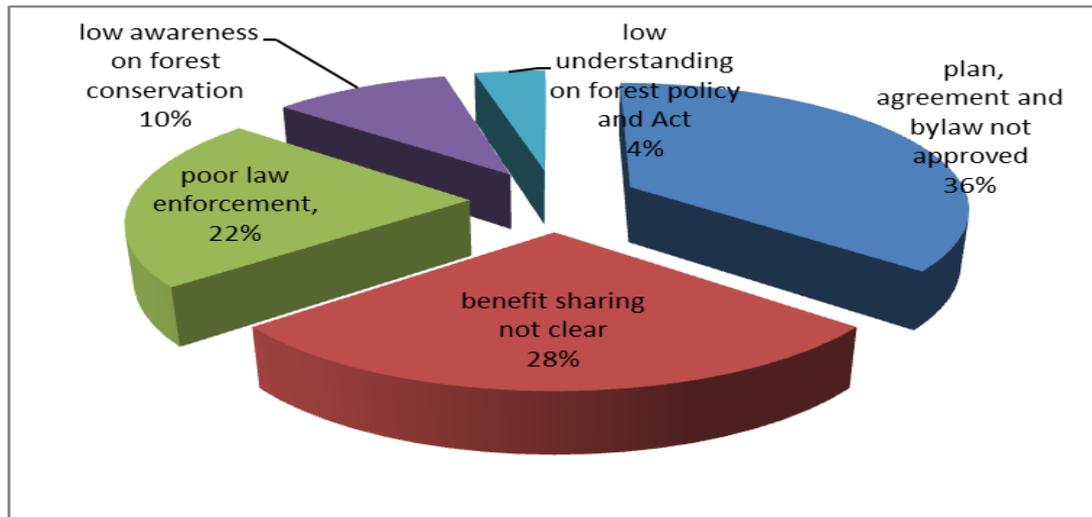
Figure 4.13: Forest Management Challenges

Source: Field Survey Data (2016).

4.6 Summary of Chapter

The present chapter has dealt with the study findings, results and discussion. This chapter particularly dwelt on descriptive analysis of sample characteristics as well as the quantitative of the study variables. The data presentation and analysis focused on testing the three research questions to achieve the desired objectives of the study. The qualitative analysis was used to examine the relationship of the interested variables.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECCOMANDATIONS

5.1   Introduction

This chapter presents conclusions of the study findings, results and discussion presented in chapter four. Finally the chapter presents recommendations for administrative action and for further study.

5.2   Conclusion

This chapter summaries the findings and results related to population growth, forest management, social economic factors relating forest uses, benefit sharing and Policy, legislative and regulatory measures-enforcement and compliance

The finding revealed that forests in the study are poorly managed and community do not adhered to government laws, rules and regulation. Forest has been under pressure due to illegal activity such as tree cutting, fire wood collection, and forest encroachment and mining. The evidence showed that rapid urban population growth has led to poor forest management in the study area because the demand and supply of the natural resource requirement do not balance.

The first objective of this study examined the trend of population growth in Tanzania over the past thirty years. The study has shown that population of Tanzania has doubled from 17.5 million in 1978 to 44.9 million in 2012 while the population of Lushoto District raise from 246,049 in 1978 to 492,441 in 2012 with a population

density of 120.4 Square Kilometer which is higher than the national population density of 51 persons per Square Kilometer. High population density in the study area resulted to shortage of land for cultivation as the result lead to forest encroachment and illegal activity inside the forest.

The basis of objective two was to examine the socio-economic factor affecting forest resource uses. The study assessed the factors affecting the resource uses in the study area and it has found that about 84% of the community depends on forest for fire wood while the 93% revealed that there is high demand for forest products like medicine, firewood, poles in the study area. The finding from the study area revealed high demand for forest product to support their social and economic needs which required attention from the conservationist to find the alternative solution for it. The study area is surrounded with reserved forest owned by the government, but due to adjacent community population growth; high demand of the forest products and poor forest management practices has led to high pressure to the forest. Some measure should be taken to resolve this such as introduction of agroforestry practices and woodlot establishment.

The final objective of the study was to evaluate forest management intervention measures taking place in the study area. The focus was on observing forest management system existing in the study area. The finding revealed that proper forest management practices do not exist in the study area, although participatory policies have been adopted, JFM model does not adequately grant local actors the real decision making authority to participate actively and effectively in natural

resource management. This is because the JFM model dictate the limit of local actors participation and the vision of resource management remains rather resource state-centric, with very little room for local actors to accurate their own interests. None of Joint forest agreement which explain the distribution of the benefit sharing has been signed, as the result community they don't fill as part of the management. The responds from the key informant revealed that the study area has weak forest management system, poor laws enforcement and lack of cooperation between the community and Forest departments. This has resulted on continuously uptake of the forest products from the forest reserve.

5.3   Recommendation

The following recommendations were drawn on the basis of this study

i)   The study recommends that family planning education and campaign should be strengthened in Lushoto District Council, so as to reduce human population pressure over the land. Likewise the district should re-mobilize, re-encourage and sensitize people to move to unoccupied/vast land especially in Handeni and Kilindi or to establish employment opportunities that will attract people to settle and work on these suggested areas. The district should develop land use plan to each village which will show equal distribution land according to the use. Furthermore the community should be trained on optimal utilization of available land using improved agriculture practices.

ii)   Social economic benefit of the forest should be considered during the initial stage of the development of the management plan, this includes high cultural,

spiritual, or recreational value, employment, value generated from the processing and trade of forest products, and investments in the forest sector. Maintaining and enhancing these functions is a part of sustainable forest management, hence information on status and trends in socio-economic benefits is essential.

iii) Ministry of Natural Resource should ensure that PFM is actively implemented and the challenge of benefit sharing between government and forest adjacent community is resolved. Active Joint Forest Management will control harvesting and utilization of the forest product and maintained sustainably. Community forest management should be promoted because it gives community responsibility to protect their own forests and the right to use them in sustainable manner which lead to improvement of forest condition.

iv) The study recommended that government could develop the mechanisms whereby National and international beneficiaries of the environmental services of forests have to pay for such services .There has been some success in devising schemes to collect payments for environmental services like carbon sequestration, biodiversity conservation and catchment protection. This success can further be more realized by integrating participatory mode of management with these collection schemes to ensure rights and tenure with equity in resource and benefit sharing for improving the livelihood of the rural poor who actually are the

primary stakeholders of conservation and management. All parties with an interest in the fate of the forest should be communally involved in planning, management and profit sharing.

v) Wide variety of policy statements and legislative and regulatory measures have been established to protect forests but need to be effectively enforced. New modifications/adjustments are of course needed for site specific conditions. Laws, policy and legislation should be such that they encourages local people and institutional participation in forestry management and conservation along with safeguarding indigenous people's traditional rights and tenure with rightful sharing of benefits. Many formal and informal enforcement/compliance mechanisms can be used to protect forest. These approaches include negotiation, warnings, cancelling work orders, notices of violation, fines, arrests and court action.

5.4 Recommendations for Further Research

This study dealt only with the assessment of the impact of population growth on forest resource management in West Usambara, Tanzania. It is suggested that, further research should be done to assess the social-economic impacts of population growth or other related aspect on population and sustainable utilization of the forest products.

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APPENDICES

APPENDICES 1

Household questioners

Interviewers start by clarifying the objective of the research, and reassuring the respondent that all information they provide will be strictly confidential and will not be used against them and that they should feel free to talk about all benefits derived from the forest, even those that are illegal.

A. Location of the Village

Questionnaire number……………………………………...………..………………

1. Name of Interviewer……………..

2. Village………..……ward……..…….Division……………District….………

B. Respondent Information

1. Gender: 1. Male ( ) 2. Female ( )

2. Age ……………………… (in years).

3. Ethnic Group ……………………………………………………………….

4. Marital status

    1. Married 2. Single 3.Separated 4.Divorced 5. Widow

    Household size

    (1) 1 (2) 2-5 (3) 5-9 (4) 10+9. Level of education

No. Level of education   Tick   Specify exact class

1. No formal education

2. Primary education

3. Secondary education

4. Technical education

5. Diploma or University Education

6. Others (Specify)

7. Place of origin

1. Born in the village ( ) 2. Born outside the village but within the district ( ) 3.

Born outside of the district but within the region ( ) 4. Born outside the region ( )

8. If you moved into this village, when did you settle in this village? ……………

(Year)

9. What were your main reasons for settling in this village?

1. In search of agricultural land 2. In search of business opportunities

3. Unfavorable climatic conditions in previous place 4. Following relatives

5. Marriage 6. Employment 7. Others (specify)

……………………………………………………

10. What is your main occupation?

1. Crop production 2. Livestock keeping 3. Wage employment 4. Petty business

( ) 5. Beekeeping ( ) 6. Collecting and selling forest products 7. Casual labor ( )

8. Others (Specify)………………………………………..

(C) Information about Forest Management Challenges

1. What is the general situation of the reserved forest in your village?

   1. Good   2. Moderate   2 .Bad   4   Others   (Specify…………

   ………………..…..…….. (   )

2. What are the main challenge facing the reserved forest in your village?

3. Illegal tree cutting 2. Forest encroachment 3. Grazing 4. Mining

4. Others (Specify …………….……………….………….…………… (   )

5. Do you think there is forest destruction in your village/area? YES/NO………….

6. If YES, What are the main causes of forest destruction in this village?

7. Over stocking

8. Poor agriculture practices

9. High rate of population growth

10. Poverty

11. Others specify ………………………………………..…………….… (   )

D) Information about Forest Managemnt System

1. Do you have forest reserve? Yes or No

2. What type of the forest reserve do you have?

      i) Community forest

      ii) Catchment forest reserve

      iii) Village forest reserve

      iv) Both village and catchment forest reserve

      v) Both community and catchment forest reserve

      vi) Traditional forest

      vii) Others (Specify)

3. What type of forest Management system do you have?

      i) Community base forest management system

ii) Joint forest management system

iii) Both community and Joint forest management system

iv) Others (specify)

4. Is there any forest management challenge in the village? Yes or No

If yes, what are those challenges?

i) Poor law enforcement

ii) Low of awareness about forest conservation practices

iii) Management plan and bylaws not approved

iv) Low knowledge about forest policy and act

v) Benefit sharing not clear

vi) Others (specify)

5. What measures have been taken to resolve those challenges? Mention

………………………………………………………………………………..

………………………………………….…………………………………..……

E. Availability and Uses of Forest Products

1. Do you have access to forest products? 1. Yes ( ) 2. No ( )

2. How do you gain access to these forest resources?

i) Allowed by the village government ( )

ii) Allowed by the existing traditional institutions ( )

iii) Both existing village government and existing traditional institutions ( )

iv) Pioneering into the forest

v) Community forest management plan and bylaws

vi) Joint forest management plan and bylaws

vii) Both community Joint forest management plan and bylaws

viii)   Other means (specify)………………………………………… ( )

 ix)   Mention type of forest products does your family collect from forest?

   1. Firewood ( ) 2. Poles ( ). 3. Medicine ( ). 4. Timber ( ).5 fruits. 6.

3. Is there other benefit do you get from forest apart from forest product? Yes or No

If the answer is Yes, Please mention

………………………………………………………...

4. Apart from forest where else can you get forest products?

   1. Own wood lots ( ) 2. Forest patches around our farms ( ). 3 General land ( )

5. How many days per week do you go to collect the forest products?

   1. One ( ) 2. Two ( ) 3. Three (   ) 4. Every day (   ) 5. Not involved (   )

6. Describe and name forest products in detail, and their uses within your locality.

   The relative importance of various forest resources for different groups

Type of local use	Low Medium	High
Food		
Medicine		
Building/construction materials		
Fodder/grazing		
Fuel wood for energy		
Spiritual /Ritual use		
Others (specify)		

7. Do you own woodlots/farm trees? 1. Yes ( ) 2. No ( ).

8. If the answer is yes, will you please provide information to fill the table below

No.	Name of tree planted	Type (1.Exotic, 2. Indigenous)	Number of trees owned	Where planted (1.Within village, 2. Outside village)	Size of farm	Use of trees
1						
2						
3						
4						

9. What problems do you faced on woodlots establishments and management?

   1. Theft ( ) 2. Drought ( ) 3.Lack of tree seed ( ) 4.Disease and pest ( ) 5.Fire( )

   6. None ( )

10. Do you have any challenges in accessing forest products? Yes or No

If yes what challenges do you faced? Mentions

……………………………………………………………………………

…………………………………………………………………………….

11. What measures have been taken to resolve those challenges?

…………………………………………………………………………………..

…………………………………………………………………………………..

F. Information about Population Growth

1. Do you think high rate of population growth has led to the increase in forest destruction? Yes or No

2. If yes in which aspects

  i)   Forest encroachment

  ii)   High demand for forest products

 iii)   Utilization of marginal land

  iv)   Others specify

3. How do you compare the availability of forest products over the past 10 years?

   1. Increasing ( ) 2. Decreasing ( ) 3. No change ( )

4. If decreasing, what are the causes for such decrease?

  i)   High demand forest products due to increase in population

  ii)   Poor law enforcement

 iii)   Climatic change

iv) 4. Lack of education about forest conservation

v) 5. Lack of awareness about forest conservation

vi) 6. Other specify

5. What measures have been taken to control the impact of population growth on natural resources?

i) Family planning

ii) Shifting to other area

iii) Improved agriculture and soil conservation techniques

iv) No measure taken

THANK YOU FOR YOUR COOPERATION

APPENDICES 2.

Focus group discussion

2.1 Forest Management System

District Forest Department/Village Natural Resource Committee

Form number…………………

Date of interview: ……………………………………………

Group Name: ……………………………………………

1. What is the existing forest management system in your village? Mention

…………………………………………………………………………………………

2. What are the existing rules/regulations for accessing such forest products/resources?

No.   Rules on Forest Resources   Who formulated those Satisfied   Yes/No

Reason Any suggestions

…………………………………………………………………………………………

3. What institutions are responsible for forest and forest resources management?

No.   Name of Institution   Roles   Name of institution   Roles

…………………………………………………………………………………...……

4. How is community involved in forest resources management?

5. How are benefits from forest resources management shared by the community?

6. What problems/challenges are faced in accessing and utilizing forest resources?

7. What are the major problems/challenges are facing management of forest resources?

8. What should be done to overcome these problems?

…………………………………………………………………………………

2.2 Village Chairmen and Village Executive Officers

Location

Village: Ward: Division: District

Date of interview: -------------------------

Position at the village: ----------Age------------   Sex---------------

1. How long have you lived in this village?

2. How many households does the village have?

3. What was the population for the past 10, 20 and 30 and present?

Years Present   10   20   30

Population

4. What forest management system do you have?

5. Are there some regulations and bylaws set by the village/ward/district regarding

    forest management?

6. Do the communities adhere to the forest regulation and bylaws? Yes or No

7. If the answer is no, why? ....

8. Do you think the forest regulation and bylaws help in forest protection? Yes   or

    No

9. If the answer is No, why?

        ....

10. What type forest products does community use?

Mention……………………………………………………………………

11. Is the community allowed to access forest products? Yes or No

12. Which criteria are used to access forest product?

13. In your opinion, do you think the increase in population affect forest management? Yes or No

14. If yes in which aspect?

THANK YOU FOR YOUR COOPERATION

APPENDICES 3

Individual interview checklist

Interviewee name and title…………………………………………..………..

Date of interview and place……………………………………………………

1. Briefly explain the environmental situation in the village adjacent to Baga Forest reserve

2. Why do you think the increase in population is a major problem in forest management? What are the causes and the magnitude of the problem? What do you think is the impact of this situation?

3. What are forest management system practiced by Forest department and community?

4. What are factors affecting forest management system, magnitude of the effect, measure taken to overcome the effect?

5. Do you think the measure taken by the government and NGOs to address the Problems it's adequately enough? What other measures should be taken?

6. What will happen if nothing will be done regard to the increase in population?

7. What recommendation do you give to improve the forest management system in this area?

THANK YOU FOR YOUR COOPERATION