LAND SCARCITY, RURAL LIVELIHOODS AND FOREST MANAGEMENT IN WEST USAMBARA, TANZANIA

Alexander Elias Songoro (M.Sc.)

A thesis submitted in partial fulfillment of the requirement of University of Giessen for the degree of Dr. rer. nat.

April 2014

Justus Liebig University Giessen

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FB07- Mathematics and Informatics, Physics, Geography

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Dedication

I dedicate this work to:

- My father Elias Songoro Chipalazya and my late mother Anna Kambelembele who sacrificed their resources in favor of my youth education.
- My son Exodus and my wife Happiness Enock Lyimo who supported me in so many ways during the entire period of my studies.

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Acronyms

AHI – African Highland Initiatives

BA – Basal Area

CBD – Central Business Districts

CBFM – Community Based Forest Management

CFR – Community Forest Reserves

DADP – District Agricultural Development Plan

DBH – Diameter at Breast Height

DED – District Executive Director

DFID – The British Department for International Development

DNRO – District Natural Resources Officer

DUCE – Dar es Salaam University College of Education

EAM – Eastern Arc Mountains

ECA – Economic Commission for Africa

EU – East Usambara

EU – European Union

FAO – Food and Agricultural Organization of United Nations

FBD – Forestry and Beekeeping Division of Tanzania

FBLA – Forest Based Livelihood Activities

FDI – Foreign Direct Investors

GDP – Gross Domestic Product

GPS – Global Position System

HCEI – Household Consumption Expenditure Index

HII – Household Income Index

HSRC – Human Science Research Council

HWI – Household Wealth Index

IIED – International Institute of Environment and Development

IJA – Institute of Judicial Administration

ILC – International Land Coalition

IMF – International Monetary Fund

IUCN – International Union for Conservation of Nature

JFM – Joint Forest Management

JLU – Justus Liebig University Giessen

JMA – Joint Management Agreement on Forest

LAFR – Local Authority Forest Reserve

LARRRI – Land Rights Research and Resources Institute /Hakiardhi

LDCs – Less Developed Countries

LEAT – Lawyers Environmental Action Team of Tanzania

LGFR – Local Government Forest Reserve

MBRS – Mlalo Basin Rehabilitation Scheme

MLHHS – Ministry of Lands, Housing and Human Settlement Development of Tanzania

MNRT – Ministry of Natural Resources and Tourism of Tanzania

MRG – Minority Rights Group International

NFP – National Forest Program

NFR – National Forest Reserves

NGO – None Governmental Organization

PBFP – Property and Business Formalization Program of Tanzania/MKURABITA

PCCB – Prevention and Combating of Corruption Bureau

PF – Private Forest Reserve

PFM – Participatory Forest Management

REDD – Reducing Emission from Deforestation and Forest Degradation

RRI – The Rights and Resource Initiatives

SACCOS – Savings and Credit Cooperative Societies

SECAP – Soil Erosion Control and Agroforestry Program

SEKOMU – Sebastian Kolowa Memorial University

SIDA – Swedish International Development Agency Studies

SLA – Sustainable Livelihood Approach

SPSS – Statistical Package for Social Science

STRF – Sacred and Traditional Forests

TAFORI – Tanzania Forest Research Institute

TASAF – Tanzania Social Action Fund

TFCG – Tanzania Forest Conservation Group

TGNP – Tanzania Gender Networking Program

TIC – Tanzania Investment Center

TIP – Traditional Irrigational Program

TNRF – Tanzania Natural Resource Forum

TZS – Tanzanian Shillings

UDSM – University of Dar es Salaam

UNCTAD – United Nations Conference on Trade and Development

UNESCO – United Nations Educational, Science and Cultural Organization

UN-HABITAT– United Nations Human Settlements Program

URT – United Republic of Tanzania

US$ – United States Dollar

VICOBA – Village Community Bank

VLFR – Village Land Forest Reserves

WHO – World Health Organization

WWF – World Wild Fund for Nature

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1 Introducing the Research

The importance of West Usambara rests on the fact that it inhabits exceptional features. The features include: *high scarcity of arable land*; *high population density*; and *tropical rain forests which are rich in biodiversity*, hence having higher conservation value. These features do not appear in other places in Tanzania. Though Tanzania has some districts with scarcity of arable land, such districts have no forests with high conservation values of national and international importance. Likewise, even other districts that are endowed with forests do not face critical scarcity of arable land like in West Usambara. These conditions motivated the researcher to embark to a study which looks at the interdependence of land, livelihoods and forest management. Previous researches in West Usambara have tackled them in isolation. Hence, there is so much emphasizes of some issues at the expense of others or overlooking of some topics (e.g. more weight on forests at expense of livelihoods). Findings from such kind of works might mislead the decision and policy makers leading to erroneous policies and programs. Therefore, the researcher saw the importance of analyzing them simultaneously. The importance of this research is also due to the fact that, arable land, livelihoods, population and forests issues remain major concerns of development policy at both national and international levels. Thus, the research represents a crucial body of reference which will assist the decision makers on appropriate steps to be taken in West Usambara which will assist in poverty reduction and forest management.

Organization of the Research Chapters

This research consists of ten chapters. Though every chapter is complete by its own in terms of answering different themes, they also meant to support one another. This is done purposely to have an understanding on different issues raised by this research. Chapter one provides the background to the research. Chapter two gives the clarity to the key concepts and theoretical framework for analysis, while chapter three is on methodological issues. Chapter four presents information on legal and institutional frameworks that govern land and forest sector in Tanzania.

The research findings span from chapter five to nine. In chapter five the overall information on social infrastructure existing in West Usambara and population issues are analyzed and

discussed. Thus, the purpose of chapter five is to give a glance of social and demographic characteristics of the study area. In chapter six issues related to land, rural livelihoods, and wealth status in West Usambara are analyzed and discussed. The chapter provides answers to the question, *'how does land scarcity impact on rural livelihoods and wealth accumulation in West Usambara?* Next it come chapter seven which presents various measures which are taken by West Usambara communities to address land scarcity problems. Thus, it aims at appreciating different efforts by an individual, the community, the villages' governments, and the Lushoto District Council in addressing the problem of land scarcities and its implications. Therefore, it is envisaged that, the information presented in chapter five, six and seven provide a body of knowledge for one to understand the issues of land and rural livelihoods in West Usambara.

Chapter eight and nine deal with forest management. Chapter eight consists of two sections. The first section explains how forests are managed in West Usambara while the second part gives information on how forests are accessed and utilized by the local communities. Thus chapter eight provides crucial information that set a ground for answering objective three and four. On the other hand, chapter nine is answering questions related to the current forests conditions in West Usambara and the kind of pressures they experience. In this respect impact of anthropogenic disturbances on diversity of wood trees, species composition, and forests condition are presented. Also, issues on consumption patterns of forest products, and forest based livelihood activities *(FBLA)* are discussed. The chapter closes by presenting the perception of the local communities towards forest management and its outcomes in relation to forest conditions.

Chapter ten is discussion, conclusion and policy recommendations. The chapter summarizes the key findings of this research; presents general observation and point of views. Thus, the discussion surround issues such as: *high out migration*; *scarcity of arable land and its outcome*; *risks of leaving land problem to be addressed by individuals*; *forest management*; and the *performance of different organs responsible for resolving land dispute* such as *the village land councils*, *the ward tribunals* and *the district land and housing tribunal*. In order to guide the readers, every chapter begins with an introduction and ends-up with a summary of the major findings.

1.1 *Background of the Investigation*

Land is of utmost importance for socio-economic development. This is recognized by both developed and developing countries. The importance of land lies in the fact that it offers opportunities for development. It includes resources such as arable land, landforms, surface and sub-surface hydrology, forests, minerals, oil, pasture, and wildlife. The importance of these resources found on land is confirmed by the statement of UN-HABITAT (2012: IX) that "everyone has a relationship to land".

The socio-economic importance of land cannot be overemphasized especially in developing countries since it contributes a large share to the Gross Domestic Product and employment in most countries, and constitutes the main source of livelihood for a large portion of the population (COTULA, TOULMIN and HESSE 2004: 1; ECA 2003: 1; MÜNKNER 1995: 4). This has made HANSENGULE (2000: 1) to argue that "to the ordinary African land is equivalent to the market share to a western company; it carries social function and the entire life of an average African revolves around it". The Tanzania Presidential Commission Report of inquiry into land matters, popularly known as Issa Shivji's Land Report (1994) expressed the same line of thinking with even stronger emphasis on the importance of land to smallholder farmers, when it pointed out that:

> "For the smallholder in Tanzania and elsewhere, land is much more than simply a factor in economic production. It is his/her lifeline. One would risk loss of one's land if there was a potential alternative means of livelihood, for example on the labor market. That hardly exists. Therefore, in the rural areas, loss of land means virtually marginalization and eventually destitution".

Consequently, both shortage and unequal distribution of land is seen as limitation for socio-economic development. Scholars have recommended that 'realistic discussions of poverty alleviation strategies in Africa need to be addressed in the context of pattern of land distribution and trends' (JAYNE, YAMANO, WEBER, TSCHIRLEY, BENFICA, CHAPOTO, and ZULU 2003: 253). These scholars add that, 'poverty reduction in countries where 70-80 % of the rural population draws their income from agriculture will depend on the distribution of assets 'in particular land'.

This conclusion was made after conducting a study on smallholder income and land distribution in Kenya, Ethiopia, Mozambique, Rwanda and Zambia. The study revealed existence of strong correlations between landholding size, education levels, and income. Certainly, it was noted that most households who owned small land had limited potential to break out of poverty.

The same kind of argument is given by the Economic Commission for Africa *(ECA)* which pointed out that 'an attempt to address poverty in Africa should be centered on reinforcing the rights of the poor people on land' (ECA 2004: 15). Likewise, there is accumulation of evidence that shows that, equity in land distribution is associated with high economic growth and poverty reduction. This is seen in China, Taiwan, Costa Rica, Indonesia, Malaysia, Thailand, and South Africa (VAN DEN BRINK, THOMAS, BINSWANGER, BRUCE and BYAMUGISHA 2006: 21, 25). It again shows that land shortages irrespective of its cause can lead to poor performance of the economy and increase poverty, especially in rural areas where land is the prime resource.

Also lack of land and other economic opportunity through which poor people could mobilize and plan future development have tempted them to engage in destructive activities such as charcoal making and illegal logging. Such activities end-up in environmental and forest degradation. For instance, in many African countries and Tanzania in particular, charcoal making is mentioned as one of the factors that triggers environmental degradation and forest depletion (BLOMLEY and IDDI 2009: 7; MADULU 2005: 953; DOGGART 2003: 25-27). The situation is accelerated by unclear and disputed forest tenure together with land insecurity (ZAHABU, EID, KAJEMBE, MBWAMBO, MONGO, SANGEDA, MALIMBWI, KATANI, KASHAIGILI and LUOGA 2009: 18; SACHEDINA 2006: 7) which exacerbate to the poor performance in forest resource management and poverty reduction.

Additionally, literatures show that poor people benefit little from land resources. A case in point are forest sectors where forest experts and other practitioners report that they perform poorly in terms of contributing to livelihood benefits for poor people who live closer to them despite them bearing most of conservation costs (LARSON and RIBOT 2007: 1; MESHACK 2003: 19). The major reasons include among others, unclear forest tenure and absence of real devolution of decision making. Also, the local communities lack power and are politically weaker than their counterpart (e.g. the national governments, forest concessionaires, agro

industrialists, entrepreneurs, infrastructures projects, and operators of mining companies) who all tend to override their interests (SUNDERLIN, ANGELSEN, BELCHER, BURGERS, NASI, SANTOSO and WUNDER 2005: 1388; 1390). Consequently, the forest adjacent communities are being affected by conservation programs especially in terms of rural livelihoods. Therefore, there is a need to interrogate how issues of land, livelihoods and forests influence each other, and this is the primary aim of this research.

1.2 Statement of the Problem and Research Objective

The West Usambara area is located in Lushoto District, Tanga Region. It is one of the areas in Tanzania with high population density (LUSHOTO DISTRICT COUNCIL 2010: 16; TENGE, DE GRAAFF and HELLA 2004: 1; JEREMIAS, STEPHEN, and MZOO 2002: 1; JAMBIYA 1998: 3). For Lushoto District which forms 80 % of West Usambara its population is 492,441 with a population density estimated at 141 Sq. Km. The density is very high in comparison to other places in Tanga Region and Tanzania in general. For instance, it is more than three times that of Muheza, Handeni and Kilindi districts in Tanga Region (see map 1). It is also more than two times that of Tanzania as a whole which is estimate to be 51 per Sq. Km.

This situation has aggravated to land scarcity both for agriculture and human settlements. Signs of high population and land scarcity in West Usambara were there even before Tanzania got its independence in 1961. After independence it was addressed by giving out land in forest reserves; in this regard 3,000 ha of forestland were given to locals (JAMBIYA 1998: 3 - 6). Villages such as Malindi, Lukozi and Mnadani benefited from this program. However, some villagers complained that the exercise was not fairly conducted. As a result, some villagers reacted by invading forestlands which led to forest degradation (TENGE, DE GRAAFF and HELLA 2004: 100; JEREMIAS, STEPHEN and MZOO 2002: 1). The problem of land scarcity in West Usambara is much complicated by the mountainous nature of the area, and existence of many forest reserves which are rich in biodiversity. Highlands and steep slopes that dominate the area have accelerated soil erosion leading to the decline in soil productivity. In the same way, the government has set aside nearly all natural forests as reserves, as these forests are among the

earth's biological richest with higher conservation values. Such decision has restricted more expansion of crop land.

As a result the area has witnessed many research projects with different goals. Among them are: those that advocate restriction and conservation of Usambaras forests (PRESTON 2011; LEONARD, MWANGOKA, MKONGEWA, DOGGART and VIHEMÄKI 2010; DOGGART 2009; BURGESS 2005; HAMILTON and BENSTED-SMITH 1998); adoption of participatory forest management *(PFM)* for gaining support from adjacent communities (WOODCOCK, MESHACK and BILDSTEN 2006; MESHACK 2003; RUGUMAMU 1998); forest degradation (BJØRNDALEN 1992); land use and cover changes; soil and water conservation (TENGE, DE GRAAFF and HELLA 2004); population dynamics (JAMBIYA 1998; KAONEKA and SOLBERG 1997) and poverty environmental linkages (MASCARENHAS 2000).

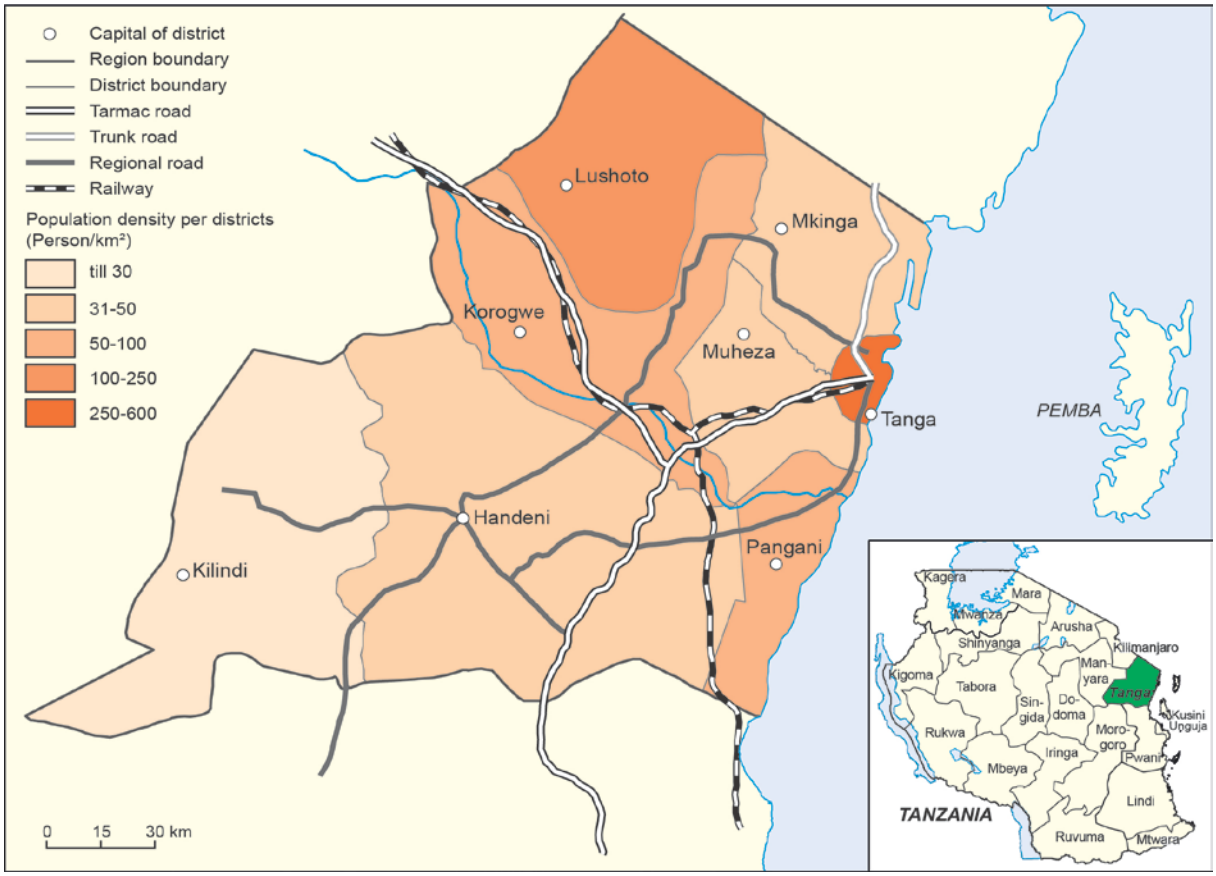
Despite an increased interest in West Usambara, few studies have analyzed the inter-linkages between land, rural livelihoods, and forest management. Even those few researches that made an attempt to touch some of these issues, like that by JAMBIYA (1998) were conducted at a very small scale, covering just two villages. Thus such study fails to mirror a greater picture of what is going on in West Usambara. Indeed, almost 15 years have passed since it was conducted. On the other hand, a research by MASCARENHAS (2000) mainly focused on comparing the level of poverty along ecological gradients of West Usambaras; hence it put less weight on land and forests as important variables in influencing livelihoods. Too both works lack information on anthropogenic impacts on forests let alone the status of forests in West Usambara.

Therefore, the existing scenario in West Usambara of high population pressure, many reserve forests with high conservation value, and the scarcity of arable land, necessitate a research that aims at investigating these matters simultaneously. The importance of such research is even greater than before as enhancement and protection of forests is advocated nationally and globally to address climate change impacts. Such advocacy will further restrict the utilization of forest products which might again compromise rural livelihoods and forests themselves.

Indeed, the situation of West Usambara is unique when compared to other areas in Tanzania. This is because although Tanzania has other districts with scarcity of arable land, such areas have

no forests with conservation values of national and international importance like West Usambara. Equally, though some districts in Tanzania are endowed with forests, such districts have no scarcity of land as it is commonly reported in West Usambara. Following that the area is best placed for this kind of research.

Map 1: Population Density by Districts in Tanga Region



Source: Draft Songoro (2014). Cartography: Department of Geography, JLU Giessen (2014).

Notes: As it has been show on the map 1, Lushoto District (which forms 80 % of West Usambara) is ranked the second with the higher population size in Tanga Region after Tanga City. The district occupies about 11% of the total region population; its population size has increased from about 150,000 in 1957, to 418,652 in 2002 and 492,441 in 2012 according to official population census. This increase has complicated the availability of arable land for agriculture and other livelihoods strategies in the district.

1.2.1 General Research Objective

The major objective of this research was to analyze the inter-linkages between land, rural livelihoods, and forest management.

1.2.2 Specific objectives

The specific objectives of this research were:

1. To investigate how the size and quality of arable land under households affect livelihood strategies (i.e. farming activities, animal keeping, and small income generating activities) and wealth accumulation (i.e. household amenities, domestic animals, woodlots) in West Usambara.
2. To explore the measures taken by the West Usambara community in addressing the scarcity of arable land and their outcomes.
3. To investigate the impacts of anthropogenic disturbances on diversity of wood trees, species composition, and forests condition.
4. To investigate the perception of the community towards forest management and its outcomes in relation to forest conditions.

1.2.3 Research Hypothesis and Questions

The research is guided by three main hypotheses:

- The scarcity of arable land coupled with restrictions on utilization of forest resources leads to the decline of rural livelihoods and undermines the future development for the population**;**
- Arable land is one of the resources to increase the collection of assets beyond land to the full portfolio (combination of activities) necessary for sustainable livelihoods in West Usambara; and
- The scarcity of arable land does not lead to the decline of livelihoods and undermine future development, as the communities would develop to ensure sustainable land use or develop other livelihood strategies which are less dependent to land resources.

In addition to these hypotheses, the following research questions are set out to be answered: *(i) How does land scarcity impact on rural livelihoods and wealth accumulation in West Usambara? (ii)What are the community responses towards land scarcity in West Usambara? (iii) What is the perception of local communities on different forest issues in West Usambara? And (iv) What are the current forests conditions in West Usambara and what kind of pressures are they experiencing?*

1.3 Significance of the Research

This study is fundamental in addressing the problem of land scarcity and poor performance in poverty reduction and forest management in West Usambara which cannot be attained without understanding the inter dependences between land, rural livelihoods and forests. Thus, the research will contribute to the knowledge and establishment of facts that will help the decision makers to address these problems. This in turn will help to avoid erroneous policy prescriptions that might end-up escalating the problems. Likewise the lesson from this research would help the decision makers to make thoughtful decisions in other areas of Tanzania where there is scarcity of arable land while at the same time are rich in forest resources.

The research is also important academically. It belongs to the field of Human Geography which studies how humans interact with the environment. It also belongs to the field of Biogeography which deals with the spatial distribution of biotic resource and the pressures they are experiencing. In a nutshell these sub-disciplines of Geography provide an understanding on how human beings interact with the environment and the implications of such interactions. Thus, the research will contribute to the knowledge and to the existing body of literature on how people interact with their environments, and specifically their strategy in addressing land scarcity and their impact. Thus, the research is not only intended to researchers and academicians but also to policy makers who are concerned in rural development and forest management.

2 Concepts and Theoretical Framework

The section is set out to define and make clarification on terms and concepts that encompasses issues of land, rural livelihoods, and forest management. In particular concepts of land, land shortages and scarcity, land tenure, livelihoods, sustainable livelihoods, and poverty reduction are defined and explained. Additionally, the concept of species diversity and forest disturbance and how they are used in the context of West Usambara are explained accordingly. The chapter concludes by presenting a Sustainable Livelihood Framework *(SLF*) and the Household Wealth Index *(HWI)* which are adapted as theoretical framework for analysis.

2.1 Concept of Land

There are controversial statements about the definition of land, as some people confine the term only to the soil, thus, separating other components attached to it. This has led to misconceptions about the term. However, JAMES (1971: 39) argued that land includes much more than just the physical soil or substance. To him, it includes for instance, building and any other things attached permanently to the soil. Like JAMES, also NJOGU and DIETZ (2006: 1) have pointed out that, land encompasses a range of resources the scope and influence of which transcends private property. These lines of thinking correspond to that by UN-HABITAT (2012: 2), which states that 'land involves a wide range of rights and responsibilities'. Hence, unlike other resources, land consists of diversity resources such that to entrust all land rights exclusively to a single individual is difficult. This is particularly true in Africa where different people tend to have different rights over the same piece of land over different land resources (POTEETE 2010: 69).

In this study the term land is defined as *'a physical resource that consists of many attributes of the biosphere that support life, ranging from arable land, landforms, surface and sub-surface hydrology, forest, minerals, pasture, and both human and animal populations*. This definition helps to avoid an error of confining the term to subsurface soil, which end up in restricting user rights to other components of land such as: minerals, water, oil, and other precious metals

(POTEETE 2010: 69). Certainly, the broad views of the term reflect the importance of land and how it differs to other factors of production. As stated by OWENS (2007) that:

> "Though land is considered as a resource and as one of the factors of production, it is a different resource. It is peculiar and it is not the same as other resources that support our society and economy. Although it provides material basis for the economy also it has powerful cultural meaning as it gives us a sense of place and leaving". (OWENS 2007 as cited in WINTER and LOBLEY 2009: 7).

The argument by Owens explains why traditionally in many parts of Africa land was not owned by an individual; instead it was under the chief, headman or headwoman (JOY 1993: 126). Also these functions ascribed to land suggest that, any decision on land and its resources need to be taken with great caution. Indeed, they explain why land has an emotional component and always brings sentiment among different land users, and especially when their rights on land are not well adhered. In showing the importance of land, ANSEEUW and ALDEN (2010: 1) argued that, "land is both a source of conflicts and also an essential element in peace building, political stabilization and reconstruction in the post-conflict situation". This is especially true in a society where the major cause of conflicts is social injustice on land. Cases in point are seen in Kenya, Rwanda, Somalia, Costa Rica, and in Tanzania among pastoralist and between them and farming' communities and also between national governments and citizens.

In Kenya for instance, it is reported that, in 1970 the government of Kenya implemented a land resettlement program for squatters in the Chepyuku Area of Mount Elgon District. However, the program was conducted in unfair manner as it was surrounded by favoritisms, corruption, nepotism, tribalism, patronage and outright grabbing by politicians and government officials. This led to dissatisfaction in the community and in particular among Sabaot community, who ended up forming a militia group called *'The Sabaot Land Defense Force'* for protecting their land rights. The group caused serious intra-community conflicts over land, deaths, and harassment and humiliation of innocent civilians (SIMIYU 2008: 6, 35 - 36). This made SIMIYU, to suggest that "although the government of Kenya has suppressed the group through military interventions, a lasting peace in the area should be seen through revisiting its land resentment scheme which is a root cause of the conflict" (SIMIYU 2008: 44, 66). This point

of view is also shared by CLOVER (2010: 147) who pointed out that, “promoting peace and unity entails respecting and integrating all groups constituting the society”. In other words without meeting this necessary and prerequisite condition there is no tomorrow.

While this happens in Kenya, in Rwanda and Somalia, scholars have contended that, although ethnicity and tribalism are frequently ascribed to Rwandan genocide of 1994 (which ended in loss of lives of about 800,000 people), and civil war in Somalia, which resulted in state failure, the root causes for such conflicts among others is injustice in distribution of arable land and other resources (DEHEREZ 2009: 6-12; BIGAGAZA, ABONG and MUKARUBUGA 2002: 51-52). Thus to have a sustainable peace in these countries scholars have called upon including land and resources consideration in conflict prevention and management policies and processes.

Similarly, in Costa Rica in 1980s women organized a movement which ended in invasions of state-held land as a way to struggle for housing rights. The action forced the government to declare a national emergency to the housing situation in the country (UN-HABITAT 2005: 10). In the same way, in Tanzania, evidences show that unfair land tenure regulations and socio-economic policies that do not take into account the need of livestock keepers have adversely affected pastoralists, leading to endless conflicts (OLENGURUMWA 2010: 2 - 3; OLENASHA 2006: 17 - 18; NELSON 2005: 3; MAY 2003: 26; BLENCH 2001: 4; MAJAMBA 2001: 7; MRG 1998: 1 - 7).

However, studies by LOVETT, KIWASILA, STEVENSON, PALLANGYO, MUGANGA and QUINN (2001); QUINN, HUBY, KIWASILA, and LOVETT (2003), and MADULU, KIWASILA, and SILANGWA (2007) undertaken in pastoral and agro-pastoral areas have shown that unsustainable farming and pastoralism and unsustainable mining and harvesting of trees from including protected catchment forest areas has often caused land degradation. Land degradation has in-turn lead to rural-rural migration for farming and grazing land that has triggers to land use conflicts between farmers and migratory pastoralists and between them versus the state. This has also occurs in many rural areas of Tanzania. Fighting and killings, burning of houses and farms between pastoralists and farmers and fighting between them against protected areas authorities and state police have well been documented in the country. All these show the importance of land, poor division and management of land, and how land scarcity, unfairness on land matters can culminate in many problems and which offers are disruptive to the society.

2.2 Concept of Land Scarcity

Land scarcity can be visualized by grasping first the meaning of the term *scarcity* as used in the field of economics. The economists use the term to indicate a state in which there is disproportionate between the *supply* and *demand* of a commodity or item. Meaning that, the *scarcity* of good or any item develop when the demand for that good is higher than its supply. In other words, scarcity arises when the demand for such good has greatly increased or when its supply has decreased substantially. In Geography we consider the scarcity of land resources by considering the quality and quantity of such resources in relation to population.

Also, it is important not to confuse *scarcity* to *shortage.* These terms explain different things. The former is attributed to the decline in natural resources which are finite in nature. In the sense that it is impossible to replenish them after use through production and importation (e.g. oil, arable land, water, minerals etc.). On the other hand, the latter is used when describing the decline in the supply of manmade good or resources which is the outcome of human intervention through price and market forces. Thus, the term *scarcity* fits perfectly in describing the decline in natural resources such as land, which occurs naturally, while the term *shortage* fits better in explaining the decline in the supply of manmade goods as human beings have greater influence on their existence.

Therefore, based on this view, *land scarcity* develops when its supply or its quality is low compared to its demand. As a fundamental natural resource, land is a requisite for meeting different necessities which are increasing at higher rate while the supply of land especially worldwide is constant. These demands include among others, land for crop production, human settlements, environmental conservation (national parks, game areas, rangeland), recreation sites, areas for planting forest, and building different infrastructure, such as roads, air strips etc. These needs have contributed to an increase in scarcity and value of land, hence making it harder to find it. Indeed, bad agricultural practices such as overuse of chemical fertilizers, poor irrigation methods, and continuous tilling of the same land for many years accelerate soil erosion (BRAIMOH and VLEK 2008: 6). Such agricultural practices contribute to lowering *soil quality* - a notion that include among others, the capacity of the soil to supply nutrients, maintains suitable

biotic habitats, and resists degradation (BRAIMOH and VLEK 2008: 6). The outcome of low *soil quality* is the decrease in its carrying capacity which is manifested by low agricultural output.

An increase in land value and scarcity is also compounded by the fact that, qualities of lands i.e. its suitability and capabilities in supporting different needs are not homogenous over space. For instance, good soils are not evenly distributed around the world (BRAIMOH and VLEK 2008: 1). Consequently, since not all pieces of land are suitable for crop production, people always concentrate on few areas where agricultural yields are meaningful. This is especially true in developing countries where economic and technological levels are too low to allow land reclamation and transformation which increase land productivity, hence lessening severity of land scarcity.

Therefore, with regard to West Usambara, land scarcity is defined in terms of decline in the size and quality of arable land (soil) which is under household's user rights. Such land includes among others, land under crops, woodlots, tree crops, gardens, fallow and rented land. For that reasons, all lands which fall under *common property rights*[1] and *forest reserves* are excluded. In the analysis therefore, all land which a household has *user rights*[2], such that, one regularly utilize and has influence on its management is included. Among these rights are: ***rights to occupy/access and use;*** **the** ***rights to transact*** (lease, rent and bequeath it to another person); ***the rights to exclude others from occupying it*****;** ***the right to manage*** (e.g. to manipulate the land resource and plan for future use); and ***the rights to enforce legal and administrative provisions*** in order to protect it from being seized by others.

These bundles of rights are worth to consider because they are mostly mentioned in many literatures on land (see LARSON, CORBERA, CRONKLETONI, DAM, BRAY, ESTRADA, MAY, MEDINA, NAVARRO and PABLO (2010: 1-2); TENAW, ISLAM and PARVIAINEN (2009: 8); VAN DEN BRINK, THOMAS, BINSWANGER, BRUCE and BYAMUGISHA (2006: 3); KLAUS (2003: 23); FAO

[1] ***Common Property Regime/Rights***: the group as whole has been entrusted to own and manage the land on behalf of the dead, the living and the future generations and have all rights to exclude outsiders and other nonmembers from utilizing the resource (MÜNKNER 1995: 42).

[2] ***Land User Right*** is explained in the context of property right, and according to VAN DEN BRINK, THOMAS, BINSWANGER and BYAMUGISHA (2006: 3) property is a social relation. It is about *rights* and *duties.* In this context, therefore, it is the duty of the society to define the rights that one can exercise on land resources.

(2002: 10); ADAMS (2001: 1); ADAM, SIBANDA and TURNER (1999: 2)). Indeed, these bundles of rights over land explain what a bearer of such right can and cannot do with a particular land, and what others are expected to do on such land (GHEZAE, BERLEKOM, ENGSTRÖM, ERIKSSON, GALLARDO, GERHARDT, KNUTSSON, MALMER, STEPHANSSON and WALTER 2009: 15). Thus, it is anticipated that, a person or a group of people would exercise one or more of these rights. And that, the more bundles of rights one exercise on a piece of land; the more one will be enjoying benefits of such land.

2.3 Concept of Land Tenure, and Resource Tenure

Like the land concept, also the term *land tenure* is perceived differently by authors. According to MAXWELL and WIEBE (1999: 825), land tenure is defined as a system of rights and institutions that governs access to and use of land and other resources. On the other hand, FAO (2002: 10) defined land tenure on legal grounds, to refer to the bundle of both rights and obligations – the right to own, hold, manage, transfer, or exploit resources and land, but also the obligation not to use these in a way that harms others. Moreover, MÜNKNER (1995: 5) has argued that, the term land tenure has a very broad meaning and caution that, one should be careful to avoid misconception. To him it includes the social, economic, legal and technical relationships of persons (individual or groups) to land and to other individuals or groups. It also covers relations concerning family, kinship, labor and access to resources, and is influenced by natural/physical factors as well as man-made rules regarding the man/land relationship. Perhaps, these are kinds of arguments that make POTEETE (2010: 59) and FAO (2002: 10) to consider land tenure as an institution. As it includes roles invented by the society to regulate behaviors on how to utilize land resources.

Therefore, based on these definitions, *land tenure* can generally be defined to include terms and conditions under which land resources are governed and regulated. It constitutes legal or customarily defined bundles of rights and obligation entrusted to an individual or groups as a whole regarding access to and use of land and other resources. These bundles of rights are defined based on existing social, legal, economic and environmental conditions. Hence, it should be pointed out from the outset that, the rights on land resources may be derived through customary or statutory laws, marriage and inheritance and through power and control.

Consequently, *resource tenure* refers to all ways by which people gain legitimate access to the natural resources (e.g. forests, rangeland, wildlife, water, agricultural land, and pasture) for the purpose of management, extraction, use and disposal of such resources (GHEZAE, BERLEKOM, ENGSTRÖM, ERIKSSON, GALLARDO, GERHARDT, KNUTSSON, MALMER, STEPHANSSON and WALTER 2009: 15). On this ground therefore, the definition of land tenure is interchangeably used with that of *natural resource tenure*, as the two definitions addresses all types of land resources.

In respect to West Usambara, land tenure include all ways through which people get legitimate access to arable land (which they use to grow crops, woodlots, tree crops, gardens, or exercise renting) and other land resources such as forests. Among these ways are customary procedures (e.g. marriage, inheritance, and gift), purchase, first clearance of forest (which was common when land was plenty), and statutory laws and other by-laws (e.g. village allocation of land and other permissions by responsible authorities who regulate access to forest resources).

2.4 Rural Livelihoods, Livelihood Resources, Livelihood Strategies and Diversification

The term livelihood comprises people, their capabilities and means of living, including food, income and assets (CHAMBERS and CONWAY 1992: 6). Thus, *rural livelihoods* includes different means of gaining a living in rural areas which to a large extent are connected to their capabilities, assets (including both material and social resources) and activities required for a means of living. Based on sustainable rural livelihoods framework, ***livelihood resources***[3] include natural capita, human capital, economic/financial capital, and social capital. For people to perform socio-economic activities they need a combination of *livelihood resources*. As a result, different people

[3] ***Livelihood Resources:*** include (i) *natural resource capital*: refers to natural resources base such as arable land, pasture, water, forests, marine resources, minerals and environmental services used by people to pursue different activities; (ii) *economic/financial capital* : include people's financial resources such as savings, cash, supplies of the credit, pension, remittance and other economic assets; (iii) *human capital:* include both manual and skill labor, the ability to labor and good health required to undertake various activities; (iv) *social capital:* refers to formal and informal social resources or social relationships of people, such as family networks, membership of groups/affiliations, relationships of trust and access to wider institutions of the society; (v) *physical capital:* include things like producer goods, physical infrastructure and production equipment (CHILESHE 2005: 73 – 74; SCOONES 1998: 7 - 8).

perform different activities depending on the types of *livelihood resources* they possess. Therefore, *livelihood strategies* (activities or pathways) in urban areas differ substantially to those performed by people in rural areas. While the former depends much on industrial and service sectors, the latter depends more on land resources. This is true especially in developing countries where people still rely on land resource to ground livelihood strategies.

Being so, unevenness in access to and control of *livelihood resources* (e.g. land, water, energy, credit, knowledge and labor) partly explains why some people are poor and others are well-off in a community. This is because people's well-being and welfare depend on the level of ownership of *livelihood resources*. This is supported by SCOONES (1998: 7) who argues that "the ability to pursue different *livelihood strategies* is dependent on the basic material and social, tangible, and intangible assets that people have in possession". This also explain why developmental geographers like BOHLE (2007: 9 – 10) considers a secure access and ownership of these resources to *livelihood security* (social security), since through them one is able to offset risk, ease chocks and meet emergencies. Therefore, under an ideal situation, a person who poses many *livelihood resources* (say land, education, social network, capital etc.) would be more able to enjoy a sustainable livelihood than the one who has no access or ownership to those resources. Thus for equity purpose and addressing poverty issues pro-poor programs that are tailored at empowering poor people are important.

Livelihoods strategies: refer to all socio-economic activities that are carried out by human beings to attain a living in a society (SCOONES 1998: 9). The *livelihood strategies* are usually manifested in the ways in which resources are used in the community to generate access to the basic needs. In rural areas the dominant *livelihood strategies* include crop cultivation, livestock keeping and beekeeping. Others are fishing, collection of forest products, and tourisms activities. Thus, rural livelihoods are considerably connected to natural resources base, and particularly to arable land. This again justifies why land tenure issues and management of natural resources are important for rural people.

A major strategy of rural actors is ***livelihood diversification*** – the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living (ELLIS 2004: 1-3; ELLIS 1999: 3). Therefore, to a large

extent *livelihood diversification* comprises non-agricultural activities conducted by rural people to supplement crop and livestock activities and in most cases is an outcome of multiply effects of agricultural activities. ELLIS accord highly livelihood diversification in promoting sustainable livelihood when he point out that:

> "Diversity of livelihoods is an important feature of rural survive and is closely allied to flexibility, resilience and stability, [such that] are less vulnerable than undiversified ones; they are also likely to prove more sustainable over time precisely because they allow for positive adaptation to changing circumstances". (ELLIS 1999: 8).

In the context of West Usambara this research anticipate that arable land as a physical resource forms a basis through which people organize and plan different livelihood strategies and particularly crop cultivation to attain their living. The surplus from these activities is then reinvested in other economic activities including agriculture. This in turn enhances their capabilities to endure different shocks thus promoting sustainable livelihoods. Hence, the scarcity of arable land will hinder economic performance of many activities in this area. Consequently would adversely affect accumulation of wealth, income, and food security which all will compromise the attainment of *sustainable livelihoods* i.e. livelihoods which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (BOHLE 2007: 10; SCOONES 1998: 5). Thus through this ways poverty reduction will be attained in West Usambara.

2.5 Poverty and Poverty Reduction

Poverty is a preoccupied subject in political and socio-economic discourses. This has necessitated provision of a holistic definition to the term. According to the WORLD BANK (2001: 5) "poverty is defined as a noticeable deprivation of well-being related to lack of material income or consumption, low levels of education and health, vulnerability and exposure to risk, lack of opportunity to be heard, and powerlessness". Poverty is therefore manifested in the lack of material well-being (lack of food, clean water, shelter, and tools); bodily well-being (good health

and energy); social well-being (having a social network); and security (peace, physical safety, sense of confidence and understanding at household and community level).

The definition by the World Bank is supported by many experts of poverty because it goes beyond a simple understanding of poverty especially in terms of income which was much emphasized in 1960s. For instance, the International Land Coalition *(ILC)* contend that, "poverty is not only a question of economics but, also probably most importantly a lack of poor women and men's participation in the decision making that affect their livelihoods" (ILC 2009). Certainly, poverty is socially defined in the sense that a person is regarded as poor when she/he is below a socially defined minimum level of well-being. This a broad view of looking at poverty issues brings another important aspect that, disadvantaged groups like women should be considered when discussing poverty issues. Therefore, in rural settings poverty can include among other things lack of access to arable land, water, food, clothes, house for shelter, livestock, credit, and income to cover the costs of basic social services such as health, food, and school fees for children.

Therefore, ***poverty reduction*** is all about improving people's well-being, and particularly for the poor people. It should tackle all disadvantages that counteract poor people from achieving sustainable livelihoods. Thus poverty reduction should be manifested in improving the access of formerly poor people to material income, education, economic opportunities and health facilities. Additionally, it should also be reflected in terms of reducing their vulnerability and exposure to risk, and more important to be heard and included in all decision making especially on matters that affect them. Thus, the primary goal for any poverty reduction project or program must be to lessening of deprivation of well-being or prevention of increase in deprivation of well-being among marginalized groups in the society.

2.6 The Concept of Species Diversity and Forest Disturbance

Diversity: Generally species diversity is used to explain the variety of species found within an area. This includes plants, animals, and organisms such as fungi, protozoa, and bacteria (NEWMARK 2002: 3). The term diversity and species richness are used interchangeably.

However, there is a slight difference between them. In vegetation studies, species richness is used to explain the total number of plant species in a quadrat, area, or vegetation community. While diversity on the other hand is meant to indicate both species richness and relative abundance of those species (species evenness or unevenness) within the samples or plant community (KENT 2012: 122). In this research more stress was given on the diversity of wood trees. Thus, the available wood species and their relative abundance were identified and quantified (see appendix 2 and 3). Additionally, the species' attribute data such as diameter at breast height *(DBH),* basal area *(BA),* trees' heights, and canopy cover percentage were measured. These data are important in ascertaining the condition of a forest. Along with diversity, also forests disturbance were assessed.

***Forest disturbance*:** The term disturbance is used to refer to temporal and spatial discrete events that alter the structure of population, communities and ecosystem (PICKETT and WHITE as cited in PASSMORE 2009: 2). The forest disturbance can be induced by natural (e.g. hazards, lighting fire, volcanic activities, landslides, etc.) and anthropogenic causes. The later has been seen to cause serious impacts on the environment and ecosystem in many places (see SAMIMI and BRANDT 2012: 20). In the context of West Usambara, this research confine forest disturbances only to anthropogenic events which might alter in one way or another forest structure and species composition. Thus, emphasize is made on illegal extractive activities such as: pit-sawing, grazing, firewood collection, in-situ farming, medicinal harvesting, pole extraction, forest fire, fodder harvest, and mining activities conducted inside forest reserves.

According to PASSMORE (2009: 2) disturbance effects include mortality of individual specie and local extinction of species in the given area, changes in the size of trees, their number and the types of species present. These changes produce both short and long term impacts as they alter the community composition and structure. Therefore, assessing the level of forest disturbance is important in West Usambara. This will inform forest managers and policy makers on the extent and kinds of pressure the forests experience and guide informed decision making.

2.7 Theoretical Framework

This research adopts a *Sustainable Livelihoods Framework (SLF)* formulated by SCOONES (1998) to understand land, rural livelihoods and forest management issues in West Usambara. In particular the focus is to analyze how rural livelihood resources (e.g. arable land and forests) contribute to livelihood strategies, wealth accumulation and livelihood sustainability. In this regard, different factors and process that enhance or limit attainment of sustainable livelihood in West Usambara are examined. The *SLF* is suitable to guide this research because its center is livelihoods resources, livelihoods pathways and sustainability which are also central to this research. The framework has been used by researchers and development agencies in many ways. For instance, with some modification the Care International, the Institute for Development Studies (IDS), the United Nations Development Program (UNDP) and the British Department for International Development (DFID) have used it in understanding poverty issues especially in developing countries. Indeed, livelihood approaches is central in planning process for many development agencies (SCOONES 2009: 172). On the other hand, the researchers have used it to guide their analysis (see CHILESHE 2005).

A key question raised by *SLF* is: "given a *particular context* (policy setting, history, politics, macro-economic conditions, terms of trade etc.) what combination of *livelihood resources* (different type of capital) results in the ability to follow what combination of *livelihood strategies* (economic activities) with what *outcome**?"*** (SCOONES 1998: 3). To answer this question the framework proposes five key components for analysis: *(i) context conditions and trends, (ii) livelihood resources, (iii) institutional process and organizational structures, (iv) livelihood strategies* and *(v) sustainable livelihood outcomes* (figure 1). Hence the framework appreciates the fact that, livelihoods are largely influenced by micro and macro environment together with physical and socio-economic settings existing at different levels. In other words, the analysis components are worth considering because they are the one that enable or constrain the achievement of sustainable livelihoods in a community.

Although SCOONES made an attempt to explain different elements that is required to fall in each *analysis components*, however, they are presented in aggregated and unpacked form (figure 1). The reason could be because each community has its unique circumstances, history and

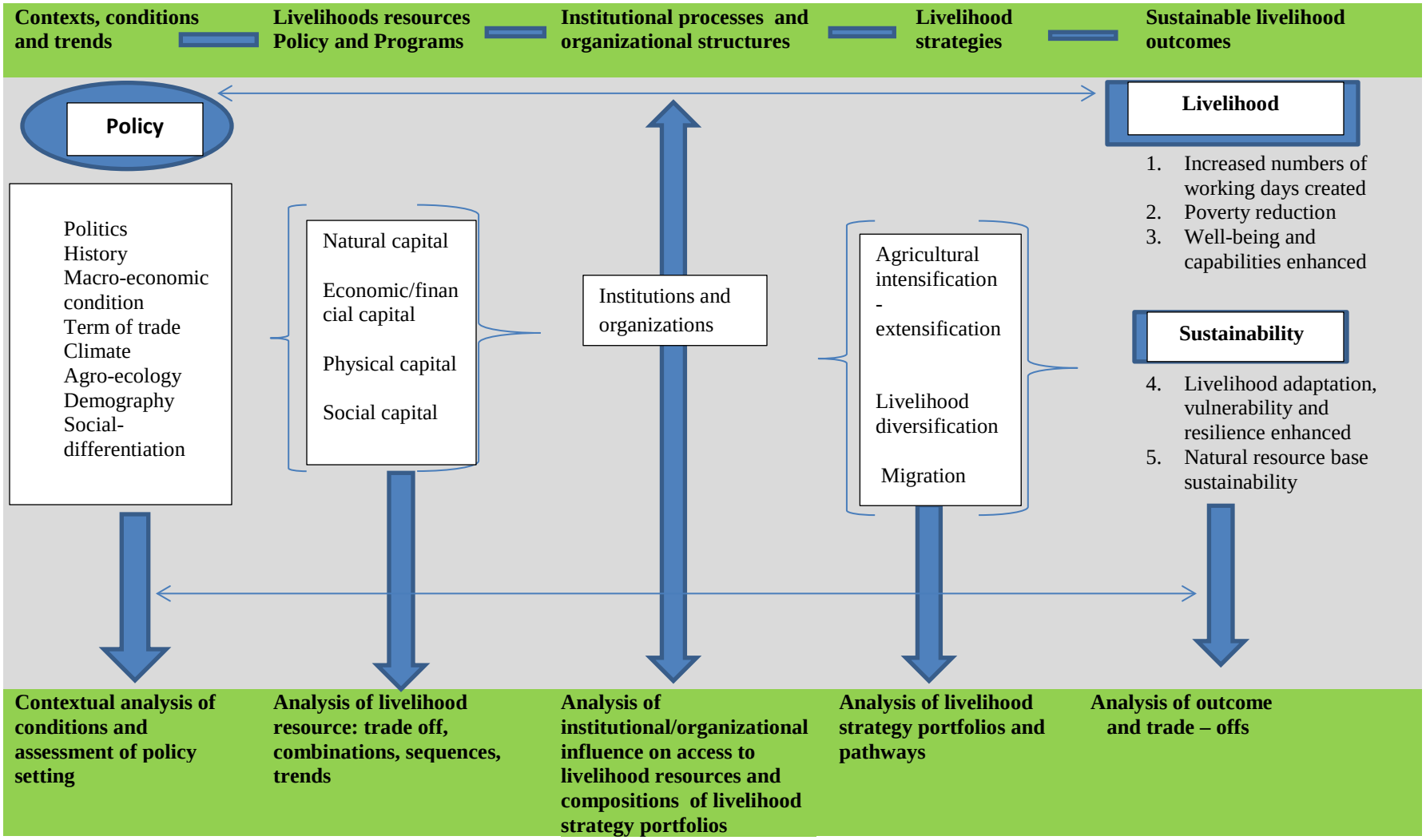
livelihood resources which also tend to differ over time. Therefore, everyone who opts to use *SLF* for analysis is responsible to unpack those elements (see figure 2). SCOONES also caution that, it is important to specify the scales of analysis and to define what it meant by sustainable livelihoods (SCOONES 1998: 5). The former is important because the framework can be applied at a range of scales while the latter is important in establishing the indicators of livelihood outcomes. With regard to this research the household is chosen as the scale of analysis.

According to *SLF*, the sustainable livelihoods outcomes are to be assessed in terms of looking five indicators: (*i) creation of gainful employment (ii) poverty levels (iii) well-being capabilities (iv) livelihood adaptation, vulnerability and resilience*[4] and *(v) natural resource base sustainability*. To these five indicators this research adds *conflicts over land resources* as another indicator to be considered in assess sustainable livelihood. This dimension is important because there is potential of conflicts among different land users when they try to pursue different livelihood strategies. Such conflicts occur regardless whether or not a resource in question is scarce or plenty. For instance, an increase in land scarcities increases the competition among users hence opening chances of conflicts. On the other hand, the mismanagement of land issues by the governments, investors and other actors especially when local people's land rights and other concerns are not adhered tend to culminate land conflicts even in abundant land areas. Therefore, consideration of incidences of land conflicts is crucial in understanding sustainable livelihoods in rural settings. This is because conflict over land is detrimental economically.

In the same way, the consideration of multiply effects of different livelihood strategies is central in assessing sustainable livelihood outcomes (SCOONES 1998: 11). In this regard, the impacts of livelihood activities performed in West Usambara to wealth accumulation, income, food security, and creation of other economic opportunities is assessed. In other words assessing livelihoods diversification is crucial in this framework.

[4] ***Livelihood Adaptation, Vulnerability and Resilience*:** is all about the ability of a livelihood to be able to cope with and recover from stress and shocks (BOHLE 2007: 11; SCOONES 1998: 6).

Figure 1: Sustainable Rural Livelihoods: A Framework for Analysis



Source: Scoones (1998: 4).

The Strengths and Things to Consider when Using a Sustainable Livelihood Framework

There number of strengths associated with using a *Sustainable Livelihood Framework (SLF)*. According to KRANTZ, the framework is useful in three terms: First, it makes one to consider a range of assets which is required in constructing livelihoods rather than concentrating in just one asset. Secondly, it facilitates an understanding of the underlying causes of poverty in the community. This is possible by focusing on the variety of factors that operate at the different levels that directly or indirectly determine or constrain poor people's access to resource/assets of different kinds, and thus their livelihoods. Thirdly, *SLF* is a more realistic approach for assessing people's living condition. It goes against a conventional ways of assessing livelihood conditions that relies on just one dimensional of understanding poverty like that of looking at productivity or income criteria only (KRANTZ 2001: 4).

Other advantages of *SLF* are based on the fact that it put weights at the strengths, opportunities and potentials of the poor rather than their weaknesses (CHILESHE 2005: 70) in meeting their livelihoods and wellbeing. Hence its mainstay is on how people can support themselves sustainably. Also it views poor people as operating in a context of vulnerability, as they have access to certain assets or poverty reduction factors (BOHLE 2007: 10). Therefore, lack of access to livelihood resources to ground livelihoods strategies makes one to become vulnerable to poverty and vice versa. Indeed, the framework is flexible.

In spite of these advantages of *SLF*, there are also challenges associated with using it such as: the difficult of including the *numerous elements* suggested in *analysis components* in investigation. For practical purpose elements which are thought most relevant could be considered and others might be left aside. In a course of selection there is a possibility of eliminating a very important element which is crucial in understanding livelihoods. Another challenge is *the varied types of information* which is required in analysis which call for *varied methods of data collection* and *analysis* which complicate things. Last but not least, in using this framework there is a need to identify a kind of measure which will be used to assess poverty. Providing an answer to this question is crucial because understanding poverty levels is a key

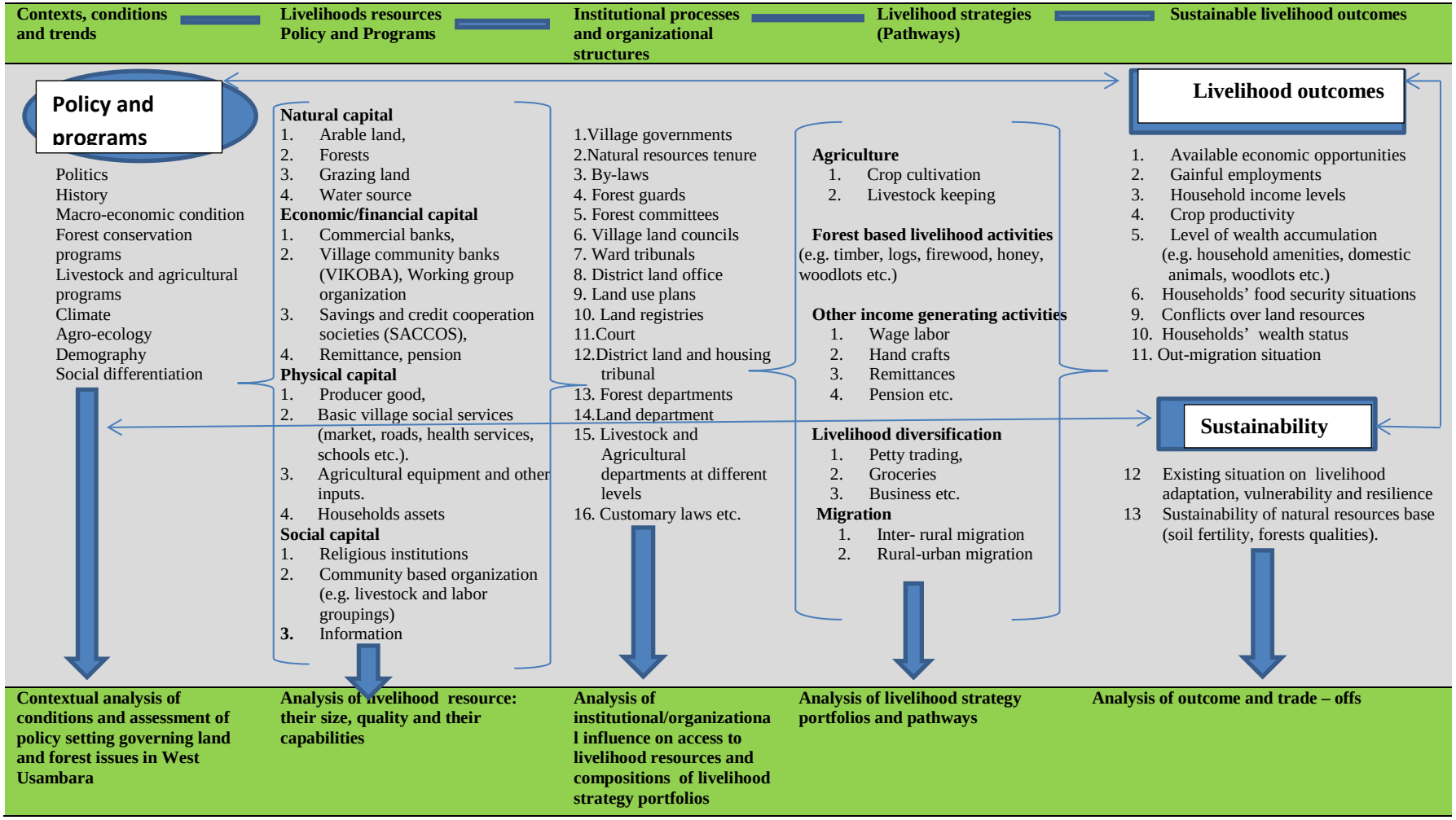
criterion in the assessment of livelihoods (SCOONES 1998: 6). A great deal of debate is going on about the suitable and appropriate measure to be used for measuring poverty.

In order to deal some of these challenges, the research uses also the *Household Wealth Index* (HWI). It is important also to point out that, the purpose of the research is not to determine the number of people who live under poverty line in West Usambara. Rather it aims at looking the interdependences between land resources and rural livelihoods in this area. And particularly to examine how arable land and forest resources contribute or limit the accumulation of the household assets beyond land that are necessary for attaining sustainable livelihood. Through this way, both *SLF* and *HWI* are used in understanding the socio-economic status of the West Usambara which is an outcome of *livelihoods strategies* grounded from existing *livelihoods resources.*

How a SLF is applied in this Research?

In this research a *SLF* was mainly applied in guiding the designing of research instruments to make sure that all necessary elements regarding *livelihoods resources*, *institutional processes and organizational structures*, and *livelihood strategies* that contribute to sustainable livelihoods are included. Thus, the final analysis and conclusion was mainly based at looking at the livelihoods outcome and other indicators that shows whether or not a society is attaining sustainable livelihoods. Consequently, indicators such as: *the availability of economic opportunities and employment situation*; *the households' annual income levels; crop productivity, households' food security situation in terms of meeting food requirements throughout the year; households' home amenities and other assets; migration situation;* and *conflicts over land resources* were investigated. Together with these indicators the condition of natural resources base (life supporting systems) such as arable land and forests were investigated. In this respect, the sustainability of arable land was assessed in terms of crop productivity and its ability to endure shocks such as drought and rainfall variability. Also, the forests qualities were assessed through measuring the level of anthropogenic disturbances and their impacts on forest conditions. Hence, species basal area *(BA), DBH,* trees heights, species relative abundance and resemblance were investigated to determine the forest qualities which is important for enhancing rain formation and water sources which is crucial for socio-economic development.

Figure 2: Sustainable Livelihoods Framework for Understanding and Analyzing Livelihood Strategies in West Usambara



Source: SCOONES (1998: 4) modified.

2.8 Household Wealth Index (HWI)

As mentioned in the foregone section this research also employs the *Household Wealth Index (HWI)* in ascertaining the socio-economic status of West Usambara communities. The index is recommended by RUTSTEIN and JOHNSON (2004: 2-4) who argued that, "the *Household Income Index* (*HII)* and *Household Consumption Expenditure Index (HCEI)* measures are incapable in measuring accurately the economic status especially in rural areas in developing countries". This is because in these areas many people do not know their income, and they much depends on own production to sustain their living. Thus this makes it difficult for *Household Income Index* to capture accurately the economic status of those communities. Indeed, in rural areas in developing countries the costs of many goods are usually not recorded. MASCARENHAS also shares this point of view by arguing that "a-dollar-a-day makes a nice universal slogan but in many rural areas it is unlikely to happen and neither is it really relevant" (MASCARENHAS 2000: 4).

Similarly, the *Household Consumption Expenditure Index (HCEI)* is also discredited by the same scholars by arguing that: in most cases, the household's expenditures are obtained from one adult household member who is at home when interviewers arrive. As a result, the expenditures of other family members like children are often not included in that calculation. Indeed, there is still a debate on what kind of expenditures should be included and what should not be included in such calculations (RUTSTEIN and JONSON 2004: 2–4). These kinds of limitations discredit both indexes in capturing accurately the economic status of rural people.

Thus, the *Household Wealth Index (HWI)* tries to correct these limitations by assessing the value of physical assets which are more permanent than does either income or consumption. Indeed, only single respondent is enough to give information about all assets present in a particular household (RUTSTEIN and JONSON 2004: 2 - 4). Ideally, the possessions of different assets by a household largely depend on its ability to afford them. This again is an outcome of the performance of *livelihood strategies* conducted by that household and *livelihood resources* which fall within his reach. Consequently, the soundness of household's *livelihood strategies* and their performances can be indirectly understood by looking at its assets it possesses. Therefore, *HWI* is most appropriate to collect data concerning sustainable livelihood assets. For this purpose therefore, for

understanding the wealth status of the community of West Usambara, a total of 32 types of assets were used. Heads of households were asked to give the quantity of each asset and their estimated current values, and then their values were summed-up.

In order to determine the household's relative economic status, categories of wealth status were established. Equally, other indicators that are related to economic status are used to compliment data on wealth. The wealth status categories was correlated and regressed with other variables like ownership of bank account, land size, readiness to borrow from credit facilities and the ability to meet food demands.

3 The Study Area and Research Methods

3.1 Description of the Study Area

West Usambara is located in northeastern Tanzania within 4^o 25' – 4^o 55' latitude south of Equator and 30^o 10' – 38^o 35' Longitude East of Greenwich (LUSHOTO DISTRICT COUNCIL 2010: 9). The area is dominated by mountains with main physical features being highlands, valleys and steep slopes. These mountains lie between 900 m to 2250 m above sea level (MOWO, MWIHOMEKE and MZOO 2002: 1). The nature of West Usambaras Mountains is folded and faulted chain consisting of metamorphosed, volcanic and sedimentary rocks (MASCARENHAS 2000: 5; SOKONI and SHECHAMBO 2005: 12). Such mountainous nature has made the area to develop its own distinctive characteristics in terms of climate. It is relatively cooler than other areas in Tanga Region and Tanzania with annual temperature ranging from 18^o C to 23^o C, and annual rainfall of 800 mm to 2000 mm. Rainfall in West Usambara is bimodal, with long rains *("Masika")* falling from march to june with pick in april and short rains *("Vuli")* are in october to december with a dry spell from january to february (LUSHOTO DISTRICT COUNCIL 2010: 13). The most of rains received in this area is from south-west and north-eastern monsoon (MASCARENHAS 2000: 6). This kind of climate has made the area to receive enough rains that support dense tropical forests as shown in the photo in figure 3 below.

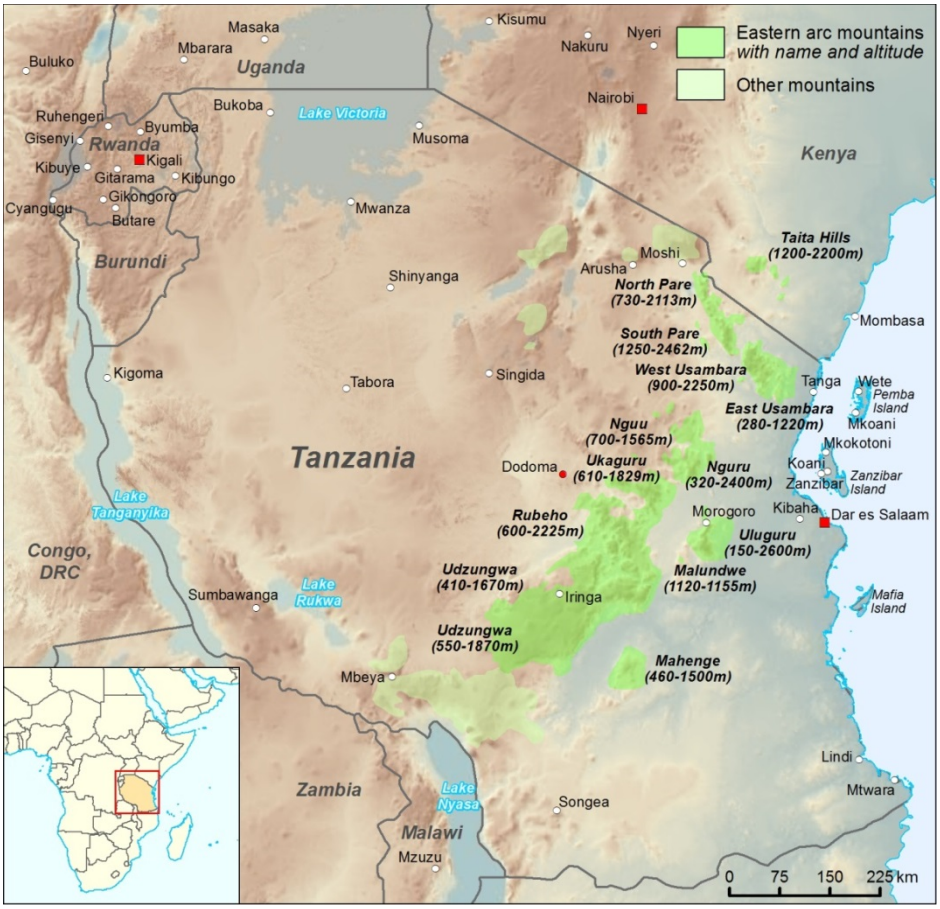
Figure 3: The part of Shumemagamba Forest Reserve in West Usambara

Source: Photo by Author (2012).

Natural Resources and Biodiversity of West Usambara

The West Usambara is endowed with forest resources and is one of the areas that form Eastern Arc Mountains[5] which are rich in biodiversity (map 2). The area has been designated as a biodiversity hotspot by the Conservation International (WOODCOCK, MESHACK and BILDSTEN 2006: 7).

Map 2: Eastern Arc Mountains Area



Source: Modified from HARPER, MEASEY, PATRICK, MENEGON, VONESH and SWILA (2010: 9)
Cartography: Department of Geography, JLU Giessen (2014).

[5] ***Eastern Arc Mountains*****:** is a term that was introduced in 1985 to describe the arc of forests - capped ancient crystalline mountains of eastern Tanzania, and south - east Kenya that consists thirteen separate forests mountains blocks extending from 300 m at the base to over 2000 m. The forests are under the influence of Indian Ocean climatic regime, and therefore, contain predictable local climate (UNESCO 2010: 19, HARPER, MEASEY, PATRICK, MENEGON, VONESH and SWILA 2010: 9). More than 90 % of these forests are located in Tanzania.

Forests in West Usambara are wetter in nature and are sub-montane and montane in type with high canopy; and are among few tropical rainforest areas in Tanzania. According to RUGUMAMU (1998: 121) only one percent of the country (10,000 Sq. Km) receives sufficient rains (1000 mm to 2500 mm) to allow high canopy forests to survive. About 830 Sq. Km (equivalent 8 %) of tropical rain forest grows in the Usambara Mountains.

The West Usambara forests consists strictly of four endemic vertebrates (two amphibians and two birds), and another 21 vertebrates that are only found in Eastern Arc Mountains *(EAM).* There are also 34 vascular plants confined to West Usambara blocks (UNESCO 2010: 33). Higher biodiversity values of these forests have made them to become important locally, nationally and internationally. The dominant plant species include *Podocarpus usambarensis, Olea hochleri, Euclea, Myrsine, Toddalia, Maba buxifolia, and Juniperus procera* (HAMILTON and BENSTED-SMITH 1989 as cited in MWITA (2010: 19). Tree species such as *Newtonia buchanani (Mnyasa), Ocotea usambarensis (Mkulo), Podocarpus usambarensis (Shuuti),* and *Cola greenwayi (Mkongoo)* produces valuable timber which attracts illegal loggers hence endangering the quality of these forests.

Apart from biodiversity value, West Usambaras forests form important catchments as well, and are sole source of water for surrounding villages which are more than 250. In the same way, towns such as Lushoto, Mombo, Korogwe, Muheza, and Tanga City rely heavily on water from these forests. The Lwengera River, Sine River, Soni River, and Umba River are major rivers that drain Usambaras area, and their existence have made possible by availability of numerous tributaries that drain from these forests. In addition, the Pangani River receives a significant amount of water from Usambaras forests, though its source is from Mount Kilimanjaro. The river is crucial for irrigation and hydroelectric power. Consequently, being among few tropical forests in Tanzania and high in terms of biodiversity, the West Usambara forests are important. Despite importance of these forests they have and still continuing to experience human pressures that threaten their existence as it will be seen in this research.

3.2 Studied Villages and Forests

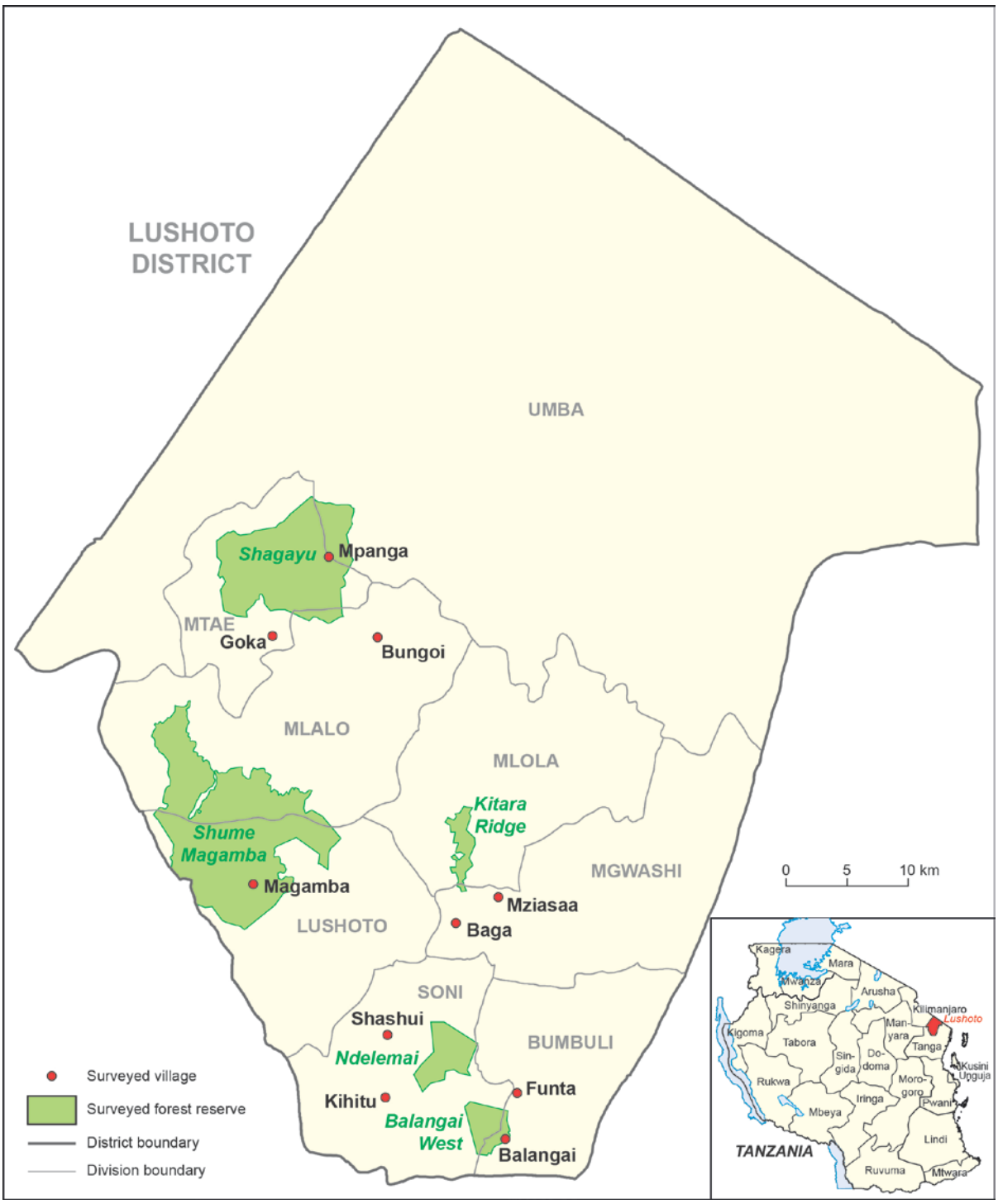
Six divisions out of eight that form the then Lushoto District (which was combining with the new district of Bumbuli) were selected. These divisions were selected from all direction of West Usambara to have enough coverage and good representation. From these divisions ten villages of Baga, Mziasaa, Funta, Balangai, Bungoi, Mpanga, Goka, Shashui, Kihitu and Magamba were selected. On the other hand, the forest reserves of Shagayu, Shumemagamba, Kitara Ridge, and Ndelemai were selected (map 3). The inclusion of the village depended on whether it is bordered by the forest. This is an important criterion because under an ideal situation it is expected a closer village to the forest to have more interaction and information on the forest than a far village.

Then a sample size of 254 households was selected from these villages for further investigation (table 1). Such respondents were selected from sub-villages of selected villages which were much closer to the forests. A systematic random sampling was used to select respondents from *sub-village book register* - a book which list of all households in the sub-village together with their family members. This was done for avoiding biasness from village leaders who might favor some villagers to participate and exclude others.

Table 1: Villages Selected and number of Respondents

Village	**Respondents**	**%**
Mziasaa	22	8.7
Baga	29	11.4
Funta	23	9.1
Balangai	19	7.5
Bungoi	23	9.1
Shashui	34	13.4
Kihitu	19	7.5
Goka	22	8.7
Mpanga	28	11.0
Magamba	35	13.8
Total	**254**	**100%**

Map 3: The Study Villages and Forest Reserves in West Usambara



Source: Own (2012).

3.3 Research Design

A case study research design was chosen to guide this research. This design is ideal because issues of land, livelihoods, and forest management are complex to understand.

Indeed, the task of describing fully every issue demand going beyond obvious borders of each phenomenon. According to KUMAR (2005: 113), a case study design is flexible and enables in-depth examination of different phenomena. It allows thorough study and analysis of an individual case, which is any unit of social life such as an individual, group, process, or community (KUMAR 2011: 126, 127) that shape interaction between people and land resources. In this regard facets related to land, rural livelihoods and forest management were collected followed by analysis.

Consequently, a mixed-methods approach was chosen for gathering, analyzing, interpreting, and validating results. According to JOHNSON, ONWUEGBUZIE and TURNER (2007: 123) mixed method research refers to a type of research, which combines elements of quantitative and qualitative research approaches for the broad purposes of breadth and depth of understanding and triangulation of information. Thus, instead of relying on just one type of methods such as quantitative[6] or qualitative[7] methods, all available approaches were employed to gather, cross-check, analyze and interpret data. By combining the strength of each method the research and its subsequent results is improved.

3.4 Research Process and Data Collection Methods

3.4.1 Nature and types of Data

Both qualitative and quantitative data were collected. The Sustainable Livelihood Framework *(SLF*) was useful in determining the nature and types of data to be collected. Different *livelihood resources* which are found in rural settings together with *livelihood strategies* were identified. These are natural resources, physical capital, economic capital, and social capital. However, more weights were given to *livelihood strategies* that mostly depend on arable land and forests since in West Usambara many people are still relying much on agriculture. Thus, data on crop cultivation, livestock keeping, and forest based

[6] ***Quantitative Methods****:* Mostly results in quantitative data, which are collected by means of a highly structured survey and are analyzed by statistical techniques (CHUNG 2000: 338).

[7] ***Qualitative Methods****:* Mostly results in qualitative data, encompasses textual or visual data that are derived from interviews, observations, documents, or records (CHUNG 2000: 337). Normally qualitative data focus on the everyday life of individuals, groups, and organization (PATTON 1990 as cited in CHUNG 2000: 337). Consequently, they tend to employ unstructured questions (open ended questions) which allows one to express his/her value and experience on a certain phenomenon.

livelihood activities *(FBLA)* were gathered. Also information related to forest utilization, management issues, and diversity of wood trees was gathered to understand forests conditions.

Attention was also given to financial capital, physical capital and social capital components of livelihood resources. In respect to financial capital, data related to income, savings and credits cooperation societies, village community banks, financial institutions, remittance and pensions were gathered. On social capital information on labor grouping association, information sharing, religious institutions were collected. Likewise off-farm income generating activities such as petty trading, handcraft activities and the like were included. Regarding physical capital, weight was made on the basic social services which are found in villages such as: road, markets, hospital, schools, village land councils, and ward land tribunals.

In addition, factors that constrain or enhance different *livelihoods strategies* were examined. In this respect institution arrangements that regulate access to *livelihood resources* such as natural resources tenure were investigated (for more detail see appendix 11; 12; 13; and 14).The Human capital was left aside. However, this doesn't mean to undermine the role of human capital in promoting production (e.g. the ability to labor, and other skills etc.). It was just left because the majority of people in West Usambara do not depend on formal employments that need a specialized training and skills.

The research was conducted in two stages. The first phase was on socio-economic survey and another phase covered vegetation survey. Data collection started on 1 of march to 31 may 2012. The second phase commenced on 1 july to 10 of august 2012.

3.4.2 Social Economic Survey

The socio-economic survey preceded vegetation survey. This was important in order to have a glance on what is transpiring on different issues pertaining to land, livelihoods and forest management. During this period household questionnaires were administered to 254 heads of households in selected villages. The exercise went hand-in-hand with interviewing the village government leaders and village forest committees for the purpose

of getting general information on land, forests management and livelihood activities in the respective villages. Similarly, different experts such as agriculturists, livestock officers, foresters, and members of land tribunals at different levels were interviewed.

At the district level key informants were interviewed. These are district natural resource officer, agricultural officer, livestock officer, district forest officer, land officer, and lawyers. This was important for understanding technical information with regard to land issues, livelihoods and forest management. Different checklists of questions were designed to guide interview depending on the respondent's profession and responsibility. Similarly, narrative and in-depth interviews were used to acquire personal experience regarding land matters and forest management. Equally, secondary data from Lushoto District Council, research papers, and reports from private institutions were visited to enrich information.

3.4.3 Vegetation Survey

Vegetation survey was done after rain season. Given the nature of investigation which entailed gathering quantitative data on abundance of various wood species (which is more tedious, time-consuming and laborious), limitation of resources and time, two forest reserves were included. These are Balangai Forest Reserve (990.6 ha) and Kitara Ridge Forest Reserve (388 ha). Vegetation survey was crucial for two major reasons. First, it was important for crosschecking and complimenting qualitative information on forests conditions that were obtained during socio-economic survey. Secondly, it was imperative because without it the exercise of explaining forest conditions in West Usambara would be incomplete. This is emphasized by scholars, who commend that:

> "Vegetation classification system, or consideration of how environmental change or disturbance impacts vegetation, must be based upon, supported with, or tested by, data on present or past distribution that are collected in the field in a systematic and scientific manner". (GILLESPIE and MACDONALD 2010: 138).

In order to gather the required information, quadrats of 600 m^2 size (20 m by 30 m) were established through systematic sampling method at an interval of 150 m. This quadrat size was used as a standard area for examining the level of disturbance and for identification of species of trees available. The 20 m by 30 m size of quadrats was chosen

based on suggestion by KENT (2012: 61). KENT recommends quadrat sizes for woodland canopies vegetation types to range from 20 m x 20 m and 50 m x 50 m, though he also agrees that in the tropics it is possible to have larger quadrats. Quadrat was preferred because in vegetation description it provides a higher resolution data on species richness and the density of individuals within a sampled area than belt transect and transect line (GILLESPIE and MACDONALD 2010: 149). They also allow the identification and quantification of different types of forest disturbances.

After establishing quadrats a detailed investigation was carried out to measure the extent of disturbance and diversity of wood trees. The level of forest disturbance was measured based on estimating the percentage of canopy cover of the whole quadrat and by measuring the presence or absence of illegal consumptive use of forest products. Thus to determine the general condition of the forests, aggregate conditions of all investigated quadrats were established. This was done by investigating all illegal activities within quadrat and estimating their impacts on percentage canopy cover for a particular quadrat. Then, based on the extent of disturbance, and how such quadrat look like when compared to the general condition of the whole forest under investigation an overall condition of such quadrat was established. Consequently, the general conditions of quadrats were determined and their information supplemented by those from a socio-economic survey on qualitative information on forest condition.

In particular the following types of disturbances were investigated: pit-sawing[8], firewood collection, grazing, in-situ farming, pole extraction, and medicinal plant harvesting. Others are forest fire, fodder harvesting, charcoal making, and mining activities. The cover estimation was done visually which is considered as most appropriate, accurate and quicker especially in forest communities (KENT 2012: 67, 69).

Together with assessing forest disturbance also vegetation inventory was done for determining species abundance. Multiple observers who did recording simultaneously were used to note different attributes of tree species for accuracy purposes. With this regard, trees attributes such as heights and their Diameters at Breast Height *(DBH)* were measured.

[8] ***Pit-sawing****:* is a lumbering practice which involves the production and harvesting of timber by using hand saw. The timber productions of this type normally tend to involve a selection of certain tree species which are considered valuable in the community.

However, since the core purpose of the investigation was to assess forest disturbance (and not to describe the whole plant community) the great weight was given to the higher trees (wood) with a diameter of ≥ 10 cm. Such diameter was chosen because trees of such sizes are more likely to be put into variety of uses like, firewood, poles, timber etc. For precision only information of trees that were harvested between a period of one and five years were recorded. Trees' *DBH* and reasons for harvesting were also recorded. The species identification was done by using botanical field book guide, local field assistants for local names and Botanist for local and botanical names.

Since the survey focused largely on assessing the level of anthropogenic disturbances, and understanding floristic[9] information, the vegetation survey involving groundtruthing was much preferred. Likewise, due to limitation of time and financial resources, environmental and edaphic data were not captured. Although these data are helpful in understanding spatiality in distributions of plant species, leaving them did not affect the research, since the focus was on anthropogenic impacts on forests.

The following equipment were used in data capture: *Global Position System (GPS)* (for recording thematic spatial data and microclimatic and habitat information such as elevation and location), *the diameter tape*/*girthing tape* (for measuring the circumference of tree - Diameter at Brest Height), *markers,* and *fiberglass tape* for establishment of quadrats and in measuring trees heights.

3.5 Data Analysis

3.5.1 Analysis of socio-economic Data

The data analyses were mainly done by computer aid using Statistical Package for Social Sciences *(SPSS)* Program. Data entry was done by using EpiData software in order to manage massive socio-economic data which were gathered. After data cleaning the data was analyzed. Chi-square and regression analysis were used to test correlation between variables. Qualitative data was analyzed inductively by interpreting of data collected from individuals or groups on how they address certain social or human problems. Thus, by

[9] ***Floristic***: is concerned with collecting information about the species and in particular where the species present in the study area are identified and their presence/absence or abundance is recorded (KENT 2012: 50).

observing different specific cases generalization was done. In other words reliability of results obtained from qualitative data was checked by triangulation methods; whereby, the same issue is proved through different ways to check its authenticity. Data were presented in form of tables, figures, graphs, texts and maps.

3.5.2 Analysis of biophysical Data

Like for socio-economic data, also data entry for vegetation information was done by using EpiData software, which was then transferred to the SPSS program for analysis. Different trees attribute data such as frequencies *(dominant, abundant, frequent, occasional, and rare)*, trees heights, the Diameter at the Breast Height *(DBH)*, and densities of different species were then calculated. Thereafter, the spatial distribution of different species was determined. *Simpson's Diversity Index* was used to determine species richness and evenness within quadrats. Moreover, *Jaccard's Coefficient Index* was employed to assess the degree of species similarities and dissimilarities between quadrats and between forests.

4 Institutional Framework Governing Land and Forests in Tanzania

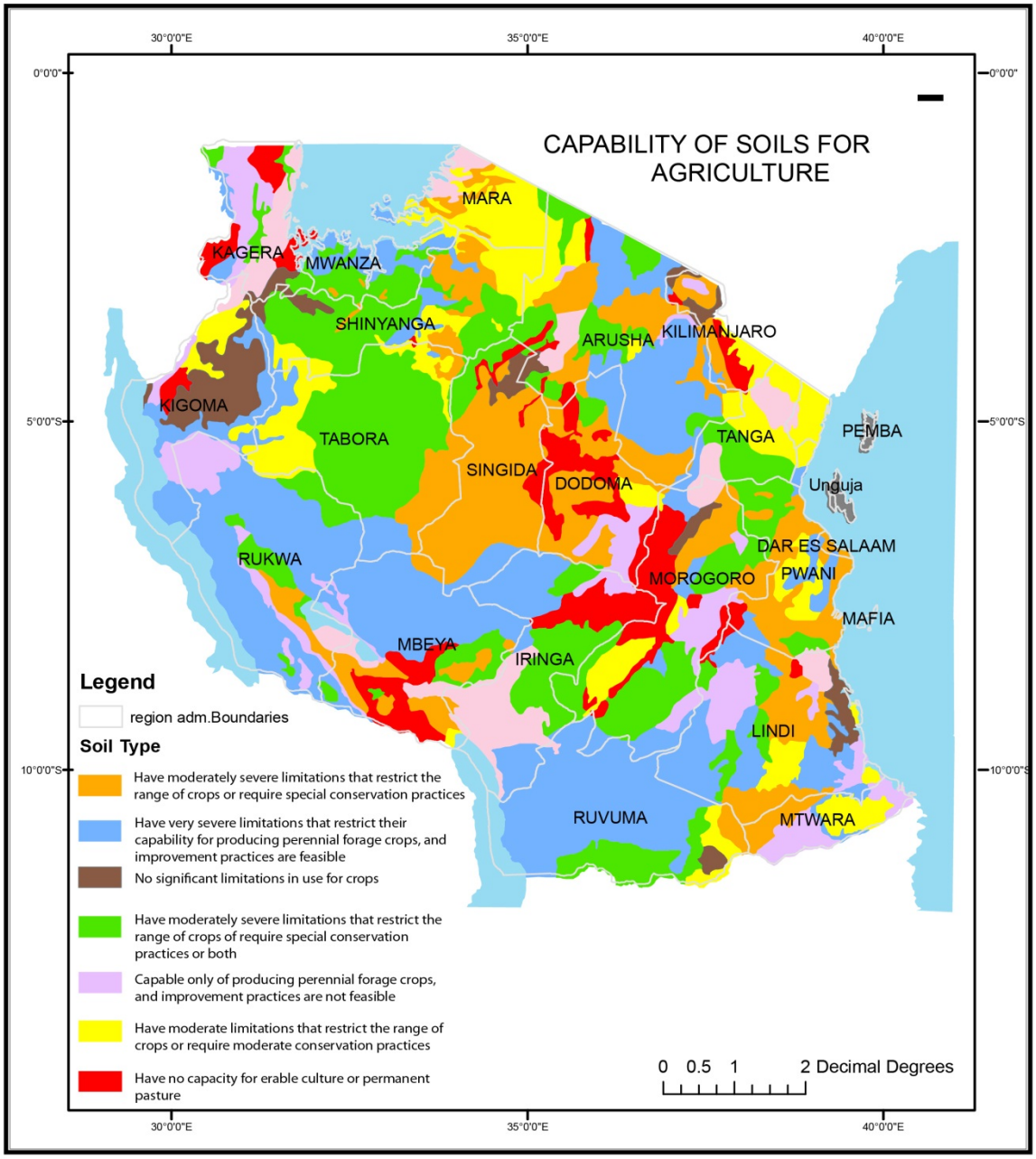
The primary objective of this chapter is to describe the institutional framework that governs land and forest resources in Tanzania. Therefore it is divided into two major parts. The first part presents the legal framework governing land matters in Tanzania. Here, more attention is given to how national lands and village lands are administered; ways by which one can get access to land; and how conflicts over land are resolved at different levels. In addition, issues about land acquisition process to investors and their implications have been explored and examined. The second section gives an overview of forest administration in Tanzania. Thus, forest policy, legal framework governing forest resources, and existing forest tenure in Tanzania are explained and discussed.

4.1 Framework of Land Administration in Tanzania

Although in reality different stakeholders both formal and informal organizations and institutions participate in land management and administration. In Tanzania, this role has been entrusted to the Ministry of Lands, Housing and Human Settlements Development (MLHHS). The ministry is mandated to provide various land related services to individuals and institutions in the country. Among these services include: the preparation of land policy and strategies aiming at developing the land sector; to prepare land use plans; to administer rural and town planning. Another function of the ministry is to determine the value of land and its assets; to participate in solving conflicts related to land use, and engaging in land mapping, registration and issuing of land titles; collecting land tax for the government; and keeping and administering land records.

The size of Tanzania's land is about 945,000 Sq. km of which 44 million hectares are arable land. About 88 % of the arable lands are found in rural areas mostly under villages' administrations. It is only 23 % of the arable land which is currently utilized (CHACHAGE 2010: 6). This has made some people especially politicians to believe that the country has abundant land, hence motivated to give it to investors who are thought to use it productively. However, about 75 % of land area is either inhabitable or difficult to manage because of difficult relief, tsetse flies, or national parks, game and forest reserves (URT 1997: 4). Also, many soils in almost all regions in Tanzania their capabilities in terms of supporting agriculture is low as it can be appreciated in map 4 below.

Map 4: Soils Capability for Agriculture by Regions in Tanzania



Source: Own (2014).

Together with low capabilities of soils for agriculture in many regions, also large sections of the country such as central and northern parts are arid or semi-arid, thus unsuitable for agriculture as it is mainly rain fed. The condition is even complicated by low economic and technology condition prevailing in the country which limits people to transform different types of land to productive use. Thus, there is a need to make thorough assessment on the current and future demands of arable land for citizens before giving it to feign investors. This is because in most cases land lease to investors are done for long

period of time up to 99 years something that will compromise future demand of land for locals. This argument is also supported by UN-HABITAT which has called nations to manage their lands with great cautiousness. With regard to rural land UN-HABITAT commends that:

> "Pressure on rural land is increasing due to world population increase, climate change, declining soil fertility, and need for global food and fuel security. These trends offer developing countries an opportunity to attract foreign investment, but they also threaten the land rights of small-scale producers and indigenous rights". (UN-HABITAT 2012: 2).

In Tanzania the Land Act Number 4 and the Village Land Act Number 5 both of 1999 are the two key statutes that govern land tenure and administration in the country. The two laws recognize three categories of land which are: *village lands*, *reserved lands*, and *general lands* (LAND ACT NUMBER 4 of 1999: 42). Sometimes *reserved lands* and *general lands* are called national lands. For administration purposes, the Land Act number 4 of 1999 deals with the management of reserved lands and general lands, while the Village Land Act Number 5 of 1999 is concerned with the village lands. These laws allow one category of land to be transferred to another. For instance, a part of village land can be transferred to general land and vice versa.

The village's lands include all lands which have been declared to be village land under and in accordance with section 4 of the Land Act No. 4 of 1999, and include any transferred land to a village (LAND ACT NUMBER FOUR 1999: 35). On the other hand, reserved lands are defined to include lands reserved, designated or lands which have been set aside for special purposes. These purposes among others include lands reserved for forest conservation; wildlife conservation; marine parks; settlements, and reserved roads in highways. Also they include land reserved for public recreation; lands for investment; lands along the drainage system; land reserved for public utilities; and land declared as hazardous (LAND ACT NUMBER 4 of 1999: 49).

All reserved lands are under the control of the Commissioner for Lands who has a mandate to grant the *right of occupancy* to the responsible authorities for administration. Thus reserved lands fall under sectoral legislations such as the Forest Act (2002), the National Parks Ordinance, the Wildlife Conservation Act (1974), and Town and Country Ordinance, Highway Ordinance, Public Recreation and Grounds Ordinance and Land

Acquisition Act. It is estimated that about 30 - 40 percent of Tanzanian's total land area are reserve lands (MWAKAJE 2010: 6).

The *general land* is defined to include all public land which is not reserved land or village land and includes un-occupied or unused village land (LAND ACT NO 4. 1999: 24). Different land experts and other practitioners in Tanzania have challenged the definition given to the *general land*. The major arguments for their critique are that, the definition contradicts land administration especially at the village level. This is because general lands also fall under village's jurisdiction. Thus, including unused and unoccupied village land in general land make such kind of land to become susceptible for alienation by government in favor of external investors, the rich, elites and government officials (OLENGURUMWA 2010: 11, 12; OLENASHA 2006: 17, 18).

The situation is made worse due to the fact that the general lands are under exclusive administration of the Commissioner for Lands, thereby providing a loophole that allows the president to alienate it at his will and give it to anyone. The fear of losing general land by villages is increasing due to the corruption behavior and bad governance of some politicians and government officials nowadays in Tanzania. For instance, researches show that government officials and politicians have facilitated appropriation of village land to the investors without following the required procedures (CHACHAGE 2010: 16-22, 36, 40; OLENASHA 2006: 17).

Likewise, the definition of general land is criticized on the ground that, it compromises the welfare of pastoralists. This is because, unlike agriculture which leaves a permanent sign on land, pastoralist activity does not leave permanent mark to act as evidence showing that, such land is occupied to protect it from being taken away (OLENGURUMWA 2010: 2; BENJAMINSEN, MAGANGA and ABDALLAH 2009: 424; COTULA and MAYERS 2009: 6; OLENASHA 2006: 17-18; NELSON 2005: 3; BLENCH 2001: 4; MAJAMBA 2001: 7). This has lead pastoralists' land to be taken away leaving them with very small land to graze and water their livestock.

The overall result of pastoralists' marginalization is weakening their welfare in recent years. In Tanzania pastoralists are constantly moving from the northern part to the southern part of the country. Nowadays are seen in almost all regions in Tanzania though in past were mostly confined in the northern circuit of Tanzania in Arusha, Manyara, Mwanza and

Shinyanga Regions. Their movements have been sometimes counteracted with many challenges in the way as they collide with farmers and other land users they meet. The situation is complicated by the belief *'myth'* among pastoralists that *'every plant is animal feed'* something that make some of them not to take care of crops.

The climate change impacts have made lives of pastoralists more difficult in recent years in Tanzania. Such impacts are manifested in intensification of drought condition as most of pastoralists occupy arid and semi-arid areas. Drought has adversely affected the availability of water sources and pastures which are two principle resources for them. According to MUNG'ONG'O (UNDATED), although many sectors in Tanzania have been impacted by climate change, none of them have been affected as pastoralist. He adds that, the year 2005, 2006 and 2009 were serious for pastoralists. With 2009 drought being the worst in 40 years; as it lead to the loss of about 70 % of pastoralist's livestock. The poor health of their animals made them to fetch low price in the market. In that year, the price of a bull declined from between TZS 80,000 to 100,000 (approx. US$ 50 to US$ 63) to TZS 50,000 (approx. US$ 31).

It is also important to note that, the situation of Tanzanian pastoralists is not unique. In East Africa and the Horn of Africa Regions land rights for livestock keepers are hardly considered and normally are discussed in terms of agrarian societies and peasants (MAY 2003: 26; MRG 1998: 1 – 7). In terms of livestock development, governments have consistently advised the pastoralists to reduce their herds by adopting sedentarization; however, such advice does not please pastoralists always.

To a large extent, the endless land conflicts and disputes between pastoralist's societies on the one hand, and government, conservancies, and agriculturalists on the other hand are attributed partly to such adverse land policies. In some cases such conflicts claim lives and loss of property. In this respect, the Kilosa District in Tanzania is renowned for pastoralists-farmers land conflicts. On 8 december 2000 the district saw a tragic killing at Rudewa Mbuyuni village which claimed lives of thirty-eighty farmers (BENJAMINSEN, MAGANGA and ABDALLAH 2009: 425). Recently, on 12 january 2014 another disastrous conflict between pastoralists and agriculturalists took place in the Kiteto District in Manyara Region. In this conflict thirteen people were killed, fifty were injured while others left with permanent disability (Tanzania Daima 12 january 2014; Tanzania Daima 13 january 2014). These incidences call for genuine and fair land use planning which will

delineate land for every land users. Indeed, it is a high time to devise land tenure regulations and socio-economic policies that would take into account all groups of land users in Tanzania.

4.2 Administration of National Lands and Village Lands

It should be made clear from the outset that, although the Ministry of Lands, Housing and Human Settlements Development is mandated to oversee land matters in Tanzania, the actual land administration and management is done by the Commissioner for Lands, and the village councils. All *national land* (general lands and reserve lands) are under the Commissioner for Lands who is responsible to the Minister for lands. Normally every village obtains the certificate of their land from the Land Commissioner, who gives it in the name of the president. Upon village receiving such certificate, the management of land is automatically transferred to the village council (LEAT 2011: 34). In Tanzania there are three categories of village lands: the *communal village lands* (land available to all people in the village); *land occupied or used by an individual or family or group of persons* under customary law and *reserve lands*.

The administration and management of village lands unlike the national lands is under the village councils. However, the village councils have no exclusive autonomy to decide on land matters as it is answerable to the village assemblies. In other words, village councils hold land just as trustees on behalf of all villagers like the president does, and they are not allowed to allocate any part of village lands to any one without the consent of village assemblies. Likewise, the law has another provision that give power to the district councils and the Commissioners for Lands to give advice to the village councils. In this regard, the law gives direction that, in such situations the village councils have to obey this provision without fail. Some land experts have argued that, "this provision undermines the power of village councils to decide on land matter" (SHIVJI 1998: 2, 6). The major reason is that, while the law gives the villagers power to decide on land matters at the same time it concentrates power on other actors to supervise or withdraw the entrustments that have been given to the villagers; something that ruins the democratization of land matters.

According to LARSON and SOTO (2008: 216), true devolution sometimes called *'democratic decentralization'* should involve complete transfer of power from the central

authorities to lower levels with all autonomous, unrestricted decisions making spheres with the power and resources to make significant decisions pertaining to local people's lives. This form of devolution [in this case, the decentralization of land administration to the local people] is accorded by some renowned land expert in Tanzania. For instance, SHIVJI (1998: 2) has consistently advised that, the land administration and in particular 'village lands' should be devolved fully to the *village councils* which would be responsible to democratic village assemblies.

However, due to an increase in demand for land at the global level the researcher see risk in leaving villagers alone to decide on what should happen on their land. This is because villagers in many cases lack awareness on the land value and especially on what is happening at the international level regarding land issues. Indeed, they do not have enough knowledge to safeguard their rights when comes to signing agreements with investors during land acquisition processes. This might compromise their future rights on land. A case in point is observed at Chumbi 'C' and Kivinja 'A' villages at Rufiji District in Coastal Region. Newspaper report that, villagers of Chumbi 'C' were given 2 kg of maize flour to convince them to grant 2,300 hectares of land to one investor from the royal family of the King of Saudi Arabia. While Kivinja 'A' villagers were convinced through a bottle of Coca-Cola to provide 50 hectares of land to investor. According to the village chairperson, Mr. Mtimbuko, they had to reach that decision because its village was facing food insecurity. And they could not get any assistance until he met an Arab who promised to provide them with the maize flour with the condition that its village would provide them with an investment land (Mwananchi Magazine 15 november 2012). As you can see from this example, un-informed villagers might reach irrational decision by just looking at short term benefits.

4.3 Ways of Land Access in Tanzania

In Tanzania people can have access to land through different ways including clearing of unoccupied bush, allocation by the village authority, or Commissioner for Lands who can give land to the villagers or non-villagers and to non-citizen. Other methods are inheritance, gift, and purchase, which involve the transferring of the *right of occupancy*[10].

[10] ***Right of Occupancy:*** Means a title to the use and occupation of land and includes the title of a Tanzanian citizen of African descent (native) or a community of Tanzania citizens of African descent using or occupying land in accordance with a customary law (LAND ACT NUMBER 4 of 1999: 32).

Generally, the conditions of holding land are defined as the *right of occupancy*. According to FIMBO (2004: 10) *the right of occupancy* helps to avoid *freehold land title* 'unconditional title' which is associated with land speculation. Again, *the right of occupancy* is of two types. The first is *granted right of occupancy/derivative right*[11] which mostly is given to non-citizen for investment purpose, and the second is *customary right of occupancy* which is based on customary arrangements especially for citizen.

Unlike in the colonial time where a *granted right* on land was superior to *customary right of occupancy* in the court of law, now the two land tenure arrangements have equal weight before the law. Another type of land access is *adverse possession*, which is where a person has used someone's land which is unregistered for more than twelve years without interruption and thereafter it becomes his.

It should be made clear in advance that, a non-citizen cannot own land in Tanzania through *customary right of occupancy*. Instead, they only get access through the *granted right of occupancy* to the general land and only for investment purposes. Consequently, wherever the village land is to be given to a foreigner for investment purposes, first, such land needs to be transferred to the general land. Such transfer is done by the president through the Commissioner of Lands. Likewise, the foreign inventors can be allocated the land which is already earmarked as general land by the Tanzania Investment Center *(TIC)* through the *'Land Bank'* scheme.

4.4 Land Dispute and Resolution Mechanisms

Resolution mechanisms for land disputes are important for addressing conflicts related to land. Currently the demand for land resources in Tanzania is increasing thereby contributing to making land scarce. Land scarcity is exacerbated by factors such as population pressure, land degradation, rapid urbanization, and increase of investors from within and outside the country. There is always potential of land conflicts when different land users try to pursue their interests and goals on land. Thus, for creating peace and harmony in the society the land laws have directed to introduce different councils and

[11] ***Derivative Right*****:** refer to a right to occupy and use land created out of right of occupancy and include lease, a sub-lease, a license, a Usufructuary right and any interest analogous to those interests (LAND ACT NUMBER 4 of 1999: 22).

courts responsible for settling disputes at different administrative levels. These councils and courts include, the *village land councils*, *ward tribunals*, *district land and housing tribun*als, *the land division of the high court*, and *the court of appeal* (LAND ACT NUMBER 4 of 1999: 467; and THE LAND DISPUTES COURTS ACT NUMBER 2 of 2002: 5). The land practitioners have accorded with this structure since it enables one to obtain land services at different levels hence, reducing costs if such service could not be available at the lowest levels.

4.5 Land and Foreign Investment in Tanzania

Tanzania like other African countries has witnessed Foreign Direct Investments (FDI) in land over recent years. Investors are motivated to acquire land for meeting among others, the global food security, alternative energy due to steadily diminishing supplies of nonrenewable resources, and in addressing climate change (UN-HABITAT 2012: 2; WEINGÄRTNER 2010: 12; COTULA, VERMEULEN, LEONARD and KEELEY 2009: 52-53; WINTER and LOBLEY 2009: 3). This has led to investment in mining sector and commercial agriculture *'agri-business'* for producing both food crops and energy crops in Africa. The investors are mostly coming from oil producing countries *'Arab world'* (Bahrain, Egypt, Kuwait, Libya, Qatar, Saudi Arabia), Eastern Asia (China, South Korea, Japan), and European Union (GTZ 2009: 2).

Consequently, since nearly all investments require land they have increased its demand and competition. The demand for more land is even escalated by the fact that, the European Union (EU) and USA have set their target to shift from the use of fossil fuel energy to renewable energies. For instance, while the EU targets to increase the use of renewable energy in transport sector to 10 % by 2020 (BROADHURST 2011: 3), the USA has plans to get fuel from ethanol to replace 20 % of transport fuel by 2017 (LARRRI/JOLIT 2008: 3, 4). The possibility of meeting these targets within their countries is impossible. It is reported that acreage requirements for biodiesel and bioethanol production exceed the available amount of set-aside land in EU25 (MANUEL and JÖRG 2005: 19). About 11.2 million hectares of land is required to meet the EU target for 5.75 % transport fuel from biofuel by 2010 and replacing 10 % of fossil fuels by bioenergy in 2020 would require 38 % of the total acreage in the EU-15 (UNCTAD 2009: 31. Thus they are all compelled to look

for land from other countries and in particular in developing countries including Tanzania where land is considered to be abundant.

The possibilities of investing in lands in Africa and in Tanzania in particular are higher following liberalization policies (see SCOONES, SMALLEY, HALL and TISKATA 2014: 4) which most countries have adopted following the conditionality by the IMF and the World Bank in 1980s. Currently, the government of Tanzanian for instance, through the Tanzania Investment Center *(TIC)* encourages investments in the agribusiness sector, extractive industry 'mining' and infrastructure, natural resources, tourism, manufacturing, commercial buildings, transportation, services, financial institutions and human resource development (MNALI 2008: 10). The Tanzanian government envisages that, investments in such sectors would create more employment opportunities; stimulate the utilization of natural resources; and improve social services, which all promote the standard of leaving of the citizens. Consequently, the country has witnessed many investors in recent years which are taking large tracts of land for production of food crops, forestry and renewable energy.

Although investors are given land by the government, to date the actual amount of land which is under foreign investors is not known. The situation is complicated by general lack of transparency on many land deals. Tanzania is considered as among the top ten countries worldwide in terms of the amount of land handed over to foreign investors (LOCHER and SULLE 2013: 1). The countries investing in Tanzania in *agri-business* sector include among others: the United State of America, Canada, Switzerland, Netherland, Germany, Belgium, United Kingdom, Sweden, Finland, China, India, Italy, Egypt, Turkey, Mauritius, Kenya and Nigeria.

The analysis by this research made based on ***Land Matrix***[12] *data* on Tanzania shows that from year 2000 and 2013, fifty two investors from different parts of the world

[12] ***Land Matrix:*** The land matrix is a global and independent land monitoring initiative aiming at facilitating an open development community of citizens, researchers, policy makers and technology specialists to promote transparency and accountability in decisions over land and investments. It does this by tracing and verifying global land deals. The partner institutions working to this effect include: the International Land Coalition *(ILC);* German Institute of Global and Area Studies *(GIGA);* the Centre for Development and Environment *(CDE)* at the University of Bern; the Centre de cooperation Internationale en Recherche Agronomique pour le Development *(CIRAD);* and Gesellschaft fur Internationale Zusammenarbeit *(GIZ)* (http://landmatrix.org/en/about/).

expressed their interests to invest in agriculture and renewable energy. The all requested amount of land if granted amount to 1,523,155 hectares. Such size of land is equivalent to 15,231.55 Sq. km or more than a half of the size of country of Rwanda which is 26,338 Sq.km. In this group, some investors are seeking up-to 325,117 hectares of land.

The negotiations of such land deals have reached different stages. Out of these 52 investors, 33 (63.5%) investors have already concluded and signed their land deal. Though many got less amount of land than what they intended in the first place. On the other hand, 6 (11.5 %) investors their land deals have failed and 11 (21 %) investors are still negotiating their land deal. Also about 8 investors (15.4 %) have abandoned their production. In addition, almost all investors who have obtained land have developed a very small portion of it. For instance, it is only 5 % out of 361,732 hectares of land falling under the so called concluded contracts which is under production. This is despite the fact that some investors obtained land since early 2000s (see detail in appendix 10).

The low amount of developed land by the investors is contrary to the expectation of many people. Also it is contrary to what Tanzanian government tells its people that investors would use land productively. This scenario suggests that some investors might be just interested in land speculation rather than investment. Thus, are waiting enough time to pass for land value to upsurge so that they can transfer it to other investors for high price. This is detrimental economically if it would continue unchecked because, whenever land is given to the investors it refrain others from using it let alone the secondary user rights by the local communities.

4.5.1 Mechanisms to deal with an Increase in Demand for Land for Investors

In order to address the growing demand for land especially for investors, in 2002 the idea was proposed to establish a unit called *'Land Bank'* within the Tanzania Investment Center *(TIC).* In the context of *TIC*, '*the Land Bank'* should not be confused with other banks as in a financial institution. Instead, "*Land Bank* refers to a depository of records detailing lands that have been earmarked as suitable for investment purposes in each region of Tanzania" (MNALI 2010: 5). It also includes statistics showing where such land is located, its size, and available infrastructures such as roads, water, and electricity. According to *TIC*, this initiative is seen as a mechanism to address the challenge of

allocating land to the investors. Normally, such land records 'depository' is kept by *TIC* ready to be shown to potential investors who can in turn select the suitable land from the list. In most cases it is said that, the best prime lands in the villages are mostly targeted (OLENASHA 2006: 29-30). If the future demand for land for the local people would not be determined now, such program might compromise people's welfare on land in the long term.

This initiative by *TIC* is in line with the land reforms which were undertaken in 1990s and early 2000s which have commercialized the land sector in Tanzania. In 1999, the government enacted the Land Act Number 4 and Village Land Act Number 5 which came into use in may 2001. In 2004 these acts were amended to include provisions that allow commercialization of land. Among these amendments are like giving value to undeveloped bare lands. Thus, they have legalized selling undeveloped bare land; and allow selling and buying land just like any other commodity in the market. Equally, new changes allow the use of land as collateral for borrowing in financial institutions.

Along with these changes, in Land Acts, in 2003, the Tanzanian government initiated a program known as 'property and business formalization program *(PBFP)*' or *'MKURABITA'* as popularly known by its Kiswahili name. The program aims at enhancing self-development of the majority of Tanzanians in the informal sector through the use of their own property and business assets. It is thought that, by formalizing their assets through registration and giving them title deeds it would be easier to use them as collateral in borrowing from financial institution for investment purposes. Most of poor's assets are regarded as *'Dead Capital'* before legalization. As are not recognized in financial institutions hence cannot assist in securing loan. This idea was borrowed from the Peruvian economist, Hernando De Soto, who in his book *"The mystery of capital: why capitalism triumphs in the west and fails everywhere else"*. In this book he advocates why there is a need to legalize poor's assets. His major idea can be summarized as follows:

> "Many assets owned by the poor people in Less Developing Countries (*LDCs)* and former communist nations are in defective forms or simply are '*dead capital'* in the sense that, the owners do not have official title to those capitals. Lacks of titles (i.e. Legal representation) make many of poor's assets not to qualify to enter in the market as collateral for credit. Thus, formalization program entailing at giving titles to such properties is important. In turn obtained titles will give poor people the

> power to change their ownership into capital to be used as collateral in securing credit at financial institutions. Obtained credits will be invested in other economic activities thus helping them not to continue to be trapped in subsistence agriculture or small livelihoods activities. In the context of many *LDCs* giving title to their land is highly suggested as a way to use globalization to fight poverty". (DE SOTO: 2000: 5 - 13, 44 - 61).

Consequently, some governments in Africa including Tanzania have adopted this idea. The types of property which are targeted mostly are land, houses and other buildings.

Land experts in Tanzania have challenged these decisions by the government although it argues that such changes are in favor of the interests of Tanzanians. Commentators maintain that, amendments in the land laws together with the *'Land Bank'* will compromise the welfare of many citizens in the near future by leaving many landless (OLENASHA 2006: 21-27, 29). Similarly, although formalization program (*PBFP)* sound good in terms of poverty reduction, a close looks at it leave a lot of doubt whether it would bear benefits to the poor. There are chances for many people to lose their land to the commercial banks through given the higher interest rates charged by financial institutions in Tanzania. The situation would be made worse by the low level of entrepreneurship skills among many people. Hence, these initiatives might be just as other avenues of easing investors to obtain land from ordinary citizens through manipulation of policy and land laws.

Some scholars have also argued that, "amendments especially those made in the land acts were largely backed by the World Bank which to a large extent is favoring liberalization policies on land and a class of commercial farmers" (CAMPBELL 1996: 72). The IMF/World Bank's agenda on land since 1980s has been to replace customary systems with private land tenure system (OLENGURUMWA 2010: 6; GHEZAE, BERLEKOM, ENGSTRÖM, ERIKSSON, GALLARDO, GERHARDT, KNUTSSON, MALMER, STEPHANSSON and WALTER 2009: 42; PETERS 2007: 8). Thus, these changes are not in favor of the rural poor. In examining the way in which the IMF and the World Banks have been conducting their activities, GREEN argues that:

> "For much of the past 30 years the IMF and the World Bank have been pursuing nothing less than a radical overhaul of the way that developing countries run their

> economies. That role has been hugely controversial and, in many eyes, profoundly destructive, and both institutions have been obliged to rethink their approach". (GREEN 2012: 244).

The pressures from these two institutions have also been mentioned as a reason why the government of Tanzania declined many recommendations given by the presidential commission of inquiry into land matters in 1994. Such recommendations to a large extent were geared at increasing the security of land for the poor people (CAMPBELL 1996: 72). The president tasked the commission to make a thorough research on land matters and come up with advice which would help to solve land problems in the country. The motivation by the government to appoint such commission was because during the end of 1980s and early 1990s the country was witnessing many problems on land. Such problems were related to land tenure conflicts, corruption, grabbing of poor people's land by the rich and elites, and conflicts over land between different land users such as farmers and livestock keepers, pastoralists' vis-à-vis investors and conservationists. While all these problems were facing the land sector, at the same time the World Bank demanded the government to enact land policy which could accommodate foreign investors.

As a result, in 1995, the government formulated the national land policy which disappointed many people including land experts, lawyers, academicians and human right activists. The government rejected many valuable suggestions made by the Commission, hence leaving so many unanswered questions to the public (OLENASHA 2006: 6, COMPBELL 1996: 72). One would ask '*why government appointed the commission that spent a lot of money and time while it was not ready to accept its recommendation?* Only politicians and government officials who were at the office by then can answer this question satisfactorily. Despite rejection of many of recommendations, experts believe that, the commission did a very commendable and a thorough study of land matters to date in Tanzania (SUNDET 2006: 13). The key recommendations by the commission are summarized in chapter 14 of the commission's report, page 145 as follows:

- The land of Tanzania is to become a constitutional category. The constitution should have a specific chapter that addresses land issues. In particular the chapter should stipulate clearly the fundamental principles of land tenure as well as put in place the responsible organs mandated with issues of land tenure.

This will forestall frequent manipulation and amendment which other pieces of legislation experience;

- To have two categories of land, national lands and village lands;
- The National lands to be vested in the Board of Land Commissioners to be held in trust for the benefit and use of the people;
- The National Land Commission *(NLC)* to manage national lands while the day-to-day governance of land matters be left to the Board of Land Commissioner;
- Village land to be vested in the village assembly, the democratically elected body of the village;
- Whereas national lands may be excised and merged in village lands, village lands subject to exceptions expressly provided in law should not be excised and integrated in national lands;
- The land tenure system to be based on multiple land regimes all existing side by side and none of which should be considered superior to the other and interests under all of them should enjoy equal security of tenure under the law;
- In all forms of land tenure regimes, security of tenure to be dependent on use and occupation;
- Use of land and pastoral communities for attaining food self-sufficiency and production of surpluses for domestic and export market to be the principle basis of the land tenure system.

4.5.2 Land Acquisition Process involving Investors and Land Grabbing in Tanzania

Increasing evidence shows that, land acquisition process in Africa and Tanzania in particular involving investors is surrounded with a lot of upside-down procedures and irregularities (KWEKA 2012; BROADHURST 2011; LEAT 2011; OAKLAND INSTITUTE 2011; WEINGÄRTNER 2010; CHACHAGE 2010; OLENGURUMWA 2010; WWF 2009; COTULA, VERMEULEN, LEONARD, and KEELEY 2009). Despite the fact that Tanzanian land laws and

policies stipulate clearly how land acquisition process should be done, they are still contravened by government officials and institutions (LEAT 2011: 49). In many places where biofuel farming is conducted, villagers have expressed their concern that their lands were taken without their consent. In Utunga village at Kilwa District for example, villagers accepted to give SEKABU BioEnergy Tanzania 1,000 hectares only, however investors with assistance from government officials earmarked 19,000 hectares of land (CHACHAGE 2010: 36).

Likewise, KWEKA (2012: 82-83) report that, villagers in Kisarawe, Bagamoyo, Rufiji and Kilwa Districts were forced to make un-informed decisions by the District Land Officer, the Regional Commissioner, and member of the parliament to give their land to the biofuel investors. KWEKA adds that, villagers were asked to conduct emergency meetings instead of the normal village assembly meetings, as decision to grant land to the investors had already been made at the higher authorities. In the case of Kisarawe District for instance, she report that, the District Land Officer ordered the Mtamba village council to prepare the minutes that show that they have agreed to give land to the Sunbiofuels project before even the said company sent a request letter for land to the village. During this process neither districts council nor the Tanzania Investment Center *(TIC)* prepared the villagers to make a rational decision, and inform them on impacts that may be associated with biofuel project before granting their land to the investor. On the other hand, SULLE and NELSON (2009: 3) report that, Sunbiofuels Company acquired about 8,211 hectares of land in Kisarawe district leading to displacement of over 10,000 people in 12 villages.

These events leave a lot of unanswered questions. For example: what motivated the officials to work for investors at the expense of their own people? Where land officers and other government officials obtained power to trespass and override the power of villagers to decide on land matters as stipulated in land laws? No one can answer adequately these questions except the officials themselves. The Tanzania VILLAGE LAND ACT (1999) clearly stipulates that, village councils are responsible for village land with subsequent approval of village assembly. Also the district councils and the Commissioners for Lands are required to advices villagers accordingly on land matters.

Such arbitrary decision by land officers and other government officials is also contrary to the international law on the rights of indigenous people. In particular article 7, 8(2), 14 and 16 which empowers indigenous people to decide on their lands. Among such rights is:

to make their own decisions regarding the land they occupy; the right to retain their own customs and institutions, where are not compatible with international human rights; the rights to own and possess over the lands they traditionally occupy; and that the relocation from their land has to be done with free and informed consent (UN-HABITAT 2005: 104). Consequently, the manner in which land acquisition process involving investors is being done in Tanzania is ascribed to *land grabbing*[13].

4.5.3 Socio-economic Consequence of Commercial Agricultural Investments in Tanzania

Investments in commercial agriculture in Tanzania have little positive impacts for local people (LEAT 2011: 50). Also impacts depend to a large extent on the production models adopted and the nature of contracts that participants sign. Three models of production are largely used in conducting biofuel projects in Tanzania, these are: *large plantation farms*; *community projects* (with aim of producing bioenergy for local energy project) and *out-growers* (BROADHURST 2011: 5; SULLE and NELSON 2009: 3). In the first two models, investors own land while the latter does not require investors to own any land. Instead, investors commission local farmers to produce the required crops in their land; in turn farmers sell their produce to the investors according to the signed contract. In other words: the *out-growers* (*contract farming)* operate on the basis of pre-agreed supply of certain type of agricultural crop between local farmers and buyers and both are bound to fulfillments of a certain agreements.

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[13] ***Land Grabbing (Global Resource Grab):*** To date there is no the agreed definition on what does it mean by *Land Grabbing*. However, a critical look at many literatures gives indicatives that the manner in which land acquisition is being done are surrounded by irregularities. This has made commentators to question on the legitimacy of land deals, and whether such move is beneficial to the hosting countries let alone its local population. I define the term *Land Grabbing* based on the suggestions by the TRANSNATIONAL INSTITUTE (2012: 4) which has suggested that, to understand *Land Grabbing* there is a need to consider who is controlling land, benefiting from it and the impacts associated with the whole process.

Therefore, ***Land Grabbing*** is any large scale land acquisition which involves acquiring land from local communities or national government especially in developing countries by wealthier investors mainly from developed worlds. Such process lead to the former owners of the land to lose the power over the control of the land in question let alone the associated benefits which is accrued from such land. Consequently, among notable adverse impact of land grabbing is loss of land sovereignty which sometimes is associated with displacement of people, dispossession and destitute of the local people.

The research by BROADHURST aimed at assessing the sustainability of different models of production of jatropha in Tanzania revealed that, the *out-growers* models had greater potential positive impacts for improving rural livelihood and has less impacts on environment (BROADHURST 2011: 8; 9). This is because apart from supporting global biofuel demand it also creates opportunities for local people to diversify their livelihoods and income (BROADHURST 2011: 8; 9). The similar observation is reported by SULLE and NELSON (2009: 7). This is different to a *large plantation* farms that are reported to have more adverse impacts on land rights, livelihoods of local people, food security and environment (water, soil and wildlife) due to alienation of huge land from locals (BROADHURST 2011: 8; 9; MWAKAJE 2010: 1).

Although researches appraise *out-growers* model in terms of benefiting local communities, a critical look at all three production models for biofuel projects show that: all lead to the loss of land sovereignty whereby local communities lose the power over the control of the land in question. I consider such effect as a significant negative impact of these new agricultural investments. While such effect is obvious on plantation model, it is also evident in *out-growers* model. Once peasants sign the contract with an investor to supply a certain type of agricultural crop from their pieces of land they cannot divert such land to other land-use within a specified period of contract. This is irrespective the fact that the market forces can create other best opportunities to utilize land which is more beneficial to the local communities. In the same way, SMALLEY (2014: 62) report that in *out-growers* model the interests of the contractor are often at odds with those of local farmer, which calls into the doubt the assentation that contract farming can have win-win outcomes.

On top of these situations, literatures show that investors are buying land at very give-way prices in Tanzania. In Kilwa District for instance, village land was sold for around US $12.00 per acre while compensation in Kisarawe District was only US $ 250.00 per households (WWF 2009: 3; SULLE and NELSON 2009: 7). This is serious undervaluation of the value of land which one cannot expect to take place anywhere, and especially in Africa where land form the basis of livelihood for the majority of people and is the only asset remaining for the poor. Devaluing of land of this kind might be partly due to the assumption that land is still abundant, or at present the communities do not realize the

value of their land. If this situation would continue unaddressed it would leave future population landless.

Similarly, in some cases investors failed to keep promises they make during inception stage of projects. Such promises are related to compensation and participating in village developmental activities. Also they undermine labor value and increased threats on food security, environmental degradation, and poverty (LEAT 2011: 45; CHACHAGE 2010: 13, 14, 17-20). Such circumstances contribute researchers to hesitate on the contribution of investors to socio-economic development. Some have even argued that:

> "There is a need for genuine compensation of land, since one-off payments for land compensation are unlikely to be satisfactory in the long term. Instead it is important for the communities to become shareholders in the investing companies so that they receive regular dividends". (MWAKAJE 2010: 6).

Moreover, since land acquisitions is either through long-term lease (99 years) and are large in size, they displace people from their own land and deny them customary land use rights (LEAT 2011: 18). In Tanzania and Africa in general, land tenure systems are characterized by the existence of multiple tenures i.e. several users have different use and access to different resources on the same land (POTEETE 2010: 69). So, it is common to see that although one may have right to farm on a certain piece of land still others may have rights to use the same land for other purpose such as fire wood collection, medicinal collection, fetching water, and grazing. Such kind of use rights of land is called *secondary use rights* (POTEETE 2010: 69). This is contrary to large scale agriculture which tends to contravene *secondary use rights* of land by the community since in most cases they fence their land.

Consequently, by the community loosing such rights it opens new chances for land use conflicts between investors and communities. Such cases are reported at Mtamba village in Kisarawe District, and Lake Basutu in Manyara Region. In the former, the SunBiofuels company deny villagers access to water sources, firewood collection, use of shortcut paths to neighboring villages, access to ancestral burial grounds, and wood chopping (LEAT 2011: 66). While that is happening in Mtamba village, in Lake Basutu press reported that:

> "Investor who has been given land in Lake Basutu to cultivate onion he is humiliating villagers. He has closed all paths that were formerly used by local

> communities to attain their daily livelihoods including animal paths, and paths used for fetching water and firewood, hence leading to the fighting between villagers and the investor. The situation has made some villagers to run away from their home, and now live in the jungle." (Tanzania Daima 15 september 2011).

Notwithstanding these socio-economic malaises caused by investors, adverse environmental impacts are also evident. A case in point is seen on biofuel investors who operate mostly in coastal areas which have forests with high conservation value; as they consists rare, endangered, and endemic species (WWF 2009: 1; BROADHURST 2011: 7; SULLE and NELSON 2009: 2). The chances of losing these species is high since there is lack of data on actual sites where those species are concentrated (WWF 2009: 3). Also, there case where investors clear a huge land of forestland and develop just a small portion. An example is Bioshape Netherland which cleared extensive miombo woodland in Kilwa District and develops only 200 hectare, leaving large tract of land undeveloped (BROADHURST 2011: 5). The similar land misuse is reported in Nyamwage village in Rufiji District, where village government is blaming the Tanzania Investment Center *(TIC)* that:

> "The Center has sent us an investor who has failed to develop 5,000 hectare of land granted to him six year ago. Villagers agreed to give land to the investors after receiving his application letter through the District Land Officer. However, it is six good years now since we gave the land to the investor who has failed to take any initiative to develop it. The village chairman Mr. Ibrahimu Mboweto report. He added that, such act is contrary to the Tanzania investment laws and in particular land acts of Tanzania. Thus, the villagers have been complaining a lot. We have forwarded our concern to the responsible higher authorities to ask for the investor to return back our land, but no answer has been given to us. Therefore, villagers have decided to invade the area by force and divide it among themselves so that they can use it for agriculture. The villagers are ready and are determined to face any one who will try to stop them. We have already sent the information about this plan to the District Commissioner, District Executive Officer, Regional Commissioner, Tanzania Investment Center, and the Commissioners for Lands in the Minister for Lands and Settlement Development." (Mwananchi Magazine 16 may 2011).

This account by the village chairman gives us a lesson that: whenever the responsible authorities fail to adhere to the laws and investment procedures while at the same time the peoples' concerns are not taken into consideration, the only thing we could expect is violence and resentments from people culminating to conflicts which offers are disruptive of peace and harmony in a society.

4.5.4 Concern Arising from Foreign Investments on Land in Tanzania

The mismanagement of land issues in Tanzania has made people to show their dissatisfactions. It is now common to see the daily presses in Tanzanian to report cases regarding land conflicts as it will be seen. Although some people might criticize the information by journalists on land, but frequencies of their stories is an indication that something is wrong somewhere regarding land issues. The country which once was known as peaceful has its parts repeatedly in conflicts due to social injustice on land matters. This has led to land experts, academia, civil society organizations, media, and members of parliament to show their concern. Their dissatisfaction is particularly on how land issues are administered especially when it comes to investors, and how country at large and local populations would benefits on such investments in the long term. Research shows that when it comes to allocating land to the investors their interest are served at the expense of the citizens (LEAT 2011: 24).

Such allegation is also repeated in the speech by the Shadow Minister for Lands and Settlement Development, Halima Mdee on june 2011 in the parliament. Apart from giving several evidences showing inconsistencies and irregularities on land acquisition process, Halima Mdee also lamented that:

> "When foreigners come in the name of 'investors' the acts of the Tanzanian government goes contrary to Swahili elders saying which states that: ***'Mgeni njoo mwenyeji apone'***. Literary meaning that "let the guest come and the host enjoy and be happy". Unfortunately, it has turned other way round, as it is like ***"Mgeni njoo mwenyeji asulubike"*** literary meaning that ***"Visitors come and hosts get humiliated and persecuted".*** (Hotuba ya Msemaji Mkuu Kambi ya Upinzani Wizara ya Ardhi Kuhusu Mapitio ya Utekelezaji wa Bajeti ya Mwaka 2010)

In Tanzania, the proverb meant at encouraging people to welcome visitors since they should be considered as a sign of blessing. Thus, guests should not be treated and seen as a menace and dangerous.

The similar kind of complains were expressed by many people at the 10 workshop of Tanzania Gender Networking Program (TGNP) which was attended by villagers from the Regions of Manyara, Kilimanjaro, Arusha, Morogoro, Mbeya, Mara, Dar es Salaam, Ruvuma, Pwani and Pemba. In this symposium, villagers showed dissatisfaction on what is going on regarding land matters, especially when it comes to the land acquisition from villages to investors. In explaining their experience, one of the villagers reported the following story:

> "KPL investor is practicing aerial spray for the purpose of killing weeds on the land which has been granted. As a result chemicals have adversely affected our paddy farms hence; compromising food security as chemicals have killed our crops…reported Mr. Clavery Mwakinyonge from Mkwangwelo village in Morogoro Region". (Tanzania Daima15 september 2011).

Despite the widespread cries and concerns on mismanagement of land matters in Tanzania, the government seems to be undecided to correct and stop these developments. On november, 2012, the same shadow Minister for Lands, Housing and Human Settlements Development, Halima Mdee reported similar cases in the parliament which caused hot debate, when she accounted that:

> "Various reports on land from different parts of the country show that, the multinational companies had taken over land for investment by pushing away villagers. Thus, fomenting land conflicts. Bad enough some investors who got the chunks of fertile land had failed to develop them. Instead, they sub-lease it to the villagers at exorbitant prices. For instance, while investors lease one hectare of land for TZS 2,000.00 per year (approx. US$ 1.25) they sub-lease the same land to the villager for TZS 100,000 (approx. US$ 62.5) per hectare per year. Therefore, I call the parliament to pass a resolution to press the government to suspend the allocation of huge chunks of land to foreign investors. After suspension of the exercise, the government should carry out a special assessment to establish the amount of land that had so far been dished out to investors. This will enable the

government to get a correct statistics on the amount of land which is under foreign investors as currently the ministry for Lands, Housing and Human Settlements Development had no clear statistics". (The Guardian 9 november 2012; Mwananchi 15 november 2012).

The argument raised by the shadow minister especially on the statistics of land which is currently under foreign investors correspond to that of Lawyers' Environmental Action Team which shows in its report that: many villages where large scale agricultural investment is conducted have no land use plans, hence suggesting that villages are not aware on exact amount of land which is available for different use something that will compromise their future livelihoods (LEAT 2011: 52).

In responding to the call of the shadow minster for land, the government agreed to carry out an assessment to determine the actual amount of land which is under foreign investors and to provide such information by april 2013. However, it declined the idea of suspending the allocation of land to foreign investors by arguing that, if such resolution will be passed the Tanzanian government would be seen as unreliable and inconsistent in its investment policies. This argument arouses one to question, *'are Tanzania's development partners or investors pleased with investments which do not follow regulations and human rights?*

From the preceding discussion the following features could be summarized to surround investments on land in Tanzania:

Ten Features Surrounding Land Grabbing involving Large Scale Agricultural Investments in Tanzania

- Loss of land sovereignty. This is one major negative impact associated with large scale land acquisition whereby local communities and the country at large lose the power over the control of the land in question. This impact happens regardless the manner in which land is acquired regarding the terms of complying with the national land laws and investments regulations.
- Lobbying, politics and anomalies surround some land deals in Tanzania. This in turn compromises the local communities' interests in the decision making process on whether or not to grant their land to investors.
- The local people in many cases accept the investors to take-up and use their land because they are blinded by promises which are made by investors or their companions on the returns associated with their investments. Such promises include job creation and provision of social services including hospitals, education, road infrastructure and dispensaries among others. The vulnerability situation is compounded by the high levels of poverty prevalent in many rural areas

in which these investors operate; hence rural communities consider the presence and operations of investors as last hope for some sort of livelihood improvement.

- Interests of local communities on the land issue as well as sustaining them are little protected by the government. This lack of government protection makes the situation worse especially in rural areas where local people lack awareness on their legal land rights and mechanisms that they can use to protect them.
- The officials who have been entrusted to administer land matters at different levels are doing little to provide the necessary advice, which could assist the local communities to reach the rational decision before giving land to the investors.
- The local communities are weaker than the investors in terms of protecting their land rights. This is why despite their expression of dissatisfaction regarding the way land issues are being administered many have failed to enforce and realize their demands.
- Although the major cause of land grab was attributed to bio-fuel production in the beginning, the trend is now changing towards food crop production.
- Writers on land grabbing are mostly biased towards foreign investors. This trend obscures the irregularities on land which is caused by the local investors, elites, politicians and rich people which also compromises the land sovereignty of the poor.
- Although investors argue that large scale agriculture would promote food security in the host countries, the reality shows that the most food produced is exported to investors' countries.
- While investors have obtained a big chunk of land they have developed a very small portion of it. This trend suggests that many of them are only interested in land speculation.

4.5.5 Relationship of Land Issues in Tanzania and Other African Countries

Tanzania has started to experience conflicts related to land just like other African counties. The situation is complicated because land acquisition exercise is surrounded by irregularities especially when it comes to following the required procedures regarding transferring of land from villagers to the investors as discussed under section 4.5.2. These misfortunes limit the communities from participating fully in the decision making process whether to grant their land to an investor or not.

As a result, one of the negative impacts of commercial agriculture by investors in Tanzania is conflict over land between villagers and investors. This new type of conflicts adds to those that used to exist especially between pastoralists on one hand and conservation, or between pastoralists and agriculturalists. Such conflicts were common in the northern regions of Tanzania. Consequently, the situation contributes people to see their government as betraying them something that create hates on it and the ruling part.

The ongoing land conflicts in Tanzania correspond with what has been contended by the Rights and Resource Initiatives organization *(RRI)* that, "perhaps two-to thirds of ongoing violent conflicts in less developed countries *(LDCs)* are driven by contested claims to land and resources" (RRI 2009: 5). Conflicts over land in many parts of Tanzania are to a large extent not related to land scarcity or even ethnicity and political pressures as commonly reported in other countries such as in Kenya, Somalia, Rwanda, and Cameroon (NYERERE 2011: 254; MGHANGA 2010: 17, 44; MÉDARD 2010: 19, 33; DEHEREZ 2009: 6 -12; SIMIYU 2008: 1; WAKHUNGU, HUGGINS and NYUKURI 2008: 3 - 4; GAUSSET 2007: 69; BIGAGAZA, ABONG and MUKARUBUGA 2002: 52) or even the colonial social injustice on land and other social services as in Zimbabwe, Kenya, Namibia and South Africa (WERNER and ODENDAAL 2010: 3; AFRICAN UNION 2009: 21; DONGE, EISEB, and MOSIMANE, 2005: 4; HUNTER 2004: 111;VAN DEN BRINK, THOMAS, BINSWANGER, BRUCE and BYAMUGISHA 2006: 19).

Instead, land conflicts in Tanzania arise from what is called by FAO (2002: 8) overriding interest[14]; failure of government and developing investors to take into account the needs of local people (e.g. ignoring collective and customary rights over land of local people); lack of adhering to procedures as stipulated in land laws; corruptive behaviors; and mismanagement by the government. These factors are compounded by in effective land use planning that fails to accommodate different land users, inefficiency in land administration as manifested in inadequate capacity to plan, compensate, map and issue land to different users. Also increase in human activities due to population increase that outstrip the government capacity to render land services contribute to land conflicts.

4.5.6 Summary of major Issues on Land Matters in Tanzania

The manner in which land matters are undertaken especially when it comes to investors will not guarantee sustainable investments in the long term. Also it is different from what government and investors promise in the inception stage of these projects. In many cases, villagers are promised that agricultural projects will be economically, socially and

[14] ***Overriding Interest***: It occurs when one group has more power than another group, such that it decides to allocate or reallocate land through expropriation without full consent of other stakeholders. A good case is governments and investors who tend to make decision over land without due consideration of local communities. (FAO 2002: 8).

environmentally viable and friendly. As long as there is mismatch between what is promised in the first place and what is happening in practice, the government and investors will continue to experience resentment and hostility from people. This again would end-up in clashes. Indeed, these situations question how Tanzania would attain its overall goal of the National Land Policy, which states that:

> "The overall aim of national land policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources and to facilitate broad based social and economic development without upsetting or endangering ecological balance of the environment". (URT1997: 5).

These challenges make it difficult to attain the specific objectives of the National Land Policy such as (i) promoting an equitable distribution of, and access to land resources; (ii) to ensure that existing rights in land especially customary rights of smallholders (i.e. peasants and herdsmen who are the majority of population in the country) are recognized, clarified and secured in law; and (iii) to promote land resources from degradation for sustainable development. (URT 1997: 5).

Hence, any type of land acquisition which is facilitated by politicians, and government officials with little or no consent from local communities lack legitimacy. The sustainability of any investments in such land is questionable as enforceability of claimed rights on such land will be difficult in a long-run. Also it should be kept in mind that political will is not enough to justify land acquisition if the move is not accepted by the general public. Social legitimacy is particularly highly required when land is given to foreign investors. Therefore, there is a need to ensure that, the manner in which land is acquired from villagers is done in a fair and transparent way. This is best explained by scholars who have pointed out that "for something to qualify to be called property [for this case land] it must be recognized by the society. If this important element is missing, it is not a property". (VAN DEN BRINK, THOMAS, BINSWANGER, BRUCE and BYAMUGISHA, 2006: 4).

Furthermore, since livelihoods of many people in Tanzania continue to depend on land resources, any program that put villagers at risk of losing their land should be avoided. This is due to the fact that, Tanzania like other African countries has low level of industrialization to absorb influx of landless people who would be produced by such kind

of undertaking. Also, any land insecurity attributed to foreigners will not be accepted by the local people in the long term. It would be one of the sources of conflict, political instability, war and bloodshed which in turn will affect investor's projects. This is because, wherever arising problems in the community especially which is related to poverty it will remind people about the history of unfair land acquisition like what has happened in Namibia, Kenya, South Africa and Zimbabwe (VAN DEN BRINK, THOMAS, BINSWANGER and BYAMUGISHA 2006: 22; KAUMBI 2004: 99). In these countries people still have strong feelings about how and by whom land should be used.

Therefore, in conducting agri-business projects in Tanzania and Africa a priority should be given to the projects that do not involve acquisition of land that local communities use. Therefore, *out-growers models* are highly emphasized. This is because to a large extent poverty reduction in Africa will take place upon governments increase their investments in agriculture and rural infrastructure and not privatizing land to the investors for the sake of plantation. Also the lease period should be revised because 99 years is too much time. After giving insight on land management, the following section gives highlights on forest management in Tanzania.

4.6 Framework for Forest Management in Tanzania

4.6.1 Tanzania Forest Sector

Tanzania is one of the countries in Africa which is still having large areas of natural forest. Currently, it is estimated to have 35.3 million ha of forestland, out of which 16 million ha comprise reserve forests, 2 million ha are forests in national parks, and 17.3 million has (49 % of all forest lands) are unprotected forests in general land (URT 2009: 2). The forests types found in the country include miombo woodland, the acacia woodlands, coastal forest/woodland mosaic, mangrove forests, and mountain forests with closed canopy (BLOMLEY and IDDI 2009: 7). These forests are under three legal statuses namely forest reserves (mainly protective catchment forests), national parks, and none reserved forests.

In Tanzania forest resources play a crucial role in socio-economic development. They provide the direct use value such as firewood, herbal medicine, wild fruits, charcoal, poles, and timber. Apart from providing these direct use value forests provide also none use value including environmental services such as soil and water conservation, habitats for wild animals, harbouring biodiversity, climate amelioration, sink for carbon dioxide which causes climate change, and spiritual functions. Similarly, forestry sector offers employment to about 3 million people in Tanzania. These employments are offered through forest industries, government forest administration, and self-employment in forest related activities (BLOMLEY and IDDI 2009: 7).

In the years 2000 to 2010 the forest sector in Tanzania was estimated to contribute less than three percent to the Gross Domestic Product (table 2). However, in reality these figures are undervalued. This is because the value of goods and services provided by forests are hardly included in the national income accounting. For instance, in rural areas people consume a lot of forest products and organize different livelihood strategies based on forest resources without recording them. The failures to integrate different values of forest products and services in the national accountings tend to distort the contribution of the sector to the GDP.

Table 2: Contributions of Forestry and Hunting Activities to Gross Domestic Products (GDP) from 2000-2010 Mainland Tanzania

Year	Gross Domestic Product Estimates at Current Prices of Forestry and Hunting (TZS million)	Gross Domestic Product Estimates at Current Prices of Forestry and Hunting (approx.US$ million)	Annual Growth Rates of Gross Domestic Product of Forestry and Hunting Activities (%)	Shares of Gross Domestic Product at 2001 Prices of Forestry and Hunting Activities (%)
2000	219,000	137	4.8	2.7
2001	230,800	144	3.6	2.5
2002	249,374	156	3.3	2.4
2003	274,924	172	3.0	2.3
2004	324,527	203	2.7	2.3
2005	346,512	217	3.6	2.2
2006	388,094	243	4.6	2.2
2007	438,934	274	2.9	2.1
2008	504,774	315	3.4	2.0
2009	622,606	389	3.5	2.2
2010	784,484	490	4.1	2.4

Source: National Bureau of Statistics 2011 (modified).

Despite the benefits accrued from forests, Tanzania is still experiencing widespread forest degradation. At present the rate of forest degradation is estimated at 412,000 ha per year (URT 2009: 2). Such loss of forestland is attributed to firewood collection, charcoal making, pit-sawing, over-grazing, encroachment of agriculture to the forestlands (BLOMLEY and IDDI 2009: 7; SANDHÖVEL and PETERSEN 2001: 39), and increasing illegal,

unregulated and wasteful timber harvest and export especially in southern Tanzania (MILLEDGE and ELIBARIKI, 2004: 6). Likewise, unclear forest tenure and disputed land tenure are mentioned to cause forest degradation (ZAHABU, EID, KAJEMBE, MBWAMBO, MONGO, SANGEDA, MALIMBWI, KATANI, KASHAIGILI and LUOGA 2009; BLOMLEY and IDDI 2009: 6). The unclear forest tenure is especially seen in joint forest management *(JFM).* In this mode of forest management, villagers participate in conservation without clear ownership rights (AKIDA and BLOMLEY, Undated: V). Consequently, one of the outcome of unclear forest tenure is demotivation of villagers from fully engaging in forest management which exposes forests to further deforestation.

Another cause of forest degradation is disputed land tenure due to the definition given to the general land[15] in the LAND ACT NUMBER 4 of 1999. The definition includes unused and unoccupied lands to the general land. In some cases such lands fall under the village jurisdictions and consist of forest reserves. Here, it should be remembered that the in-charge of unused and unoccupied land is the Commissioner for Lands. In this way, the same resource is entrusted to the two authorizes at the same time (i.e. the Commissioner for Lands and the village councils). This brings confusion when it comes to making decision on forest resource management; as it touches interests of different stakeholders who might have incompatible goals and plans. Literature shows that, although forest degradation also takes place in reserve forests, degradation are much higher in general land which are commonly considered as open access (URT 2009: 2; BLOMLEY and IDDI 2009: 8). Therefore, by clarifying land tenure and particularly by having just two categories of land *i.e. the national lands* and *the village lands* the large forests could be saved from further degradation.

The management of forests in Tanzania is complicated by the government low capacity in terms of financial and human resource to monitor and manage them (URT 2001: 32). Also forest degradation is caused by widespread poverty, and lack of alternative off-farm activities in rural areas which make people to depend on forest resources (THE DIVISION OF ENVIRONMENT 2009: 22 - 25). As a result most livelihood strategies rely heavily on land resources which end-up in exerting more pressures on forest resources, leading to

[15] ***General Land:*** is defined to include all public land which is not reserved land or village land and includes un-occupied or unused village land. (LAND ACT NUMBER 4 of 1999: 24).

degradation of forest and other land resources. Consequently, the country is continuing to experience loss of valuable biodiversity; decline of forest products and services which led to drought and desertification; loss of water sources; and acceleration of soil erosion which all have far-reaching impacts on socio-economic development.

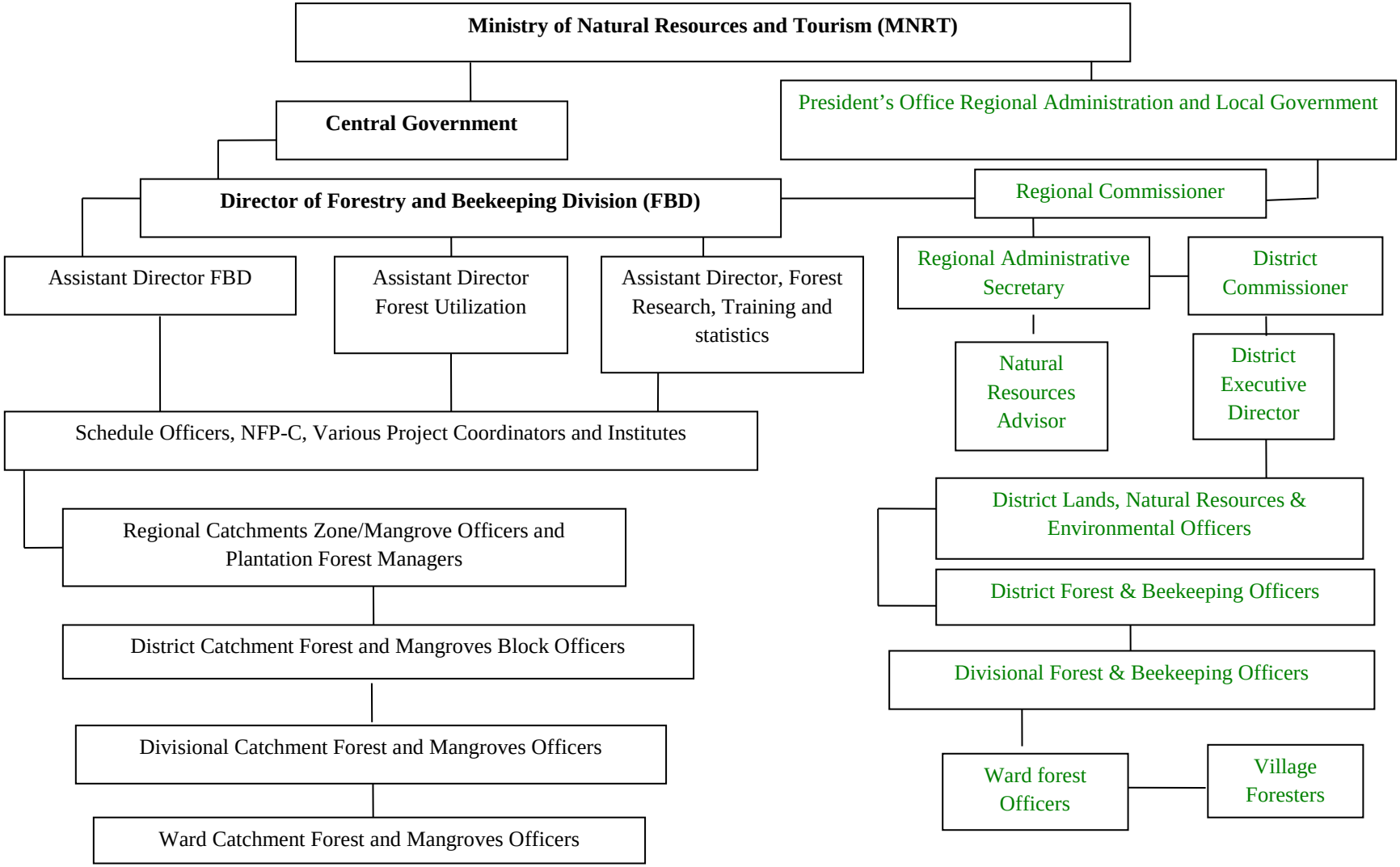
4.6.2 Tanzania Forest Administration

The mandate to administer forestry sector in Tanzania is entrusted to the Ministry of Natural Resources and Tourism *(MNRT).* The ministry is responsible to conserve natural and cultural resources and developing tourism sector in the country. These roles are performed under four sectoral divisions, namely: *the wildlife, antiquities, tourisms,* and *forestry and beekeeping divisions*. The forestry sector is under custodian of *forestry and beekeeping division (FBD)* which is required to oversee all forest matters in the country.

Tanzania use parallel system in managing its forest resources (URT 2001: 23). Some forests are managed direct by the central government while others are owned by the local government authorities through the regional commissioners and district councils. However, despite such division the role of designing and formulating forest policy and forest guidelines is done by the central government through the forestry and beekeeping division *(FBD).* According to part II section 5 of Forestry Act of 2002, the director of forestry is a chief advisor to the government on all matters pertaining forest management in the country. The director has direct link to the minister through the permanent secretary and is answerable to the minister of Natural Resources and Tourism *(MNRT).*

The Tanzania forestry administrative structure is summarized in figure 4. The forest management is structured into two main distinctive parts: the first part include all forests which is under the central government. Most national forest reserves are managed through this line. The second part consists of forests under the president's office, regional administration and local government. The latter represents decentralized forest administration where different stakeholders at different administrative levels are allowed to take part in forest conservation. Despite this categorization, both sections are under the umbrella of the *MNRT* and they operate in accordance to the guidelines and regulations provided by the director of *the forestry and beekeeping division (FBD).* In other words the director of *FBD* act as watchman, monitoring what is happening in both systems.

Figure 4: Administrative Structure of Forestry Sector in Tanzania



Source: United Republic of Tanzania (2001:32) modified.

4.6.3 Policy and Legal Framework Governing Forest Sector in Tanzania

In order to attain sustainable forest management, the government of Tanzania passed the National Forest Policy in 1998 which was followed by the Forest Act in 2002. In the same way, it draws the National Forest Program *(NFP)* as an instrument for implementing the National Forest Policy. The overall goal of Forest policy and *NFP* is to enhance the contribution of forest sector to the sustainable development of Tanzania, and the conservation and management of its natural resources for the benefit of the present and future generation (URT 1998: 14). In designing *NFP* macroeconomic and socio policy development related to land resources such as water, environment, energy and agriculture are taken into consideration (URT 2001: 2, 14). Apart from these initiatives, the government also recognizes that its institutions have low capability to manage huge forestland. Thus, it calls for other stakeholders to take part in forest management.

Consequently, the National Forest Policy (1998), Forest Act (2002), and the National Forest Program (2008) accord highly the *decentralization of forest management*[16] which is seen as a means to attain sustainable forest management. The acceptance of decentralization of forest management was motivated also by the widespread deforestation which many African countries including Tanzania experienced in 1970's and 1990's. Such forest degradation were mostly attributed to centralized forest management model (URT 2001: 20), which was inherited from colonial administration. During this period the management of forests and other natural resources was through establishment and expansions of protected forest areas for protections or preservation purposes. Thus, in many cases conservation went hand in hand with eviction of people from their land as they were considered as destroyers of natural resources. The overall results was hostility between conservationists and local people which ended-up with illegal harvesting of forest resources that culminated to depletion and degradation of resources (GOBEZE, BEKELE, LEMENIH and KASSA 2009: 348).

[16] ***Decentralization of Forest Management*** in Tanzania takes the form of ***Participatory Forestry Management*** **(PFM)** which refers to the processes and mechanisms that enable those people who have a direct stake in forest resources to be part of decision-making in all aspects of forest management, from managing resources; formulating and implementing institutional frameworks; and enjoying benefits associated with forest resources. In most cases PFM is manifested through involving local communities who live inside or adjacent to forests in managing state-owned or formerly state-owned forests or when villagers are given autonomy to manage forests that fall under their jurisdictions.

Therefore, it is thought that decentralization of forest management would promote forest management and poverty reduction especially in rural areas. Indeed, some experts comment that, "devolution of forest sector is advanced as a way to improve ownership, accountability and transparency" (SANDHÖVEL and PETERSEN 2001: 42). The will of the Tanzanian government to decentralize its forests management to other stakeholders is clearly stipulated in the National Forest Policy (1998) and in particular in policy mission statement number three which states that:

> "To enable participation of all stakeholders in forest management and conservation, joint management agreements *(JMA),* with appropriate user rights and benefits, will be established. The agreements will be between the central government, specialized executive agencies, private sector, or local governments, as appropriate in each case, and organized local communities or other organizations of people living adjacent to the forest". (URT 1998: 17).

Equally, part III section 16 of the Forest Act (2002) give provision and procedures on how to initiate joint management agreement with different stakeholders. Such provisions in forest policy and forest act have led to wide advocacy of forest decentralization in Tanzania. According to the forest act, such decentralization of forest sector is done through the Participatory Forest Management *(PFM)* which is of two types: the Community Based Forest Management *(CBFM)* and the Joint Forest Management *(JFM).* The former takes place in village land while the latter takes place on land reserved for forest management such as the national forest reserves *(NFR),* local government forest reserves *(LGFR)* and or private forest reserves *(PF).*

The *CBFM* is established either by the village councils or the district councils on land which fall under village jurisdiction. Such land is earmarked as village forest reserve. Normally the ownership and management responsibility of such reserves is fully delegated to the villagers. In turn villagers have all rights to undertake patrol, arresting and fine offenders, harvest timber and other forest products, and collecting and retaining all forest royalists (BLOMLEY 2006:4). On the other hand, *JFM* is done through signing of a joint management agreement between the village councils and the government representatives mainly district

council or *MNRT*. Normally such agreements divide forest management responsibility and returns between the forest owner and the forest adjacent communities (AKIDA and BLOMLEY, undated: 4).

Therefore, unlike *CBFM* where villagers enjoy full benefits of forests, in *JFM* villagers exercise partial rights regarding forest management and benefits accrued from them. Literature shows that even though several hundred villages have formulated *JFM* with the central or local government, only a limited number of these agreements have been signed by the government (BLOMLEY and IDDI 2009: 12-13). The reluctance to sign those agreements is due to the lack of legal mechanism that provides the basis for sharing of management costs and benefits between government and participating communities (BLOMLEY and IDDI 2009: 12-13).

Consequently, in Tanzania four categories of forest tenure are recognizes by the Forest Act (2002): *national forest reserves (NFR); village land forest reserves (VLFR), local authority forest reserves (LAFR),* and *private forests (PF).*

(i) National Forest Reserves (NFRs)

The *NFRs* include all gazetted forests owned and managed by the central government through the Forestry and Beekeeping Division *(FBD).* In most cases these forests are reserved for catchment or biodiversity conservation. Thus production of forest products is forbidden by *FBD* in these forests. Plantation forests which are managed for production of timber and other productive use are also under this category of forest tenure (BLOMLEY AND IDDI 2009: 7, AKIDA and BLOMLEY undated: 3). According to KILAHAMA (2009) the country has 600 central government forest reserves *(CGFR)* which are distributed throughout the country.

(ii) Village Land Forest Reserves (VLFRs)

According to the Forest Act (2002) village land forest reserves *(VLFRS)* encompasses all forests that fall under land which is within village's jurisdiction and are owned by village governments. The management of such forests is done through village environmental/forest committees who are responsible to the village council and village assembly. According to AKIDA and BLOMLEY (undated: 3), *VLFRs* are managed for different purposes including protection and production. Protection in *VLFRs* is especially seen when such forest contains much biodiversity. The typical examples of *VLFRs* which are managed for biodiversity and protection purposes are found in West Usambara. Normally the management approach for *VLFRs* is community based forest management *(CBFM).* This mode of forest management is possible as most villages in Tanzania are registered and have recognized authorities which can devise forest responsibilities among villagers.

It is also possible to find the *community forest reserves (CFR)* and *sacred and traditional forests (STFR*) within the jurisdiction of village land (AKIDA and BLOMLEY undated: 3). The major difference between these two categories of forests to the *VLFRs* is on their ownership and management. For instance, while all villagers are considered as owners of *VLFRs* it is not the case on *CFRs* and *STFRs*. This is because their management and ownership is delegated to a small group of people within the village community by village council. According to AKIDA and BLOMLEY (undated: 3) such groups of people can range from association of women, group of charcoal producers, or clan who use the forest for different purposes including firewood collection, grazing, burial sites, worship, sacred or religious purposes.

(iii) Local Authority Forest Reserves (LAFRs)

This category of forest includes all gazetted forests that are owned and managed by the district councils under the local governments. The *LAFRs* are supervised and managed by the district forest and beekeeping officers who are responsible to the district natural resource officers *(DNRO)* and the district executive directors *(DED).* At the regional level, there is natural resource advisors *(NRA)* who are chief advisors to the Regional Commissioners on all

matters related to natural resources in a particular region (see figure 4). According to KILAHAMA (2009), at present the country has 200 local authority forest reserves. Like the central government, the district councils also have low capacities to manage their forests hence they much rely on adjacent villages to these forests who participate in conservation though *JFM.*

(iv) Private Forests

Part IV of Forest Act (2002) gives a provision of a private person to grow private forest on their land for different purpose including, the commercial production of forest produce, water and soil conservation and or for the preservation of wildlife. For this ground therefore, private forests in Tanzania may include planted forestry, or natural forests on leasehold lands and traditional forest areas. Thus, such forests range from small woodlots, agroforestry on a farm, and large scale plantation. In West Usambara there are private natural forests which are owned by tea estates; notably is the Ambangulu Forest Reserve in Korogwe District under Ambangulu tea estate. The famous private plantations are Kilombero Valley Teak Plantation *(KVTP)* at Kilombero Valley in Morogoro Region, and Tanganyika Wattle Company *(TWC)* based in Njombe Region dealing in tanning extracting and timber products. Although all regions grow forest in their land, Iringa Region is well known for having woodlots and small private plantation in Tanzania.

5 Socio-economic and Demographic Characteristics of Study Population

The focus of this chapter is to analyze and discuss the demographic situation of West Usambara community. It begins by discussing overall information on community social infrastructure in this area. It proceeds by explaining demographic characteristics of the targeted population where information on age, gender, marital status, family size, education, and ethnicity of respondents are analyzed and explained. The chapter emphasizes on migration, in particular the patterns of migration in West Usambara are presented. In addition, *push* and *pull factors* for migration in the context of West Usambara have been analyzed and discussed accordingly. This is done also to see the extent to which such movements are influenced by the availability or scarcity of livelihood resources and livelihoods strategies. The chapter ends-up by giving opinions' of the heads of households on how they perceive emigrants especially youth who are migrating to big cities such as Dar es Salaam.

5.1 Community Social Infrastructure

All surveyed villages in West Usambara are organized into village government's administration, thus, they are all registered with the Prime Minister Office, Regional Administration and Local Government. A total population of 29,506 inhabitants was recorded from 10 villages which were surveyed. On average a village had a population of about 2,950 people. Although nearly all villages are served with earth roads, or roads which are simply covered by gravel coat, all are accessible throughout the year. Just few villages on the way to Lushoto town from Mombo town are connected with tarmac road. The mountainous natures of West Usambara have made road construction cumbersome. Many roads have steep and sharp corners which increase the risk of accident especially for naive and inexperienced drivers. The risk of accidents is higher during the rain seasons where many roads are slippery.

Almost all villages have basic social services such as primary school, village offices, and religious organization. At least every ward has one secondary school which serves the surrounding villages. Most of these secondary schools are new and are facing shortages of teachers and other facilities such as desks, books, teacher's houses and laboratories for science

subjects. These limitations compromise the quality of education provided by the schools. In term of health care, villagers in West Usambara obtain health services on two hospitals; one owned by the government and another by the Lutheran Church. Together with these hospitals, there are also seven health centers and 45 dispensaries.

With regard to domestic water supply, the West Usambara villages are relatively better off compared to other villages in other districts in Tanga Region such as Handeni, and Kilindi Districts. The popular water sources are gravity scheme and shallow wells which are facilitated by mountainous nature of the area. The tropical rain forests have formed catchments to the surrounding villages; hence, made possible the formation of Spring Rivers, and other small tributaries that provide water for villagers. Mountainous nature allows water to flow down hills as surface streams and springs which in turn are taped for different uses.

5.2 Demographic Characteristics and Income

5.2.1 Marital Status, Age, and Family Size in West Usambara

In total 254 heads of households were randomly sampled for further investigation. About 203 (79.9 %) households were headed by men, and 51 (20.1 %) were headed by women. In the same way 87.8 % respondents were married while singles, divorce, separated, and widow/widower were few (table 3). The low number of separation shows that families are intact in this area. An overall, the mean age of the respondents was 46.3 years which reflects that West Usambara is dominated by younger population. On the other hand, the mean age difference between sexes was 8.7 years which was statistically significant (p=0.000). This again shows that many males prefer to get married to females who are relatively younger than them.

The mean family size was 7 people per household which is much higher and it far outstrips that of Tanga Region and Tanzania as a whole which is 4.7 and 4.9 respectively (URT 2012: 8; 43). Consequently, big family size has contributed to higher dependence ratio among working

population and high population density in West Usambara. The problem is complicated by the low performance of livelihood strategies in this area.

Table 3: Age Group, Sex, and Marital Status of the respondents in West Usambara

Age Group	**Freq**	**%**
15-24	10	3.9
25-34	53	20.9
35-44	63	24.8
45-54	52	20.5
55+	76	29.9
Sex	**Freq**	**%**
Male	203	79.9
Female	51	20.1
Marital Status	**Freq**	**%**
Single	7	2.8
Married	223	87.8
Divorced	9	3.5
Separated	4	1.6
Widow/widower	11	4.3

Source: Own Survey Data (2012).

5.2.2 Ethnicity in West Usambara

The *Sambaa* (Shambaa) is the native and dominant ethnic group in West Usambara. Out of 254 respondents, 83.1 % were *Sambaa,* 7.1 % *Pare* and 4.7 % were *Mbughu.* Other ethnic groups were represented by 5.1 % and include ethnic groups such as *Zigua, Digo, Chagga, Haya,* and *Kindu.* Most of them are working as civil servants. Hence, although some tribes like *Pare* and *Mbughu* migrated much earlier to this area, but they have not managed to influence much the percentage of population in terms of ethnic composition.

Indeed, the percentage of the *Shambaa* is even much higher now than it was reported before by some studies. In 1980, *Shambaa* as one ethnic group in West Usambara formed 78 % of the population (EGGER 1980 as cited in JAMBIYA 1998: 1). In recent years some towns like Lushoto have been receiving other ethnic groups who are coming to work with various institutions. Such institutions include the Sebastian Kolowa Memorial University *(SEKOMU),* the Institute of Judicial Administration *(IJA),* tourist hotels and health institutions. In particular, *SEKOMU* has attracted academicians from other places in Tanzania and outside (DITTMANN 2008: 10 - 11). However, these migrants remain in Lushoto town. Hence, apart from *Mbughu* and *Pare* that have inhabited the area for quite some time the contribution of other ethnic groups in terms of ethnicity composition has remain low.

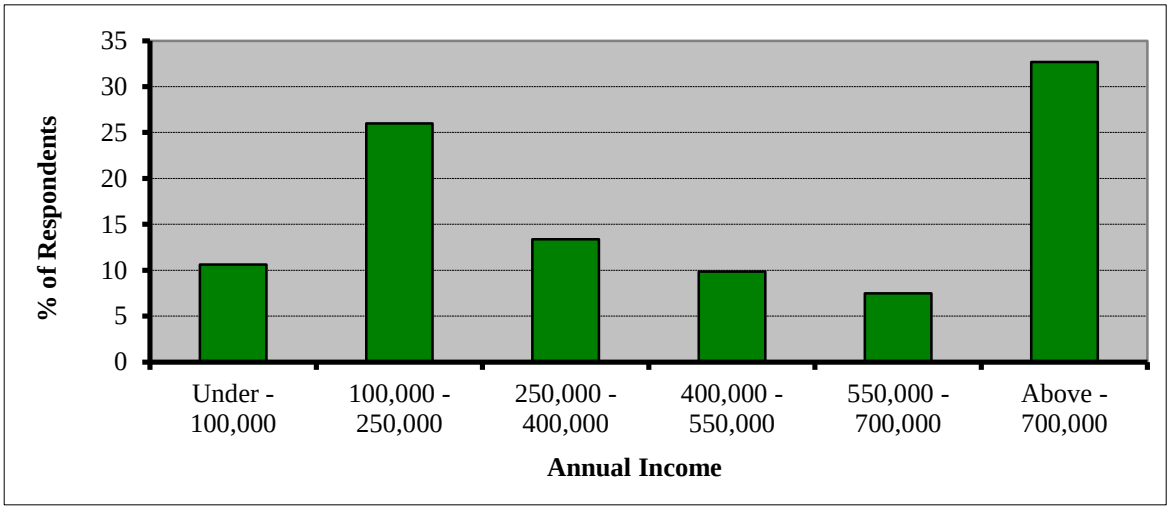
5.2.3 Literacy Level in West Usambara

The literacy level in West Usambara is low. Out of 254 respondents, only two respondents had a university education. About 208 (81.9 %), 3 (1.2 %) and 4 (1.6 %) respondents had primary education, secondary and college education respectively. Thus, a large segment of population has primary education - which is the lowest level of education in Tanzania. About 36 (14.2 %) respondents had no any formal education. This indicates that the illiteracy level among adults in West Usambara is relatively higher than that of Tanzania which was estimated at 72.9 % in 2009.

5.2.4 Income Level in West Usambara

The level of annual income in West Usambara is low. The majority of households obtain below TZS 700,000.00 (approx. US$ 438) per year which is relatively smaller to the national per capita income which is TZS 881,366 (approx. US$ 551). As is shown in figure 5 below only 33 % of the respondents had their annual incomes above TZS 700,000, the rest are earning smaller amounts. Although, income index is discredited in measuring accurately the economic status of the community especially in rural areas, it gives some indicatives on what is happening in the community in terms of economic performance. Low incomes are mainly caused by low performance of livelihood strategies conducted in the area as it will be discussed later in section.

Figure 5: Estimated Annual Income in West Usambara (TZS) [17]



Source: Own Survey Data (2012).

5.3 Migration Trends

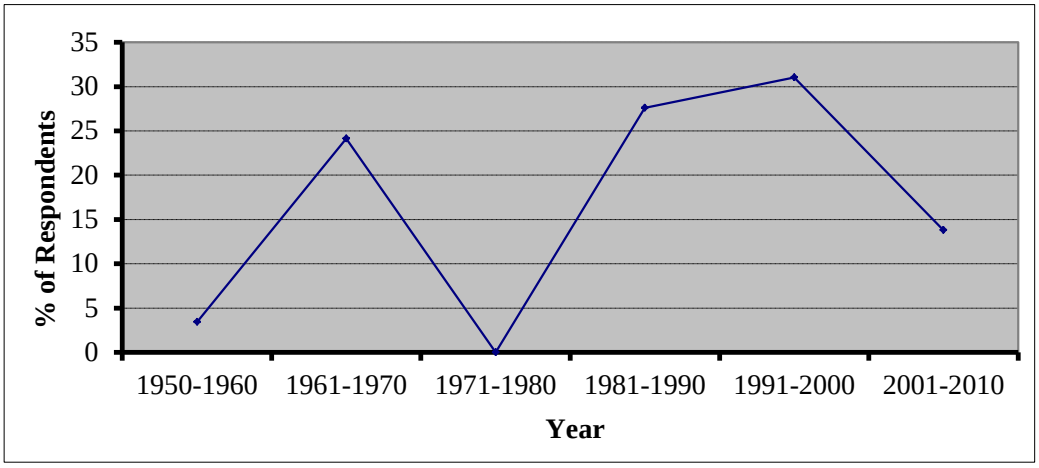
The West Usambara is experiencing a negative migration trend. About 223 (89 %) respondents reported to be born in their respective villages, and 28 (11 %) respondents were immigrants. However, 10 (93 %) of these immigrants were from villages within Usambara,

[17] ***During research time One US$ was equivalent to 1,600 TZS.***

while 7 % of the respondents had migrated to West Usambara from other areas in Tanzania. This indicates that, in-migration is very low in the area. Thus, population movements are largely dominated by inter-village migrations. Consequently, high population density which is experienced in this area is mainly caused by natural population increase rather than immigration. More than two third of migrants stated to migrated to their respective village due to marriage, and about one third of the migrants the reason was due to agricultural land and lumbering activities. The lumbering was a booming economic activity in West Usambara in the past. Many of the migrants have stayed in the villages for a long period as the mean years since the migrants arrived in the villages is 27 years.

In-migration: the West Usambara has experienced a fluctuation trend in immigration since 1950s. The area received many people from outside in 1950s. The number of immigrants steadily declined in the early 1970s and rose again in 1980s. From then forward the area has been experiencing a diminishing immigration trends (figure 6). Formal and informal discussion with local people showed that, Usambara was one of the areas in Tanzania where the economy was booming due to tea estates and lumbering activities. Tea estates used to employ significant number of people from within and from outside as casual laborers. The collapse of tea farms and the underperformance of the remaining have substantially contributed to economic stagnation in the area and that of Tanga Region as a whole.

Figure 6: Immigration Trend From 1950-2011 in West Usambara

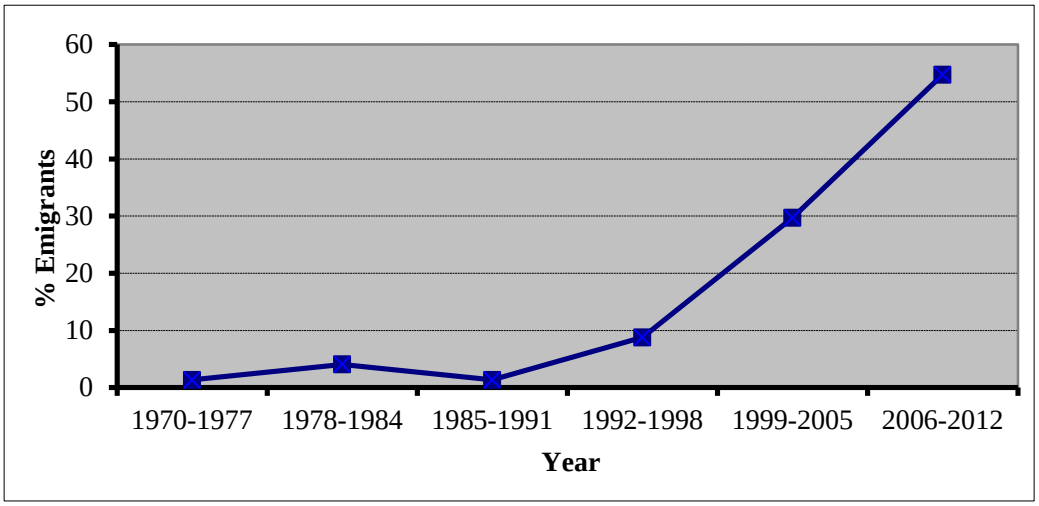


Source: Own Survey Data (2012).

Out-migration: While in the one hand, the West Usambara experiences a low number of in-migration, on the other hand, the number of out-migration is higher. About 110 (43.3 %) respondents reported to have at least one family member who has migrated out. Out-migration is especially higher among large size households. Families headed by a head of household of 35 years old and above had at least one or more family members who had migrated to seek employment elsewhere.

The number of emigrants was low in 1970s and early 1980s in West Usambara. It is during this period when the economy was booming due to tea and sisal estates. From 1985 onward emigration trend has significantly risen (figure 7). The overall result of high out-migration is negative net migration which contributes to a loss of energetic working populations who could be used in productive activities.

Figure 7: Trend of Out-migration in West Usambara

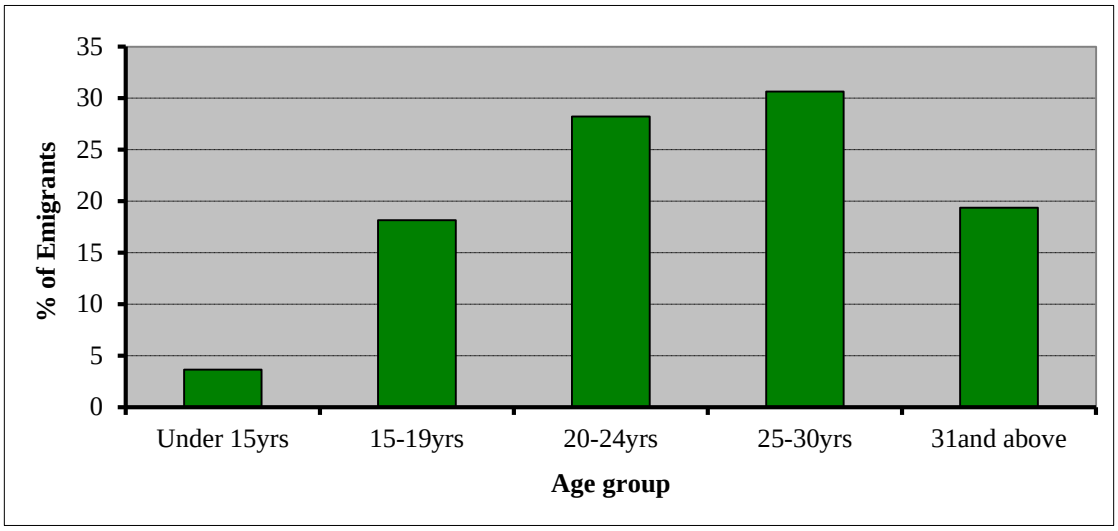


Source: Own Survey Data (2012).

Although all age categories migrate, the most vulnerable category is the youth. The out-migrations are higher among age group 15-19; 20-24; and 25-30 (figure 8). Lower numbers of out-migration among youngsters (under15years) is because they are under the control of parents and are attending primary education. But they are potential emigrants upon completion of standard seventh grade which is the end of basic primary education in Tanzania. Migration

is thus age selective. And since it is much dominated by youth rather than adults the pressure on land resources are still there.

Figure 8: Migration by Age Group



Source: Own Survey Data (2012).

The favorite cities for most of the emigrants are Dar es Salaam, Arusha, and Tanga; with Dar es Salaam receiving a significant number of emigrants. About 63.2 % and 41.2 % of male and female respectively migrated to Dar es Salaam. The migration within the Tanga Region was about 10 % and 22 % for male and female respectively. The rest 26.6 % male and 37.3 % female migrated to other regions in Tanzania and outside the country like Mombasa (Kenya). The people in West Usambara find it easier to go to Mombasa (Kenya) since it is much closer to the Tanga Region**.** The predominance of a large proportion of people migrating to Dar es Salaam and Arusha from West Usambara accords the general theory of migration by LEE (1966: 54). Lee stated that migration tends to take place largely within well-defined streams. Meaning that, it is always specific both in terms of origin and destination. In this case therefore, migrants from West Usambara find their way to cities of Dar es Salaam and Arusha.

Likewise, the big number of females who migrate within Tanga Region suggests that the majority of them got married within the region. While male prefer to migrate to other regions of Tanzania to explore economic opportunities. These findings confirm one of the ‘migration

laws' by RAVENSTEIN, who observed the predominance of females among short distance-migrants (RAVENSTEIN 1885 as cited in LEE 1966: 48); hence [concluding] that, females prefer to migrate in places which are much closer to their place of origin than their male counterpart. Also it suggests that females are more attached to their families compared to the males and their movements are mostly controlled by parents in many cases than males.

5.3.1 Reasons for High Out-Migration in West Usambara

Multiple factors are responsible for higher out-migration in West Usambara. Lack of job opportunities and other economic ventures are the main reasons that motivate the majority of people to migrate. The villages' leaders pointed out that, apart from agriculture which is poorly performing, villages have no alternative economic opportunities for retaining youth from migration. They added that, the situation is compounded by the scarcity of arable land and droughts that all have made their life circumstance much harder. The study by JAMBIYA (1998: 8) also confirmed this when it pointed out that, "a bleak in economic outlook in many villages of West Usambara motivate people to migrate". Therefore, youth see the best option is to migrate to big cities where they believe to have better life circumstances. In other words, the poor life circumstances in West Usambara villages are the major reason which motivates people to move away. The findings on high-out migration in West Usambara corresponds those by 2002 and 2012 Population and Housing Census; which indicated the Tanga Region to had high out-migration (URT 2012).

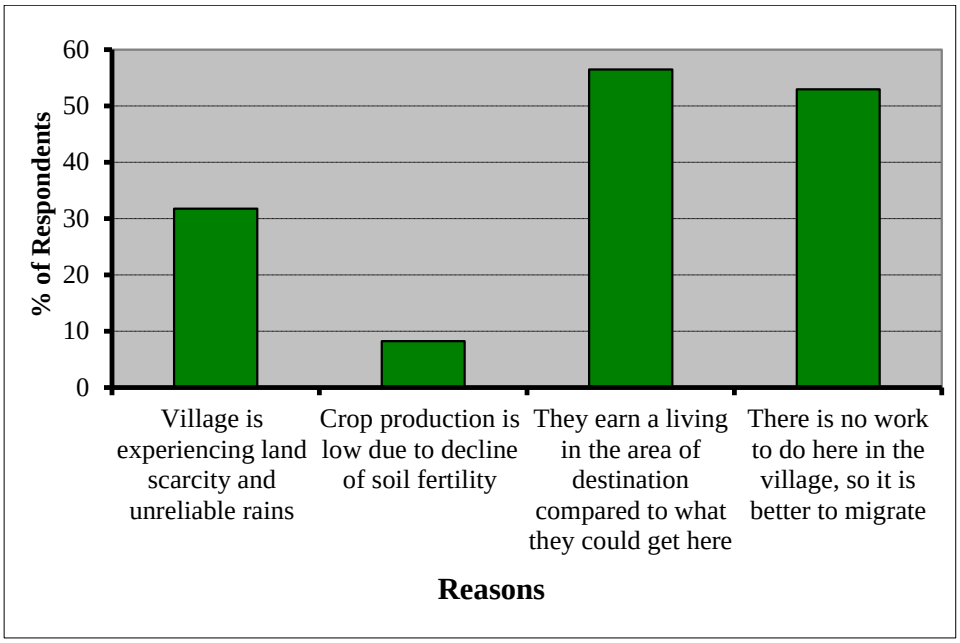
The lack of economic opportunities mentioned by village leaders corresponds with the information from the heads of households. At least every household had two or three people who were jobless. And very few people had been employed by others within their respective villages. In responding to the question *'does your household member get employed by others in this village?* Only 7 (2.8 %) respondents out of 254 reported to have family members who had been employed by others. Such people were working as casual laborers. This is very worse situation in terms of economic growth because, it adversely affect the multiply effect which is generated when people employ each other. The overall results of lack of employment opportunities are higher out-migration. Almost all villages are experiencing similar situations

in terms of out-migration and the number of jobless people in the family. The situation is worse in the villages of Mpanga, Shashui, Funta and Balangai which experience slightly higher number of out-migration than other villages. Similarly, many respondents in Shashui, Funta, Baga, Mpanga, and Magamba villages had many family members who were jobless.

5.3.2 Parents Opinion on Emigration

When parents were asked their views on how they perceive the high out-migration situation, the majority argued that, they have no good reasons to restrict their family members from migrating so longer there are no better options in villages. About 217 (85.5 %) respondents support youth to migrate and just one sixth (14.5 %) were disappointed. In responding to the question *'why you think the decisions for youth to migrate is good?'* Land scarcity, low crop production, and lack of job within their respective villages were mentioned. Also, a great number of respondents believe that migrants are earning a living in destination areas compared to what they get in villages of origin (figure 9).

Figure 9: Parents Reasons for Supporting Out-Migration in West Usambara



Source: Own Survey Data (2012).

Consequently, the economic motives and scarcities in *livelihood resources* like arable land dominate decisions why people support out-migration in West Usambara. A close look at reasons given to support out-migration suggests that, although they vary, all fit perfectly to *'**push-pull'*** factors as commonly described in migration studies. In migration, ***'push factors'*** are used in referring to all reasons that ***'push'*** one to leave a place. Such factors could be regarded as disadvantages existing at the place of origin (e.g. lack of economic employment, harsh environmental conditions like drought and other natural hazards, famine, lack of education services, lack of religious and political freedom etc.). These and alike factors discourages people from remaining in an area of origin.

On the other hand, ***'pull factors'*** comprises factors that are considered as advantages existing at the area of destination. Thus they attract one to move over there (e.g. economic opportunities, good climatic condition, education opportunities, political and religious freedom etc.). In West Usambara ***'push factors'*** include among others, the scarcity of arable land, unreliable rainfall, low crop production due to the decline of soil fertility, and lack of economic activities in respective villages (figure 9). These factors demotivate people especially youth to remain in their respective villages while at the same time they discourage in-migration.

In addition, the perception that emigrant earns a living in the area of destination attract ***"pull"*** them to move towards those areas. As the majority of respondents think that the living conditions are much better in cities than in respective villages youth are motivated to move away. The similar expressions were given by villagers' leaders by commenting that "if people cannot make in their villages what then they should wait for?" The implications of these views are high out-migration which will even continue more in West Usambara. This is because both heads of households and village leaders do not see alternative ways to address the situation. For them migration is a panacea. Yet, the question remains: *'Are there better life circumstances in destination areas such as Dar es Salaam or Arusha where these migrants go?* Person observation, experience and research show that, major cities of Tanzania have low capacity to offer employment to migrants. This is also reflected by the low amount of

remittances sent by migrants to West Usambara which on average was TZS 281,730 (approx. US$ 176) per year.

It is also better to caution that while migration has some advantages it has its own challenges. Among advantages of migration are: acting as adaptation mechanisms for adjusting to hash condition which one might be facing in the area of origin; a means of gaining better economic opportunities which are absent at the area of origin; cultural freedoms such as religious and academic freedom; source of innovation, and as a means to escape from human and natural disasters. A case in point is reported in Bolivia, where recent research shows that rural-urban migration is more advantageous for economic development (ANDERSEN 2012: 12).

However, these advantages of migration would largely depend on the area of destinations. In particular, their ability to offer employment opportunities and other basic social services such as housing, water services, health facilities, transport and security. Hence, if the areas of destination are poorly placed in providing those services they cannot attain the expected expectations of migrants. This is true in the case of Dar es Salaam, Arusha and other cities in Tanzania. Research shows that unemployment is higher in urban areas than rural areas in Tanzania, though the latter are more prone to underemployment (URT 2011: 24). The same research adds that, the unemployment situation is critical in Dar es Salaam with unemployment rate of 31.5 %.

The situation is complicated by the fact that Dar es Salaam is highly dominated by youth than other cities in Tanzania. The youth population (15-35 years) as a percentage of total population in Dar es Salaam is 46.8 % and about one in every four residents is youth (URT 2012: 38, 41). In the same way, the Dar es Salaam city authority is overtaxed in terms of offering services such as water, transportation, waste management, electricity and health services. This is because the city grows faster than the ability of authority to offer social services (START 2011: 33 - 40). Consequently, Dar es Salaam is experiencing an increased pressure on few resources and services available that are not enough even to accommodate available population, let alone migrants.

Therefore, based on these arguments it is undesirable to support population movement in the direction of Dar es Salaam. If one looks of the situation in West Usambara in terms of economic opportunities and the situation of major cities in Tanzania, it is evident that, neither at the place of origin nor at the destination areas there is hope for earning higher income. Therefore, although it is difficult to stop rural-urban migration or completely discredit its role, there are possibilities to check for it for the sake of both migrants and cities as it will be recommended latter by this research.

5.4 Summary of major Findings

The analysis has revealed that:

- The social infrastructure in West Usambara is relatively favorable based on standards of Tanzanian villages and Africa in general. However, demographic situations of this area pose challenges. Particularly, the challenge is seen in average family size which is higher than that of Tanga Region and Tanzania as whole. This has increased burden among the working population. The situation is complicated by existence of many jobless people in this area.

- The adult illiteracy level in West Usambara is relatively higher than that of Tanzania in general. This has adverse impacts in socio-economic development since it impairs their capabilities to participate fully in socio-economic development. This is especially in this era of science and technology where basic education is important for one to partake in socio-economic development. In many cases the majority of people who have no formal education they do not know to read and to write that limit their capacity to participate in socio-economic development.

- Furthermore, West Usambara has experienced a fluctuation in immigration since 1950s. It received many people from outside in 1950s, the number of immigrants steadily declined in the early 1970s. And since 1980s the area has been experiencing a diminishing immigration trends.

- On the other hand, the area is experiencing higher out-migration. Increasing in out-migration started in 1980s. The number of emigrants was low in 1970s and early 1980s, and from 1985 onward the number has significantly risen. Also emigration trend is experienced in all villages of West Usambara. Thus, the higher population density which the area is experiencing is mainly caused by natural population increase. This is appreciated by average family size which is higher.

- The major causes of out-migration are lack of *livelihood resources* such as arable land which has led to low employment opportunities due to lack of *livelihood*

strategies. The situation is complicated by drought condition. Although, all age groups are susceptible to migration, the most vulnerable age groups are 15-19; 20-24 and 25-30 both male and female. Thus, the area is now experiencing a negative migration trends which contribute to the loss of energetic labor force.

- Both parents and villages' leaders are in support of emigration. They argue that there are no good reasons to restrict their family members from migrating so long there is no better option in their villages to make a living.

6 Land Shortage, Rural Livelihoods, and Wealth Accumulation in West Usambara

This chapter addresses the first objective of the research i.e. investigating how the size and quality of land under households affect livelihood strategies (e.g. farming activities, livestock keeping, and other-income generating activities) and wealth accumulation (i.e. household amenities, domestic animals, woodlots) in West Usambara. It starts by presenting the social structure governing land issues in West Usambara. Then it continues with explaining existing situation on land where issues such as land value, and land availability for agriculture and other activities are analyzed and discussed.

Moreover, factors that have contributed to land scarcity in West Usambara are explained. Furthermore, attention is also given to different livelihood strategies that are conducted in this area and the challenges they face. Thus, livelihood activities like, crop cultivation, livestock keeping, and other-income generating activities are analyzed and presented accordingly. In addition, issues on credit facilities, and social networks and how they complement livelihood activities are explored. The chapter closes by discussing how *livelihood strategies* conducted in this area contribute to household's income, wealth accumulation, food security, and the overall economy.

6.1 Land Tenure and availability of Agricultural Land in West Usambara

- ***Land Tenure in West Usambara***

West Usambaras villages have no village land for allocating to the villagers. Each family has its own land which has inherited or bought, and is passed from one generation to another within the family. Thus land rights in crop fields and residential areas belong to individuals who have inherited or bought it. Such situation has contributed to land fragmentation which now is being complicated by high population increase. Land fragmentation is widespread; it is easily seen in small wetlands popularly called ***'Vitivos'***. In such land it is difficult to realize if different plots belongs to different people as some of the plots are even less than 25 m^2.

There is very little possibility of getting land through other means such as clearance of forest or bush land, and gift from friends. Such means were common in the past when land was abundant. However, while these means of getting access to land are not common in West Usambara they are still relevant in other part in Tanzania. This suggests that, whenever land becomes scarce people place high value on it leading to land commodification and snuffing other means of getting access to land such as gift and free felling of forestland (table 4).

Traditionally in West Usambara land was considered as a free commodity and every one had right to use it without paying any fee. The headsman elder as an authority to allocate land to the members of the community was only concerned with land which was inhabited in some way. Otherwise the common method of obtaining land was through first clearance of forest or bush land, and inheritances which did not also need consent of the authority. Land holding was simply divided between heirs both male and female and inheritance enjoyed full rights on such lands and could dispose it to any one at any time (table 5). An increase in land scarcities due to population increase and other socio-economic changes have transformed to some extent the customary arrangements that used to govern land issues in West Usambara. For instance, while marking boundaries on fields and paying rents by tenants to the landlord were not common in the past they are now practiced in West Usambaras.

Table 4: Ways of Accessing Land in West Usambara

Way	Frequency	Percentages
Through buying	133	52.4
Through inheritance	209	82.3
Through village allocation	4	1.6
Through clearing forest	2	0.8
Gift from friend or relative	3	1.2
Through renting	0	0.0

Source: Own Survey Data (2012).

These findings coincides those by CHILESHE at St. Joseph village and those by JOY in Luapula Province both in Zambia. In these two villages it is no longer easy to get access to arable land through first clearance of forest and the registered ownership patterns are

becoming prevalent (CHILESHE 2005: 223; JOY 1993: 126). This shows that land scarcities are steadily increasing in African where for many years people perceive to have abundant land.

Table 5: Land Tenure Characteristics of the *Shambaa* 1884-1970s

A: Method of acquiring land	**Means**
Authority for allocation	Headman Elders
Fee paid for allocation?	No
Recipient of fee	No
Usufructuary (right to use land) or proprietary rights on land?	Semi Proprietary
Land allocated to outsiders?	Yes
B:Uninhabited land	
Permission of authority needed for use?	No
Boundaries marked?	No
Can landlord estate be acquired?	Rarely
C: Inhabited land	
Permission of authority needed for use?	Yes
Boundaries marked?	yes
Limitation on size of holding?	Yes
D: Inheritance issues	
Consent of authority needed before inheriting land?	No
Is holding divided between hairs?	Yes
Can female inherit land?	Yes
What kind of rights has heirs?	Proprietary
Can landlord estate be inherited if it exists?	Yes
E: By Agreements (Sale)	
Sale of all types of land?	Yes
Sale to outsiders allowed?	Yes
Has a family pre-emptive right to buy land?	No
Complete holding sold or single fields only?	Fields
F: Lease or loan	
Complete holding or single fields?	Fields
Rent paid by tenant?	No
Can tenant be evicted any time?	Yes

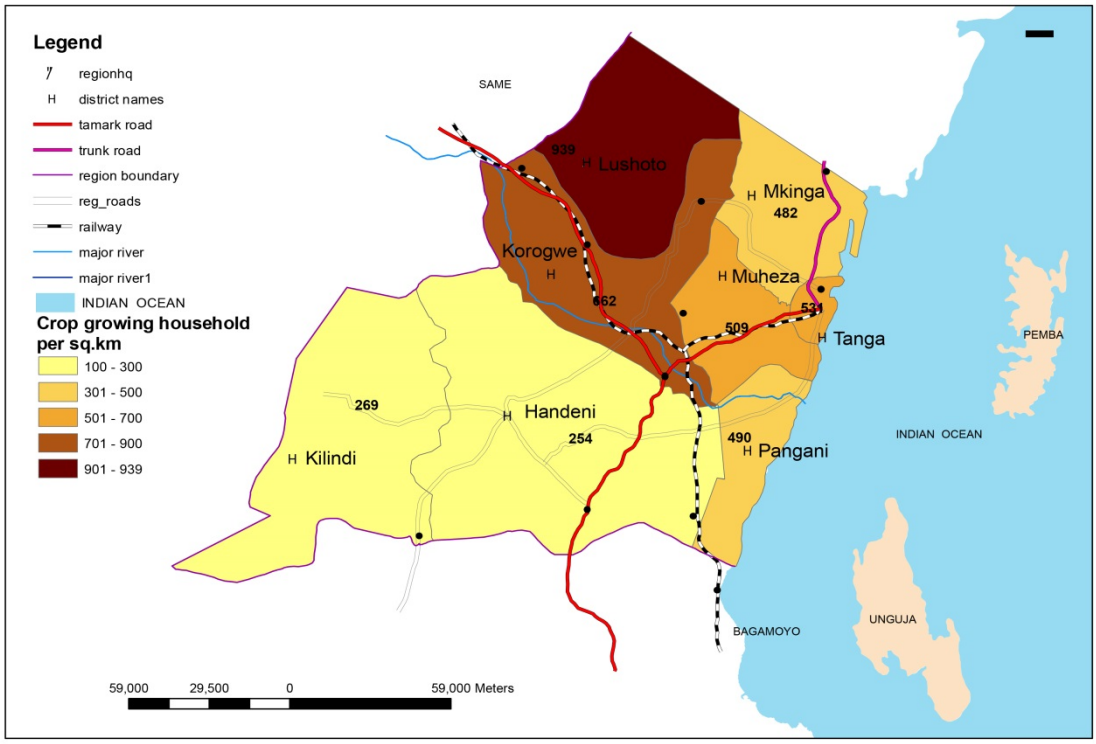
Source: (modified from PITBLADO 1970).

- ***Availability of Agricultural Land in West Usambara***

According to the Lushoto Agricultural Office, the district has 190,000 hectares of land which are available for agriculture. However, such amount is steadily decreasing due to overpopulation which diverts it to other land use such as human settlements. Hence, the number of crop growing households per Sq. Km in West Usambara is very high when compared to other areas in Tanga Region (see map 5). The situation is complicated because almost all *livelihoods groups* along the ecological gradients of West Usambara depend on land. Such *livelihoods groups* include: hunters and gathers, pastoralists, subsistence cultivators, partial substance cultivators, commercial farmers, agro-pastoralists, and urban/pre-urban livelihoods (MASCARENHAS 2000: 24). Hence, just like other places in Tanzania agriculture is a prime economic activity in West Usambara hence making land an important issue.

The research showed that nearly all respondents 249 (98 %) were possessing agricultural land and only 5 (2.0 %) had no land. However, such lands are very small to cater for the agricultural needs for the households. On average each household owned four plots which total size were about four acres (equivalent to 1 hectare). The household with biggest land possessed 12 hectares. There was positive correlation between the number of plots one owned and the size of land owned. Meaning that the more the number of plots one own the larger the size of land owned by that household. It should also be remembered that, although one hectare is enough to produce considerable agricultural yields if properly used it is not the case in West Usambara**.** This is because most of the fields have been affected by soil erosion as are located in a very steep terrain and in uplands hence many are not productive. Based on this ground therefore, the arable land available for the households in West Usambara is less than one hectare. The situation is complicated as such land is not all together due to land fragmentation.

Map 5: Number of Crop Growing Household per Sq. Km by Districts in Tanga Region



Source: Modified from URT (2007/2008:14).

- ***Land Distribution between Wealth Categories, Age Groups and Villages in West Usambara***

The research showed significant disparity in terms of land size owned by households between different wealth categories (p-value 0.001). However, such differences could not be compared with what is commonly seen in other regions in Tanzania. The mean land size owned by richest wealth category was 5.8 acre while lower wealth category owned 3.4 acre. Hence makes the different of 2.4 acres (table 6). Consequently, although well-off households could expand their land size through buying, they have not managed to do so as it would be expected.

Such failure is evidence that, though about 50 % of respondents reported to obtained access to land through buying at present many people are not ready to sell their land. Selling land in West Usambara means a lot, and one should get prepared to become landless, something which many cannot afford. This is different to what is usually seen in other villages of Tanzania where it is possible to find well-off people owning up to 200 hectares. In other places of Tanzania observation and experience shows that, the rich people, elites, and politicians have even much large size of land than that. The current tendency for many is to speculate on land something that has started to accelerate land grabbing. Land speculation is now much easy following new changes that have been introduced in land laws that allow selling undeveloped land. If this situation is not controlled it would create more tension over land in the near future especially in rural areas.

Table 6: Land Distribution in Acres with specific Wealth Status

Wealth Status	Mean	95% CI		Min	Max	P-Value
		Lower	Upper			
Lower wealth	3.4	2.8	4.0	0.25	20	
Middle wealth	4.2	3.3	5.1	0.25	30	0.001
Higher wealth	5.8	4.6	7.0	0.50	30	

Source: Own Survey Data (2012).

Furthermore, none of the surveyed villages had village land. This is different from other villages of Tanzania which own land, and can allocate it to the villagers and outsiders who are in need. About 88 % of arable land in Tanzania is found in rural areas and mostly under village administrations. This enables respective village authorities to plan different social services especially that require large quantity of land. Villages leaders in West Usambara supposed that, ‘absence of village land limits their capacity to assist poor people and in undertaking village plans that requires large land size’. Also, there is slight disparity in terms of land size distribution between the villages of West Usambara (p-value 0.2790) (table 7).

This again indicates that the problem of land is widespread in all villages and it is much worse in villages of Magamba, Bungoi and Shashui.

Table 7: Land Distribution in Acres by Villages

Village	Mean (in acre)	95% CI		Min	Max	P-Value
		Lower	Upper			
Mziasaa	5.8	4.3	7.3	2.00	15.0	
Baga	5.0	2.7	7.2	1.00	30.0	
Funta	4.6	2.8	6.4	1.20	16.0	
Balangai	4.4	2.5	6.2	1.00	17.0	
Bungoi	3.7	2.7	4.7	0.25	8.5	0.2790
Shashui	3.7	2.9	4.4	0.50	9.0	
Kihitu	6.6	2.5	10.7	0.50	30.0	
Goka	4.8	3.1	6.5	0.50	15.0	
Mpanga	4.0	2.5	5.4	0.25	20.0	
Magamba	3.5	2.3	4.7	0.25	15.0	

Source: Own Survey Data (2012).

The disparities of size of land also exist between different age groups. On average the size of land owned by age group 15-24; 25-34; 35-44; 45-54 and 55+ was 3.2; 4.0; 4.0; 4.8 and 5.0 acres respectively. Consequently, 45-54, and 55+ age group categories relatively enjoy large share of land than others. This is because the youth are largely depending on elders to acquire land through inheritance.

6.2 Land Value in West Usambara

The West Usambara is one of the areas in Tanzania where agricultural land is very expensive and people place much value on it. The mean estimated value of land owned by households (estimated at 4 acres) is TZS 6,278,680 (approx. US$ 4,017) while the mean estimated value of an acre is TZS 1,569,670 (approx. US$ 981). It was revealed that many people are not ready to sell their land, and if one has to sell it prior consultation to relatives and other members of the family is necessary. In other words, one has to justify the reasons for his decision, and get an approval from family members. After such consultation selling contract is signed before village government leaders and witnesses. This is quite different to what used to characterize land tenure among *Shambaa* as already discussed in section 6.1.

The higher value of land was also manifested in land renting. While such practice is less common in other rural areas in Tanzania, in West Usambara 86 (34 %) respondents reported to rent land especially in lowlands areas popularly called ***'Vitivos'***. Such lands are fertile and contain enough water; hence are seen as last hope especially during drought year. For those who find difficulties in cultivating them productively due to lack of capital or other reasons, instead of giving them away they enter in agreement with one in need. Such agreements in most cases are in kind or renting which sometime involves also dividing equally the agricultural produce or revenue after selling crops.

In Tanzania, similar practice was common in the past especially in customary landlord tenure *'feudal lord system'* in Kagera Region, and districts of Pare, Moshi, Rungwe and Ukerewe. The system was abolished in 1965 by the then Tanganyika government which was determined to build a socialist community. During this period the *feudal lord* system was considered as unjust and exploitative one. The re-emergence of this practice which is similar to *feudal lord system* shows how land scarcity encourages commodification of land resource just like other commodities. The great value placed on land in West Usambara is contrary to what is often seen in other places in Tanzania where land is much devalued as already discussed in section 4.5.2 – 4.5.5.

6.3 Land allocation for Different Use in West Usambara

Land scarcity has limited some activities to take place in West Usambara; hence hindering economic ventures which could assist poverty reduction. In this area almost all land is allocated for crop production leaving very little land for woodlots, gardens, and renting (table 8). Also, fallow is hardly practiced leading to overuse of the soil. With respect to tree planting, many respondents pointed out that they would wish to plant woodlots but do not have enough land. Moreover, land scarcity is even hindering good agricultural practices such as the adoption of agro-forestry farming which could help in soil and water conservation. Respondents complained that trees take-up large spaces which are required by other crops.

Table 8: Household's Land Distribution for different Uses by Acre

Land use	Mean	95% CI		Min	Max
		Lower	Upper		
Crop Production	2.82	2.48	3.16	0.0	22.0
Woodlots	0.65	0.42	0.88	0.0	20.0
Fallow	0.27	0.15	0.39	0.0	10.0
Tree crops	0.17	0.10	0.25	0.0	5.0
Garden	0.19	0.10	0.28	0.0	8.0
Rented	0.03	-0.01	0.07	0.0	4.0

Source: Own Survey Data (2012).

Like other activities, also the land allocated for gardens is very small. On average the household's land under garden is 0.19 acre (equivalent to 769 m^2). Such size is smaller for agriculture given low prevailing agricultural technology and capital in West Usambara which limits land productivity. Gardening activities are mostly conducted in small wetlands located in valley bottoms ***'Vitivos'*** (figure 10). In those lands horticultural crops are grown and have contributed them to face high pressures as have been subdivided into very small plots that are under intensive agriculture. However, despite the smallness of these lands villagers pointed out that, they are helpful and dependable for household's food security. They added that it is

the money from horticultural crops grown from these ***'Vitivos'*** which help them during food crisis period.

Figure 10: Horticultural Crops grown in Wetlands at Baga Village in West Usambara

Filed of Irish potatoes in small wetland

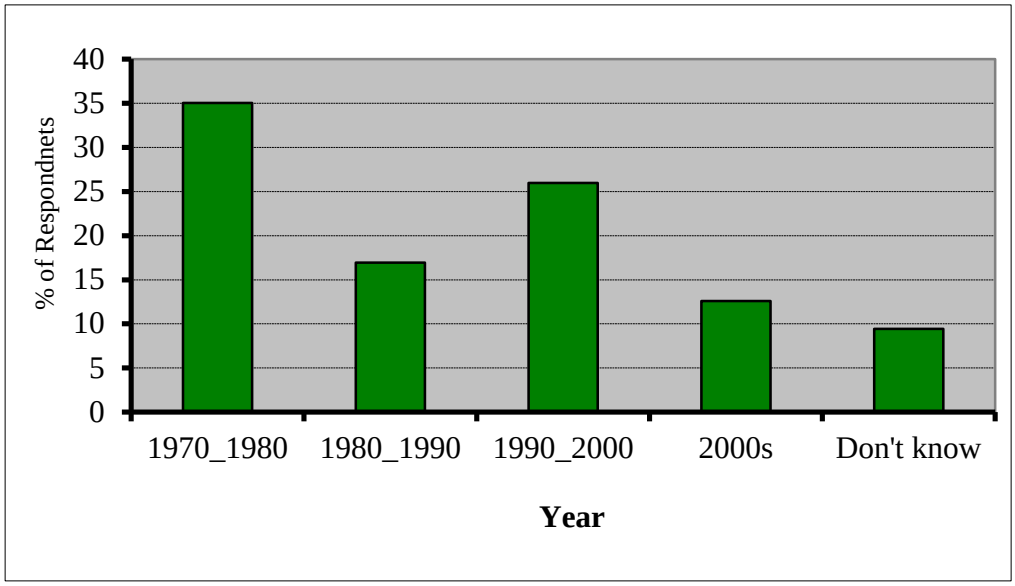
Field of cabbage in small wetland

Source: Photo by Author (2012).

6.4 Factors for Land Scarcity in West Usambara

Although the problem of land scarcity in West Usambara was noticed even before independence the scale of the problem was not widely spread as it is today. This was attested by asking a question *"when did you start to experience land crisis in your village?"* Analysis showed a remarkable deviation in answers among respondents in different villages regarding this question. Only 89 (35 %) respondents reported that land scarcity started to be noticed in 1970s and 1980s. The rest started to experience land scarcities in 1990s and 2000s (figure 11). In 1998 the average farm size under small holders in some villages of West Usambara was reported to stands at 1.8 ha per household (JAMBIYA 1998: 4) which is almost two times higher than what this research has found which is 1ha. Hence, land scarcity problem is spreading in the whole area of West Usambara. Unless the necessary step is taken to address it many problems related to land shortage will be witnessed in this area because crop cultivation is a dominant economic activity.

Figure 11: The Year when Land Shortage started in West Usambara



Source: Own Survey Data (2012).

The following factors were attributed to the development of land scarcity in West Usambara: population increase, mountainous nature of terrain, land degradation, forest conservation, and decline of soil fertility. These factors are compounded by drought conditions and rainfall variability which have reduced the productivity of upland-plots which are relatively lager in size. Consequently, losses of productivity of upland plots have decreased the value of those fields and decline of arable land substantially. The decline of the value of upland-plots was observed when respondents were asked to state the cost of an acre if one has to buy; where they priced lowlands plots higher than upland ones.

The report of poor potentiality of upland-plots by villagers was consistent to those by agricultural experts at different administrative levels, who reported that, the Lushoto District is experiencing crop failures in upland-plots as they are mostly affected by soil erosion and drought. Personal observations also showed upland fields to be highly affected by soil erosion and droughts compared to the lowland ones. In most cases such fields fail to sustain crops which are important in supporting the population which is already dense (see photo **'a'** and **'b'** in figure 12 below).

Figure 12: Maize Fields grown at different Locations in West Usambara

'a' A well thrive maize field on lowland near Funta village

'b' A stunt maize field on upland field near Magamba village

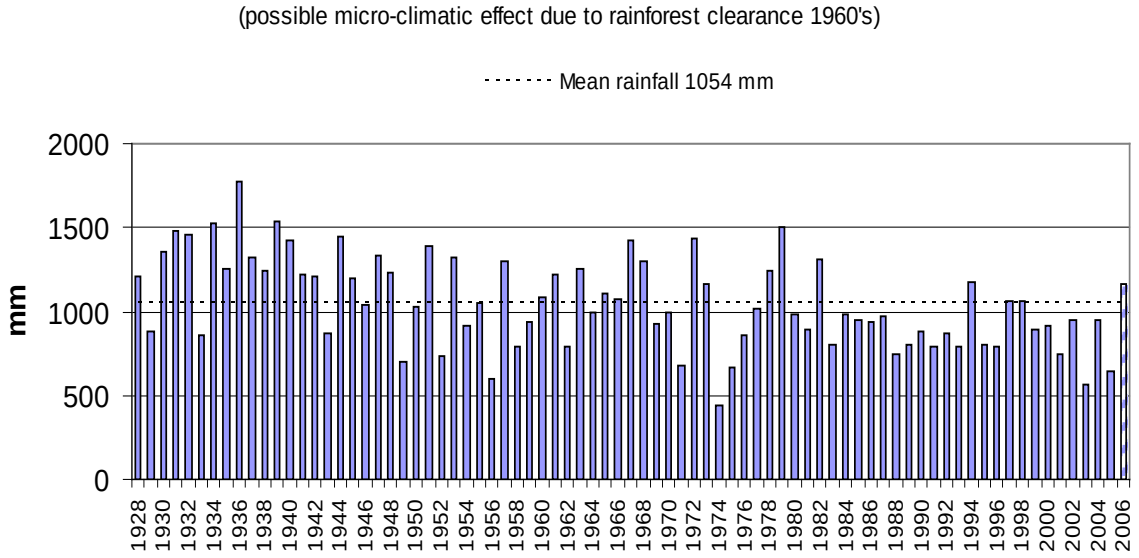
Source: Photo by Author (2012).

Similarly, the rainfall data at different stations shows declining trends in the amount of rainfall which West Usambara has been receiving for consecutive five decades. Worse enough these rains are erratic, hence adversely affecting upland-plots to sustain crops as it is indicated by photo 'b' above. For instance, the rainfall data recorded at the Sakarani Station in Soni Division indicates that, over past 50 years average rainfall received in that station has declined from 1300 mm to 900 mm per year (figure 13). Mr. Selestine Rapposis, the head of the Sakarani Center, stated that: "the station is obtaining only two third of the rains which used to obtain before. Such decline is attributed to the depletion of natural forests which used to facilitate rain formation".

This micro climatic data at the Sakarani Station align those at the Lushoto town which also shows declining trend on average rainfall received (figure 14). The majority of villagers in survey villages complained about drought and rainfall variability by lamenting that, rainfall variability has adversely affected agricultural productivity hence ruining food security and income. This reflects that crop cultivation as a major livelihood strategy in West Usambara is unable to adjust from environmental stress and shocks. The situation is now compromising livelihood sustainability for the majority of people in the area. This observation, confirm the

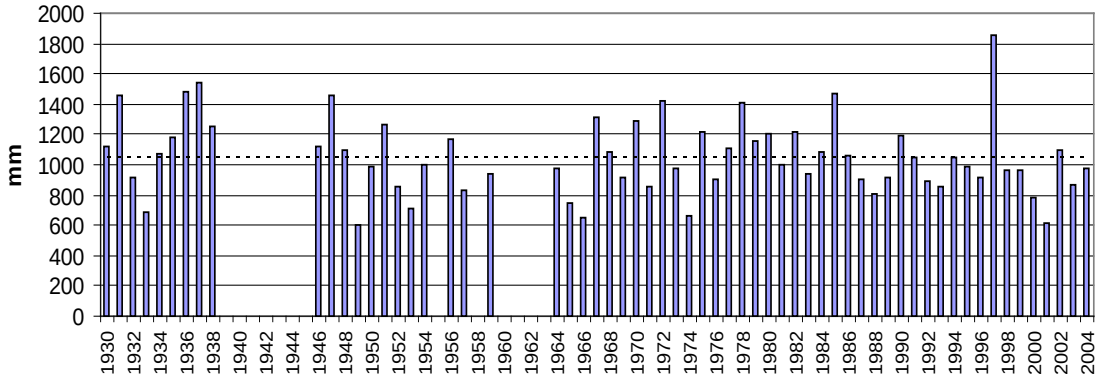
suggestion by ENGLER, LUTERBACHER, MAUELSHAGEN and WERNER (2013: 1015) who have argued that: to understand food insecurity and famine issues there is a need also to include environmental and climatic drivers. Such suggestion is due to the fact that many theories towards understanding famine focus on food entitlements of the population i.e. social condition for food distribution and not on its alleged availability.

Figure 13: Rainfall Records at Sakarani, Soni in Lushoto from 1928 to 2006



Source: Sakarani Station, Soni Lushoto

Figure 14: Lushoto Rainfall Records from 1930 to 2004



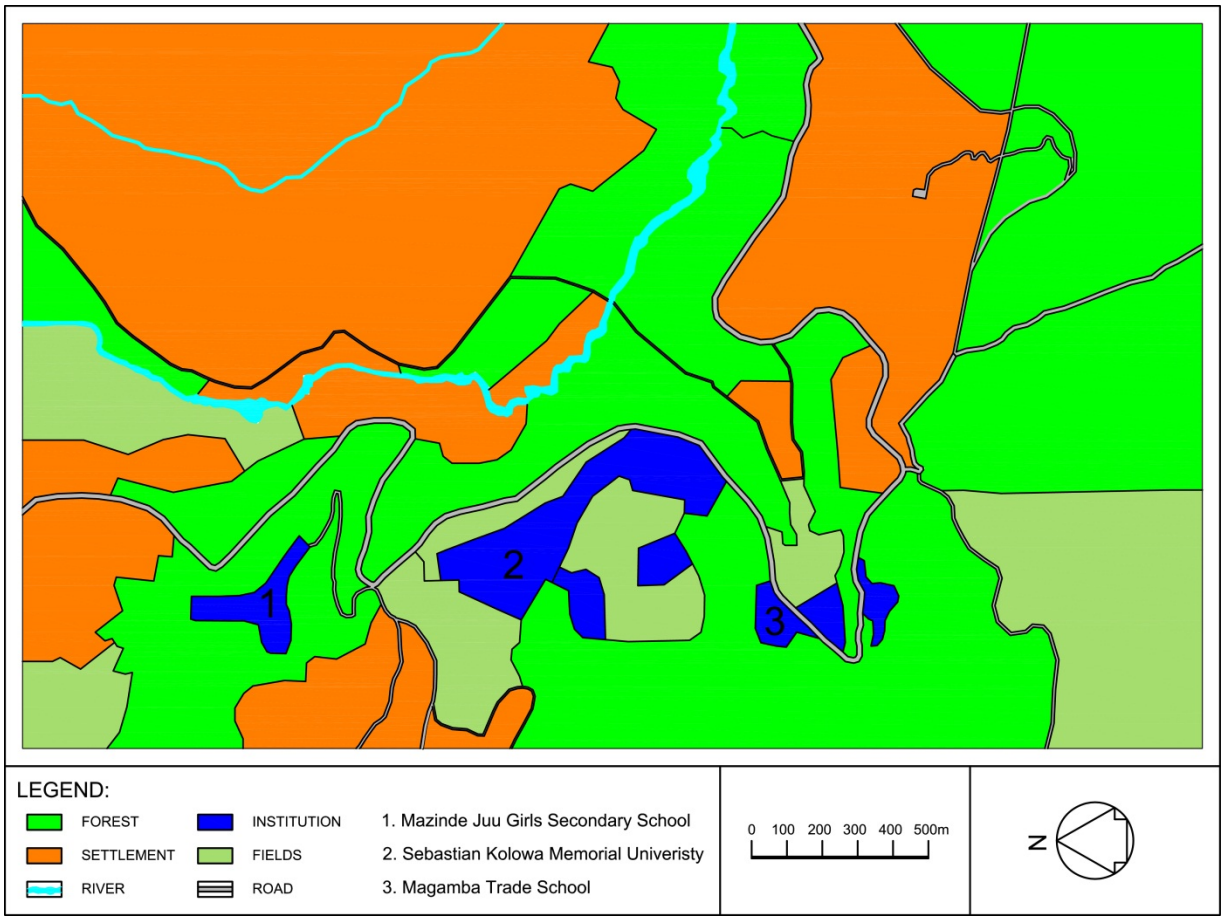
Source: Sakarani Station, Soni Lushoto

Additionally, about 56 (23 %) respondents associated land shortage with forest conservation. Among them, 50 (86 %) said that forest conservation has take-up a big portion of land which could be used for agriculture. About 8 (13.8 %) respondents supposed that they are no longer allowed to expand farms on forest frontier, and 7 (12.1 %) reported their agricultural land to be taken away for forest conservation. The existence of 23 % of respondents who connect land scarcity problem to forests conservation is risky. This is because though the number could be considered as small, but those people might develop negative attitudes toward conservation leading to bad forest practices such as illegal activities. Therefore, it is not wise to take it for granted if we want to conserve forests in West Usambara. Indeed, chances of illegal activities inside reserve forests are even higher because many people lack economic opportunities which can earn their living.

While these factors are relevant to all villages concerning development of land scarcity, there was peculiar situation in Magamba village. The villagers reported that, land scarcity has been intensified by existence of many institutions which possesses large tract of land. Such institutions include the Sebastian Kolowa Memorial University *(SEKOMU)*, the Noviate of Oakland Lushoto, Mazinde Juu Secondary School, Magamba Nature Reserve, and the Community Development Technical Training Institute (CDTTI) Mabughai. All institutions are located at Magamba village and their presences have increasing the demand for land

especially for human settlement (map 6). The situation is also compounded after giving Magamba village the status of small town which has contributed to an increase in the price of land for settlements and other activities. After understanding the situation surrounding land issues in West Usambara, the next section discusses different *livelihood strategies* in this area and how they relate *livelihood resources* and in particular how land resources influence *livelihood strategies.*

Map 6: Land use at the Magamba Village in West Usambara

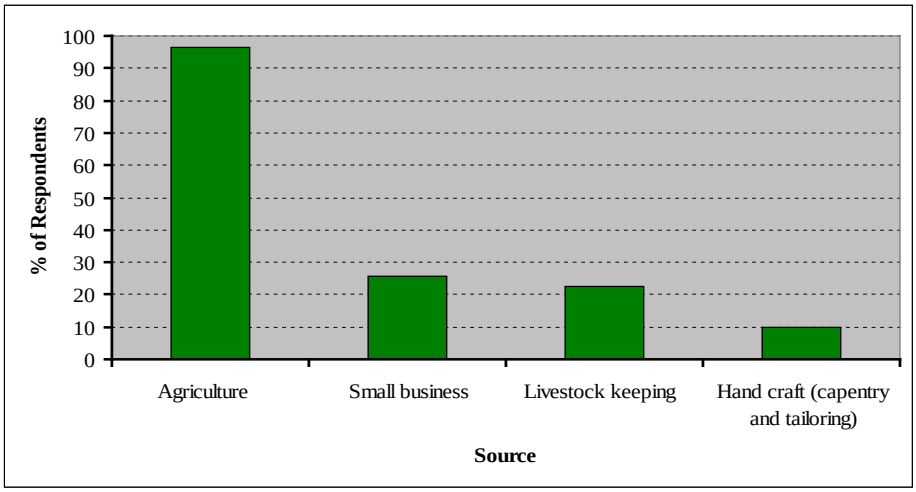


Own (2014).

6.5 Rural Livelihoods Strategies in West Usambara

Exploring rural *livelihood strategies* is so important in understanding individual's and community's wellbeing. People in West Usambara engage in various livelihood activities for purpose of meeting daily sustenance and accumulation of wealth. These activities include among others agriculture, livestock keeping, petty trading, handcraft, carpentry, and forest based livelihoods activities *(FBLA)* such as timber and non-timber activities. Others are formal and informal works, pension schemes, local credits, and remittances. Although all activities are conducted at different scales, agriculture, small business, livestock keeping, and handcrafts are major activities (figure 15). These livelihood strategies have created economic base through which people earn their daily income and accumulate of wealth.

Figure 15: Main Sources of Household Income in West Usambara



Source: Own Survey Data (2012).

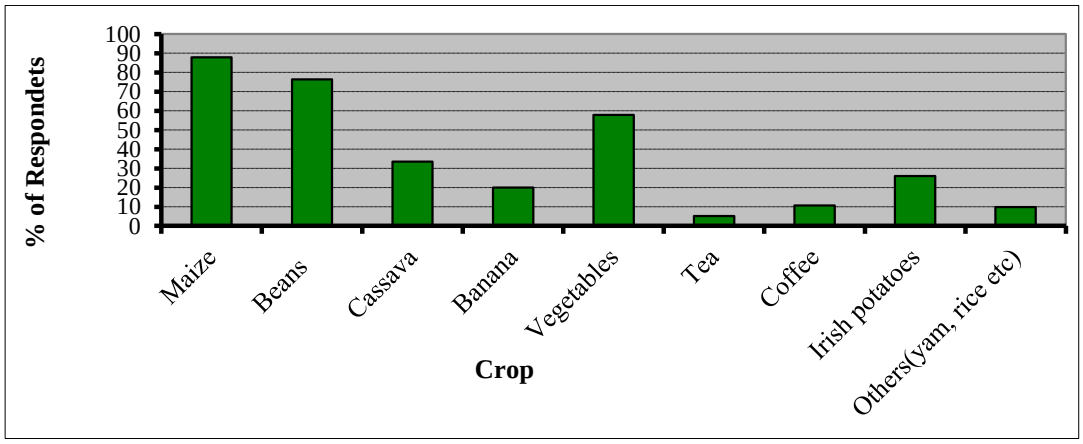
(i) Crop Cultivation and Productivity

As indicated in figure 16 above agriculture in form of crop cultivation is practiced nearly by all people in West Usambara. Hand hoe has remained a basic tool for tilling the soil for many years and agriculture is mainly rain-fed with low scale of traditional irrigation. About 11,000 hectare is potential for irrigation and 9,000 hectares are currently under modern and

tradition irrigation schemes (LUSHOTO DISTRICT COUNCIL 2010: 24). Land fragmentations, smallness of plots and mountainous nature have hindered land mechanization. Crop grown include maize, beans, cassava, banana, Irish potatoes, vegetables, coffee, tea, and yams. Beans, vegetables, tea, and coffee are used as cash crops.

The West Usambara is also prominent for fruit production; though many households had no data on the amount of fruits produced in a season. Maize, beans, and cassava are used as staple foods, hence are grown by the majority of people (figure 16). The majority of households have stopped to grow coffee and tea due to low global prices of these crops.

Figure 16: Types of Crops grown in West Usambara



Source: Own Survey Data (2012).

Currently, the West Usambara is experiencing a steady negative trend in the productivity for many crops in spite application of chemical fertilizers. This reflects soil degradation and fall of its carrying capacity due to overuse of it. Both mean harvests per acre and mean value for different crops are low (table 9). Nearly all produce for crops like maize and cassava are consumed, leaving very little for sale. The only exception is observed for horticultural crops (i.e. cabbage, onion, potatoes, Irish potatoes, and carrot) which had a relatively large share of mean amount sold than consumed. Also, the contributions of horticulture crops to the household income were fairly higher than other crops. The only problem is that, few respondents engage in cultivation of horticultural crops because are cultivated in small wetlands ***'Vitivos'*** which are possessed by few people. As shown in table 9, less than 24 % of

respondents cultivate horticultural crops such as tomatoes, cabbage, onion, carrot and yams. These findings confirm what was suspected by previous research that the “benefits from agriculture in West Usambara were declining or stagnating; as yields and sales from agriculture are inadequate to meet all household requirements, both in terms of cash incomes and food security (JAMBIYA 1998: 9).

Table 9: Crops grown in the last Season, Area grown, Amount harvested, sold and consumed in West Usambara (2012)

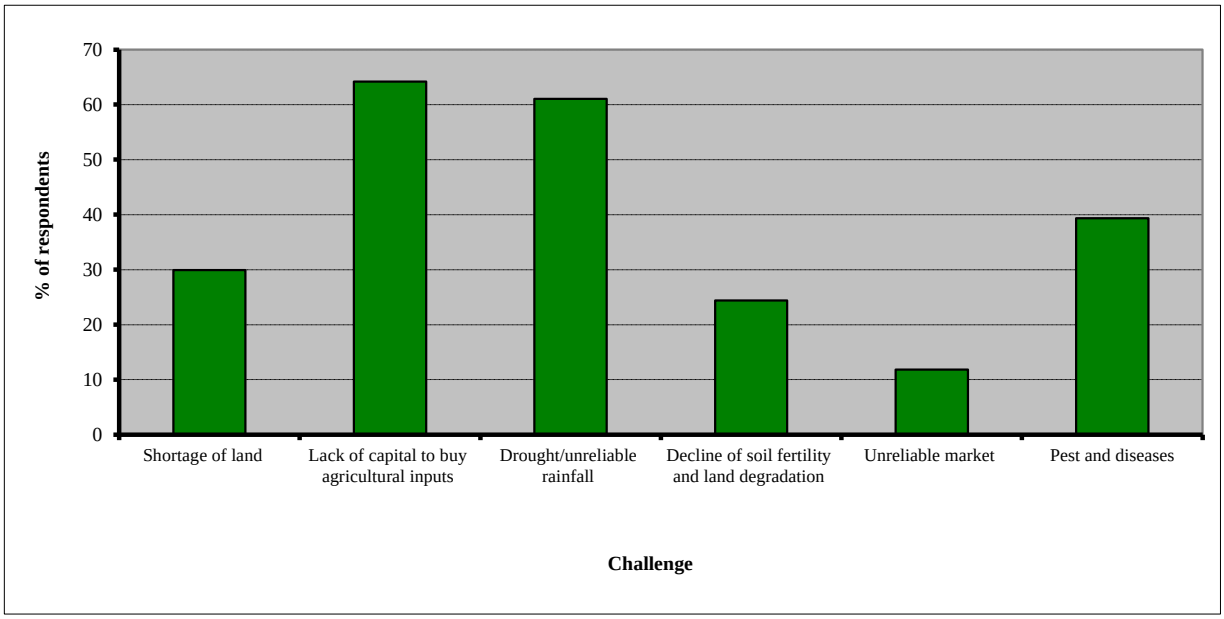
Type of crop	No. of people grown the crop	% of people grown the crop	Mean acres	Mean harvested (kg)	Mean value of the harvested (TZS)	Approximate mean value of harvested (US$)	Mean amount sold (kg)	Mean amount consumed (kg)
Maize	227	89.4	1.6	370.8	152,769	95.48	41.4	329.4
Beans	200	78.7	1.1	154.8	170,881	106.80	82.8	72
Potatoes	100	39.4	1.0	624.6	385,166	240.73	298.8	325.8
Cassava	43	16.9	0.7	265.6	127,115	79.45	35.2	230.4
Coffee	26	10.2	1.3	313.5	120,570	75.36	298.5	12.0
Cabbage	52	20.5	0.9	557.7	312,340	195.15	295.1	262.6
Onion	19	7.5	0.9	198	128,100	80.06	129.0	69.0
Carrot	30	11.8	0.4	421.6	196,177	122.61	300.9	120.7
Tomato	60	23.6	0.5	1,186	193,877	121.17	504.0	682
Yams	4	1.6	1.1	334.8	83,400	52.13	77.4	257.4

Source: Own Survey Data (2012).

Why Crop Productivity is declining in West Usambara?

The decline in agricultural productivity in West Usambara is caused by many factors. Among them are lack of capital to buy chemical fertilizers and other agricultural inputs, unreliable rainfall, crop diseases, shortage of land, decline of soil fertility, and unreliable markets of crops. However, lack of capital for buying agricultural inputs, drought and unreliable rains, and pest and disease were mentioned as major factors that constrain agricultural activities in this area (figure 17).

Figure 17: Challenges in conducting Agricultural Activities



Source: Own Survey Data (2012).

Furthermore, many respondents were concerned with high prices of agricultural inputs. At the time of field research the cost of fertilizers ranged from TZS 65,000 and TZS 75,000 (approx. US$ 41 and US$ 47 respectively) per a 50 kg bag of NPK, TSP and UREA. Although for others such price could be seen as affordable it is not a case in West Usambara. This was also confirmed by the agricultural experts at different levels. The Lushoto District Agricultural Officer commented that, “the prices for agricultural inputs are high for the majority of peasants given the prevailing poor economic situation. The overall outcome is low crop

production which fails even to cater for household's food requirements for the majority of households. Consequently, many people in West Usambara are doomed to hunger and poverty and some have started to look for agricultural land elsewhere.

It is important also to remember that one of the ways through which poor people in Africa and Tanzania in particular increases crop production is through expansion of agriculture land (extensive agriculture). When such means is unavailable and there are limited opportunities to do land intensification peasants remain with no options, hence become vulnerable to abject poverty. What is happening in West Usambara corresponds to the remarks by BRAIMOH and VLEK who pointed out that:

> "Food production in many developing countries is hampered by decreasing per capita crop land, soil nutrient depletion, lack of access to intensification inputs, and lack of enabling policy environments that favor smallholders". (BRAIMOH and VLEK 2008: 3).

Therefore, unless the necessary steps are taken to address land scarcity problem in West Usambara the community will continue to suffer.

The impacts of land scarcity in this area on agriculture were particularly revealed when households were asked to explain how it has affected them. In responding to this question respondents reported that: land scarcity has limited the expansion of crop land; lowered crop production; and hunger and poverty. Other impacts are over cultivation of the same land which mines soil nutrients; and an increase in the cost of production due to much application of chemical fertilizers. The situation has also forced some villagers to look for agricultural land outside West Usambara (table 10). The latter has potential of increasing conflicts over land in other regions of Tanzania if it will not be coordinated.

Table 10: Impacts of Land Scarcity on Agricultural Activities in West Usambara in the perception of local population

Impact	Freq	%
No more expansion of crop land or growing variety of crops	131	51.6
Crop productivity is low compared to the family needs	97	38.2
We are traveling long distance to look for agricultural land	2	0.8
Over cultivation of the same plot	9	3.5
We are applying much fertilizers to improve soil fertility	4	1.6
Hunger and poverty	13	5.1

Source: Own Survey Data (2012).

Critical look at the challenges facing agriculture in West Usambara suggests that, besides capital and unreliable markets, other main factors are more related to land scarcity. For instance, land scarcity aggravates low fallowing period which otherwise help restoring soil fertility and assist in addressing land degradation. Likewise, land scarcities are forcing people to grow the same crops on the same field for many years. This encourages the outbreak of plant diseases. Similarly, it motivates some people to encroach forest areas that are culminating to drought as observed at the Sakarani Station at Soni Division. Therefore, in such a state where land is in critical supply, providing peasants with capital and other agricultural implements might solve the problem shortly. This is because land like other natural resource has its own *carrying capacity* – the largest number of a population that the environment of a particular area can carry or support without getting impaired (HAGGETT 1983: 52).

Literature about West Usambara also points out that, it is among the areas in Tanzania which has received a considerable number of soil and water conservation programs before and after independence. The notable programs include: the Soil Erosion Control and Agroforestry

Program *(SECAP);* the Mlalo Basin Rehabilitation Scheme (*MBRS);* the Usambara Scheme; the Traditional Irrigation Program *(TIP);* and the African Highland Initiatives (*AHI)* (TENGE, DE GRAAFF and HELLA (2004: 1). However, these programs had little impacts in addressing the problem of soil erosion and water conservation. Although commentators and researchers attributed such failures to top-down approaches natures of most programs, thus advocating bottom-up approaches, the problem of soil erosion is still apparent and widespread in the whole area of West Usambara (see figure 18).

Figure 18: Soil Erosion at Funta Village in West Usambara

Source: Photo by Author (2012).

Soil erosion in west Usambara is mainly caused by different agent including: surface running water, soil creeping and wind which remove the productive top soil. The situation is compounded by the steep terrain nature of the area. Soil erosion impacts in this area are manifested especially in the low agricultural production. Therefore, while the internal solutions to address land scarcity through water and soil conservation program cannot be undermined, it is important also to solve the problem externally. This can be done by looking for alternative arable land from other districts in Tanga Region or elsewhere in Tanzania.

(ii) Livestock Keeping in West Usambara

Livestock keeping is another livelihood strategy after crop cultivation**.** About 236 (93 %) respondents were raising livestock in West Usambara. This findings corresponds those by PICA-CIAMARRA, TASCIOTTI, OTTE and ZEZZA (2011: 4) in Bangladesh, Ecuador, Ghana, Guatemala, Madagascar, Malawi, Nicaragua, Nigeria, Nepal, Pakistan, and Vietnam. Which made them to conclude that, livestock are kept across all expenditure quintiles in developing countries which is suggestive of the multiple roles of farm animals in the household economy. They added that, the motive for livestock keeping is taken either as a risk-coping or income-enhancing strategy or simply because household lack the means or have few opportunities to diversify into none-livestock income-enhancing activities.

The types of livestock raised in West Usambara include cow, goat, sheep, pig, chicken and duck. According to the Lushoto District Livestock Office, the district has 119,492 cattle; 85,250 goats; 4,700 pig; 2,892 donkeys; and 76,200 sheep. About, 90,292 (76 %) cattle are indigenous while 29,200 (24 %) are exotic. On the other hand, the number of chicken and duck in the district stand at 362,000 and 60,500 respectively. However, although the majority of households keep animals, 43 (17 %) respondents are not keeping animals such as cattle, goats, and sheep – *ruminant animals*. The major reasons are lack of pasture, animal disease, low income and capital to maintain them. High costs of veterinary services (e.g. artificial insemination/cross breeding, and vaccination); lack of livestock officers and extension services; and education among peasants on how to raise livestock were mentioned as main challenges.

Due to lack of open access areas where animals could roam about, livestock keeping in West Usambara is done through zero grazing. This forms of livestock keeping demands much labor especially for looking fodder. The workload is even compounded by drought conditions that have contributed to shortage of pasture. As a result, though 93 % of the households engage in livestock activity the scale of operation is low. The mean quantity for cattle is two while that of chicken is eight per households (table 11). Few households reported to keep pigs due to religious reasons as the area has a considerable number of Muslims.

Although the role of livestock activities cannot be undermined in terms of improving the household wellbeing such as: the provision of protein, manure, cash income, acting as forms of savings and insurance in time of emergencies, and source of wealth, the sector contribute little to the economy of West Usambara. The milk production for improved cow is 7 liters per day while for indigenous cow ranges from 1.5 liter to 3 liters per day which is low for meeting household's need. The situation is made worse since the majority of people own indigenous cattle which produce less milk. The low contribution of this sector is also appreciated by the low mean quantity and mean asset value for different livestock types as indicated in table 11.

Table 11: Number of Respondents Keeping Livestock in West Usambara

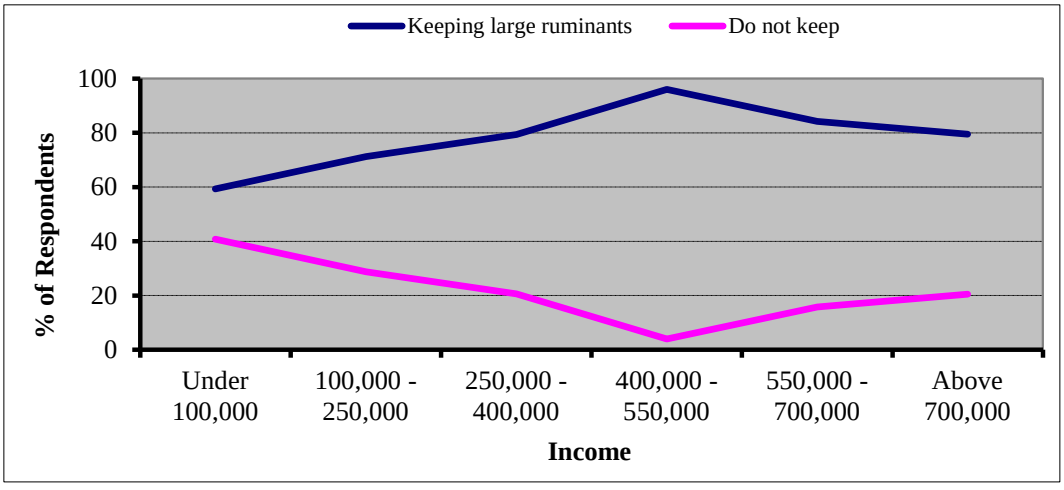
Livestock type	Freq	%	Mean quantity (95% CI)	Mean assets value (TZS)	Mean assets (US$)
Cattle	157	61.8	2	805,159	503
Goat	80	31.5	3	149,750	94
Sheep	94	37.0	3	95,402	60
Pig	10	3.9	3	268,000	168
Chicken	205	80.7	8	63,145	39
Duck	19	7.5	7	77,368	48

Source: Own Survey Data (2012).

- ***The Relationship between Household Income and Ownership of Large Ruminants Animals***

Further analysis showed that, there is a relationship between income and ownership of *large ruminant animals*. The households who had high income possessed *large ruminants* than those who had low income who had *small ruminants* and *poultry*. The reasons might be the higher costs of maintaining *large ruminants* (e.g. the cost of spraying, artificial insemination, vaccination and other veterinary services) which poor people fail to afford as it will be discussed latter. The findings on relationship between income and ownership of *large ruminant* animals are consistence with those by PICA-CIAMARRA, TASCIOTTI, OTTE and ZEZZA (2011: 14) in Bangladesh, Ecuador, Ghana, Guatemala, Madagascar, Malawi, Nicaragua, Nigeria, Nepal, Pakistan, and Vietnam. In these countries it was observed that the poorer households kept *small ruminants* while the richer ones kept *large ruminants*. Yet, given the low availability of pasture in West Usambara an increase in income may not lead to an increase in the number of *large ruminant* animals (figure 19). Hence people are compelled to keep only minimum number of animals which are manageable. Based on this observation one can conclude that, income or wealth status are not only factors which determine investments in livestock activities, rather environmental factors and availability of land resources such as pasture and water is important.

Figure 19: Relationship between Household annual Income and keeping Large Ruminants Animals in West Usambara



Source: Own Survey Data (2012).

- ***Livestock Diseases and Services***

The common livestock diseases in West Usambara are *Anthrax, Black quarter, East coast fever, Newcastle diseases* and *Rabies.* Both government and private people provide veterinary services in this area. The cost of services differs depending on who provides it. The cost of spraying four animals is TZS 1,000 (approx. US$ 0.63) if it is provided by government personnel, and between TZS 2,000 and TZS 2,500 (approx. US$ 1.25 and US$ 1.6) if offered by private person. These costs are relatively manageable. On the other hand, some animal diseases and services are expensive to afford by peasants. A case in point is the cost of treating *East coast fever* which ranges from TZS 25,000 to TZS 27,000 (approx. US$ 16 to US$ 17) while that of cross breeding was TZS 10,000 (approx. US$ 6.25) to TZS 15,000 (approx. US$ 9). The Livestock Officers at different administrative levels together with villagers' leaders argued that such costs are higher given the level of economy which is low.

None of the villages surveyed had cattle deep, though the Lushoto District Livestock Office reported that the district has six cattle deeps. Nevertheless, some Livestock Officers argued that, cattle deeps are not economical and efficient in West Usambara. This is because the area has small amount of livestock. Hence, such livestock officers argued that there is no need of having them. Also they added that the mountainous nature of the West Usambara make cumbersome when it comes to moving animals from one area to another. Moving animals might also be complicated by the lack of open land as large section of the land is under permanent cultivation. Certainly, the free movement of animals would open conflicts between farmers and cattle owners if it would be allowed. Therefore, at present they prefer to use hand-sprays rather than cattle deeps which are also considered as cost effective.

(iii) Other-income generating Activities (none-farm activities)

Petty-trading, formal and informal employments, remittance, pension, and hand crafts (wood work and basketry) are analyzed and discussed under this category of livelihood strategy. These activities are vital for the survival and accumulation of wealth in West Usambara. Generally the incomes accrued from none-farm activities far outstrip those

obtained from crop cultivation. For instance, while the total mean value for all harvested crops per year in West Usambara was TZS 1,870,395 (approx. US$ 1,169) the average annual income from *other-income generating activities* was TZS 4,211,682 (approx. US$ 2,632). This is almost two times than that of crops. Such difference is even much higher if you had to compare the annual income from single activities from the *crop side* to that from *other-income generating activities*. In this respect, the average income obtained per year from petty-trading was 6.9 times as much as that obtained from maize. Similarly, the income from kiosk was 6.7 times that obtained from maize which is grown by 227 (89 %) respondents. On the other hand, the income obtained from Irish potatoes was 2.7 lesser than that from petty trading. Here, it should be remembered that, the annual income accrued from Irish potatoes is the highest than all crops grown in West Usambara.

About 30 % of the respondents reported to receive remittances. Such remittances are partly attributed to many youth who are migrating to big cities who might be sending money home. The average annual income from remittance was TZS 281,730 per year (approx. US$ 176). This amount is small given an increase in costs of living and inflation in Tanzania. Again it reflects that people who have migrated to towns have not managed to bring enough money to West Usambara which could otherwise assist in improving life through investing in farming and off-farm activities. This was also reflected by the low number of respondents who engage in other productive activities such as shop, carpentry, basketry, and petty-trading which requires some capital (table 12).

On the other hand, the number of respondents who are somehow employed and receive wage is just 2 %. The low number of this group partly contributes to the low percentage of pensionable people in West Usambara. The situation is made worse because, at the present there is no state pension for elder citizens in Tanzania. Hence only three respondents out of 254 reported to receive pensions. This situation makes elder people to face difficult to attain their livelihoods especially if there are no children or relative to take care of them. Consequently, there is a need to find a way to include the elder people in the national social security schemes which will improve their well-being.

Table 12: Other Sources of Household Income obtained annually in West Usambara (in TZS and US$)

Livelihood activity	Freq	%	Mean	Approx. mean (US$)
Pension	3	1.2	436,000	273
Remittance	76	30	281,730	176
Wage	5	2.0	844,000	528
Shop	10	3.9	1,037,400	648
Carpentry	10	3.9	500,000	313
Basketry	4	1.6	51,500	32
Petty-trade	17	6.7	1,061,052	663

Source: Own Survey Data (2012).

In the same way, the numbers of respondents who engage in craft making are equally low in West Usambara. During field research it was common to see domestic industrial goods like baskets in some villages which formally are made locally. This shows how trade liberalization demise indigenous technology leading to reduction of source of livelihoods of local people. People who engage in carpentry and other wood activities in Bungoi village complained that:

> "The industry is declining due to timber shortage. We used to get income through carpentry but, conservation of the Shagayu Forest Reserve has substantially reduced the availability of timber products which are vital resource for our industry. This has adversely affected the industry. At present the cost of timber is higher, hence increasing the price of furniture compared to the income of our customers".

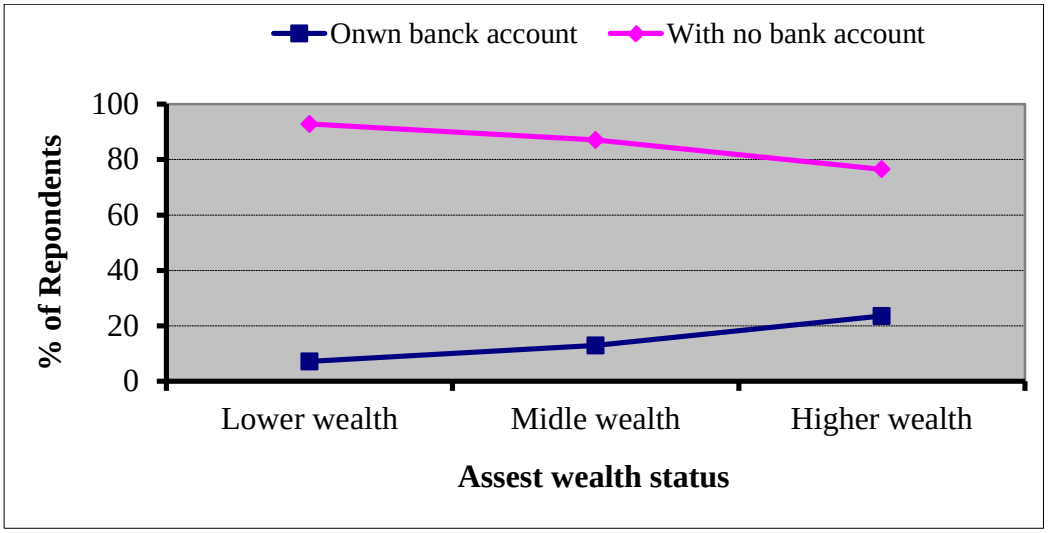
As a result carpenters were arguing the government to see how best the Shagayu Forest Reserve could be utilized sustainably. Currently they do not see any economic advantage of the forest which has been closed since 1986. These kinds of scenarios show that in the long term people will lose their traditional skills if not promoted.

(iv) Credit Facilities and other Social Networks

The foregone section has demonstrated that the *other-income generating activities* relatively generate higher income than the main livelihood strategies in West Usambara. However, the initial capital is required for one to engage in such activities something which is obstacle for the majority of the people. The number of credit facilities operating in West Usambara is low and many villagers are not aware on their existence. For instance, only 56 (22.0 %) respondents were aware on the existence of local credit facilities such as Savings and Credit Cooperative Societies *(SACCOS);* the Village Community Bank *(VICOBA),* BLACK group and the Tanzania Social Action Fund *(TASAF).* Also, the financial capacities of these facilities in term of providing loans are thin. Thus, they have not managed to assist large section of the community. The situation is compounded by lack of bank facilities in this area. At present the whole Lushoto District is served by one bank - the National Microfinance Bank *(NMB)* which is operating at Lushoto town.

Also, it was revealed that only 37 (14.6 %) respondents operate saving or current accounts. Varied reasons were given to why many people are not operating bank accounts. Low income was a major reason as it was reported by 190 (87.6 %) respondents. About 8 (3.7 %) respondents supposed that bank services are very far, and 4 (1.8 %) respondents said bank charges are higher. Further analysis revealed existence of the association between *asset wealthy status* and owning bank account. As indicated in figure 20 below, as ones *wealth status* increase also the possibility of owning bank account increase and vice versa. This shows that, many people would open bank accounts in West Usambara if their level of economic status would improve. Banking is very important in economic development and in poverty reduction because, it facilitates savings and investments. Also it promotes money circulation which is essential in economic development.

Figure 20: Household Assets Wealth Categories by Bank Account in West Usambara

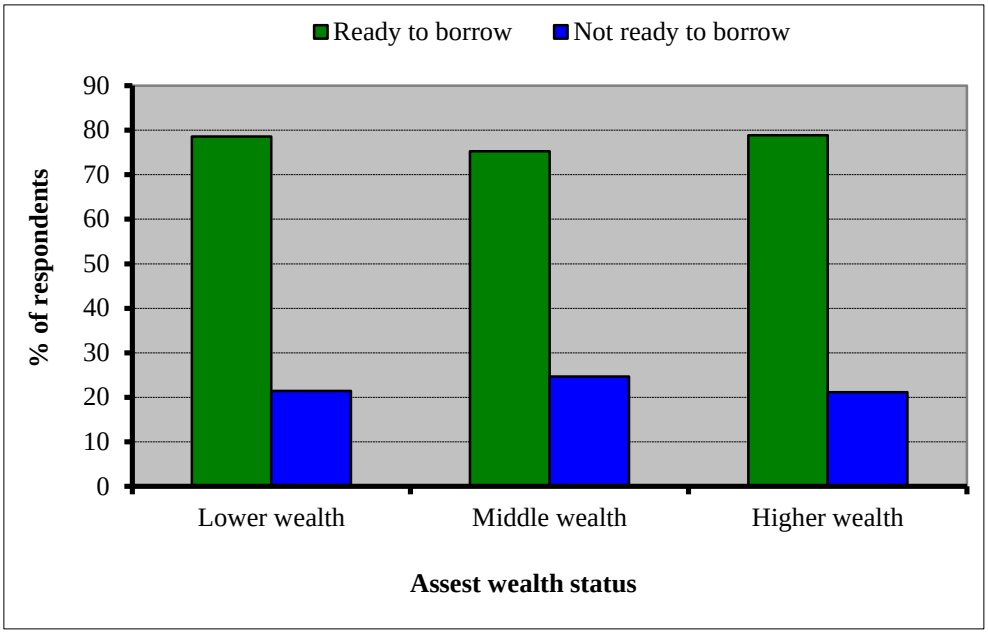


Source: Own Survey Data (2012).

- ***Readiness to Borrow from Credit Facilities***

The research was attracted also in understanding the willingness of the community to borrow from credit facilities if such opportunities are introduced. About 198 (78 %) respondents showed interest to borrow money. However, they were suggesting proper education to be given to them first before providing such credits. The respondent's *wealth status category* had no influence on the decision to borrow because, in all *wealth status* there were almost equal number of people who were ready to borrow and those who were not ready (figure 21). The mean amount to borrow was TZS 2,106,345 (approx. US$ 1,316). Nevertheless, the amount of credit was different between sexes. For male it was TZS 2,395,783 (approx. US$ 1,497) and for female was TZS 556,451 (approx. US$ 348). Hence, the mean difference amount to borrow between sexes was TZS 1,839,331 (approx. US$ 1,150) which was statistically significant (p = 0. 004). The major reason for such difference is because women are interested in opening-up small business that requires just a small capital while their counterpart males aspire for big investments. These results reflect that, women in general are not ready to take risk compared to males.

Figure 21: Household Wealth Categories by Readiness to borrow



Source: Own Survey Data (2012).

It was imperative also to understand how people are prepared to spend such money if credits could be granted. About 68 % of the respondents wish to invest in agriculture, while 65 % are interested to invest in small business. On the other hand, 13.2 % of respondents were planning to improve livestock activities (table 13). One would ask *'why large number of people is attracted in agricultural investments despite its low return?'* Such interest was mostly driven by the interest of the household to meet food security. Similarly, the existence of significance percentage of respondents who aspires to invest in business indicates that, people are aware that *other-income generating activities* pay much as discussed. Indeed, these priority areas for investments reflect the capabilities (e.g. education, skills, interest etc.) of the local communalities in terms of what they can pursue better if assistance is given.

It should also be noted that, despite the poor economic situation in West Usambara some respondents were not interested in credits which are supposed might improve their economic conditions. The major reasons include worrying to be imprisoned; having no plan to spend such money; being aged; and religious reasons (table 13). The latter reason was seen among

few Muslim, who argued that, any credit which requires one to pay interest goes against their religious doctrine.

Discussion with village leaders and individuals revealed that, existing credit facilities charge higher interest rates that scare villagers to borrow from them. In Baga village for example, village leaders reported that their fellow have been dispossessed their property because they were not able to pay back loans. This is contrary to what many expect from credit facilities, especially regarding empowering people and enhancing their capabilities to get rid out of poverty. If these facilities would not be monitored they might widen poverty in rural areas. Similar situation is observed in many financial institutions in Tanzania where commercial banks charge higher interest rates which ranges from 18 % to 30 %.

Table 13: Readiness to borrow Money from Credit Facilities in West Usambara

Reason and Aspirations for Borrowing	**Freq**	**%**
Improvements of agricultural activities (e.g. vegetables)	134	68.0
Initiating business (e.g. crops, kiosk, brick making, fish, clothes)	128	65.0
Initiating livestock activities (chicken and dairy cattle)	26	13.2
Reason for not Borrowing	**Freq**	**%**
Being worried to be imprisoned	31	54.4
Having no plan to spend such money	25	43.9
Being older can't pay back the loan	14	24.6
Religion reasons	1	1.8

Source: Own Survey Data (2012).

(v) Social Network/Social Grouping

The scope of social grouping in West Usambara is still low. Only 55 (21.8 %) respondents involves in some kinds of social groupings which assist in improving livelihood activities. These networks are based on neighborhoods and sharing similar interests. They include among others: the local credit facilities such as Savings and Credit Cooperative Societies *(SACCOS)* and the Village Community Bank *(VICOBA).* Others are livestock groups and labor force groups. Consequently, a considerable number of people were not taking part in these groups. Their reasons included lack of awareness on existence of those associations 45 (58.4 %); lack of money to pay for registration fees 16 (20.8 %); having other commitments 11 (14.3 %); being not selected 10 (13 %); older age 6 (7.8 %); and gender reasons 1 (1.3 %). The issue of gender was reported in Baga village; where leaders complained that "most projects are now targeting women most than male. This systematically withdraws men from participation". This shows that, women emancipation which is advocated worldwide might cause misunderstanding within the family and a community at large leading to a decline in its cohesion. This calls to watch the manner in which projects are implemented.

The existence of a large number of people who are not aware on the existence of different social networks reflects newness of these networks and lack of those facilities in some villages. Also is a hint that some villages have inadequate means to disseminate information to the entire community. The situation is complicated by lack of skilled people with entrepreneurship knowledge who can educate villagers on credit facilities and how to startup a new business. This contributes to the majority of rural people in West Usambara and Tanzania in general to continue depending on traditional activities like agriculture. After discussing *livelihood strategies* in West Usambara, the next part analyzes and discusses how such activities contribute to wealth accumulation, food security and the economy at a household level.

6.6 Impact of Livelihood Strategies on Rural Wealth, Food Security, and overall Economy in West Usambara

The preceding sections have analyzed and discussed different livelihood strategies conducted in West Usambara. The present section is seeking to evaluate how these livelihood strategies contribute to income, wealth accumulation, and food security. This is important because livelihood strategies are crucial for wealth accumulation and in enhancing the communities' ability to attain sustainable livelihoods. Therefore, the extent of accumulation of household's assets (physical assets), income, and the communities' ability to meet food requirements are investigated. Consequently, such information is used as indicators of what is happening to the large segment of population regarding communities' wealth status. Thus, the purpose of this section is not to show the segment of population who live below poverty line. Instead, it aims at presenting the communities wealth status, and incidences of poverty which indicate the level of wellbeing of the entire community and their reasons. Thus, through this analysis the linkages between *livelihood resources, livelihood strategies* and communities' wellbeing in West Usambara are understood.

(i) Wealth Status in West Usambara

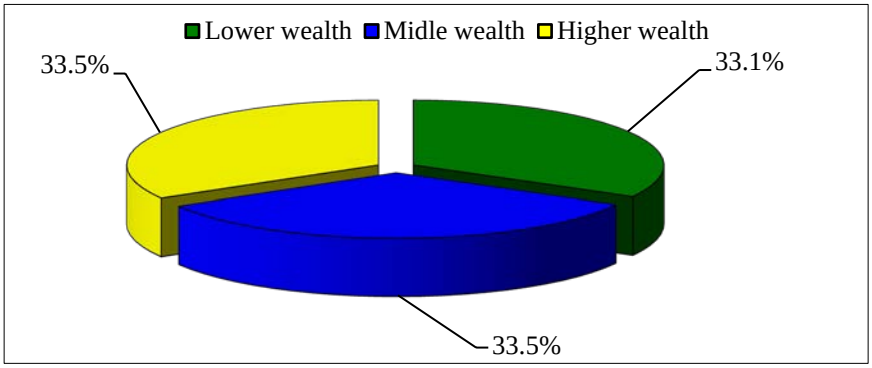
The level of economic status of the community of West Usambara is still very low. This was investigated by examining 32 assets owned at the household level. Their quantities and current estimated values were assessed to establish the community wealth status. The mean number of households assets owned was 14. There was significant ($r=0.391$, $p=0.0001$) positive correlation between total value of assets and the number of assets owned by the household. Overall, the mean household assets value was TZS 5,641,981(approx. US$ 3,526). Under ideal situation this value is very low since it includes all assets owned by the households, ranging from house, home amenities to livestock.

Accordingly, the majority of people do not own luxury goods like generators, motorcycles, bicycles, televisions, satellite dishes, and cars which are often considered to be sign of wealth in rural areas (figure 23). The expensiveness of these assets explains why majority could not

afford them. This is also a reflection that livelihood strategies conducted in this area have failed to contribute enough to wealth accumulation. In the same way, the quantity and mean value of different assets are also very low (table 14). For instance, although almost all respondents (97 %) own houses their value were low about TZS 3,824,917 (approx.US$ 2,391). The low values of houses also echo their quality which is low.

Consequently, three categories of wealth status were established, these are: ***lower wealth*** (with wealth worth TZS 1,945,000 approx. US$ 1,215); ***middle wealth*** (with wealth worth TZS 1,945,001 to 4,550,000 approx. US$ 1,216 to US$ 2844); and ***higher wealth*** (with wealth worth TZS 4,550,000 approx. >US$ 2844) categories (figure 22). The level of wealth status is almost evenly distributed within these wealth categories. Hence indicating that, the income levels are consistently and homogenously distributed throughout the community among wealth categories.

Figure 22: Distribution of Household Assets Wealth Categories



Source: Own Survey Data (2012).

Moreover, the West Usambara has higher number of respondents who owned cellphones. Out of 254 respondents, 182 (71.7 %) respondents own cellphones. The mean quantity of cell phone per household is 1.4. Thus, on average in every household there are at least one or two family members who owned phones. The mean value of cellphones was TZS 65,752 (approx.US$ 41). The cellular phone companies operating in West Usambara include *VODACOM, AIRTEl, ZANTEL,* and *TIGO.*

Table 14: Households Assets and their Current Value in West Usambara

Asset	Freq	%	Mean quantity	Mean assets value (TZS)	Mean assets value (US$)
House	246	97	1.4	3,824,917	2391
Tables	231	91	2.3	66,576	42
Chairs	241	95	6	67,781	42
Beds	247	97	2.3	157,691	99
Hand hoe	248	98	3.4	13,800	9
Axe	224	88	1.4	6,238	4
Sickle	62	24	2	6,733	4
Radio	201	79	1.4	51,841	32
Machetes	154	61	2	6,552	4
Wood lots	79	31	1.4	2,602,207	1626
Video TV	16	6	1.3	231,333	145
Satellite dish	9	4	1	185,555	116
Bicycle	48	19	1.1	94,895	59
Motor cycle	10	4	1.0	1,420,000	888
Buckets	232	91	6	12,986	8
Milling machines	2	0.8	_	_	-
Cars	1	0.4	_	_	-
Water pumps	4	2	1.0	107,500	67
Generator	3	1.2	_	_	-
Beehives	9	4	2.1	11,611	7
Iron	119	47	1.1	11,465	7
Mobile phone	182	72	1.4	65,753	41
Spade	132	52	1.2	5,611	4
Cooking port	234	92	7	30,809	19
Spraying machine	42	17	1.4	66,275	41
Cow	157	62	2.2	805,159	503
Goat	80	32	3.0	149,750	94
Sheep	94	37	3	95,402	60
Pig	10	4	3	268,000	168
Chicken	205	81	8	63,146	39
Duck	19	8	7.2	77,368	48

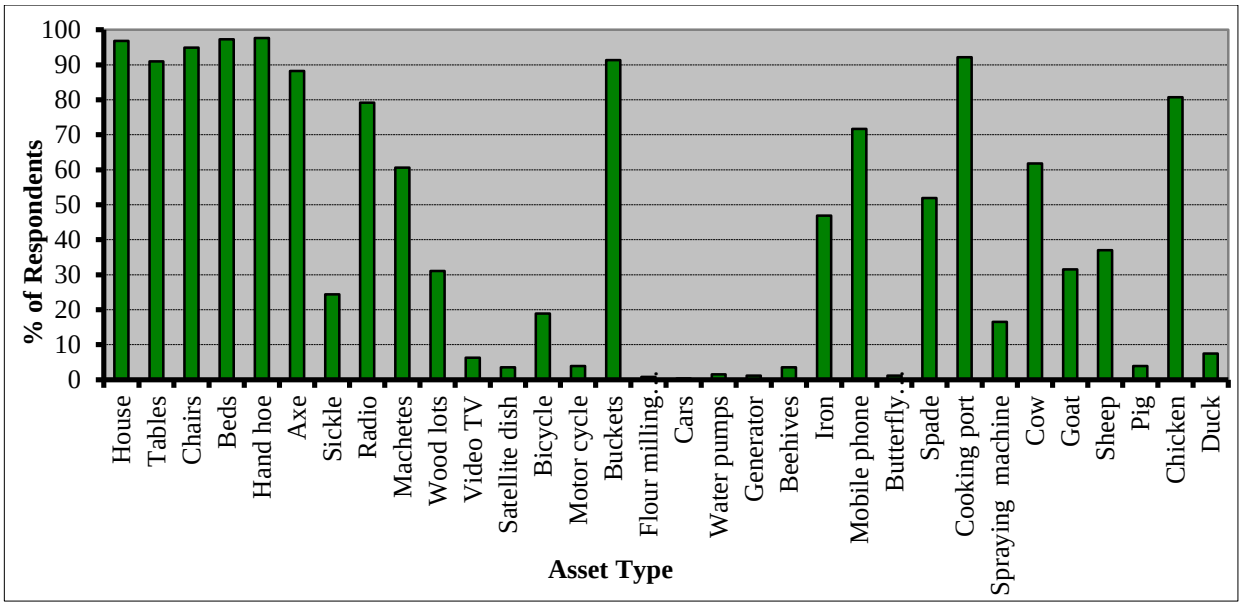
Source: Own Survey Data (2012).

Cellphone companies have revolutionized communication sector in West Usambara and Tanzania at large. For many decades telephone services was through landline telephone system operated by the Tanzania Telecommunication Company Ltd *(TTCL).*Very few people could afford it and mostly it was used by rich people and government departments. Worse enough the service was mostly confined in urban areas; automatically marginalizing the rural people from using telephones. The introduction of cellphone companies has eased communication, and for the case of West Usambara nearly all villages are connected. The only challenge is whether cellphones are used productively for instance in searching markets for agricultural products and similar activities. Like cellphones, the West Usambara community is not backward in terms of possessing radios. About 201 (79.1 %) respondents own radios. The mean quantity of radios per household was 1.4, just similar to that of cellphone and they had a mean value of TZS 51,841 (approx.US$ 32).

With regard to other home amenities such as furniture, cooking dishes and farming tools, almost every household possessed them. However, the mean quantities for some of household basic amenities such as sleeping beds and chairs were lower than average family size. For example, while the average family size is 7, the mean quantity for sleeping bed and chairs is 2.3, and 6 respectively. Thus, some family members live without these basic facilities. The similar situation is seen for farming equipment such as hand hoes; which its mean quantity was 3.4 hence far outstripped by family size. Although this might be challenged on the ground that some family members are children who do not engage in farming activities, still it is bad sign.

Generally, low values of assets owned by people in West Usambara are an indication that the level of economic status in this area is very low. This is also portrayed in figure 23 which detailed the percentage distribution of households with specific wealth indicators. Indeed, it is strong evidence that, the *livelihood strategies* conducted in West Usambara are poorly performing.

Figure 23: Percentage of Households with Specific Wealth Indicators in West Usambara



Source: Own Survey Data (2012).

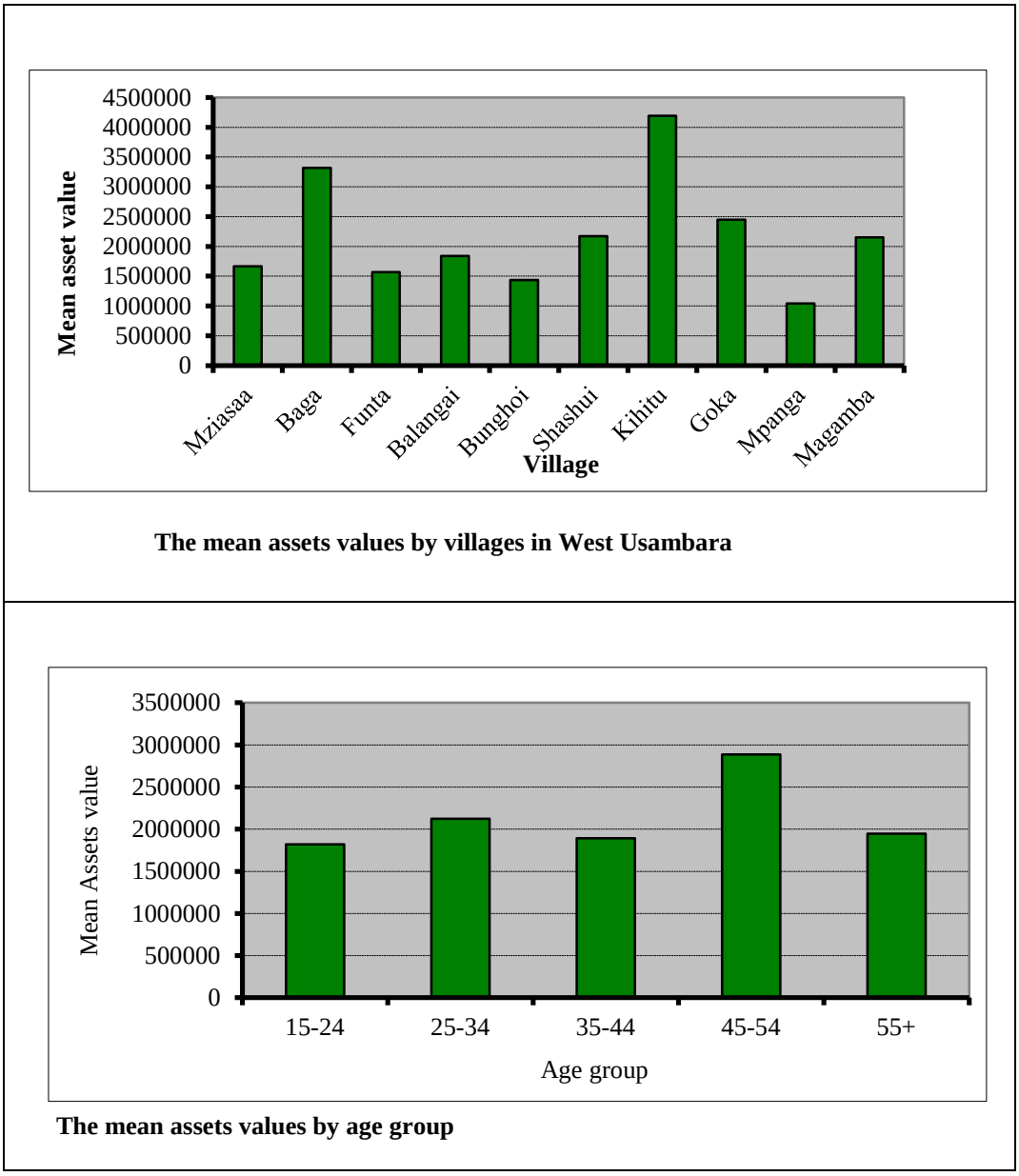
- ***Wealth Distribution by Villages in West Usambara***

The research was also concerned with seeing if there was a disparity in terms of wealth status between age groups and villages. On the former, there were very slight disparities in term of mean assets values owned. On contrary, the spatial disparity in terms of wealth status existed among villages. In this respect, Kihitu and Baga villages are relatively better-off than other villages. The wealth status is much lower in villages of Mpanga, Bungoi, and Funta (see details in figure 24). The disparities in wealth distribution are explained by many factors. The lower wealth status in Mpanga and Bungoi villages was associated to drought and land scarcities. Village leaders at Mpanga remarked that:

> "The Shagayu Forest Reserve has taken-up a large portion of land which could be used for agriculture. During the process of earmarking the boundaries of Shagayu Forest our elders were shortsighted on the future demand for arable land. During that time village population was low. Thus, they left the central government to take-up large land for

forest reserve, leaving very little land for our village. It is that decision which is torturing us now".

Figure 24: Wealth Distribution in West Usambara by Villages and Age categories (TZS)



The mean assets values by villages in West Usambara

The mean assets values by age group

Source: Source: Own Survey Data (2012).

Land scarcities partly made few respondents in Mpanga village to propose the government to revise the boundaries of the Shagayu Forest Reserve. However, the majority supposed that, the

forest is very important in rain formation and if it is left to be depleted the drought condition would even be worse. Also the remoteness of Mpanga village from the Lushoto, Lukozi and Mlalo towns which are considered as economic hubs of West Usambara is another reason for its backwardness. In Bungoi village like Mpanga, the major cry was land scarcity and fall of carpentry industry.

(ii) Food Security Situation in West Usambara

The situation of food security in West Usambara is not satisfactory. Food shortage is experienced for duration of two to six months in year. About 45 % of the food consumed in this area is obtained through buying, while 54 % is produced by the household and 1 % is obtained through a donation. The situation is complicated by low production of cereal crops such as maize which is 370.8 kg per year per household. Such food amount is insufficient for seven people which are average family size. And it is far less when compared to the international standards by WHO which estimate 180 kg of cereals per person/year (BOHLE 2007: 17). Consequently, all respondents experience food shortage during the year. About 140 (55 %) respondents experience food shortages for a period of two to three months in a year while 114 (45 %) experience for more than five months.

On average, the mean annual income spent for food budget alone (mainly staple food) is about TZS 575,845 (approx. US$360). This is a lot of money in a community in which 67 % of respondents reported their annual income to be less than TZS 700,000 (approx. US$ 438) - relatively smaller than the national per capita income of TZS 881,366 (approx. US$ 551). Also, 72 (34 %) respondents their annual expenditure on food was higher than their annual income (table 15). A close look at this situation suggest that: food insecurity in West Usambara is a matter of lack of sufficient food to meet household need that is culminated by low agricultural productivity coupled with low people's economic ability to access food on a consistent basis. The situation compromises the attainment of sustainable livelihoods since it shows that the West Usambara has a vulnerable food system. BOHLE, ETZOLD, KECK and SAKDAPOLRAK (2009: 5) have pointed out that in a vulnerable food system even small disturbances may cause significant and adverse socio consequences, especially in term of food

security of the most vulnerable. Therefore, there is a need to improve the resilience of poor segment of the community in terms of attaining food security in West Usambara. This can be done through creating other-income generating activities or by giving local communities arable land where they can produce food for their sustenance. This is important because food is a significant human need. It is placed at the top in the hierarchy of basic human needs, such that lack of it is not only the sign of poverty, but is an indicator of extreme poverty in the community. A society which struggles to feed itself has difficulty in investment activities as all produce ends up eaten. This situation cannot be accepted to continue in the country like Tanzania which has enough arable land.

Table 15: Relationship between Household's Annual Income and Annual Food Expenditure in West Usambara (n =213)

Household Annual Income Category	Annual income spent on food in TZS[18]								
	Under 100,000	**100,000 - 250,000**	**250,000 - 400,000**	**400,000- 550,000**	**550,000 - 700,000**	**Above 700,000**	**Total Respondents**	**Spend above annual income**	**Spend Below annual income**
Under 100,000	2(11.8%)	5(29.4%)	1(5.9%)	2(11.8%)	0(0.0%)	7(41.2%)	17	15(88.2%)	2
100,000 -250,000	4(7.4%)	17(31.5%)	12(22.2%)	8(14.8%)	2(3.7%)	11(20.4%)	54	33(61.1%)	21
250,000 -400,000	1(3.4%)	10(34.5%)	3(10.3%)	5(17.2%)	5(17.2%)	5(17.2%)	29	15(51.7%)	14
400,000 -550,000	3(12.5%)	9(37.5%)	3(12.5%)	5(20.8%)	2(8.3%)	2(8.3%)	24	4(16.7%)	20
550,000 -700,000	0(0.0%)	3(16.7%)	6(33.3%)	3(16.7%)	1(5.6%)	5(27.8%)	18	5(27.8%)	13
Above 700,000	1(1.4%)	20(28.2%)	16(22.5%)	9(12.7%)	5(7.0%)	20(28.2%)	71	0(0.0%)	71
							213	**72(34%)**	**141(66%)**

Source: Own Surveyed Data (2012).

[18] ***During research time One US $ was equivalent to TZS 1600***.

- ***Causes of Food Insecurity in West Usambara***

The major causes for food insecurity in West Usambara include low performance of crop production and other livelihood activities. Low crop productivity causes many families to run out of food supply before the next harvest while poor performance of livelihood activities fail to compliment crop cultivation. Also, shortage of agricultural land, lack of employments and large family sizes contribute to food insecurity. The research noted a significant ($r = -0.12$, $p= 0.041$) negative correlation between number of meals eaten per day and family size. Families which had a large number of people suffered much in terms of food shortage compared to those who had few people.

Likewise, the families which had larger number of jobless people experienced food shortage than those who had few jobless. This was revealed by existence of significant ($r = -0.15$, $p =0.015$) negative correlation between number of meals eaten per day and number of unemployed in the household. The regression analysis also indicated a significant relationship between number of meals eaten per day by the household with jobless people in the household, and the total land size owned by the household. In other words, the number of people who were jobless in the family, and the size of land owned by the household were major factors which contributed to the low number of meals eaten in the household. Thus, household's food insecurity in West Usambara can partly be addressed by reducing the number of jobless people in the household and by increasing its land size.

On contrary, there was no significant relationship between family size, wealth status, and number of meals eaten in the household. Hence, in West Usambara food insecurity is experienced by all households irrespective their wealth status. Although food insecurity is widespread in West Usambara, there is a slight spatial difference between villages. Food insecurity is severe in villages of Bungoi, Magamba, Baga, Balangai, Goka, Mpanga and Mziasaa (table 16). In these villages many respondents reported to experience food insecurity for more than three months in a year.

Table 16: Average number of Months in a Year a Household Experience Food Insecurity by Locality in West Usambara (N =199)

Village	2 Months per year		≥3 Months per year		p-value
	Freq	%	Freq	%	
Mziasaa	4	19.0	17	81.0	0.0029
Baga	3	12.5	21	87.5	
Funta	6	40.0	9	60.0	
Balangai	2	13.3	13	86.7	
Bungoi	1	6.3	15	93.8	
Shashui	8	33.3	16	66.7	
Kihitu	5	31.3	11	68.8	
Goka	3	16.7	15	83.3	
Mpanga	4	17.4	19	82.6	
Magamba	3	11.5	23	88.5	

Source: Own Survey Data (2012).

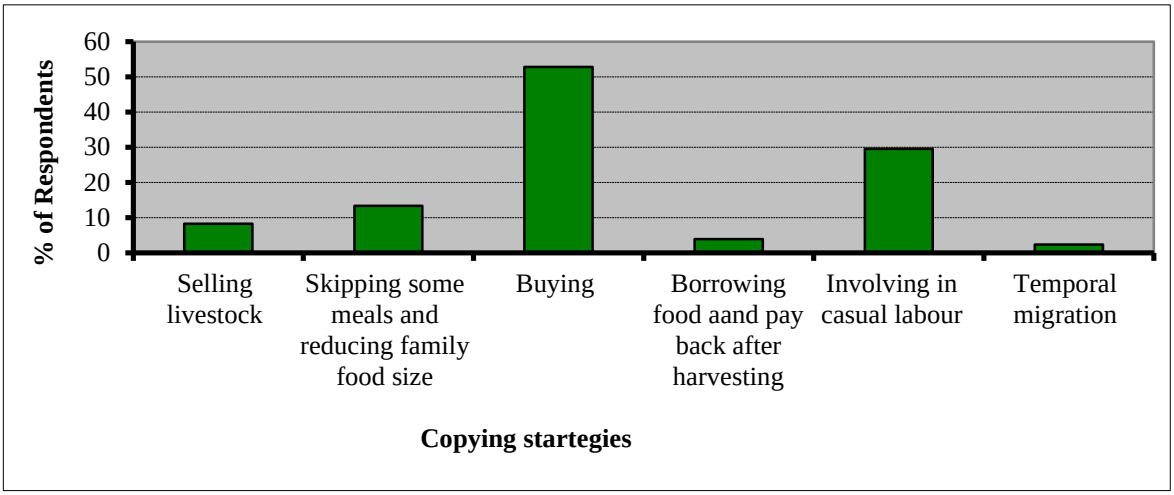
- ***Coping Strategies during Food Crisis Period in West Usambara***

In West Usambara people use different strategies to get rid from food insecurity, among them are: buying food, involving in casual labor, skipping meals, and reducing food size per meal. Other strategies include selling livestock, borrowing food to be paid back after harvesting, and temporal migration. Though all strategies are applicable it was evident that, the majority of respondents survive food insecurity through buying food, casual labor and skipping some meals (figure 25).

It should be kept in mind that, the food coping strategies that involve even selling household assets such as livestock are ineffective in poverty reduction as they erode households' wealth which has been accumulated for many years. The similar findings were observed in Mbalali District in Mbeya Region Tanzania, where poor people were found to

have the most ineffective food copping strategies which erode their asset base (MWAKALILA and NOE 2004: 39). This is inappropriate in addressing poverty reduction and calls for improving the capacity of local communities in attaining a sustainable livelihood. Indeed, until this is accepted and addressed the West Usambara communities would not escape from falling in a trap that compromises their wealth like that of selling their only assets.

Figure 25: Copying Strategies during Food Shortage in West Usambara



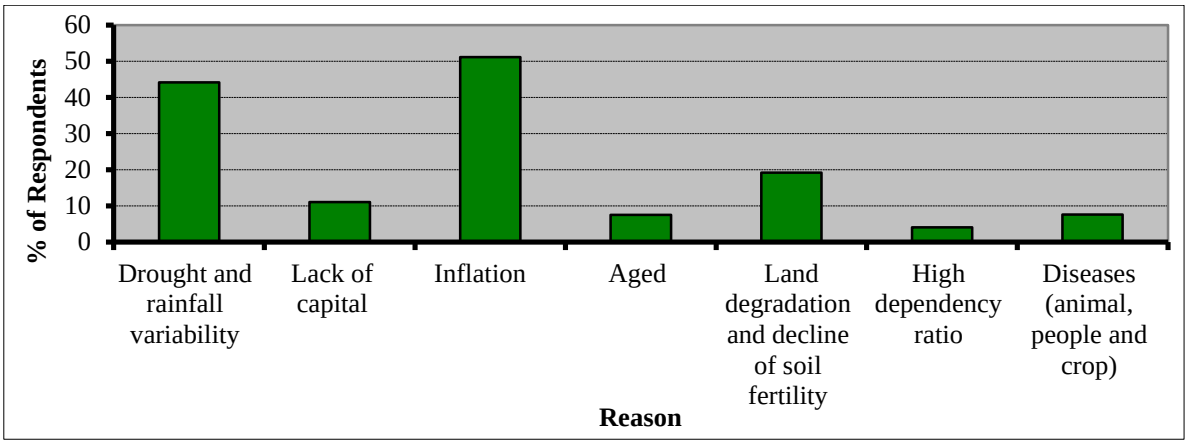
Source: Own Survey Data (2012).

(iii) The Overall Economic Situation in West Usambara

The overall economic situation of West Usambara community is low and declining. In responding to the question, *'how would you compare your overall economic situation now with five years ago?* About 180 (71 %) respondents reported their economy to decline and 38 (15 %) their economies remained the same. Only 36 (14 %) respondents reported their economic situation to improve. The economic decline was mainly attributed to drought conditions; rainfall variability; and land degradation which led to the decline in soil fertility. The overall impact is lower crop production which the majority depend on. Other factors include pest and diseases, old ages, and lack of capital for initiating sound livelihood activities (figure 26).

On top of these factors, the inflation has complicated things and the situation is being complicated by low incomes among villagers which adversely affect their purchasing power. At the time of field research the inflation rate in Tanzania was 13 %. People associated it with the world economic crisis of 2008 - 2011 (world food and financial crisis) which has not spared Tanzania. Its impacts are seen especially on higher prices of fuel which increases the cost of transportation. Consequently, the burdens of transport fall on rural people through high prices of commodities which are bought from towns.

Figure 26: Reasons for Decline of the Economy in West Usambara



Source: Own Survey Data (2012).

When the economic situation of West Usambara is compared to some criterion of poverty assessment in Tanzania, the result indicates also that the area is backward. For instance, the National Bureau of Statistics *(NBS)* consider poor people in Tanzania to include all whose consumption levels is less than *national poverty line* - which represents the cost of food and other goods which is usually consumed by poor households worth TZS 13, 998 (approx. US$ 9) per person per 28 days, or approximately TZS 500 (approx.US$ 0.31) per person per day. When this figure is related to the consumption costs of 7 people (an average household size in West Usambara) for 28 days, it amount to TZS 98,000 (approx.US$ 61). This translate to TZS 1,176,000 (approx.US$ 735) annually. Consequently, 170 (67 %) respondents in West Usambara earn annual income below this poverty line as their annual income is less than TZS 700,000 (approx. US$ 438). Although, *income and expenditure indices* have some weaknesses still they give some indicative on socio-economic situation of the community.

6.7 Summary of major Findings

Generically the following key findings are identified from the preceding analysis and discussion:

- Land scarcity is critical problem in West Usambara. This has led to allocating nearly all land to crop production leaving very little land for other activities such as woodlots, fallowing, tree crops, garden and renting. Overall, its impacts are seen on increase in the price of agricultural land which has also brought changes in traditional land tenure of *Shambaa*. Also, it compromises the performance of *livelihoods strategies* hence hindering the attainment of sustainable livelihoods. Un-sustainable livelihoods in West Usambara are especially manifested in form of *decline in agricultural productivity*, *low wealth accumulation*, *food insecurity*, *low savings*, and *low diversification of livelihood strategies*. On average food insecurity is experienced for duration of two to six months in a year which is a long period.

- Most agricultural challenges prevalent in West Usambara emanates from land scarcities. The problems such as pest and diseases, drought conditions, drop of crop productivity, waning of soil fertility, and land degradation are all connected to scarcity of arable land.

- The large section of West Usambara community is incapable to withstand natural and human induced shocks (e.g. decline in soil fertility, land degradation, erratic rains, diseases, food shortages, and world economic malaises).

- The other-income generating activities (off-farm activities) relatively generate higher income compared to the major livelihood strategies (e.g. crop cultivation). However, chances for one to engage in them are little due to lack of capital, weak support from available credit facilities, and other social networks. This has forced the majority of people in West Usambara to depend entirely on crop production which again is falling.

7 Community Efforts to address Land Scarcity Problem in West Usambara

This chapter addresses the second objective of this research i.e. exploring the measures taken by the West Usambara community in addressing the scarcity of arable land and their outcomes. Thus, it aims at appreciating different responses by the local communities following impacts emanating from land scarcity on *livelihood strategies*. The chapter starts by presenting different efforts from different levels - starting from an individual, village government, and the Lushoto District in addressing land scarcity problem. It also shows how land scarcity has intensified land competitions leading to conflicts over land. In this respect, natures of land conflicts in West Usambara and resolution mechanisms are presented. In this light also the efficiencies of the *village land councils, the ward land tribunals* and *the district land and housing tribunal* in resolving land disputes in this area are discussed.

7.1 Individual Efforts to address Land Scarcity in West Usambara

Different strategies are taken by the local communities in West Usambara to cope with land scarcity. Among them are: land intensification[19] in the form of application of fertilizers, mixed farming, and alternating different crops on the same field based on seasonal of the year. Others are buying and renting land; looking for land elsewhere outside West Usambara; initiating other- income generating activities; and family planning. About 229 (90 %) respondents practice land intensification, especially application of chemical fertilizers and farmyard manure. Respondents pointed out that, at present soil fertility in many fields is low and without application of fertilizers it is difficult to harvest enough crops.

[19] ***Intensive Agriculture:*** is defined as a process whereby inputs of capital or labor are increased in order to raise the yield (output) of a fixed land area over a period of time. There are two ways of intensifying agricultural production: by increasing inputs of capital or labor. Capital intensive agriculture is dependent on high inputs of capital such as machinery, energy and biotechnology, while labor intensive agriculture is primarily dependent on high inputs of manual labor (BÖRJESON 2004: 22).

Land Intensification in the Context of West Usambara encompasses permanent cultivation of the same plot of land, which involves among others application of high input of manual labor, artificial fertilizers, farm yard manure, mixed farming, alternating different crops on the same field, and other soil conservation measures such as terracing, contour farming, and agroforestry practices.

The farmyard manure is preferred by the majority of peasants than artificial fertilizers since it is much cheaper. Thus, about 108 (47.0 %) and 213 (92.6 %) respondents applies artificial fertilizers and farmyard manure respectively.

Although the majority of respondents apply farmyard manure it has its own challenges. Such challenges are especially regarding its availability which is low and difficult in transporting it. Villagers contended that, farmyard manure is required in large quantities to produce a meaningful agricultural yield and its availability is low given low number of livestock in West Usambara. Also its transportation is cumbersome due to mountainous nature of West Usambara. As results, 9 (24 %) respondents reported to apply neither artificial fertilizer nor farmyard manure.

Similarly, about 200 (78 %) respondents practice mixed farming while monocropping and alteration of crops in the same field are practiced by 103 (40.6 %) and 34 (13.4 %) respondents respectively. The mixed farming is much preferred because, it facilitate different crops to complement each other in times of weather failure by spreading the risks of crop failures. On the other hand, the alteration of crops is facilitated by bimodal nature of rainfall which West Usambara receives. Different crops are cultivated depending on the moisture requirements. Short rains begin in october to december while long rains start from march to june. Hence through spreading different types of crop over time the livelihood diversification is enhanced. Also it helps to avoid risks such as drought. Consequently, the land in West Usambara is intensively used, and is mainly done for increasing agricultural production to feed the growing population. However, these strategies have failed to produce enough agricultural produce for sustenance and surplus for income as already discussed under section 6.5 in previous chapter.

Another notable step to address land scarcity in West Usambara is looking for agricultural land from other areas outside West Usambara. About 18 (7.1 %) respondents reported to have obtained agricultural land in Korogwe, Kilindi, and Handeni districts in Tanga Region. However, many of these people have not migrated permanently to these districts. Instead, they do circulatory migration. During cropping season they go to these districts for farming on

short term. It was also noted that some of them have faced a lot of challenges in terms of developing such land due to lack of capital. Such a situation has started to demotivate others from looking arable land in other places. This was observed in Mpanga village during an in-depth interview with Mr. Juma, who reported that:

> "I was able to get land in Kilindi District but, failed to develop it since I had no enough capital. The situation forced me to return back in my home village. This has discouraged other villagers to look for alternative land especially outside West Usambara. Bad enough my fellow villagers are laughing at me, something that makes me feel ashamed and embarrassed".

Juma's situation gives a lesson that, although some villagers would like to engage in agricultural activities in any place, capital is a main challenge. Therefore, there is a need to assist them in forms of agricultural credits. Generally, individual efforts to address the problem of land scarcity have a very little impact in solving land problem in West Usambara. Hence, the majority of people in this area are still concentrating on small land leading to an increase in competition over crop land ending up in land conflicts.

Also, it is better to keep in mind that, although some forms of land intensification like mixed farming are recognized to have advantages such as: increasing productivity per land unit, diversification of labor hours, weed control, adaption to climate variability and avoiding the negative impacts of plant diseases (OYAMA and KONDO 2007: 131), other forms of land intensifications cause detrimental impacts on soil in the long term. For instance, land intensification that involves prolonged cultivation of the same land like in West Usambara has and will accelerate the loss of soil fertility. In particular the long term effects will be on soil quality since land intensification in this area relies much on chemical fertilizers. Research shows that much use of chemical fertilizers is not sustainable as they are associated with salinization, soil acidification and the long term loss of soil fertility (STOREY 2003: v). Additionally, continuous cultivation of the same fields with the same crops is connected to the outbreak of plant diseases. About 127 (40 %) respondents reported plant diseases among the major problems which compromises agricultural production. They argued that the problem of plant diseases is even becoming difficult to control.

Therefore, land intensification in West Usambara arises from land scarcity problem. And it is quite different to what is seen in Mbulu highlands in northern Tanzania where land intensification is also practiced. In this area agricultural intensification is due to self-reinforcing process of change and not the consequences of land scarcity. And is mainly done to compliment livestock activities which require large land area (BÖRJSESON (2004: 158-161). Consequently, any steps to address agricultural problems in West Usambara should start first with addressing the land scarcity problems.

7.2 Initiatives by Village Governments and the District Council to address Land Scarcity

The villages' governments and the Lushoto District Council have done little to solve problems of land scarcity, especially by looking an alternative agricultural land somewhere else outside West Usambara. So far, there is no attempt which has been done by the District Council; particularly in asking for arable land from the central government. The supports given to the villagers are in the form of advice. Such advices include, asking villagers to look agricultural land elsewhere outside West Usambara and promoting agricultural extension services which entail land intensification.

However, the agricultural supports are very limited in scope due to low budget. Limited support of agricultural extension services can be appreciated from the Lushoto District Agricultural Development Plan *(DADP)* for 2012/2013 financial year. In this plan the Lushoto District Agricultural Office is planning to promote agriculture in 6 villages only out of 207 villages which form the district. Bad enough the program is intended for just two crops (i.e. Irish potatoes and paddy). This is very misfortune especially for the poor peasants.

7.3 Land Conflicts in West Usambara

Conflicts over land [20]are prevalent in West Usambara though they have not escalated to many deaths as commonly seen in other places of Tanzania especially between pastoralists and agriculturalists, and in neighboring country Kenya which experience violent and strife conflicts over land (see MGHANGA 2010; SIMIYU 2008; Tanzania Daima 12 january 2014). About 151 (59.4 %) respondents reported to have experienced conflicts over land in their villages. Of the nature of these conflicts is related to disputes over field borders, land invasions, inheritance, and selling of one plot to more than one person.

(i) Conflicts on Field Borders

Conflicts on field borders are wide-spread and were reported by 118 (78.1 %) respondents (table 17). The villages' leaders commended that, people are so sensitive and emotional when it comes to land or farms in West Usambara. In some occasions trespassing of a few centimeters to one's field tends to escalate into a big conflict. This affirms that the major driver for land conflicts is land scarcity which has intensified competition among land users. It should be kept in mind that, although land conflicts in this area have not yet culminated in so many deaths as commonly reported in other communities in Tanzania it is economically detrimental. This is because conflicts over land break the trust in the community which is essential to production. Indeed, wherever the misunderstanding over the *user rights* on land surfaces the contesting parties fail sometimes to invest on land. This makes land to remain idle or underutilized. Consequently, non-violent conflicts require attention just like violent one since all undermine the performance of *livelihood strategies* and attainment of sustainable livelihoods.

[20] ***Land Conflicts***: In the context of West Usambara, land conflicts encompass all forms of misunderstanding on ownership or user rights over a piece of land between different land users (mainly between individuals). Such conflicts arise due to miss-agreement on field borders between adjacent peasants, miss-agreement on inheritance among relatives, land invasions, and double selling of the same plot. In most cases conflicts are manifested in forms of words fighting, physical fighting, or taking the dispute to machinery organs responsible for land dispute resolution such as: the *village land councils, the ward tribunals, the district land and housing tribunal* and *court*.

Table 17: Prevailing Land conflicts in West Usambara

Nature of Conflict	Freq	%
Border conflicts	118	78.1
Invading ones land	33	21.9
Inheritance conflicts	23	15.2
Selling the same plot of land to more than one person	10	6.6

Source: Own Survey Data (2012).

(ii) Conflicts Related to Land invasion

Land invasion was second after field borders in causing land conflicts. Conflicts of this nature take place in two ways. First, happen on the field of someone when that person is absent in that area for a long time, whereby upon returning back home they find someone has already occupied their land. Legally this is known as adverse possession. Secondly, someone can willingly allow one to cultivate the field for a short time. But it sometime happens people refuse to give it back to the owner when required to do so hence causing conflict.

(iii) Conflicts Related to Inheritance and Double Selling of the Same Field

The other forms of conflicts over land in West Usambara are related to inheritance, and selling the same field to more than one person. In the former it was reported that, one family member can deny to share the inherited land with other family members. In Funta Village, the dispute of that nature culminated to the death of the Agricultural Officer Mr. Mosha Exaud in 2008 who bought a piece of land from Mr. Ibrahim Saidi. However, such land was surrounded by inheritance conflict to the extent that Mr. Jabil Saidi a brother to Ibrahim killed Mr. Mosha.

Consequently, a close look at the natures of land conflicts in West Usambara show that, though they take different forms they all largely spring from land scarcity. The situation is becoming worse as the majority of people depend much on land for grounding livelihood activities. Thus, scarcities of land increase competition on small land available ending-up in land conflicts.

7.4 Land Dispute Resolution Mechanisms and their Efficiencies

The resolution of land disputes in West Usambara is done in accordance with the directives of the Land Act Number 4 of 1999 and the Village Land Act Number 5 of 1999 as discussed under section 4.4. All study villages has *village land councils* and in every ward there is *ward tribunal* which listen appeal cases on land that originate from village level. There is also one *district land and housing tribunal* in the whole Tanga Region that is responsible to resolve appeal cases on land that originate from ward level. All respondents were aware on the existence of these land machineries organs and the procedures which one is required to follow for resolving land disputes.

When respondents were asked, *"how land conflicts are handled in your village?* They reported that: cases are resolved by *village land council* and *ward tribunal* 103 (68.2 %); elders consultation at family level 51 (33.8 %); and or taking a case to the court 34 (22.5 %). Based on these findings it is evident that, the customary laws are still predominant and widely practiced in West Usambara in resolving and administering land issues. This is because although *village land councils* and *ward tribunals* are recognized by court of law their administration is done by villagers who have no any legal training on land laws and or statutory laws regarding land administration.

Regarding the level of performance of *village land councils* and *ward tribunals* mixed results were observed. About 92 (36.4 %) respondents are very satisfied with their performance. However, 62 (24.4 %) respondents were moderately satisfied; 42 (16.5 %) were unsatisfied; while 58 (22.8 %) had no information on their performances. The reasons for dissatisfaction were associated to the lack of legal education on land issues among councils

members 62 (60.2 %); delay of cases 52 (50.5 %) and corruption behaviors 45 (43.7 %). The lack of education was particularly seen on the members of *the village land councils* and *the ward tribunals*. The village's leaders reported that, the government has not yet provided members training on legal issues regarding administration of land matters. Hence personal experiences and customarily laws are mostly used in settling land disputes. The criteria that are used in considering for one to become a council member are basic education, self-discipline and wise-ness of a person.

Furthermore, councils' members are not paid wage and almost have no financial support from the government to carry out their duties. The land disputes especially at the village and ward levels are financed by the complainants themselves. For instance, at Mziasaa Village it was reported that, a complainant is required to pay TZS 20,000 (approx.US$ 13) to TZS 30,000 (approx.US$ 19) just to visit the area of conflict *'locus in quo'*. Such amount is big given the low economic level of West Usambara community and the fact that land conflict might happen when one is not in a good financial situation. Hence, the situation might compromise the provision of rights especially if one has no financial capacity to finance the case. Such practice was also seen as a one source of corruption.

The similar observations were revealed during in-depth interview and discussion with land experts and advocates who are based in Lushoto town. In giving an account on efficiencies of *village land councils* and *ward tribunal* in addressing land dispute in Lushoto District, Mr. Khery Sanga, an advocate pointed out that:

> "Their efficiencies are still very low, or at a minimal stage. This is due to various factors including the lack of education with regard to land laws and corruption behaviors. Also, members of the *villages land councils* and *ward tribunals* use their own experience in resolving land disputes which might be wrong. This is especially prevalent in *village councils*. However they are helpful in some way because those who cannot afford to go to the *district land and housing tribunal* at Korogwe normally get the help of these lowest machinery organs of solving land disputes". (An in-depth interview with Khery Sanga, 20 july 2012).

Consequently, these setbacks have contributed to the poor performance of *village land councils* and *ward tribunals* leading to an increase in applications of appeals cases at the *district land and housing tribunal*. Such an increase in appeal cases echoes two things. First, is an indication that the lowest machinery organs are poorly performing since are expected to resolve most of land disputes which emanates at village level. Secondly, it shows that most people are not ready to give-up their rights which they claim on land, such that are prepared to incur costs to safeguard them through appeals.

These circumstances have led to overtax of the *district land and housing tribunal.* In less than three years from january 2010 to june 2012, about 1,809 land disputes are pending in this tribunal (table 18). The situation is compounded by the fact that, the tribunal has an inadequate number of personnel and other facilities like car for visiting the area of conflicts *'locus in quo'*. At present, it is served by one Tribunal Chairman, one Clerk and one Secretary. This is despite the fact that the area of operation is big – which is the whole Tanga region. The Tribunal administration was of opinion that, at least it could be provided with one more Chairpersons, Tribunal Clerk, and Typist. Car is also essential given the expanse of operation area.

Additionally, the *district land and housing tribunal* has registered many land cases from other districts in Tanga Region such as Handeni and Kilindi which currently are considered to have enough arable land. However, unlike appeal cases from West Usambara which is related to land scarcities and do exist between individuals, in Handeni and Kilindi Districts the natures of conflicts are related to mismanagement by the government and investors. Such mismanagement includes lack of genuine compensation, empty promises by investors, forceful eviction of the people by the government, and invading land of natives by immigrants. These findings correspond to what have been discussed under sections 4.5.2 to 4.5.5. Consequently, the *district tribunal* receives almost equal number of cases from all districts of Tanga Region. This is a very alarming situation which needs immediate attention.

Table 18: Number of Land Cases Applied at the District Land and Housing Tribunal

Year	Case Type	No. of Cases	Cases Disposed	Pending Cases
January-August 2010	Main application	48	9	39
	Appeals from Ward Tribunals	148	38	110
	Miscellaneous application	34	5	29
Total		**230**	**52**	**178**
January-December 2011	Main application	79	45	39
	Appeals from Ward Tribunals	178	198	110
	Miscellaneous application	34	5	29
Total		**291**	**248**	**178**
January-June 2012	Main application	64	44	486
	Appeals from Ward Tribunals	134	112	877
	Miscellaneous application	105	81	446
Total		**303**	**237**	**1809**

Source: Own Compilation from the Korogwe District Land and Housing Tribunal Case Register (2012).

Notes: ***Main Application:*** Refer to cases which have been initially instituted in the district land and housing tribunal which are having the monetary value of TZS 3,000,000 (approx.US$ 1,875) up-to TZS 50,000,000 (approx.US$ 31,250).

Appeals from Ward Tribunals: Refers to cases which come from dis-satisfied individuals at ward level. ***Miscellaneous Application:*** Type of minor applications which emanate from concluded main application and ward tribunal decision such as execution of decree, bill of costs etc.

7.5 Villagers Opinions on How to address Land Scarcity in West Usambara

The scarcity of arable land has made the community concerned about what will happen in future. Such fear is particularly seen among elders who are responsible for giving inheritances to the next generation which in most cases are in the form of land for cultivation. As a result, villagers are now suggesting that the central government should think earmarking for them agricultural land in other areas. In this regard, 125 (49.2 %) respondents are willing to migrate to other areas for agricultural land. The number of respondents who are ready to move is almost similar in all villages; with a slight higher number at the villages of Baga, Funta, Bungoi, Shashui, Mziasaa, and Magamba (19). Similarly, people had an opinion that, apart from providing them with agricultural land the government should also think to provide agricultural credits. This is because few people from West Usambara who were able to secure land in other areas have failed to develop it because of lack of capital.

Table 19: Respondents Suggesting the Government to allocate them Land outside West Usambara by Locality

Village	Freq	%
Mziasaa	10	45.5
Baga	20	69.0
Funta	14	60.9
Balangai	7	36.8
Bunghoi	13	56.5
Shashui	16	47.1
Kihitu	5	26.3
Goka	13	59.1
Mpanga	11	39.3
Magamba	16	45.7

Source: Own Survey Data (2012).

Further, there is a disparity between people who were proposing the government to provide them land from outside West Usambara among age groups. The age group 45-54 and 55+ showed much interest on this option (table 20). This is because, such age categories are feeling much worries on impact associated with land scarcities as are responsible to give their youth inheritance which in most cases are in the form of arable land.

Table 20: Respondents suggesting to obtain Land from outside West Usambara by Age Categories

Age group	Freq	%
15-24	1	10.0
25-34	21	39.6
35-44	31	49.2
45-54	27	51.9
55+	45	59.2

Source: Own Survey Data (2012).

On contrary, about 129 (50.8 %) respondents were not ready to migrate to other places for land reasons. Their reasons include, un-readiness to start new life afresh in new area; old age; having no problem of land; hot climatic condition, lack of water at some districts which are usually suggested by the Lushoto District Council (e.g. Kilindi and Handeni Districts); and uncertainty of government plans (table 21). Hence, they had different suggestions such as: conserving the available land to maintain its productivity 40 (15.7 %); reducing the size of forestlands to give room for agriculture 28 (11 %); provide them with credits to start-up the off-farm activities13 (5.1 %); and family planning 11 (4.3 %).

Table 21: Reasons for being not ready to migrate

Reason	Freq	%
Not ready start life afresh	48	47.1
Aged	34	33.3
Have no problem of land	21	20.6
Hot climate of some districts proposed	14	13.7
Un-seriousness of government programs	5	4.9

Source: Own Survey Data (2012).

Among this group of people who were not ready to migrate, few showed so much fastened to their ancestral land. Such that they completely against any idea to migrate despite existing challenges posed by land scarcities. In Bungoi village, some heads of households were even not ready to reveal the information on assets their owning despite the explanation on the intention of the research. They suspected the exercise with the preparation to move them away from their homeland. Fastened to their homeland were in particular discovered when respondents were asked a question *"if the government would decide to give you land in other district would you be ready to migrate from this area?"* Where some responded that:

> "One's home remains a 'home' regardless of its status. Vacating from home is a cumbersome process as it involves evacuation of property and lives. Also our children are against it and may sneak out to town upon hearing of vacating plans". (An interview with Habiba Saidi on 15 march 2012 at Balangai Village).

> "I was born in this place and will die right here; where my parents are laid to rest". (An interview with Mr. Richard Mdoe on 17 march 2012 at Magamba village).

> "One fits well in his/her place of birth than elsewhere. We will remain and continue to clog-up here. You can go to the foreign land and end-up dying with diseases". (An interview with Rehema Salimu on 17 march 2012 at Magamba Village).

> "I will not leave this place while I'm still alive. This may only happen when my life ends and I'm translated to heaven/paradise". (An interview with Asia Athumani on 17 march 2012 at Magamba village).

These points of view show how difficult it is to disassociate some people from their ancestral land. They also give an impression on the importance of land and accord with what have been argued by Owens that, 'land gives people a sense of place and history as already discussed under section 2.1. Indeed, for some people nothing matter like home. Even if their homeland is packed with problems they are not ready to leave it. Such people are determined to live and die at their home places as they consider to fit better there than elsewhere.

Consequently, they continue to remain in ancestral land. The overall result is unsustainable land intensification and land fragmentation which is uneconomical. Also, more pressures on small available land leads to land competition and conflicts. Hence, the disparities on views regarding how to address land problem in West Usambara caution that: any assistance to attain sustainable livelihoods in this area should base on what matters to the people. This is because they know their circumstances much better and which kind of livelihood pathways they would help them to get rid out of poverty.

7.6 Summary of major Findings

The following findings are summarized from the foregone analysis and discussion:

- To cope with land scarcity problems the local communities in West Usambara have opted land intensification, which is mainly done to maximize more production for the growing population in a small available land. However, this strategy has failed to address the problem of food security.

- Land intensification in West Usambara depends mainly on application of chemical fertilizers and continuous cultivation of the same land. Such practices have long term negative impacts on soil fertility.

- The possibilities of increasing arable land within West Usambara are very slim. Hence people compete on small arable land something that has opened land conflicts especially on field borders.

- The efficiencies of *village land councils* and *ward tribunals* in addressing land disputes are still low. This is due to various factors including the lack of education with regard to the land laws and corruption behaviors. As a result, appeal cases are accumulating at the *district land and housing tribunal*.

- There is an increase in the number of people from West Usambara who are desperately in need of agricultural land and are ready to migrate to other districts for land reasons. In this respect, about 49.2 % of respondents are suggesting the government to earmark them land in other areas. However, despite this fact, some people are not ready to move away from their ancestral land. Therefore if such a plan is implemented it should be done on voluntary basis.

- Earmarking agricultural land to people in need is not sufficient to solve their problem. Instead, for achieving the desired goal of poverty reduction the process should go hand in hand with the provision of agricultural credits. This is because few people who managed to get land in other places by themselves failed to develop them due to the lack of the capital.

8 Forest Management in West Usambara

This chapter presents and discusses issues of forest management in West Usambara**.** It has two sections. The first section explains how forests are managed and the second section provides information as to how forests are accessed and utilized in West Usambara. In short the chapter aims at providing the preliminary information which is important in answering objective three and four.

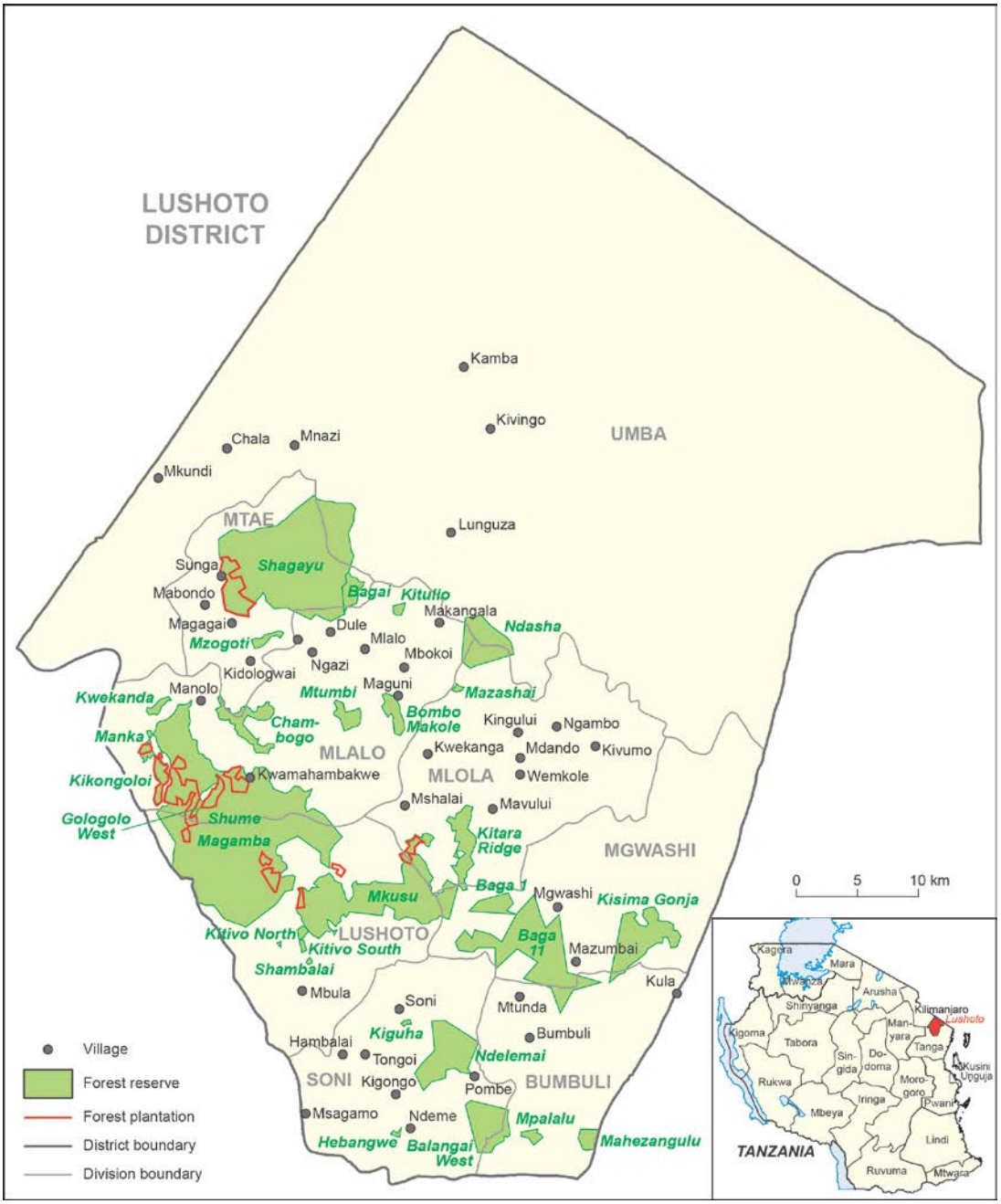
8.1 Forest Ownership and Tenure

Nearly all natural forests in West Usambara are reserve forests where production of all kinds is strictly restricted. The forest utilization especially for timber was stopped in 1986 as a way to address degradation which was higher then. During the colonial time large scale forest clearance to give way to tea and coffee cultivation was higher (KIKULA 1989: 84 – 85). In late 1800s the Germany colonial administration was ready to give the land tittles to dozens of setters amounting up-to 200 hectares for coffee plantation (MASCARENHAS 2000: 14). This is because the soil type characterizing the area is *Eutoric nitosal,* which is considered to be the most fertile in the tropics (FAO 2000 as cited in TOKO 2005: 586). Such soil type has attracted agricultural activities since colonial time leading to a reduction of forest area. About 84 % of the original forestland in West Usambara has been cleared; such depletion is associated with the extinction of approximately 34 % of the local species (NEWMARK 2000: 4). Research reports that at present about 320 Sq. Km of natural forestland remains in West Usambara (PRESTON 2011: 7). These forests have been so fragmented due to human disturbances and now are in the form of isolated patches (map 7).

The decrease in forest area in this area was also compounded by logging activities. The West Usambara forests consist of tree species which produce valuable timber. During colonial times logging was high and it expanded after the Second World War (HAMILTON and MWASHA 1989: 41, 46). And just between 1954 and 1976 about one third of natural forests in West Usambara were already cut by the Tanga Development Program (TOKO 2005: 589). In Shumemagamba Forest Reserve alone for example, the British government granted a 100 year concession to one saw mill to exploit 69,000 acres of forestland (HAMILTON and MWASHA 1989: 41, 46). At present the Tanzanian government has reserved all natural forests in West

Usambara. However, despite such measures, the area is still experiencing a considerable disturbances arising from high population density which rely heavily on primary activities as it will be seen latter.

Map 7: Forest Reserves in West Usambara



Source Own (2012).

Types of Forest Tenure

Four types of forest tenure and ownership are recognized in West Usambara. These are: (i) *the national forest reserves (NFR)* under the central government; (ii) *the village land forest reserves (VLFR)* under the village authorities; (iii) *the local authority forest reserves (LAFR)* under the district council; and (iv) *the private fores*ts, which are either owned by an individual or private organization. Normally an individual and private organization own planted woodlots, though some tea estates also own natural forests which fall within their leased land.

In total about 12 % of the Lushoto District (44,000 ha) is covered by natural forestland, of which 41,000 ha (93.18 %) is under the authority of central government. The District Council owns 1,200 ha (2.7 %) and the village authorities own 1,800 ha (4.09 %) (LUSHOTO DISTRICT COUNCIL 2010: 27). In addition, West Usambara has 6,800 ha of plantation forests which are mainly dominated by *eucalyptus* and *pines* species. These plantations are under the authority of central government. Consequently, other forests stakeholders in West Usambara have been given very small areas of forestland to manage. This is despite the low capacity of the central government to manage these forests.

(i) The Central Government Forest Reserves (CGFRs)

All forests under the central government authority are reserve forests (protected). However their management faces a lot of challenges. This is due to two reasons. First, they are larger in size, hence making it difficult to patrol and monitor them. Secondly, the local communities surrounding them are still relying on these forests for fuel wood and timber. The situation is complicated by lack of job opportunities in West Usambara which attracts people to see timber extraction as an alternative opportunity. These factors and others encourage illegal logging inside reserves. In describing the management situation of forests in the Lushoto District, the Lushoto District Forest Offer pointed out that:

> "The capacity of the government to manage these forests is low. To a large extent, their management depends on donor funding, *NGOs,* and adjacent forest communities. At present finance is obtained from the government and donors such as the government of Finland. Mainly the funds from the central government are largely used for paying

> government officials who are working with the forest department. Just in rare cases the government provides finance to implement various forest programs designed at the district level but, in most cases such funds are very limited and do not reach the office on the right time hence hindering their implementation". (An interview with the Lushoto District Forest Officer, august 2012).

In order to address those shortcomings all forest reserves under the central government are managed through Joint Forest Management *(JFM)*[21]. The bordering villages to these forests in collaborations with the government have initiated the forest committees and forests guards for patrolling forest areas and checking all illegal activities on behalf of the government. However, contrary to what many people would expect the government has not yet signed contracts on Joint Management Agreements *(JMA)* with the villagers. Out of 12 forest reserves which fall under the authority of the central government, only one forest reserve has a *JMA* with the villagers (table 22). This leaves questions regarding the commitment of the government to work with the local communities and particularly its readiness to implement its national forest policy (1998) which advocates the decentralization of forest management.

Such doubt increases given the smallness of forestland which has been entrusted to other forest stakeholders to manage in West Usambara. For example, while the central government has 12 forest reserves which are large in size, the Lushoto District Council own seven forest reserves which are smaller in size (table 23). In the same way, forests under the village authorities are smaller and many have remained unsurveyed (table 24). This is contrary to the Tanzania National Forest Policy (1998), the National Forest Program (2001), and the Forest Act (2001) which sees decentralization of forest management as an alternative mean to attain sustainable forest management. One would question *'how forest decentralization can be*

[21] ***JFM***: Is a collaborative forest management approach which divides forest management responsibility and returns between the forest owner (usually central or local government but occasionally the private sector) and forest adjacent communities. It takes place on land reserved for forest management such as National Forest Reserves (for catchment, mangrove or production purposes) and Local Government Forest Reserves or Private Forest Reserves. (BLOMLEY 2006: 4).

implemented in a situation where other stakeholders are given very small sections of forestland to manage?

Table 22: Protected Central Government Forest Reserves in West Usambara

Forest name	Size (ha)	Number of bordering villages	Estimated population	Whether or not management agreement between villagers and government has been signed
Shumemagamba	12,276	17	52,404	Yes
Shagayu Forest	7,830	13	18,141	Not yet
Balangai Forest	990.6	8	9, 516	Not yet
Mwenigombero	1,030	2	8,894	Not yet
Kisimagonja	1,423.6	4	11,220	Not yet
Baga Forest	1,8164	12	7,034	Not yet
Kwekanda	98.8	4	29,145	Not yet
Kikongoloi	245.2	2	No data	Not yet
Ndelemai	1,421.6	7	11, 920	Not yet
Mahezangulu	322.0	2	14,564	Not yet
Bumba Mavumbi	1,044	1	8,894	Not yet
Manka	135.6	1	No data	Not yet

Source: Own Compilation from the Lushoto District Forest Office Data (2012).

The findings of this research correspond to what is reported in Uganda, Senegal, Nepal, Cameroon, Indonesia, Bolivia, and Nicaragua (RIBOT, AGRAWAL and LARSON 2006). Although these countries have enacted forest policies that advocate the decentralization of forest management to the local communities, such reforms are being done without sufficient power transfers to the local communities. In Uganda although government advocate decentralization of forest management to the local communities, it re-appropriates them at the same time by

adopting contradicting laws, such as one which requires forests reserves with an area of more than 100 ha, and including mines, minerals, and water resources to be under the control of the central government (RIBOT, AGRAWAL and LARSON 2006: 1869).

Like in Uganda, in Senegal it is reported that, the Minister and Forest Services interferes communities rights to make decisions on forest commercial production, and to allocate access to productive opportunities (RIBOT, AGRAWAL and LARSON 2006: 1867-1869). Similarly, in Cameroon it is reported that, the procedures for setting up community forests are very difficult. The decentralization of forest management is limited to 5,000 hectares and the government has retained the rights to trees and land (COTULA and MAYERS 2009: 19). The case of Cameroon again begs a question. *How can the government be ready to devolve management rights to the community whilst still reserving rights to trees and land?* This is unproductive because forest management is associated with a lot of costs. Such costs for well-managed forests include amongst others, foregoing utilization of its products, participation in fire extinguishing, and sometimes destruction of crops by wild animals when their numbers increases due to improved forest qualities.

(ii) Forest Reserves under the District Council in West Usambara

As with forests under the central government, the district council has opted for *JFM* with villagers. However, unlike the former, it has signed *JMAs* with villagers in four forests out of seven. Despite signing *JMAs* the local communities have not profited economically by taking part in conservation. This might be because no production is allowed in these forests because are reserves (table 23). Also, the forest management plans, the forest by-laws, and the participatory forest assessment have been established. These are used as tools to facilitate forest management. Consequently, every village close to these forests has been entrusted to manage the forest area that fall under their sphere of influence.

Table 23: District Forest Reserves in West Usambara

Forest name	Forest status	Hectares	Number of bordering villages	Estimated population	Whether or not management agreement between villagers and government has been signed
Baghai	Protected	234.7	2	14970	Yes
BomboMakole	Protected	263	5	23986	Yes
Kitara Ridge	Protected	388	5	11,311	Yes
Mtumbi	Protected	304	5	26,992	Yes
Hebangwe	Protected	33.6	2	16056	Not yet
Kwenyashu	Protected	16.2	2	No data	Not yet
Shambalai	Protected	21	1	23256	Not yet

Source: Own Compilation from the Lushoto District Forest Office Data (2012).

(iii) Village Forest Reserves in West Usambara

In West Usambara some villages have reserved their remaining forest patches. Out of 16 forests that fall under village authorities only six (38 %) are under production (table 24). This shows the high interest of West Usambara communities in conserving forests. Such decisions are partly due to the fact that the area suffered widespread degradation in the past. Hence, it motivated large section of the community to see the importance of forest conservation. However, most of villages' forests are unsurveyed. Out of sixteen forests, only six have been surveyed. This is because villagers have low capacity in terms of finances and technical know-how regarding carrying out forest surveys. As a result, are motivated to enter into collaboration with the None Governmental Organizations (*NGO)* or the District Forest Department to manage their forests. In many cases *NGOs* and the Forestry Departments provide technical assistance especially in formulating the Community Based Forest Management *(CBFM),* forest by-laws, and in conducting forest assessments for understanding forest status in terms of biodiversity. In this respect, the Tanzania Forest Conservation Group

(TFCG) - a local *NGO* committed to protect natural forests with high biodiversity in Tanzania has played a commendable role in the whole area of Eastern Arc Mountains.

Table 24: Village Forest Reserves in West Usambara

Forest Name	Forest status	Forest (ha)	Number of bordering villages	Estimated population
Chambogo	Protected & Production	605	7	26, 992
Mzoghoti	Protected	154	4	15,388
Kiguha	Protected	34.1	1	10,138
Hande	Production	67	2	10,138
Dindira	Protected	80	2	11,311
Yumbu	Protected	250	1	17,959
Sekighoto	Protected	Not surveyed	1	6,554
Shukila	Production	Not surveyed	1	23,556
Tanda	Protected	Not surveyed	2	12,709
Deai	Protected	Not surveyed	2	No data
Kwamongo	Protected & Production	Not surveyed	4	11, 920
Kwegogwe	Protected	Not surveyed	2	3778
Ngala	Protected	Not surveyed	2	No data
Ngulu	Protected	Not surveyed	4	No data
Kifulilo	Production	Not surveyed	6	14,970
Kinkompanda	Production	Not surveyed	3	11,311

Source: Own Compilation from the Lushoto District Forest Office Data (2012).

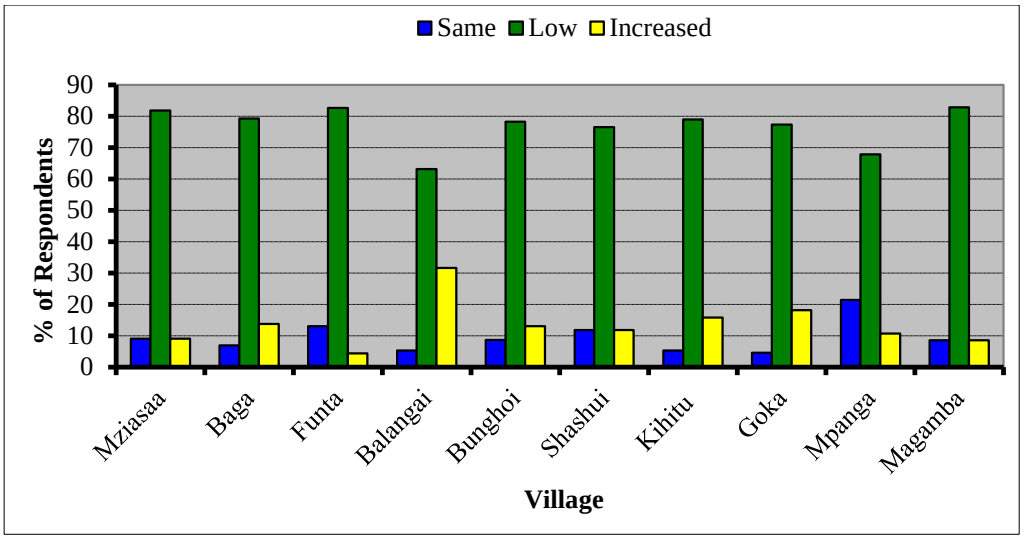
8.2 Forest Utilization in West Usambara

The access to the natural forests in West Usambara is restricted as already pointed out from the outset. Forests guards and environmental committees which have been formulated under *JFMs* have enhanced forest protection to some extent than it used to be when forests were solely under the forest government department. The villagers are only allowed to collect dead wood for fuel wood twice a week, and in some places even wood collection is not allowed. Timber production can only be harvested for village developmental activities such as construction of village buildings like school and dispensary, and only upon receiving permit given by the District Commissioner and the District Forest Department.

In responding to the question, '*how would you explain the access to the forests in this village?* About 243 (95.6 %) respondents reported the access to be very difficult and complicated. Such difficulties were attributed to stringent forest laws 68 (28.0 %), bans on forest utilization 176 (72.4 %), and guarding and protection of forests 153 (63.0 %). This has led to the decline in availability of forest products especially timber and firewood in all surveyed villages. Such decline was reported by 196 (77.2 %) respondents. Only 33 (13.0 %) respondents reported the availability of forest products to increase. Such people own woodlots of some kind. Overall, there is very slight spatial disparity in terms of availability of forest products between the studied villages (figure 27). Hence, the decline in forest products is widespread in all study villages which show what is transpiring in West Usambara.

Under ideal conditions it should not be like that because, forest conservation programs could provide an alternative source of forest products to the surrounding communities. Thus, in a situation where firewood is a prime source of energy and woodlots are limited, people would continue to exert pressures on natural forests despite existing restrictions.

Figure 27: Comparison of Availability of Forest Products between Study Villages in West Usambara



Source: Own Vegetation Survey Data (2012).

Although 207 (81.5 %) respondents declared to plant trees in their fields, many have planted just few trees and are meant to demarcate field borders. Very few people own woodlots. The failure to plant trees was attributed to land scarcity and the high cost of tree seedling. Some villagers argued that they would wish to invest in tree planting, but do not have enough land. This was also revealed by Chi-square test which showed no association between tree planting and household income. In other words, even if one could have the capital and wished to invest in tree planting still would face difficulties in obtaining land.

This trend is not promising for attaining sustainable livelihoods because, while on the one hand there is a decline in availability of forest products on the other hand, no new sound livelihood resource in forms of alternative forests products is being created in West Usambara. At present the majority of villagers collect forest products from farmlands which have few forests products (table 25).

Table 25: Utilization of Forest Products and Collection Area

Product	Freq	%	Place where forest products are collected			
			Reserve forest	Village forest	Farm land	Open access area
Fire wood	223	87.8	21(9. 6%)	9(4.1%)	159(72.6)	30(13.7%)
Wood for charcoal	40	15.7	3 (7.7%)	0(0.0%)	34(87.2%)	2(5.1%)
Building poles	26	10.2	5 (18.5%)	0(0.0%)	21(77.8%)	1(3.7%)
Wood for timber	17	6.7	7 (41.2%)	0(0.0%)	10(58.8%)	0(0.0%)
Herbs	8	3.1	1(14.3%)	0(0.0%)	3(42.9%)	3(42.9%)
Wild fruits	3	1.2	0(0.0%)	0(0.0%)	3(75.0%)	1(25.0%)
Withies	5	2.0	1(16.7%)	0(0.0%)	4(66.7%)	1(16.7%)
Grasses	42	16.5	1(2.4%)	0(0.0%)	38(90.5%)	3(7.1%)
Palm leaves	3	1.2	0(0.0%)	0(0.0%)	3(100%)	0(0.0%)
Honey (liters)	4	1.6	0(0.0%)	0(0.0%)	2(50%)	2(50%)
Wild meat	1	0.4	_	_	_	_
Wild vegetable	26	10.2	1(3.8%)	0(0.0%)	20(76.9%)	5(19.2%)
Mushroom	2	0.8	_	_	_	_

Source: Own Survey Data (2012).

9 Forests Conditions in West Usambara and the Kind of Pressures they experience

The primary purpose of this chapter is to present consequences on forest conditions arising from the current forest management and declining economy in West Usambara. Thus, the chapter aims at answering objective three and four: (i) investigating the impacts of anthropogenic disturbances on diversity of wood trees, species composition, and forests condition; and (ii) investigating the perception of the local communities towards forest management and its outcomes in relation to forest conditions.

The chapter is structured into three parts. The first part focuses on diversity of wood trees where two forest communities i.e. the Balangai and the Kitara Ridge Forest Reserves are covered. In this respect the relative abundance of different wood species is presented by using quantitative data. The dominant and rare species together with species resemblance (similarities and dissimilarities) between quadrats and forest communities is presented. Additionally, the attribute data such as trees heights, the diameter at the breast height *(DBH)* and the basal area *(BA)* are presented and discussed accordingly. Such information is presented in relation to anthropogenic forests disturbances.

The second part of the chapter focuses on the impacts arising from the current forest management. Here issues regarding the consumption patterns of forest products, and forest based livelihood activities *(FBLA)* are discussed. Also, forest disturbances caused by anthropogenic activities and their impacts on species structure and composition, trees *DBH*, forest canopy cover, and general condition of the forests are presented. The chapter end-up on investigating the perception of the local communities towards forest management and its outcomes in relation to forest conditions.

9.1 Diversity of Wood Trees at the Kitara Ridge and Balangai Forest Reserves

The West Usambara forests have experienced different human disturbances over time. Hence they differ in terms of size, conditions, and species composition. Such differences were observed during vegetation survey and through qualitative assessments of forest conditions for selected forests. For the purpose of vegetation survey, 25 quadrats were sampled at the Balangai Forest Reserve (990.6 ha), and 15 quadrat at the Kitara Ridge Forest Reserve (388 ha). The quadrats were located at an elevation of 1327 meters and

1881 meters above the sea level. The mean elevation of these quadrats was 1586 (1547 m to 1625 m) meters. From these quadrats different forms of anthropogenic disturbances and floristic information of wood trees were recorded.

Overall, 66 species of wood trees were recorded at the Balangai and the Kitara Ridge Forest Reserves. About 56 species were from the Balangai Forest Reserve and 32 from Kitara Ridge Forest Reserve. The Balangai Forest Reserve consisted of more tree species compared to Kitara Ridge Forest Reserve. Out of 66 species which were recorded, 34 are not found in Kitara Ridge Forest while 10 species are found in Kitara Ridge Forest Reserve but not in Balangai Forest Reserve. The low numbers of tree species in Kitara Ridge Forest is mainly due to its small size and the past and ongoing human disturbances which are relatively higher than at Balangai Forest Reserve. The details of all species and their relative abundances for both forest reserves are indicated in appendix 2 and 3.

9.1.1 Relative Abundance of Tree Species at Balangai and Kitara Ridge Forest Reserves in West Usambara

An assessment of the relative abundance of tree species was done objectively - through measuring and recording the occurrence and abundance data on individual species in a quadrat. Hence, data on which tree species are dominant and which are rare is given. Also *species resemblance* and *evenness* within a single quadrat, between quadrats, and between forests are examined. In addition, trees attribute data such as: height, diameter at breast height *(DBH)*[22] and basal area *(BA)*[23] are determined. The assessment of this kind is

[22] ***Diameter at Breast Height (DBH):*** is the standardized height for measuring tree diameter (circumference) and is defined as a 4.5 feet (54 inches) above the ground, on the uphill side of the tree. *DBH* is important for determining among others, growth, tree volume, yield, characterization of stand structure (diameter distribution) and forest potential.

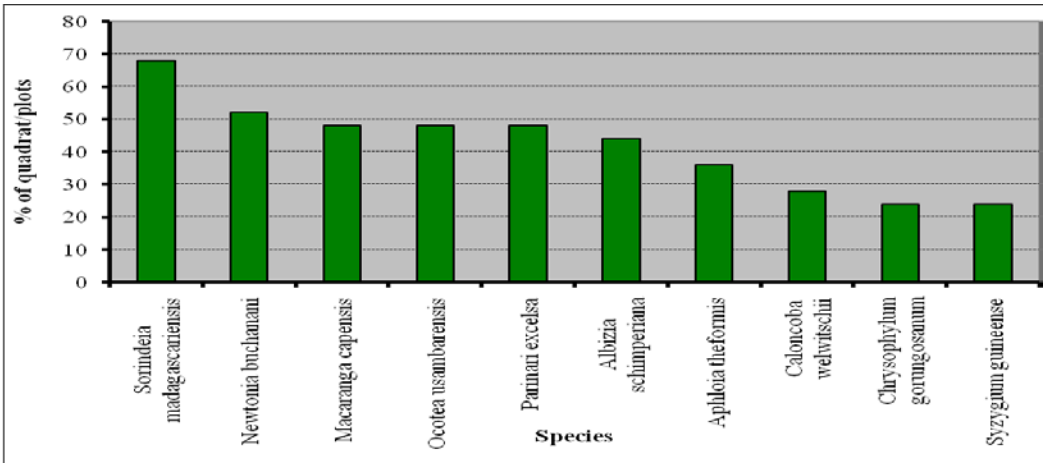
[23] ***Basal Area (BA)****:* is the term used in forest management to refer to the total cross section area of tree trunks per unit area. And is generally quantified by measuring the diameter at breast height *(DBH)* of trees and expressed as the area of trees per hectare (m^2/ha). The index is useful in approximating biomass. The *BA* is computed by this formula: *BA* = 3.14 x (radius of tree)^2 (GILLESPIE and MACDONALD 2010: 147, 150). OR BASAL AREA = 0.7854 * D^2 OR Alternatively BA = $\pi D2/4$.

important for grasping the extent to which the forest in question is natural or has experienced anthropogenic disturbances.

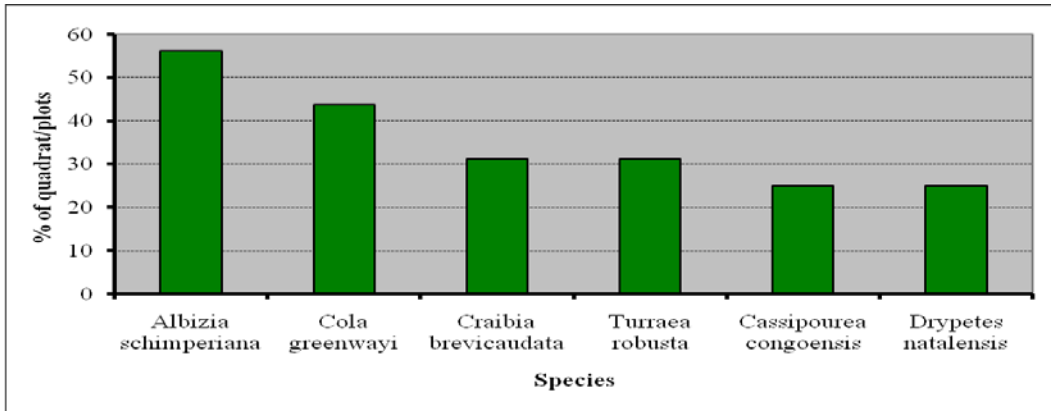
(i) Dominant Tree Species

The dominant species include all kind of tree species that occur more frequently than others in a quadrat or forest community. Ten tree species and six species are dominant at the Balangai and Kitara Ridge Forest Reserves respectively.

Figure 28: Dominant Tree Species at the Balangai and Kitara Ridge Forest Reserves



Ten dominant tree species at the Balangai Forest Reserve



Six dominant tree Species at the Kitara Ridge Forest Reserve

Source: Own Vegetation Survey Data (2012).

The dominant tree species at the Balangai Forest Reserve include: *Sorindeia madagascariensis, Newtonia buchanani, Parinari excelsa, Ocotea usambarensis, Albizia schimperiana, Macaranga capensis, Aphloia theformis, Caloncoba welwitschii, Chrysophylum gorungosanum,* and *Syzygium guineense*. While at the Kitara Ridge Forest Reserve, the dominant tree species are: *Albizia schimperiana, Cola greenwayi, Craibia brevicaudata, Turraea robusta, Cassipourea congoensis,* and *Drypetes natalensis* (figure 28). On average, the dominant species were found in five to twelve quadrats with other species like *Sorindeia madagascariensis* being found in seventeen quadrats. The high numbers of *dominant tree species* at the Balangai Forest Reserves than that of Kitara Ridge Forest Reserve show that the former is more natural hence many of its trees have not been extracted.

(ii) Rare Species

The rare species include all kind of species with very small populations which also are localized in their distribution. The Balangai Forest Reserve has a relatively low number of rare species compared to the Kitara Ridge Forest. Out of 56 tree species which are found at Balangai Forest Reserve, 16 (29 %) are rare. Such species include *Allophyllus abyssinica, Aningeria adolfi-friedericiis, Beilschmiedia kweo, Bersama abyssinica, Celtis Africana,* and *Craibia brevicaudata.* Others are, *Englerophytum natalense, Ficus natalensis, Flacourtia indica, Harungana madagascariensis, Maytenus acuminate, Polyscias fulva, Rapanea melanophloeos, Syncepalum cerasiferum, Turraea nilotica, and Turraea robusta.*

On the other hand, the Kitara Ridge Forest Reserve possesses more rare species. Out of 32 species, 11 (34.3 %) are rare. Such species are: *Allophyllus abyssinica, Casearia battiscombei, Ficus natalensis, Galiniera saxifrage, Garcinia buchanani, Maytenus senegalensis, Ochna insculpta, Ocotea usambarensis, Psychotria riparia, Syzygium guineense, and Turraea nilotica.* In both forests the rare species were found in just one quadrat. Again, the large percentage of rare species at the Kitara Ridge Forest Reserve shows the impact of anthropogenic disturbances on the composition of various tree species in the quadrats. At present the Kitara Ridge Forest Reserve is highly affected by anthropogenic pressures compared to the Balangai Forests reserve.

9.1.2 Tree Species Resemblance between Quadrats and Forests

The concept of species resemblance is used in vegetation description to explain species similarities, dissimilarities between quadrats, or between two vegetation types (KENT 2012: 116). The species similarities indicate the degree to which the species composition in the quadrats or between two vegetation communities is alike. While species dissimilarity shows the degree to which two quadrats differ in terms of species composition (KENT 2012: 116). The ***Jaccard's Coefficient Index***[24] was used to determine the degree of species resemblance between quadrats in a single forest and between vegetation communities. Mathematically species resemblance is computed by the following formulas:

$$\boldsymbol{SJ = \frac{a}{a + b + c}}$$

$$\boldsymbol{SJ = \frac{b + c}{a + b + c}}$$

$$\boldsymbol{or\ DJ = 1.0\ - SJ}$$

Whereby: ***SJ*** is *Jaccard's Coefficient Index* for similarity*;* $\mathbf{D_J}$ is the *Jaccard's Coefficient Index* for dissimilarity; **'a'** is the number of species common to both quadrats*;* '**b'** is the number of species in quadrat **ONE** only; and **'c'** is the number of species in quadrat **TWO** only. The similarity percentage figure is obtained by multiplying the coefficient index by 100 or by subtracting $\mathbf{S_J}$ by one and its value range from **0** to **1**.

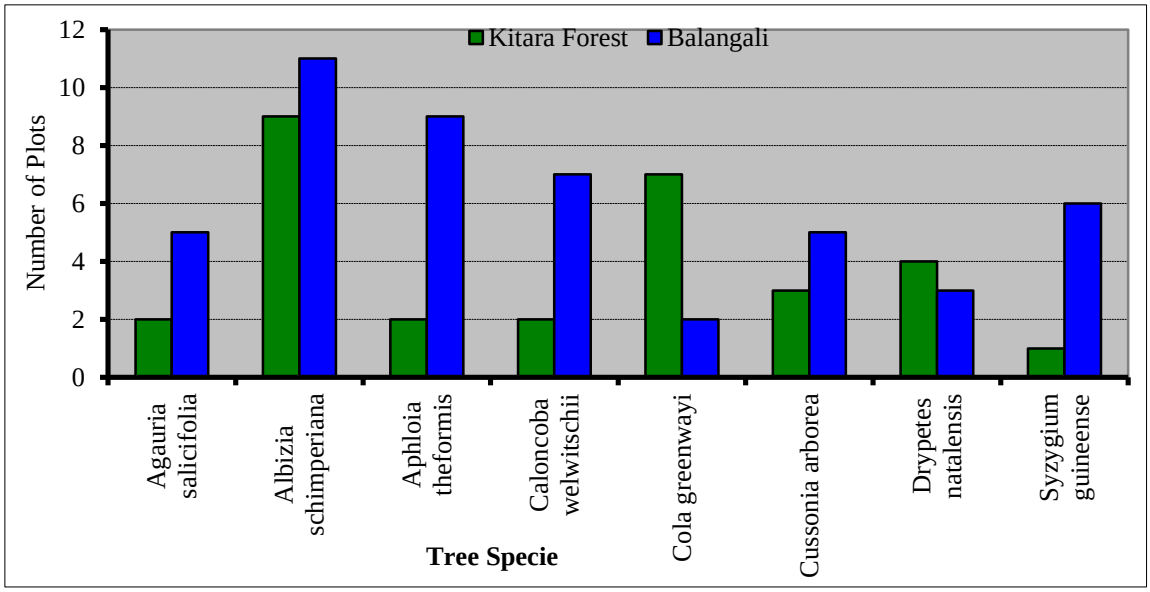
(i) Tree Species Resemblance between Kitara Ridge and Balangai Forest Reserves

Overall, 22 tree species are common in both Balangai and Kitara Ridge Forest Reserves and nine among these species are dominant. Such species include *Agauria salicifolia, Albizia schimperiana, Aphloia theformis, Caloncoba welwitschii, Cola greenwayi, Cussonia arborea, Drypetes natalensis, Ocotea usambarensis, Syzygium guineense* (figure

[24] ***Jaccard's Coefficient Index****:* is an index which is used to assess resemblance (similarities and dissimilarities) in terms of species composition between quadrats within a single forest or between two vegetation communities. The index is much better than Chi-squire test *(X^2)* in assessing species resemblance. The X^2 value is discredited in determining species similarities between vegetation stands because it takes into account both the number of species common to both quadrats (stands) and those that do not have in common; hence difficult to determine the nature of association between species. This weakness is solved by ***Jaccard's Coefficient Index*** which is based on present species only (KENT 2012: 114; CAUSTON 1998: 87).

29). The presence of common species in both forests indicates the ability of these species to grow in a wider geographical range than others.

Figure 29: Tree Species common in Kitara and Balangai Forest Reserves



Source: Own Vegetation Survey Data (2012).

(ii) Species Similarities between Quadrats

To determine the degree to which the species composition between quadrats within forests is alike, six quadrats (i.e. 1; 4; 7; 10; 13; and 16) from appendix two and three were taken for comparison. The Kitara Ridge Forest Reserve show complete dissimilarities in terms of species composition between many quadrats. The *Jaccard's Coefficient Index* values for similarities of this forest for many quadrats were 0.0. A similar observation was obtained after computing dissimilarity - *Jaccard's Coefficient Index* which its values range from 71 % to 100 %. On the other hand, the Balangai Forest Reserve shows slight similarities between species composition between quadrats - as *Jaccard's Coefficient Index* value range from 0.08 to 0.60. The details of similarities and dissimilarities of species for selected quadrats are indicated in appendix four and five.

Although there might be other reasons for these disparities like differences in species requirements in terms of soil nutrients and other micro habitat conditions, more extractive activities at the Kitara Ridge Forest Reserve is among the major reason which explain

species dissimilarities. This is also manifested itself on the structure and composition of species between quadrats. This is unlike the Balangai Forest Reserve where human disturbance is relatively low and there is some evenness in species distribution between quadrats.

9.1.3 Tree Species Evenness/Equitability within Quadrats

The species diversity and equitability within quadrats was determined by the ***Simpson Index***[25] ***(D)***. The index shows a desirable species richness within quadrats in both Balangai and Kitara Ridge Forest Reserves. In both forests the Simpson values are almost similar ranging from 0.500 to 0.8587. Also, both forests show fair equitability in terms of distribution of tree species within quadrats; the equitability values range from 0.105867 to 1.000 and values were slightly higher at the Balangai Forest Reserve. This again shows that the Balangai Forest Reserve is more natural than the Kitara Ridge Forest Reserve (see details in appendix six and seven).

Likewise, many quadrats at the Balangai Forest Reserve have higher tree density (i.e. the number of species per quadrat) than that of Kitara Ridge Forest Reserve. The average number of tree species in the Balangai Forest Reserve is 20 species (7 minimum – 32 maximum) while at the Kitara Ridge Forest Reserve is 14 species (2 minimum – 37 maximum) species (see appendix two and three). Such variations are also observed in the number of tree per hectare. On average, the number of trees per hectare at the Kitara Ridge Forest Reserve is 238 while at the Balangai Forest Reserve is 336 trees.

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[25] ***Simpson Index:*** is calculated from this formula: $\mathbf{D = \Sigma p^2_i}$ whereby: p_i is the proportional of the number of individuals or the abundance of the *i*th species. The index is usually presented as **1 – D** (the complement) or **1 / D** (the reciprocal). And the higher the **D** index value the lower the diversity and vice versa.

Species Evenness: is calculated by dividing the reciprocal form of the ***Simpson Index*** by the number of species in respective quadrat. Mathematically, $\mathbf{E_{1/D}}$ **= (1/D) /S**. Whereby '**D'** is *Simpson Index; and* **S** is the total number of species present in respective quadrat. (KENT 2012: 123-124).

9.1.4 Trees Attribute Data - DBH, Heights and Basal Area

Assessing trees attribute data such as heights, the diameter at breast heights *(DBH),* and basal area *(BA)* is essential for understanding the forest conditions and in particular the extent to which the forest in question is natural or has experienced disturbance.

(i) Trees Diameter at the Breast Height (DBH)

The survey data shows that the Balangai Forest Reserve has more large trees than the Kitara Ridge Forest Reserve. This is indicated by *DBH* sizes - trees circumferences. Trees *DBH* at the Balangai Forests Reserve range from 0.13 m to 1.31m (13 cm to 131cm) while at the Kitara Ridge Forest they range from 0.11 m to 0.85 m (11cm to 85 cm). The largest tree species in the Balangai Forest Reserve include: *Ficus natalensis, Englerodendron usambarense, Chrysophylum gorungosanum, Syncepalum brevipes, Cynometra longipedicellata, Syzygium guineense, Galiniera saxifrage, Parinari excelsa, Celtis Africana, and Ficus capensis.* These species had *DBH* sizes ranging from 90 cm to 131 cm (0.90 m to 1.31 m).

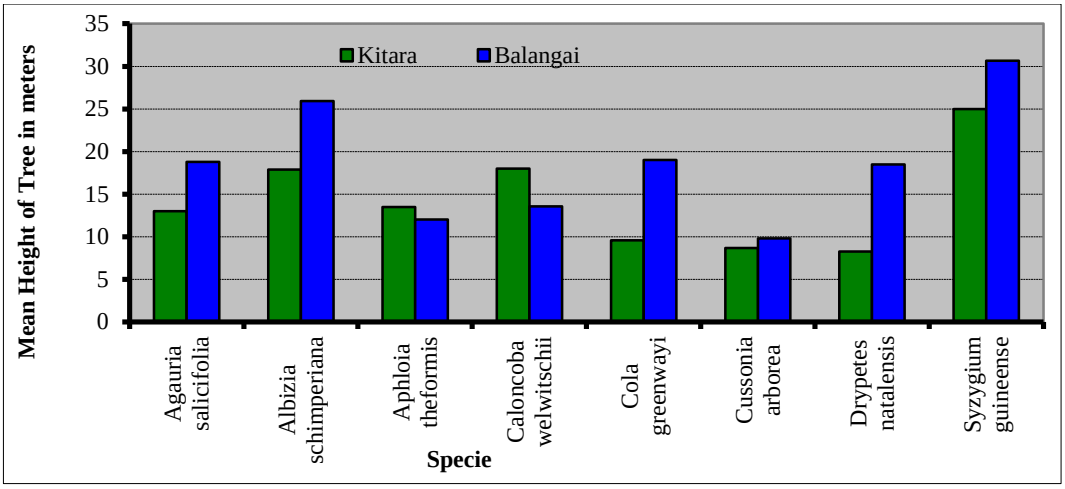
On the other hand, in the Kitara Ridge Forest, species such as *Syzygium guineense, Ficus natalensis, Allophyllus abyssinica, Agauria salicifolia, Caloncoba welwitschii, Diospyros abyssinica ssp. Abys* and *Zanthoxylum deremense* are much bigger. Their *DBH* size ranges from 50 cm to 85 cm (0.50 m - 0.85 m). The average *DBH* size for different tree species in both forest are shown in appendix eight and nine. Tree species which are larger in size are not commonly harvested in both forests; instead are left to grow to their maturity. Consequently, the forest utilization that mostly targets some tree species poses negative impacts on different species in terms of their size and their composition.

(ii) Trees Heights

The Balangai Forest Reserve possesses many taller trees than the Kitara Forest Reserve (figure 30). On average trees' heights at the Kitara Ridge Forest Reserve range from 5.7 m to 25 m while at the Balangai Forest Reserve they range from 7 m to 44 m. This again reveals that the level of forest disturbances is higher at the Kitara Ridge Forest Reserve

than the Balangai Forest Reserve. The detail data of mean heights of individual tree species in both forests are shown in appendix eight and nine.

Figure 30: Mean Trees Height between the Kitara Ridge and the Balangai Forest Reserves for selected Species



Source: Own Vegetation Survey (2012).

(iii) Basal Area (BA)

The survey data shows that the Kitara Ridge Forest Reserve has lower *BA* (i.e. total cross section area of tree trunks per unit area) than the Balangai Forest Reserve. The average *BA* at the Kitara Ridge Forest Reserve for 15 quadrats recorded at 1,659 m to 1,881 m altitude is 7.44 m^2/ha. The minimum and maximum *BA* is 2.586 m^2/ha and 27.183 m^2/ha respectively. On the other hand, the average *BA* at the Balangai Forest Reserve for 25 quadrats recorded at 1,327 m to 1,591 m altitude is 18.84 m^2/ha, with minimum and maximum *BA* ranging at 4.288 m^2/ha to 46 m^2/ha. Hence, the *BA* at the Balangai Forest Reserve is almost more than two times than that of the Kitara Ridge Forest Reserve. The details of average BA in m^2 for individual species in both forests are indicated in appendix eight and nine. These findings again show that the extents of forest disturbance are much higher at the Kitara Ridge Forest Reserve than the Balangai Forest Reserve. Consequently, the latter looks more natural than the former.

However, the *BA* for both forests is much lower when compared to that of the Mazumbai Forest Reserve which is considered as *primary forest* [26] *(virgin)* in West Usambara. The forest is owned by the Sokoine University of Agriculture *(SUA).* In 1985 HALL recorded *BA* of 35 m^2/ha at 1,400 m to 1,900 m altitude at Mazumbai Forest Reserve (HALL 1985 as cited in HAMILTON and SMITH 1989: 221). Hence, the extent of forest disturbances at Balangai and Kitara Ridge Forest Reserves is higher than one could expect to be in reserve forests where production is restricted.

9.2 Forest Conditions arising from the current Forest Management and declining Economy in West Usambara

Although restrictions of forests utilization are of sort to help addressing forest degradation, these restrictions have their own consequences. Such consequences are seen in the decline in consumption patterns of forest products; the decline in forest based livelihood activities *(FBLA);* and encouragement of illegal activities inside reserve forests. The overall outcome is deterioration of forest conditions. Appreciating these impacts is pertinent in conservation because it helps to assess the performance of conservation program and policies that the country adopts.

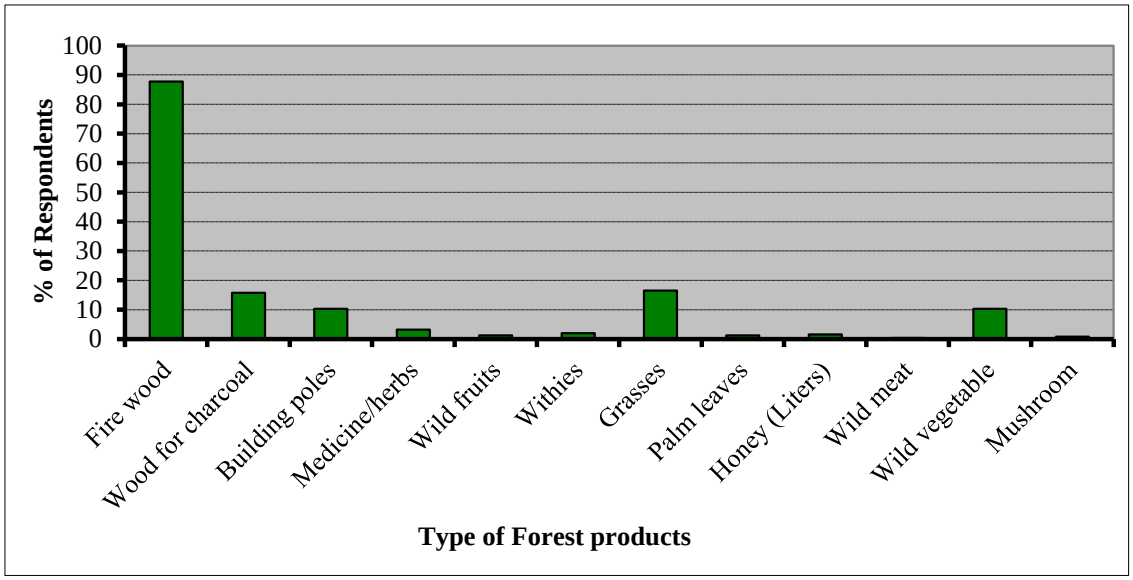
9.2.1 Consumption Pattern of Forest Products

The restriction of forest utilization in West Usambara has adversely affected the consumption patterns of forest products and forest based livelihood activities *(FBLA).* As indicated in figure 31, except for firewood which still has a higher level of consumption, the consumption of other forest products is very low. This is because at present the majority of villagers collect forest products from their fields which have few forest products compared to natural forests. Such fields are mostly dominated by exotic species which suppresses native ones. Consequently, availability of other forest products like herbs, wild fruits, withies, palm leaves, wild meat, vegetables and mushrooms are limited.

[26] ***Primary Forest 'Virgin Forest'*** : Is a term which is used to describe a kind of forest which has not yet experienced anthropogenic forest disturbances. Hence it doesn't show sign of secondary regrowth caused by succession process. The term *primary forest* and *virgin forest* sometimes are used interchangeably to mean the same thing.

In most cases these products are very important for poor segment of the society, hence by not accessing them their livelihoods is impaired.

Figure 31: Utilization of Forest Products in West Usambara



Source: Own Vegetation Survey Data (2012).

9.2.2 Forest based Livelihood Activities (FBLA)

As with effects in consumption patterns of forest products, the decline in forest utilization has also adversely affected the *FBLA* which adversely affect the economy of people. This is because, a small segment of population in West Usambara engages in *FBLA*. Out of 254 respondents, 28 (11 %) engage in non-timber forest activities, 2 (0.8 %) in beekeeping, and 10 (3.9%) in wood and logging activities. It was noted that *FBLA* generate higher incomes than other livelihood activities especially crop cultivation. For instance, except beekeeping which has a low average annual income, about TZS 50,000 (approx. US$ 31.25) the rest of *FBLA* contribute towards higher revenue to households. The average annual income obtained from the non-timber forest products was TZS 583,185 (approx. US$ 365) while logs and timber contribute TZS 844,000 (approx. US$ 528) per year. The revenue obtained from honey in West Usambara is low because its production is limited by cold temperature.

Based on these findings, the *exchange value* of forest products (i.e. income obtained through selling forest products) is higher while the *use value* (i.e. direct use of forest

products in the households) is lower and decreasing in West Usambara. In forest conservation such a trend could be fine and conducive for conservation. This is because the *low use value* of forest products suggests that the community has other sources of livelihoods to earn a living rather than depending on forest resources (SUNDERLIN, ANGELSEN, BELCHER, BURGERS, NASI, SANTOS and WUNDER, 2005: 1387). This in turn led to low human pressures on forest resources. However, this is not the case in West Usambara. As decline in forest *use value* is not associated with development or opening up of new alternative livelihood activities, rather it is due to more restrictions of forest utilization from conservation programs. The lack of alternative livelihoods activities in this area is reflected in slim job opportunities and poorly preforming livelihoods strategies as discussed under section 5.3 and 6.6 and their subsequent sections.

9.2.3 Increase in illegal Extractive Activities inside Forest Reserves

The restrictions of forest utilization and declining economy in West Usambara have encouraged illegal activities inside reserve forests. The situation is worsened by the high *exchange value* of forest products. One is sure to obtain enough income if illegal logging is done successfully. Consequently, illegal activities inside reserve forests are increasing compared to levels during the first years when the Joint Forest Management *(JFM)* was incepted in West Usambara in the 2000s.

Fire wood collection, pole extraction, and pit-sawing are practiced inside forest reserves more than one could expect (table 26). The rate of forest disturbance is much higher at Kitara Ridge Forest Reserve than the Balangai Forest Reserve. On the other hand, the fire incidents have substantially declined in recent years. In the same way in both forests there were no incidences of in-situ farming and charcoal making. Although all illegal activities cause forest disturbances, pit-sawing, mining activities and firewood collection causes major disturbance (see figure 32). For example, out of 13 incidences of pit-sawing, 11 (84.6 %) caused major disturbance. This is also the case with firewood collection where 8 (40 %) events out of 20 caused major disturbances. This is contrary to the incidences of animal grazing and pole extraction which all caused minor forest disturbance.

A finding that pole extraction causes less impacts on forest disturbance is different to those by PRESTON (2011) and KESSY (1998: 125) in West Usambara and East Usambara respectively. Under normal circumstance pole extraction could also cause major forest disturbance. This is particularly the long term impacts on recruitment of small trees into larger size class. In all ten villages people no longer erect houses by using poles which necessitate harvesting large bundles of poles. Thigh might be a reason why my findings are different to that by PRESTON. Therefore, although this research recorded many cases of pole extraction the numbers of cuts remain lower in each quadrat. Based on these findings therefore, pole extraction could continue without compromising the quality of forests if would be properly planned and coordinated.

The other reasons for differences in my findings and those by PRESTON (2011) and KESSY (1998) are also explained by the differences in method employed in data collection and the purpose of these researches which are different. For instance, PRESTON (2011) was interested in quantifying anthropogenic disturbances on the forests by using transect lines. On the other hand, this research employed quadrats; whereby impacts of different types of disturbances on forest condition within quadrats were examined. The quadrat method enabled in assessing the extent of disturbance of each quadrat by comparing it to the general condition of the whole forest. Also, it allows an assessment of the contribution of every kind of disturbance to the quadrat condition.

The results from the vegetation survey are consistent with those from the socio-economic survey by this research. The majority of respondents reported that the conditions of forests in West Usambara are deteriorating. Such deterioration was associated mainly with pit-sawing, firewood collecting, and mining activities. Also, the drought conditions, planting of exotic species especially *Eucalyptus trees* and poor governance of forests were mentioned as reasons that worsen the situation. The poor forest governance was connected to corrupt behaviors among forest guards, police and court officials.

Table 26: Evidences of illegal Consumptive Utilization/Disturbance of Forest Products at the Kitara Ridge and the Balangai Forest Reserves

Consumptive Disturbance	Overall (n=40)		Kitara (n = 15)		Balangai (n = 25)	
	Freq	%	Freq	%	Freq	%
Pit-sawing	13	32.5	7	46.6	6	24.0
Firewood collecting	20	50	11	73.3	9	36.0
Grazing	11	27.5	11	73.3	0	0.0
In-situ farming	0	0.0	0	0.0	0	0.0
Herb harvest	0	0.0	0	0.0	0	0.0
Pole extraction	15	37.5	6	40	9	36.0
Forest fire	2	5	1	6.3	1	4.0
Fodder harvest	1	2.5	1	6.6	0	0.0
Charcoaling	0	0.0	0	0.0	0	0.0
Mining	**	**	0	0	**	**

Source: Own Vegetation Surveyed Data (2012).

** ***Illegal Mining***: There is no evidence of illegal mining inside survey quadrats because it is done in the river valley inside reserves. The Balangai Forest Reserve experiences illegal mining and is polluting rivers and springs which the community depends on.

Figure 32: Illegal Activities inside Balangai and Kitara Ridge Forest Reserves

Illegal logging at Balangai Forest Reserve

Illegal Logging at Kitara Ridge Forest Reserve

Illegal Mining at Balangai Forest Reserve

Illegal Mining at Balangai Forest Reserve

Source: Own Vegetation Survey Data (2012).

The evidence of illegal activities inside forest reserves and its consequences were also seen at the Lushoto District Court. The court has registered many crimes related to illegal utilization of forest resources. The District Resident Magistrate in Charge of the Lushoto pointed out that:

> "In a period between 2010 and 2012, about 160 people were convicted for offences related to illegal utilization of natural resources, destruction of forest products, mining inside reserve forests, and unlawful possession of forest products. And only a quarter managed to pay fine - which is any amount not exceeding TZS 2,000,000 (approx. US$ 1,250). The rest were sentenced to prison term not exceeding two years. However, for those who were convicted for unlawful setting fire they were sentenced to five years in prison and to pay the fine to a tune of TZS 1,000,000 (approx. US$ 625)". (An interview with the Lushoto District Resident Magistrate on 2 august 2012).

Despite the punishment to the convicts the number of crimes has not declined (table 27). This shows that people are forced to engage in illegal activities as they have no alternative economic activities to earn income to sustain their daily survival. Most of the people who get imprisoned for such activities are youth who could engage in productive activities rather than being imprisoned wasting their labor-power. Thus, deliberate efforts are needed to change this condition which is detrimental to the economy.

Table 27: Reported Crimes related to illegal Utilization of Forest Resources

Year	Cases applied at the court	Nature of Crime
2004	9	The natures of these disputes are related to: *Unlawful possession of forest products*; *illegal harvesting of forest products*; *setting fire on the forest*; *farming in reserved water sources*; *and undertaking mining activities inside forest* reserves.
2005	4	
2006	17	
2007	4	
2008	12	
2009	31	
2010	29	
2011	35	
January 2012 to March 2012	6	

Source: Own Compilation from the Lushoto District Court Crime Case Register (2012).

9.2.4 Impact of illegal Logging on the Structure of Species Composition

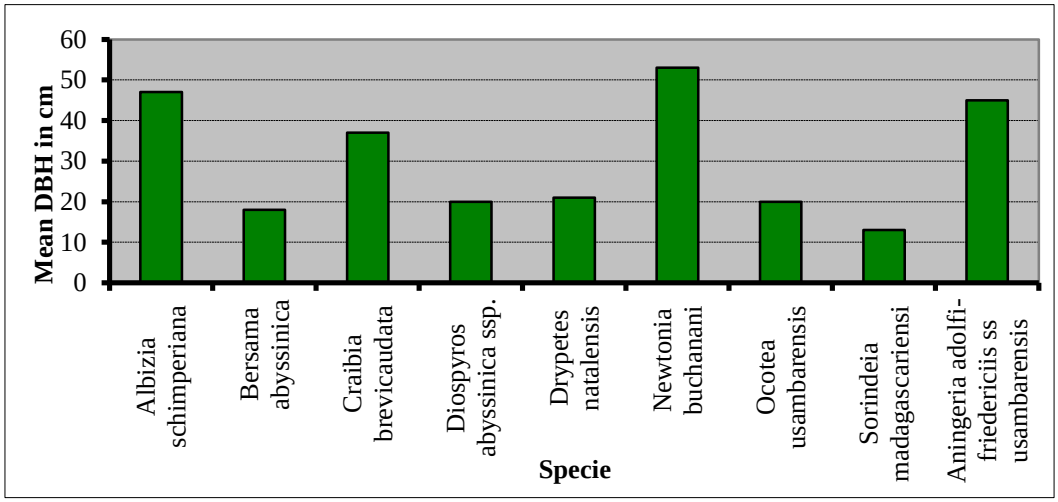
The illegal forest utilization has adversely affected the structure of species composition. This is because not all tree species are evenly extracted. The most frequently extracted tree species in the Balangai and the Kitara Ridge Forest Reserves include: *Ocotea usambarensis (Mkulo), Craibia brevicaudata (Mhande), Diospyros abyssinica ssp, Cola greenwayi (Kinkandemshi), Albizia schimperiana (Msahi), Sorindeia madagascariensi (Mkwingina),* and *Newtonia buchanani (Mnyasa).* Others are *Drypetes natalensis (Kihambie), Turraea nilotica*, and *Aningeria adolfi-friedericiis usambarensis* (figure 33).

These species produce valuable timber products. As a result pit-sawing is conducted in a selective manner that threatens their survival. The impacts are especially seen on the structure of species composition within the individual forest and between vegetation communities. A case in point is the population of *Ocotea usambarensis (Mkulo)* which is extremely low at the Kitara Ridge Forest Reserve. Also species such as *Diospyros abyssinica ssp, Aningeria adolfi-friedericiis usambarensis*, and *Maytenus acuminate* are now rare in both forests. Although there might be other reasons for their rarity like differences in microhabitat conditions (e.g. soil conditions), the selective logging is a major reason for that.

These findings affirm to an observation by PASSMORE (2009: 2) in southeastern USA who noted that, among impacts of forest disturbance is the alteration of the structure of populations, communities and ecosystems. The outcome of such impact is higher than one could imagine. The population biologists have cautioned that:

> "The impact of structural changes may be much more important and harmful than the quantitative changes of environment caused by habitat loss and chemical pollution since it changes the ways and amount of interactions within and between animal and plant populations [which might affect the entire ecosystem]"(SEITZ 1991: 2).

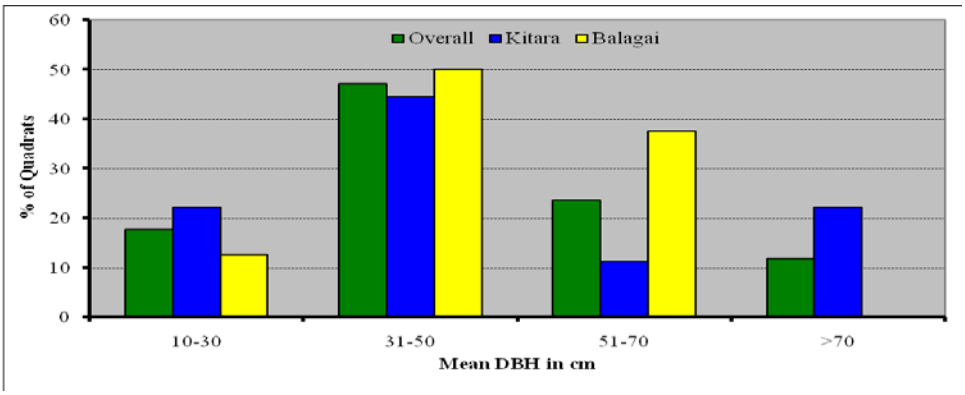
Figure 33: Mostly harvested Tree Species in the Balangai and the Kitara Forest Reserves in West Usambara and their *DBH* Size



Source: Own Vegetation Survey Data (2012).

In the same way, trees with *DBH* size ranging from 31cm to 50 cm are mostly harvested (figure 34). This is due to the fact that such sizes are put to many uses and are easier to fell down than those with large *DBH*. Overall, the average stumps of harvested trees were 30.4 cm. At present there is no statistical significant (t=1.517, p=0.313) mean difference between *DBH* size of mostly harvested species and those which are least harvested. However, if the harvesting trend continues like this it will cause long term impacts on *DBH* class sizes between the most targeted tree species and those which are less harvested. The details data on *DBH* size of different tree species are shown in appendix nine and ten.

Figure 34: DBH of harvested Trees at the Balangai and Kitara Ridge Forest Reserves



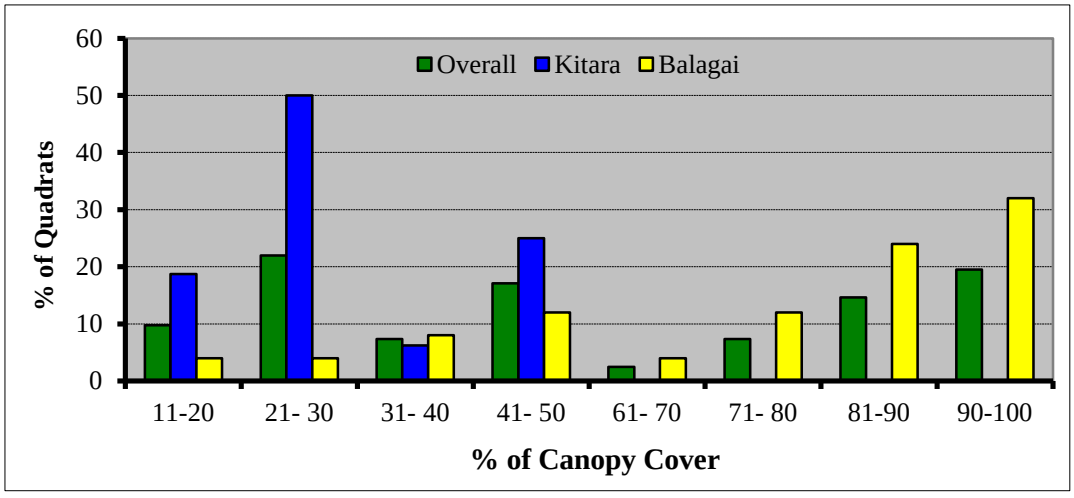
Source: Own Vegetation Survey Data (2012).

9.2.5 Impact of Anthropogenic impacts on Quadrats Canopy Cover

In vegetation study the canopy cover is defined as the area of the ground within a quadrat that is occupied by the above-ground parts of each species when viewed from above. It is usually estimated visually as percentage. Normally multiple layering of vegetation or stratification results in total cover values of well over 100 % (KENT 2012: 66). At the Balangai and Kitara Ridge Forest Reserves anthropogenic activities have adversely affected the canopy cover. Overall, out of 40 quadrats, 25 (62.5 %) quadrats had a canopy cover which ranged from 41 % to 100 % (figure 35).

There is also a significant difference between percentage canopy cover between the Balangai and Kitara Ridge Forest Reserves, with the latter having less canopy cover. Out of 15 quadrats surveyed at the Kitara Ridge Forest Reserve 11(73.3 %) had canopy cover ≤ 40 % and no quadrat had a canopy cover greater than 50 %. Hence, the forest canopy cover at the Balangai Forest Reserve was far better than that of Kitara Ridge Forest Reserve as more than 72 % of surveyed quadrats had canopy cover ≥ 61 %, and only 4 (16 %) quadrats had canopy cover ≤ 40 %.

Figure 35: Overall % Canopy Cover and Comparison of Cover between Kitara Ridge and Balangai Forest Reserves

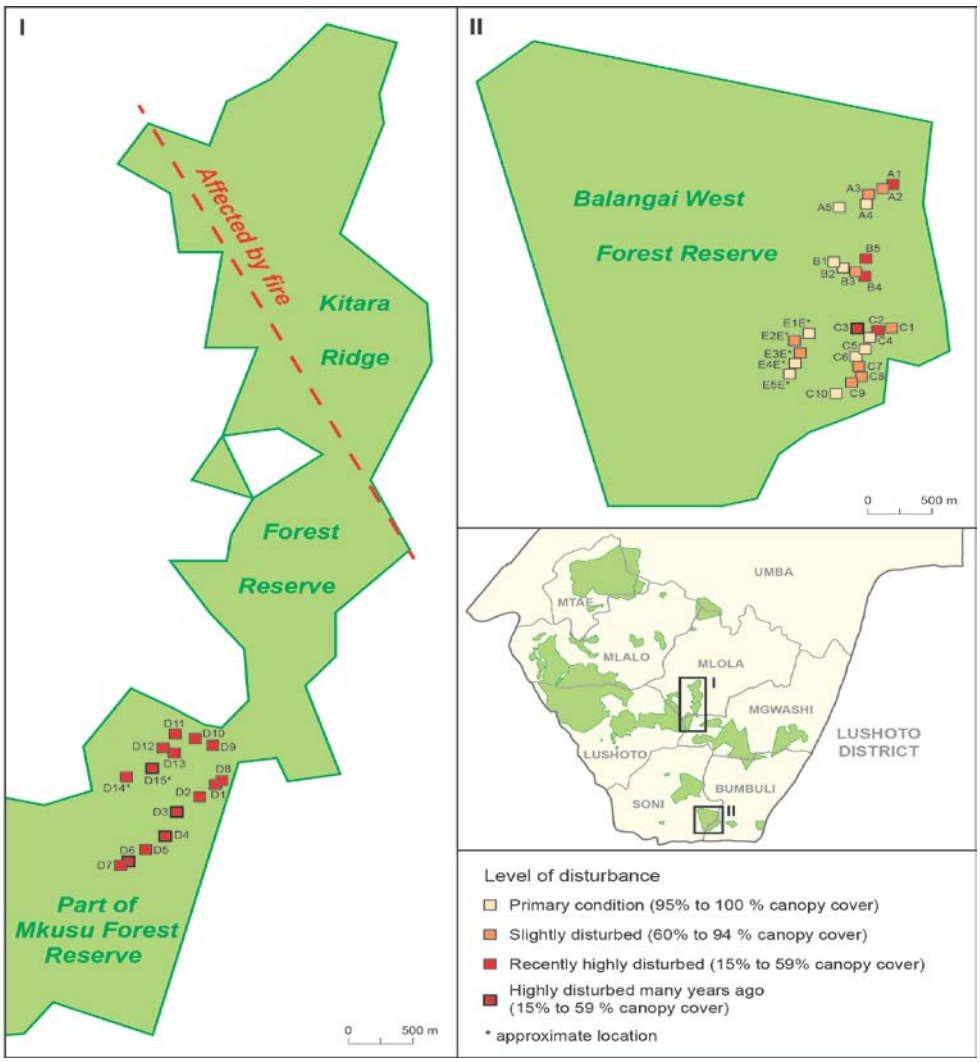


Source: Own Vegetation Survey Data (2012).

To a large extent the Kitara Ridge Forest Reserve has been much more affected by logging than the Balangai Forest Reserve. And since logging is associated with felling of juvenile trees, breaking braches and trunks, and uprooting trees it has led to more openings

in the forest canopy. The situation is exacerbated by animal grazing, firewood collection, and pole extraction which limit secondary regrowth. As indicated in map 8 below, overall only 11 (27.5 %) quadrats out of 40 are in primary condition while 29 (72.5) quadrats had experienced some forms of anthropogenic forest disturbances; among these quadrats, 21 (52.5 %) are severely disturbed. This is not a good sign for reserve forests like those in West Usambara**.**

Map 8: Spatial Forest Disturbance in Balangai and Kitara Ridge Forest Reserves in West Usambara



Source: Draft: Songoro (2014).
Cartography: Department of Geography JLU Giessen (2014).

9.2.6 Overall Forests Conditions in West Usambara

Overall, the condition of forests in West Usambara is deteriorating. It is important to bear in mind that what takes place at the Kitara Ridge and the Balangai Forest Reserves also happens at the Shagayu, Shumemagamba, and Ndelemai Forest Reserves. Although these forests were not covered by vegetation survey, the qualitative forest information regarding their condition indicates that illegal activities are going-on inside these reserves. At the moment forest patrol is not implemented properly. At Goka and Mpanga villages for instance villagers were concerned with the deteriorating condition of the Shagayu Forest Reserve to the extent of encouraging the researcher to include it in vegetation survey.

The ongoing situation begs the following questions: *Why are so many illegal activities still going on inside forest reserves if villagers have agreed to take part in JFM? Are these behaviors signs of passive resistance towards conservation programs? What has gone wrong in West Usambara regarding forest conservation?* The low economic condition is major reasons which attract people to engage in illegal forests activities in West Usambara. Together with low economic activities the following other reasons answers why illegal activities are high in West Usambara forest reserves:

(i) Villages governments, forest committees, and forest guards are demotivated to take part in JFM

The research noted that at the moment villages' governments, forest committees, and forest guards are demotivated to take part in *JFM*. This situation leaves forests especially those under the central government and the district council vulnerable to illegal logging. In some cases loggers bribe forest guards. Moreover, many forest guards do not see the reasons why they should continue to patrol forests while the government is not doing enough to support them financially. A case in point is supported by Mr. Kipingu, the secretary of the forest committee at the Balangai Forest Reserve who reported that:

> "At present, the forests guards and the members of forest committees are demotivated to take part in Joint Forest Management *(JFM)* and patrolling forests. Personally I have experienced a very horrifying situation from some villagers who are determined to exploit timber from the Balangai Forest Reserve. Since *JFM* was initiated in 2006 in our village I have threatened my life. The program has even

> contributed to ruining my relationship with some of my relatives. While all these things are happening I benefit nothing from this forest. If the government of Tanzania likes these forests it should start to pay us". (An interview with Mr. Rafael Kipingu 28 july 2012 see also appendix one).

The concern of Mr. Kipingu was also observed in other villages during the discussion with forests guards, forests committees and villages' leaders. They contended that forest patrolling is difficult; there are no gunboats, raincoats, and weapons to arrest illegal loggers who sometimes are armed. In Baga and Funta villages the forest committees reported that once the government through the forest department provided with them substandard raincoats and gunboats which could not withstand forest hardship.

(ii) Mismanagement of Cases related to Forests

The villagers also complained that cases are mismanaged when illegal loggers are caught and taken to the police or court. They implicated such tendencies with corrupt behaviors among some police officers and court officials. When the Resident Magistrate in Charge of Lushoto District was asked to explain this, he argued that, "forest guards and forest committee members they do not make follow-up of cases and sometime they don't appear at the court, as a result cases are sometime dismissed".

Although, it is difficult to disprove completely the allegation by forest guards and forest committees on corrupt behaviors of some officials, the argument by the Resident Magistrate is partly true. This is because it is difficult for the forest guards or even members of forest committees to make a follow-up on cases while they receive little support from the district authority and forest department. Such support is especially in the forms of bus-fare and meals while attending the case (see details on appendix 1).

The situation is complicated by the fact that no production is done on these forests to generate conservation funds. The situation is even made worse as the government is doing little to support these forests financially. The prevailing situation shows a lack of seriousness on the part of the government and the little value it places on forests. It is also contrary to what is preached by the government regarding the importance of these forests ecologically and economically. Under an ideal situation one would expect the government

to do more in terms of providing funds which could also be given to villagers who participate in conservation as a motivation.

(iii) Difficulties in getting Permission to cut trees for roofing Village Buildings

Another reason for the lack of motivation amongst villagers to take part in *JFM* arises from the difficulties they face in getting permission from the district council when it comes to cutting a tree for roofing village buildings. A case in point was seen in Baga and Mziasaa villages. In the latter, the village chairman reported that, "village has failed to finish its office on time because the district council delayed to release a permit to cut a tree for timber". Hence village leaders were challenging that if it is difficult even to obtain the permission to cut timber for village development what are the benefits of these forests then? It was apparent therefore that, villagers would prefer sustainable forest utilization rather than insisting on preservation. This reflects that, the decisions to set aside nearly all natural forest as reserves in West Usambara were done without figuring out its consequences on socio-economic development. These circumstances and others of this nature make villagers to think that government is politicizing conservation; and in particular the little investment the government is putting on forest conservation.

Consequently, successive forests management in West Usambara would require correction of these setbacks discussed above among others. Through that the communities' commitment on forests would be enhanced. This is important for promoting forests conservation in this area since the government has little capacity to manage them. The importance of enhancing peoples' commitment on conservation is also advocated by other conservationists who have pointed out that:

> "Successive conservation depends on the commitment of the people living with the wild species [in this case forests] - not us. Yes, we can give financial and technical support, but in the final analysis it will be those people who will make a difference. Not laws. Not government policies. And not our wishful thinking". (The forewords by EDWARDS in LITTELL 1992: VII).

This opinion is also supported by MCNEELY (1998: 30) who argues that, at the end it is the local people who determine what happens at the countryside. This point of views show

that, the disappointed people would work against conservation and this is what is happening in West Usambara.

9.3 Community Perception towards Forest Conservation in West Usambara

People's perceptions on forest issues were determined by computing *attitudes intensity values* and were expressed in terms of *mode* and *median* (table 28). Overall, more people in West Usambara strongly agree to the role of forests conservation in improving the ecological services. Also, many people do not attribute land shortage to forest conservation. Rather, land scarcity is mostly attributed to high population density. People also believe that the conservation work should be done in collaboration between villagers, government and other forest stakeholders. On the other hand, more people have least positive attitude towards the forest conservation to increase conflicts over agricultural land and increasing the price of timber. Also the majority strongly disagrees that forest conservation has improved the availability of forest products (table 28). The least positive attitudes toward these aspects are due to the following reasons: First, the majority of people compete on small land which increase land conflicts due to lack of alternative economic opportunities. Secondly, the restriction of forest utilization has reduced the supply of timber resulting to an increase in price. This also indicates that forest conservation programs has done little in promoting alternative sources of forest products to the surrounding community which could be done through planting woodlots.

Table 28: Perception of Local Community towards Forest Issues in West Usambara (2012)

Statements	Strongly Disagree		Uncertain		Agree		Strongly agree		Median	Mode
	Freq	%	Freq	%	Freq	%	Freq	%	Value	Value
Forest conservation has assisted in improving forest conditions (+)	24	9.4	14	5.5	76	29.9	140	55.1	**4**	**4**
Forest conservation has assisted in enhancing rainfall and water sources	11	4.3	10	3.9	79	31.1	154	60.6	**4**	**4**
Forest conservation has improved availability of forest products (herbs, fruits honey and wild animals) (+)	85	33.5	27	10.6	67	26.4	75	29.5	**3**	**1**
Forest conservation has abated soil erosion in the village (+)	24	9.4	11	4.3	93	36.6	126	49.6	**3**	**4**
Forest laws are well implemented in the village (+)	27	10.6	23	9.1	70	27.6	134	52.8	**4**	**4**
Forest conservation has raised environmental awareness in the village (+)	22	8.7	29	11.4	86	33.9	117	46.1	**3**	**4**
Corruption is high when it comes to asking the permission to harvest products like poles and timbers (-)	72	28.3	29	11.4	50	19.7	103	40.6	**3**	**4**
There is segregation when it comes to giving permit to access forest (-)	74	29.1	19	7.5	44	17.3	117	46.1	**3**	**4**
In provision of forest concessions for timber harvesting priority is mostly given to outsiders than villagers (-)	45	17.7	21	8.3	54	21.3	134	52.8	**4**	**4**
Forest conservation has created stringent laws that have complicated villagers' life (-)	67	26.4	32	12.6	31	12.2	124	48.8	**3**	**4**
Forest conservation has complicated availability of agricultural land (-)	58	22.8	33	13.0	25	9.8	138	54.3	**4**	**4**

Table 28 Continued

Statements	Strongly Disagree		Uncertain		Agree		Strongly agree		Median	Mode
	Freq	%	Freq	%	Freq	%	Freq	%	Value	Value
Forest conservation is worth nothing hence do not want to participate in conservation (-)	40	15.7	15	5.9	22	8.7	177	69.7	**4**	**4**
Forest conservation has increased the price of timber in this village (-)	115	45.3	29	11.4	46	18.1	64	25.2	**2**	**1**
Forest conservation has assisted in improving none-farm income activities (+)	73	28.7	36	14.2	68	26.8	77	30.3	**3**	**4**
Forest conservation has assisted in promoting agricultural services(+)	62	24.4	37	14.6	89	35.0	66	26.0	**3**	**3**
Forest conservation has contributed on improvement of social services like schools, hospitals etc.(+)	68	26.8	36	14.2	68	26.8	82	32.3	**3**	**4**
Forest conservation has increasing social surface net (+)	55	21.7	46	18.1	77	30.3	76	29.9	**3**	**3**
Forest conservation has enhanced understanding in the villages (+)	51	20.1	45	17.7	98	38.6	60	23.6	**3**	**3**
Forest conservation has increased conflicts over agricultural land (-)	127	50.0	31	12.2	33	13.0	63	24.8	**1.5**	**1**
The government should be solely responsible for conserving forests (-)	57	22.4	6	2.4	13	5.1	178	70.1	**4**	**4**

Source: Own Survey Data (2012).

Notes: Positive statements: carry the following scores: Strongly agree (4); Agree (3); Uncertain (2); strongly disagree (1).

Negative statements: carry the following scores: Strongly agree (1); Agree (2); Uncertain (3); strongly disagree (4).

People's Perception towards the role of Forests Economically

Apart from understanding the general perception of people on forest issues it was also necessary to understand their perception towards the role of forests economically. In this regard, mixed results were observed. A considerable number of respondents see the indirect role of forests economically through enhancement of rain formation, conservation of water sources, and climate amelioration which support agricultural activities. On the other hand, other respondents do not see importance in conserving forests. Their reasons are mainly based on lack of *forest use value* (table 29). Based on these findings it is concluded that, the ecological values of forests are important however, are not enough to convince everyone to see importance of conservation. Hence, both ecological benefits and the direct *use value* of forests should go hand-in-hand.

Table 29: Opinions on the Importance of Forest Conservation in West Usambara

Reasons why Forest Conservation is not Important	**Freq**	**%**
Not obtaining forest products as forest are under government	72	96.0
Local people are not allowed to utilize forest products	31	41.3
Don't know how the revenue from forests is utilized	10	13.2
Reasons Why Forest Conservation is Important	**Freq**	**%**
Enhancing rain formation	139	77.2
Protection of soil from erosion	8	4.4
Improvement of water sources	103	57.2
Amelioration of climate	42	23.3
Firewood and herb collection	34	18.9

Source: Own Survey Data (2012).

The importance of *forests use value* was also apparent when respondents were asked to mention the kinds of problems they face following conservation. About 43 (56.6 %) households reported that they face difficulties in obtaining forest products, while 11 (14.5 %) are concerned with decline of income following bans on forest utilization. Other problems were disturbances upon the break of forest fire, scarcity of agricultural land, fall of carpentry industry and an increase in the number of wild pigs which destroys crops. The latter was reported at the Balangai and Bungoi villages.

9.4 Summary of major Findings

The following major findings are summarized from the analysis of preceding discussion:

- In West Usambara villagers bear more forest conservation burden than other forest stakeholders. This should not be the case as 93 % of forestland is under the ownership of the central government. Also, *the decentralization of forest management*[27] to the local communities has not fully implemented as advocated in the National Forest Policy (1998). The large sections of forestland are still under the central government despites its low capacity to manage them. Other stakeholders such as the villages' governments and the Lushoto District Council have been allocated very small sections of forests to manage. Bad enough the government has not yet signed-up the Joint Management Agreements *(JMA)* with the local communities who are participating in forests conservation. Such agreements are very important in devising and clarifying management responsibilities and returns among different stakeholders.

- The government doesn't provide the necessary support to the forest committees and forest guards to patrol these forests. Consequently, the local communities are now giving-up from taking part in conservation. Hence, opening-up forests to further degradation.

- At present the forests conditions in West Usambara are deteriorating. Such deterioration is manifested especially in the form of decline of forest canopy cover, low basal area, and alteration in the structure of composition of some tree species.

- Restriction of forest utilization coupled with low economic opportunities encourages people to engage in illegal logging which led to wasteful forest utilization in West Usambara. Also it has led to imprisonment of youth who could engage in productive work. In the same manner, the restriction of forest utilizations has decreased forest based livelihood activities *(FBLA)* which could assist in poverty reduction. Currently, villagers would prefer sustainable forest utilization rather than insisting on preservation.

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[27] ***Decentralization of Forest Management:*** In Tanzania, the decentralization of forest management takes place in the form of Community Based Forest Management *(CBFM)* and Joint Forest Management *(JFM)* (see section 4.6 for detail on policy and legal framework governing forest sector in Tanzania).

- Overall, the majority of people have positive attitudes towards forest conservation. However, for them to continue support forest conservation it is crucial to provide with them economic incentives. Such incentives in particular should be given to forest guards and forest committees. This is important because the local communities at large have a strong sense that they have the right to benefit from these forests economically. This is despite the reality that the large sections of forestland are owned by the central government. Their justification to benefit from these forests is strong since they are the one who bear most of conservation costs.

10 Final Discussion and Recommendations

The research put weight on analyzing the inter-linkages between land, rural livelihoods, and forest management in West Usambara. It investigates particularly how a scarcity of arable land impacts livelihood strategies and wealth accumulation; and measures taken by the community to address it. Additionally, the conditions of forests in West Usambara arising from the current system of forest management and declining economy are examined. Finally, the research has investigated the perception of local communities toward forests management and its outcome in relation to forest conditions.

To attain these goals, a Sustainable Livelihoods Framework *(SLF)* and Household Wealth Index *(HWI)* have been employed to guide analysis of different themes in relation to land, rural livelihood and forest management in West Usambara. Thus, social economic survey methods were used to understand issues regarding livelihood resources, livelihoods strategies, wealth accumulations, and general socio-economic status of the West Usambara community. The same methods were employed to capture the perception of the local communities towards forest management and its outcomes in relation to forests conditions. On the other hand, the vegetation survey methods were used for examining the diversity of wood trees, forest anthropogenic disturbances and the general conditions of forests in this area. The research came-up with the following conclusions among others:

The scarcity of arable land contributes to the low performance of livelihood strategies in West Usambara. This in turn has contributed to the low wealth accumulation, low social economic status, food insecurity, low income, and high out-migration in West Usambara. Other impacts are an increase in competition for agricultural land exacerbating to conflicts over land. People have responded differently to this situation. Among adaptation mechanisms include: intensive agriculture to maximize crop production; searching arable land from outside West Usambara; engaging in other income generating activities; and migration to urban areas. However, these strategies have done very little to improve socio-economic situation of the community as reflected in low amount of remittance received in this area and improving other-income generating activities among others.

With regard to forests management and associated livelihood strategies it was noted that: the current forest management in West Usambara has contributed to the decline in the consumption patterns of forest products and the number of people who engage in forest based

livelihoods activities *(FBLA).* To pursue *FBLA* people engage in illegal activities inside forest reserves which causes wasteful forest utilization. The situation is complicated by low economic opportunities in this area. Consequently, forest conditions are deteriorating as manifested in the form of large extent of illegal activities inside reserve forests, mining inside reserves, decline of forest canopy cover, alteration in the structure of composition of some tree species in some forests and low basal areas. The alteration in the structure of composition of species is caused by selective logging which targets some tree species more than others. These situations are threatening water sources and other ecological services provided by forests in West Usambara.

In respect to the perception of local communities toward forests management and its outcome in relation to forest conditions it was observed that: overall, more people have more positive attitudes towards forest conservation. The local communities are much aware of the importance of forests especially entailed environmental benefits. However, such benefits are not enough to ensure local communities to withdraw from extraction of forest resources due declining trend in agricultural productivity along with a lack of alternative economic opportunities to earn a living.

What is new about this Research in Relation to previous Studies in West Usambara?

Apart from looking at issues of land, rural livelihoods and forest management concurrently, the research has provided quantitative data on different themes which are rarely found in other studies in West Usambara as indicated below:

***On land issues and livelihoods*:** previous researches such as that by JAMBIYA (1998) mention that, “land scarcity in West Usambara has led to serious problems of disputes over lands, thefts, and fights”. However, he didn’t show data to indicate the extent of these problems. This research has provided quantitative data on these issues and showed the extent of land disputes and how the problem of land scarcity spread in West Usambara. Also it shows how land disputes spread in other districts of Tanga Region which at present are considered to have abundant land. Additionally, the research gives a glance on the

performance of the *village land councils*, *ward tribunals* and *the district land and housing tribunal* which were not covered by previous researchers.

Moreover, it provides data on the number of people who are ready to migrate to other places for land reasons by villages and age categories. Such data are important because JAMBIYA mentioned that in West Usambara some people were showing interest in migrating to other places for land reasons; however he didn't show quantitative data on the number of such people.

Furthermore, the research has provided quantitative data on crimes related to illegal utilization of forest products and the punishment given to convicts. These data are not seen in other researches in West Usambara. Likewise, it provides quantitative data on agricultural production and sales. This is different to previous researches such as that by JAMBIYA (1998: 9) which suspected that benefits from agricultural activities in West Usambara were declining or stagnating without showing statistical data.

On migration: the previous researches observed that, West Usambara is one of the areas in Tanzania which experience high out-migration without showing the trend. This research despite showing the extent of out-migration it also indicates the trend of in-migration from1950s to 2000s and out migration from 1970s to 2000s which are not seen in other researches. Likewise, it confirms other researches which have observed that high-out migration especially among youth is due to unreceptive economic outlook of West Usambara. In this case it is manifested to a large extent on poor performance of agricultural activities.

On Biodiversity: Although many researches appreciate that the West Usambara forests are rich in diversity of plant species; it is rare to find a research which provides *quantitative abundant data* targeting wood trees. Many researches show qualitative information on different species which are mostly based on presence/absence of the species. This research apart from showing qualitative information on different wood trees adds abundant value also. In this respect, relative abundant of tree species in two forest reserves are shown. Also *species resemblance* and *evenness* within a single quadrat and between quadrats and between forests are provided. Furthermore, trees attributes data such as height, diameter at breast height *(DBH),* and basal area *(BA)* for wood trees are given. These data are very important in conservation as they can be used as a baseline for planning future management of these forests. Similarly, the research apart from showing different types of anthropogenic

disturbances and their drivers it has also quantified their impacts on forest conditions which is important in developing conservation plans.

Therefore, based on these observations the following points of views regarding issues of land, rural livelihoods and forest management in West Usambara are raised.

10.1 About high out-migration Trends in West Usambara

Lack of economic opportunities and declining performance of livelihood strategies in West Usambara motivate people especially youth to migrate to big cities. However, such population movements do not help West Usambara much economically as manifested in low amount of remittances received in this area. Instead, it contributes to the steady loss of energetic labor force that could be put to use under productive activities. Worse, cities where majority of youth prefer to migrate to such as Dar es Salaam and Arusha are facing critical unemployment problems. Therefore, though migration is one of the forms of adaptation mechanisms to adjust from harsh condition that one faces in the area of origin, its efficiency depends on the prevailing conditions at the place of destination - especially in terms of offering employment and other basic social services. Big cities in Tanzania are incapable of accommodating migrants particularly from rural areas let alone its inhabitants.

Therefore, many migrants from West Usambara and other rural areas in Tanzania who are migrating to major cities are unemployed or are engaged in less paying jobs. Also their competences to get employment are impaired as many lack appropriate formal education which is commonly a prerequisite set by employers in cities. As a result the majority is forced to engage in the informal sector as street venders and petty traders, popularly known in Kiswahili as *'Machinga*[28]*'*. This again results in constant confrontation with city guards. Such confrontation happens especially when city guards restrict '*Machinga'* from conducting business around the Central Business Districts *(CBD)* which are mostly preferred by them as they consist of many customers. The confrontation between *'Machinga'* and city guards sometimes ends-up in fighting, injuries, loss of property, and lives.

[28] ***Machinga*****:** is a nick name given to the street venders and petty traders in major cities of Tanzania. At first the name was attributed to the youth from southern Regions of Lindi and Mtwara, but nowadays the name is commonly used in referring to any street venders and small traders in Tanzania

Consequently, migrants from West Usambara have no hope neither at the area of origin nor at destination in terms of earning high incomes. Although it is wise for people to migrate and look for alternative means to survive, it is unwise to support population movement which is less advantageous. Therefore, it is wise to think alternative ways through which this population could be assisted as it would be suggested latter by this research.

10.2 On Scarcity of arable Land and its Outcome

As noted already in preceding chapters, scarcities of arable land contribute much to the low performance of livelihood strategies in West Usambara. And there is very slim possibility to address the problem from within. Therefore, though importance of improving productivity of available land through soil and water conservation measures cannot be underestimated, it is high time to address the problem from outside. This could be done by locating arable land to the West Usambara community from other districts within Tanga Region or elsewhere else in Tanzania. Together with this, there is a need to promote off-farm activities which will lessen the demand for land resources.

In this respect this research argues that, unless this is done poverty will increase in West Usambara. This in turn would accelerate out-migration ending up in overcrowding urban areas which creates tensions for the responsible authorities. Indeed, so longer as most migrants lack formal education to qualify urban employments they would end-up in abject poverty. Therefore, to avoid this, the villagers in need of land should organize themselves into groups and launch for application of land from the central government. This should be done through the coordination of their respective villages' governments, the Lushoto District Council and the Regional Commissioner Office in Tanga.

Such coordination is important because it will ease and legitimizes the process. Also, the organization of villagers around these needs is important because, while it might be difficult for the government to give land to an individual, it is much easier to give it to an organized group of small producers. The importance of poor people, small peasants, and other marginalized groups organizing and demanding their needs is also supported by GREEN who has argued that:

> "When they are organized, people can also convince authorities to alter the structure and rules governing markets to ensure that they get a fair deal. Since as an organized group their bargaining and negotiation power is higher than an individual". (GREEN 2012: 87).

While the argument in case is proposed to assist the marginalized groups to influence institutions that regulate market to work for them, it can also work for land question in West Usambara. The possibility of West Usambaras community obtaining land from the central government is even much higher in Tanzania because land laws have retained land ownership in the hands of the president as a trustee for all Tanzanians. Such provision gives the president power to decide on land matters. Indeed, president would wish to see people getting out of poverty by constructing livelihood activities based on land resources. Accordingly, it should be easy for the president to transfer one category of land to another (e.g. general land to village land) as the land laws allow for it. This view is also shared by BOHLE a renowned livelihood expert who has pointed out that:

> "An individual, household, or socio group may be enabled to gain sustainable livelihood security in many ways – *through ownership of land*, *livestock*, or *trees; right to grazing, fishing, hunting, or gathering; through employment with adequate remuneration; or through varied ranges of activities"* (BOHLE 2007: 9).

In the context of West Usambara and Tanzania, giving land to the people in need is important. This is justified by the fact that the local communities in West Usambara are prepared to engage in agriculture. About 68 % respondents were planning to invest in agricultural activities if credits could be provided to them (see section 6.5 on the readiness to borrow from credit facilities). Hence it is better to support people around their needs and in areas which they are capable.

10.3 Risk of leaving Land Problems to be addressed by Individuals in West Usambara

If the problem of addressing land scarcity in West Usambara would be left to an individual it might create tension and land conflicts in other districts in Tanga Region which are considered to have sufficient land at the moment. This is because, there is steady increase in the number of desperate people from West Usambara and other places in Tanzania who is

looking for land in other districts in Tanga Region. About 49.2 % respondents in West Usambara are suggesting the government to earmark them land in other districts. In this group others have started to look for land in other areas. If this situation would be allowed to continue without coordination it might cause problems in the near future.

The appeal cases on land at the *district land and housing tribunal* from the districts of Kilindi and Handeni which are considered to have abundant land is a good example. Although many land conflicts in such areas exist between individuals and government and between individuals and foreign investors. There are also conflicts between locals and other individuals who are migrating into these districts from other regions, particularly the Manyara Region. Hence, it is important that land scarcity problems are addressed by the government authorities through proper coordination.

10.4 On the Performance of Organs involved in Resolution of Land Disputes in West Usambara

In order to improve the efficiencies of different organs responsible for settling conflicts over land, there is a need to provide education on land laws to all stakeholders. In this respect emphasis should be given to the members of *the village land councils* and *ward tribunals.* Particularly, they should be given seminars which would give an overview of the Land Act, Village Land Act, Land Registration Act, and the Act which establishes Ward Tribunals and Village Land Councils which is the Land Disputes Courts Act, Cap.216 R.E 2002.

The members should also be given education with regard to fight corruption, and also they should be counter-checked by the Prevention and Combating of Corruption Bureau *(PCCB).* Also the community at large should be sensitized to report all corrupt practices to appropriate institutions. The improvement of performances of the *village councils* and *ward tribunals* are very important because they are helpful in settling land disputes at the local level. Furthermore, the government through the District Council should start to provide some allowances to the members of village councils and ward tribunals together with funding their day-today activities.

10.5 On Forest Management

This research argues the government and other forest stakeholders not deceive themselves that there is better future of West Usambaras forests. This is because illegal and wasteful utilization of forest products is going on inside forest reserves. The situation is perpetuated by many factors including: lack of alternative livelihood activities; high *exchange value* of forest products that attracts timber extraction; lack of incentives among forest guards and forest committees; and low support from the national government.

Likewise, the manners in which forest responsibility and costs are shared in West Usambara are not favorable for conservation. Most conservation burdens are on local communities. Under normal circumstances it should not be like that since large forestland falls under the *National Forest Reserve* forest tenure category; which suggests full government involvement. This is an unfortunate situation because except for ecological benefits associated with forests there is no other reward given to the villagers by being involved in conservation. Therefore, the Tanzanian government has to stop giving excuses that it has limited financial means to fund forests activities because it would not help. Indeed, it is difficult for villagers to understand such excuses.

In other words the prevailing situation in West Usambara cannot sustain forest quality any further. Under current condition it is unrealistic to expect local people to continue to preserve forests given low support from the government and the economic difficulties they are facing. Therefore, unless, and until these observations are accepted and rectified the result can only be poor performance in poverty reduction and forest management in this area. It is also important to remind oneself that: political will by the government to decentralize forest management to other stakeholders through participatory forest management approaches is not enough unless it is translated on the ground though genuine provision of financial support to the local communities involving in conservation. Thus, it is high time for the government to implement its forest policy accordingly. The time is now; it is not yet too late, and even if it is late better late than never.

10.6 Conclusion and Policy Recommendations

In making conclusion it is better to return back to the hypothesis which this research made at the outset *that: (1) The scarcity of arable land coupled with restriction to utilize forest resources leads to the decline of rural livelihoods and undermining the future development for the population; (2) Arable land is one of the resources to increase the collection of assets beyond land to the full portfolio necessary for sustainable livelihoods in West Usambara; and that, (3) The scarcity of arable land does not lead to the decline of livelihoods and undermining future development as the communities would develop to ensure sustainable land use or develop other livelihood strategies which are less dependent to land resources.*

This research has exposed much evidence which confirm the first and second hypotheses. Among them: is how land scarcity in West Usambara contributes to the low performance of *livelihood strategies* leading to little wealth accumulation, food insecurity, low income, high out-migration and low social economic status. Others are land conflicts following an increase in competition for small agricultural land. Likewise, more restrictions of forest utilization coupled with low economic opportunities in West Usambara encourage illegal activities inside forest reserves. This is because people's short term needs overweight the ecological benefits provided by forests. These has led to deterioration of forest conditions as manifested in the form of decline of forests canopy cover, basal area, and alteration in the structure and composition of some tree species.

Forest degradation is going on despite the fact that the majority of local communities in West Usambara have positive perception towards forest management; which is though could encourage best forest practice. This happens because West Usambara is facing a declining trend in agricultural productivity along with a lack of alternative economic opportunities to earn a living. Thus, despite existing restrictions on the utilization of forests and associated penalties to convicts still they would continue to utilize them illegally. The situation would be compounded by low incentives among villages' forest committees and forest guards to take part in conservation.

Consequently, it is concluded that the local communities in West Usambara are far from achieving sustainable livelihood let alone that of the next generation. This is because the area has limited sustainable livelihoods opportunities due to scarcities in livelihood resources such

as arable land. Also, if the deterioration of natural resource base like forests would remain un-addressed it would cause far reaching negative impacts on socio-economic development in this area and Tanzania at large. This is because these forests are among the few remaining tropical forests in Tanzania and they are sole source of water for 207 villages in West Usambara and town of Lushoto and Mombo. Also West Usambara forests contribute significant amount of water to the Pangani River though its main source is Mount Kilimanjaro, the river is important for irrigation and hydroelectric power generation in a country.

Based on the preceding discussions this research provides a number of recommendations in relation to land scarcity, rural livelihoods and forest management in West Usambara. Although previous sections have highlighted them, it is essential to summarize the main suggestions of practical significance to the Lushoto District authority, the Tanga regional government, the Ministry of Land and Settlement Developments *(MLHSD)*, and the forestry division at the Ministry of Natural Resources and Tourism *(MNRT)* as follows:

The villages' governments and the Lushoto District Council in collaboration with the Regional Commissioner's Office should mobilize villagers who are in need of arable land and forward their application to the government through the Commissioners for Lands and the *MLHSD*. Together with earmarking arable land to the West Usambaras communities, the support in forms of agricultural credits is also important. Its importance is due to the fact that peasants found it difficult in developing such lands due to lack of capital. These initiatives apart from increasing household's land size and solving unemployment problem it would also promote food security in West Usambara.

Apart of looking land in other areas for the West Usambaras communities there is also a need to improve land administration in this area. This should be done by promoting education on land management and good agricultural practices; land titling and registration; and provision of legal education to the members of *the village land councils* and *ward tribunals*. The latter should go hand-in-hand with monitoring the performance of these machinery organs.

The government should also promote off-farm activities in West Usambara to supplement agricultural activities which is declining. This is important because such activities are fairly

performing better in West Usambara and upon supported they would not only lift the economy of the area but also they would lessen the dependence on land resource.

With respect to forests management: the West Usambaras forests would receive support from villagers if the following conditions would be met: first, the government should sign the Joint Forest Management Agreements *(JFM)* with the villagers and give clarification on how villagers participating in forest conservation would benefit. Secondly, the government should provide financial incentive to the forest guards and village committees. Third, the government should increase budget to the forest departments at different levels especially targeting these important forests. This would easy implementation of different projects designed at different forest administrative levels. This can be partly done by scaling-up the ongoing *reducing emission from deforestation and forest degradation (REDD)* initiatives to West Usambara. Such initiatives would motivate villagers to engage in conservation as it ensures some economic incentives. In turn it will help to raise least positive attitudes toward forest management hence encouraging best forest practice behaviors by villagers.

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12 Appendices

Appendix 1: In-depth Interview between the Researcher and Mr. Stephen S. Kipingu, on Personal Experience on Forest Management at Balangai Village on 28 july 2012.

In 2006, the Balangai village was asked by the central government to participate in protecting the Balangai Forest Reserve. The forest specialists from the forest department at the Lushoto District came to our village and gave us seminar on how to protect and taking care of the forests. After that seminar, the forest committee comprising 25 people was chosen and it was assigned the work. Also, the committee's chairperson, secretary, and treasurer were selected. The following are some of criminal events on illegal logging which have taken place so far:

The first event took place on 4 september 2007 when the forest committee did a patrol in the forest. We were able to find 52 pieces of timber of different species including *'Mnyasa', 'Mkulo'*, and others. These timbers were delivered to Balangai Village Office. However, during this patrol we could not find any illegal loggers.

The second event took place on 22 may 2008. In this patrol, we managed to capture Mr. Rafael Kipingu, who was cutting a tree for firewood without permission. We took him to the village office, and after interview he admitted the offense. The forest committee in collaboration with the village leadership asked him to pay a penalty of TZS 15,000 (approx. US$ 9.38), which he paid. This is a small penalty in accordance with the by-laws of natural resources which has been formulated in collaboration with villagers and the district natural resource office.

Another incidence happened on 10 june 2008. In this event four people from the village of Zege-Dindira in Korogwe District were caught with two saws and eleven woods. The names of these people are Gideon Stephen, Kasimu Hassan, Waziri Kwavi, and Yusuph Solomon. They were then taken to the Village Executive Officer (VEO) at the Balangai village. When the Village Executive Officer asked the victims *'for whom are you splitting these woods?'* They answered *'they are for Mr. Raphael Kipingu'*. It should be remembered that, this is a same person who was caught cutting a tree for firewood without seeking the permission as mentioned above. These people were taken to the police station at Bumbuli, and later on were sent to the court at Lushoto, where they were given bond and released shortly.

The victims were told to appear again before the court on 22 october 2008. Also three people from the side of forest committee were asked to show-up at the same date for giving more details about the case. In this respect, Mr. Ramadhani Kahema, W. Elijah and I had to represent the forest committee. We appeared before the court as directed however, the accused did not show up for a second time. The court ordered us to give our testimony. We asked the Court Magistrate, *'why should we provide our testimony while the victims are not present in the court?'* We were told that, the defendants (suspects) will seek two cases. The first case will be on cutting wood without a permit, and the second charge will be of ignoring the court order. So we were told to give our testimony and we did so.

After the court session we asked the responsible people to pay us the bus-fare and money at least for food. They told us that, there is no money. We decided to go to the Lushoto District Natural Resource Office to request for financial assistance at least for bus-fare to return back home. The District Natural Resource Office gave us TZS 10,000.00 (approx.US$ 6.25). However, this amount was so little for three people to cover the costs for bus fare and food. Therefore we had to walk on foot from Soni to Balangai village. We waited for long time to see the fate of this case. Later on we were told that the suspects have been sentenced to prison. But we do not know for how long they have been imprisoned. Bad enough we had not seen these people getting arrested. How it is said suspect were sentenced to prison! And why they have been charged a punishment which is not understood and difficult to explain? Everyone was concerned about this event and got disappointed. After this case our lives have been threatened and we have ended up living under tension.

Another incident happened on 27 october 2008. In this event, police from Lushoto District and Bumbuli town came at Balangai village where they met the Balangai Village Executive Officer. I was asked to go to the office and told to accompany them to make inspection to the houses of Rafael Kipingu and Ramadhani Saidi. Our trip began from Mr. Raphael house. However, he was not at his house, as he was already informed by some villagers that he is wanted by the police. So we only found his children. After inspection, we found bench for making furniture and pieces of wood. Police said that, these are not wood which we are searching for, though such pieces of wood were from hard wood trees from natural forests. They wrote a report saying that, they have not found any timber in Raphael's house. The second trip was inspection to the house of Ramadhani Saidi. Also we did not find him just like Raphael, and the door was locked. Nevertheless, the window was not properly closed and it was possible to see inside. When police tried to look inside they saw a bundle of wood. They decided to unlock the door by force and found 36 pieces of wood of different sizes from '*Mnyasa'*, '*Mkulo'* species and all were taken by the police.

After all these events, Mr. Rafael Kipingu (who is my little brother) started to intimidate my life and blaspheming. He went to our father and spoke lies to him, saying that, '*I have disrupted his sources of income by helping in protecting the forest'*. My father was very angry to the extent of denouncing me, saying that, I am no longer one of his sons. When my father got sick I did not get a chance to take care of him until his death. Bad enough I was not able to participate in his burial and funeral ceremony. All these incidences have discouraged me from participating fully in protecting this forest, though I am the secretary of the forest committee. All in all, despite doing good job of protecting the forest, I am the one who is suffering as if I am criminal. It is disappointing to see that while forest guards are going through these pains we are not paid anything, except that we have rewarded threats, intimidation, and violence in our lives. Just shocking! Therefore, if the government really needs these forests to be taken care-off and receive appropriate protection it should think to employ forest guards. In other words forest guards should be paid wages. Otherwise, the forest will continue to be destroyed by few people at the expense of the public and nation at large. Subsequent, rain, clean air, and water will disappear. Also, mining inside forest reserve is another tragedy which is facing the Balangai Forest Reserve especially at section of Funta village. There is no doubt that, after finishing mining in the Funta section they will extend to Balangai part. This will pollute water which will have far-reaching impacts to our lives.

Appendix 2: Tree Species Composition and Abundance Data at the Balangai Forest Reserve

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																									Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Agauria salicifolia	5	1	6	0	0	5	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.0
Albizia schimperiana	11	0	0	0	0	0	1	0	0	0	0	2	0	2	0	2	1	1	2	2	1	2	2	0	0	0	1.6
Allanblackia usambarensis	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1.3
Allophyllus abyssinica	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Aningeria adolfi-friedericii s	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Aphloia theformis	9	1	5	0	0	7	0	0	3	0	15	0	2	0	0	0	0	2	0	0	1	0	0	0	5	0	4.6
Beilschmiedia kweo	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2.0
Bersama abyssinica	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1.0
Caloncoba welwitschii	7	0	0	0	0	1	0	0	0	0	0	0	0	1	1	3	0	0	1	0	0	8	0	7	0	0	3.1
Celtis africana	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Chrysophylum gorungosanum	6	0	0	1	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	2	1	0	1.7
Cola greenwayi	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1.0
Craibia brevicaudata	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1.0
Croton sylvaticus	3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	1.0
Cussonia arborea	5	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	1	0	0	0	1.2
Cynometra longipedicellata	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	2.0

Appendix 2 Continued

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																								Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Dracaena steudneri	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1.3
Drypetes natalensis	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1.0
Drypetes usambarica	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	0	1.5
Englerodendron usambarense	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1.0
Englerophytum natalense	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Ficus capensis	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	3	0	0	0	0	0	0	0	0	2.3
Ficus exasperata	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	6.0
Ficus natalensis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0
Flacourtia indica	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Galiniera saxifraga	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1.0
Garcinia buchananii	2	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0
Harungana madagascariensis	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Isoberlinia scheffleri	4	0	0	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	0	3.8
Leptaulus hosltii	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1.0
Macaranga capensis	12	0	0	1	3	0	0	4	0	0	0	0	7	4	1	4	1	0	1	1	0	0	2	1	0	0	2.5
Maesa lanceolata	3	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	0	5	4.0

Appendix 2 Continued

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																								Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Maytenus acuminata	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Millettia usambarensis	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1.7
Myrianthus holstii	5	0	0	0	0	0	2	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	2	1.4
Neoboutonia macrocalyx	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	9	7	0	0	0	0	9	0	0	0	6.5
Newtonia buchanani	13	0	0	0	0	0	0	0	0	0	0	4	3	5	1	10	1	3	3	0	1	6	1	1	0	1	3.1
Ocotea usambarensis	12	3	1	0	3	3	0	11	2	0	7	0	7	0	0	3	0	0	0	1	0	1	0	1	0	0	3.6
Odyendea zimmermannii	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0
Parinari excelsa	12	1	0	2	0	3	0	2	2	0	0	1	1	0	0	1	0	1	0	4	1	4	0	0	0	0	1.9
Polyscias fulva	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1.0
Rapanea melanophloeos	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Ritchea albersii	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	1	0	0	0	1.3
Rytyginia uhligii	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	1	0	0	0	0	0	0	0	2.0
Sorindeia madagascariensis	17	0	0	4	0	1	5	0	4	2	0	0	2	6	12	2	6	1	2	1	5	6	2		1	0	3.6
Strombosia scheffleri	4	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	2.0
Syncepalum brevipes	4	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	1	0	0	1	0	0	0	0	0	1.8

Appendix 2 Continued

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																									Mean
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Syncepalum cerasiferum	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.0
Syzygium guineense	6	0	5	0	0	0	0	3	2	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0	0	0	2.3
Tabernaemontana pachysiphon	2	0	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5
Teclea nobilis	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1.0
Trema orientalis	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Trichilia grotei	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1.0
Turraea nilotica	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2.0
Turraea robusta	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0
Xymalos monospora	3	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1.3
Total Trees in a Quadrat		**7**	**17**	**19**	**10**	**22**	**16**	**23**	**15**	**11**	**24**	**23**	**28**	**27**	**21**	**31**	**23**	**25**	**16**	**24**	**19**	**32**	**23**	**19**	**10**	**20**	**20.2**

Source: Own Vegetation Surveyed Data (2012).

Appendix 3: Tree Species Composition and Abundance Data at the Kitara Ridge Forest Reserve

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Agauria salicifolia	2	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	0	2.5
Albizia schimperiana	9	3	3	0	0	1	0	0	5	1	2	4	3	0	1	0	0	2.6
Allophyllus abyssinica	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Aphloia theformis	2	0	0	0	0	0	0	25	0	0	0	2	0	0	0	0	0	13.5
Bersama abyssinica	3	1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1.3
Caloncoba welwitschii	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1.0
Casearia battiscombei	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3.0
Cassipourea congoensis	4	0	0	0	8	1	0	0	0	0	0	1	0	0	1	0	0	2.8
Cola greenwayi	7	1	0	2	0	0	12	0	0	0	0	0	12	11	4	1	0	6.1
Craibia brevicaudata	5	6	6	0	0	0	0	0	0	0	0	0	0	1	2	3	0	3.6
Cussonia arborea	3	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	1.7
Diospyros abyssinica ssp. abys	2	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4.0
Drypetes natalensis	4	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1.0
Ficus natalensis	1	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	7.0
Flacourtia indica	2	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	2.0
Galiniera saxifrage	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1.0
Garcinia buchananii	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1.0

Appendix 3 Continued

Species' Name	No of Quadrats	Quadrats and % cover/ Number of Species																Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Maytenus acuminate	3	0	0	0	0	0	0	3	1	0	0	0	2	0	0	0	0	2.0
Maytenus senegalensis	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1.0
Myrica salicifolia	2	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	1.5
Ochna insculpta	1	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	17.0
Ocotea usambarensis	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3.0
Podocarpus usambarensis	2	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	2.0
Psychotria riparia	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0
Rapanea melanophloeos	2	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1.5
Ritchea albersii	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0	1.3
Syzygium guineense	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1.0
Teclea nobilis	3	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	1.3
Turraea nilotica	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0
Turraea robusta	5	0	0	0	1	0	1	0	1	2	0	0	0	1	0	0	0	1.2
Vangueria apiculata	3	0	0	0	2	0	0	0	1	2	0	0	0	0	0	0	0	1.7
Zanthoxylum deremense	2	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	1.5
Total Trees in a Quadrat		**18**	**10**	**9**	**19**	**4**	**13**	**37**	**12**	**7**	**5**	**39**	**22**	**16**	**10**	**6**	**2**	**14.3**

Source: Own Vegetation Survey Data (2012).

Appendix 4: Species Similarity and Dissimilarity for selected Quadrats from the Kitara Ridge Forest Reserve

Compared Quadrats	S_J in Proportion	Similarities (S_J in %)	D_J in Proportion	Dissimilarities (D_J) in %
One and Four	0.00	0.0	1.0	100.0
One and Seven	0.00	0.0	1.0	100.0
One and Ten	0.29	29.0	0.7	71.4
One and Thirteen	0.18	18.2	0.8	82.0
One and Sixteen	0.00	0.0	1.0	100.0
Four and Seven	0.00	0.0	1.0	100.0
Four and Ten	0.00	0.0	1.0	100.0
Four and Thirteen	0.10	10.0	0.9	90.0
Four and Sixteen	0.00	0.0	1.0	100.0
Seven and Ten	0.00	0.0	1.0	100.0
Seven and Thirteen	0.00	0.0	1.0	100.0
Seven and Sixteen	0.00	0.0	1.0	100.0
Ten and Thirteen	0.00	0.0	1.0	100.0
Ten and Sixteen	0.00	0.0	1.0	100.0
Thirteen and Sixteen	0.00	0.0	1.0	100.0

Source: Own Computation from Vegetation Survey Data (2012).

Appendix 5: Species Similarity and Dissimilarity for selected Quadrats from the Balangai Forest Reserve

Compared Quadrats	S_J in Proportion	Similarities (S_J) in%	D_J in Proportion	Dissimilarities (D_J) in%
One and Four	0.09	9.0	0.91	91.0
One and Seven	0.38	38.0	0.63	62.0
One and Ten	0.60	60.0	0.40	40.0
One and Thirteen	0.00	0.0	1.00	100.0
One and Sixteen	0.00	0.0	1.00	100.0
Four and Seven	0.38	38.0	0.62	62.0
Four and Ten	0.11	11.1	0.89	88.9
Four and Thirteen	0.07	7.0	0.93	93.0
Four and Sixteen	0.08	8.3	0.92	91.7
Seven and Ten	0.25	25.0	0.75	75.0
Seven and Thirteen	0.15	15.4	0.85	84.6
Seven and Sixteen	0.08	8.3	0.92	91.7
Ten and Thirteen	0.00	0.0	1.00	100.0
Ten and Sixteen	0.00	0.0	1.00	100.0
Thirteen and Sixteen	0.20	20.0	0.80	80.0

Source: Own Computation from Vegetation Survey Data (2012).

Appendix 6: Species Richness and Evenness/Equitability within selected Quadrats from the Kitara Ridge Forest Reserve

Quadrat	Species Name	% Cover	Proportion of Total Cover *(Pi)*	Pi^2	Simpson Index D = 1- Σ Pi^2	Species Evenness E1/D= 1/D/N
One	*Albizia schimperiana*	3	0.167	0.028	0.7901	0.1808
	Bersama abyssinica	1	0.056	0.003		
	Cola greenwayi	1	0.056	0.003		
	Craibia brevicaudata	6	0.333	0.111		
	Cussonia arborea	2	0.111	0.012		
	Diospyros abyssinica ssp. Abys	4	0.222	0.049		
	Drypetes natalensis	1	0.056	0.003		
	Total (∑i)	**18**		**0.210**		
Four	*Cassipourea congoensis*	8	0.421	0.177	0.6704	0.2983
	Ficus natalensis	7	0.368	0.136		
	Ritchea albersii	1	0.053	0.003		
	Turraea robusta	1	0.053	0.003		
	Vangueria apiculata	2	0.105	0.011		
	Total (∑i)	**19**		**0.330**		
Seven	*Agauria salicifolia*	4	0.108	0.012	0.5172	0.3223
	Aphloia theformis	25	0.676	0.457		
	Maytenus acuminata	3	0.081	0.007		
	Myrica salicifolia	1	0.027	0.001		
	Ocotea usambarensis	3	0.081	0.007		
	Rapanea melanophloeos	1	0.027	0.001		
	Total (∑i)	**37**		**0.483**		

Appendix 6: Continued

Quadrat	Species Name	% Cover	Proportion of Total Cover *(Pi)*	Pi^2	Simpson Index D = 1- Σ Pi^2	Species Evenness E1/D= 1/D/N
Ten	*Albizia schimperiana*	2	0.400	0.160	0.6400	0.5208
	Bersama abyssinica	2	0.400	0.160		
	Zanthoxylum deremense	1	0.200	0.040		
	Total (∑i)	**5**		**0.360**		
Thirteen	*Cola greenwayi*	11	0.688	0.473	0.5078	0.3282
	Craibia brevicaudata	1	0.063	0.004		
	Garcinia buchananii	1	0.063	0.004		
	Syzygium guineense	1	0.063	0.004		
	Teclea nobilis	1	0.063	0.004		
	Turraea robusta	1	0.063	0.004		
	Total (∑i)	**16**		**0.492**		
Sixteen	*Caloncoba welwitschii*	1	0.500	0.250	0.5000	1.000
	Psychotria riparia	1	0.500	0.250		
	Total (∑i)	**2**		**0.500**		

Source: Own Computation from Vegetation Survey Data (2012).

Appendix 7: Species Richness and Evenness/Equitability within selected Quadrats from the Balangai Forest reserve

Quadrat	Species name	% Cover	Proportion of Total Cover *(Pi)*	Pi^2	Simpson Index D = 1- Σ Pi^2	Species Evenness E1/D= 1/D/N
One	*Agauria salicifolia*	1	0.143	0.020	0.73469	0.27222
	Aphloia theformis	1	0.143	0.020		
	Maytenus acuminata	1	0.143	0.020		
	Ocotea usambarensis	3	0.429	0.184		
	Parinari excelsa	1	0.143	0.020		
	Total(∑i)	**7**		**0.265**		
Four	*Cussonia arborea*	1	0.100	0.010	0.78000	0.21367
	Harungana madagascariensis	1	0.100	0.010		
	Macaranga capensis	3	0.300	0.090		
	Ocotea usambarensis	3	0.300	0.090		
	Trema orientalis	1	0.100	0.010		
	Xymalos monospora	1	0.100	0.010		
	Total(∑i)	**10**		**0.220**		
Seven	*Agauria salicifolia*	2	0.087	0.008	0.70700	0.23574
	Macaranga capensis	4	0.174	0.030		
	Ocotea usambarensis	11	0.478	0.229		
	Parinari excelsa	2	0.087	0.008		
	Syzygium guineense	3	0.130	0.017		
	Trema orientalis	1	0.043	0.002		
	Total(∑i)	**23**		**0.293**		

Appendix 7: Continued

Quadrat	Species name	% Cover	Proportion of Total Cover *(Pi)*	Pi^2	Simpson Index D = 1- Σ Pi^2	Species Evenness E1/D= 1/D/N
Ten	*Agauria salicifolia*	1	0.042	0.002	0.5203	0.48000
	Aphloia theformis	15	0.625	0.391		
	Ocotea usambarensis	7	0.292	0.085		
	Rapanea melanophloeos	1	0.042	0.002		
	Total(∑i)	24		**0.479**		
Thirteen	*Albizia schimperiana*	2	0.074	0.005	0.8581	0.10587
	Caloncoba welwitschii	1	0.037	0.001		
	Croton sylvaticus	1	0.037	0.001		
	Drypetes natalensis	1	0.037	0.001		
	Macaranga capensis	4	0.148	0.022		
	Myrianthus holstii	1	0.037	0.001		
	Newtonia buchanani	5	0.185	0.034		
	Sorindeia madagascariensis	6	0.222	0.049		
	Syncepalum brevipes	4	0.148	0.022		
	Syzygium guineense	1	0.037	0.001		
	Trichilia grotei	1	0.037	0.001		
	Total(∑i)	**27**		**0.141**		
Sixteen	*Albizia schimperiana*	1	0.043	0.002	0.7488	0.19087
	Ficus capensis	3	0.130	0.017		
	Macaranga capensis	1	0.043	0.002		
	Neoboutonia macrocalyx	9	0.391	0.153		
	Newtonia buchanani	1	0.043	0.002		
	Ritchea albersii	2	0.087	0.008		
	Sorindeia madagascariensis	6	0.261	0.068		
	Total(∑i)	**23**		**0.251**		

Source: Own Computation from Vegetation Surveyed Data (2012).

Appendix 8: Other Trees Attributes Data for the Balangai Forest Reserve

Specie Scientific Name	Species Local Name	No. of Plot	Total No of tree	Mean No. of Tree per quadrat	Mean Height of tree species (m)	Mean DBH of tree species (m)	Mean Basal Area (m2)
Agauria salicifolia	Mandari	5	15	3.0	18.8	0.42	0.1372
Albizia schimperiana	Msahi	11	18	1.6	25.9	0.46	0.1662
Allanblackia usambarensis	Msambu	3	4	1.3	16.0	0.23	0.0428
Aningeriaadolfi-friedericiis	-	1	1	1.0	15.0	0.25	0.0491
Aphloia theformis	Mhunguu	9	41	4.6	12.0	0.24	0.0452
Beilschmiedia kweo	Mfimbo	1	2	2.0	7.0	0.13	0.0133
Bersama abyssinica	-	1	1	1.0	30.0	0.38	0.1134
Caloncoba welwitschii	Mhunguu	7	22	3.1	13.6	0.16	0.0194
Celtis Africana	Mjambegha	1	1	1.0	27.0	0.63	0.3117
Chrysophylum gorungosanum	-	6	10	1.7	34.8	0.94	0.6989
Cola greenwayi	Mkongoo	2	2	1.0	19.0	0.24	0.0452
Craibia brevicaudata	Mhande	1	1	1.0	17.0	0.17	0.0227
Croton sylvaticus	-	3	3	1.0	20.0	0.45	0.1614
Cussonia arborea	Mntindi	5	6	1.2	9.8	0.25	0.0483
Cynometra longipedicellata	-	2	4	2.0	37.5	0.66	0.3370
Dracaena steudneri	Mpapata	3	4	1.3	9.0	0.31	0.0755
Drypetes natalensis	Kihambie	3	3	1.0	16.0	0.28	0.0616
Drypetes usambarica	-	4	6	1.5	18.5	0.25	0.0501
Englerodendron usambarense	Mzumba	2	2	1.0	44.0	1.21	1.1404
Englerophytum natalense	Mduyuyu	1	1	1.0	9.0	0.17	0.0227
Ficus capensis	Mkuyu	3	7	2.3	23.7	0.57	0.2582
Ficus exasperate	Msasa	2	12	6.0	19.0	0.38	0.1104
Ficus natalensis	Mvumo	1	1	1.0	44.0	1.31	1.3478
Flacourtia indica	Mkongoo	1	1	1.0	6.0	0.12	0.0113
Galiniera saxifraga	-	2	2	1.0	7.5	0.65	0.3318
Garcinia buchananii	-	2	4	2.0	23.5	0.41	0.1288
Harungana madagascariensis	Mkuntu	1	1	1.0	13.0	0.17	0.0227

Table 8 Continued

Specie Scientific Name	Specie Local Name	No. of Plot	Total No. of tree	Mean No. of Trees per quadrat	Mean Height of tree species (m)	Mean DBH of tree species (m)	Mean Basal Area (m^2)
Isoberlinia scheffleri	Maghasa	4	15	3.8	25.3	0.43	0.1435
Leptaulus hosltii	-	2	2	1.0	9.0	0.12	0.0113
Macaranga capensis	Kumba	12	30	2.5	19.3	0.30	0.0711
Maesa lanceolata	Mzikoziko	3	12	4.0	14.3	0.28	0.0616
Maytenus acuminata	-	1	1	1.0	8.0	0.12	0.0113
Millettia usambarensis	Mhafa	3	5	1.7	11.5	0.24	0.0452
Myrianthus holstii	Mkonde	5	7	1.4	11.0	0.30	0.0688
Neoboutonia macrocalyx	Mbona	4	26	6.5	17.8	0.27	0.0583
Newtonia buchanani	Mnyasa	13	40	3.1	27.9	0.40	0.1252
Ocotea usambarensis	Mkulo	12	43	3.6	26.3	0.43	0.1419
Odyendea zimmermanni	Kuti Bango	2	2	1.0	13.5	0.18	0.0254
Parinari excelsa	Muula	12	23	1.9	27.0	0.62	0.3001
Polyscias fulva	-	1	1	1.0	32.0	0.34	0.0908
Rapanea melanophloeos	-	1	1	1.0	9.0	0.20	0.0314
Ritchea albersii	-	3	4	1.3	10.3	0.18	0.0245
Rytyginia uhligii	Mwoozanyama	3	6	2.0	7.7	0.16	0.0201
Sorindeia madagascariensis	Mkwingina	17	62	3.6	11.0	0.19	0.0287
Strombosia scheffleri	Sangana	4	8	2.0	16.5	0.23	0.0425
Syncepalum brevipes	Msambia	4	7	1.8	23.8	0.84	0.5509
Syncepalum cerasiferum	-	1	1	1.0	23.0	0.22	0.0380
Syzygium guineense	Mshihwi	6	14	2.3	30.7	0.66	0.3421
Tabernaemontanampachysiphon	Mueeti	2	7	3.5	12.0	0.28	0.0616
Teclea nobilis	-	2	2	1.0	11.5	0.25	0.0491
Trema orientalis	Mshinga	2	2	1.0	12.0	0.19	0.0269
Trichilia grotei	Mbamba	2	2	1.0	14.0	0.27	0.0573
Turraea nilotica	-	1	2	2.0	9.0	0.14	0.0154
Turraea robusta	Mdwayu	1	1	1.0	12.0	0.11	0.0095
Xymalos monospora	Kidimdim	3	4	1.3	7.3	0.16	0.0193

Source: Own Computation from Vegetation Survey Data (2012).

Appendix 9: Other Trees Attributes Data for the Kitara Ridge Forest Reserve

Specie Scientific Name	Specie Local Name	No. of Quadrats	Total No. of tree	Mean number of Trees per quadrat	Mean Height of trees specie (m)	Mean DBH of tree species in meters	Mean Basal Area (m^2)
Agauria salicifolia	Mandari	2	5	2.5	13.0	0.58	0.2597
Albizia schimperiana	Msahi	9	23	2.6	17.9	0.36	0.1018
Allophyllus abyssinica	Mbangwe	1	2	2.5	25.0	0.59	0.2734
Aphloia theformis	Msiezi	2	27	13.5	13.5	0.28	0.0616
Bersama abyssinica	-	3	4	1.3	10.3	0.18	0.0264
Caloncoba welwitschii	Mhunguu	2	2	1.0	18.0	0.50	0.1924
Casearia battiscombei	Mtonte	1	3	3.0	8.0	0.15	0.0177
Cassipourea congoensis	Mtontondo	4	11	2.8	19.0	0.36	0.1018
Cola greenwayi	Kinkandemshi	7	43	6.1	9.6	0.20	0.0301
Craibia brevicaudata	-	5	18	3.6	14.2	0.36	0.1041
Cussonia arborea	Mntindi	3	5	1.7	8.7	0.25	0.0478
Diospyros abyssinica		2	8	4.0	25.0	0.52	0.2083
Drypetes natalensis	Kihambie	4	4	1.0	8.3	0.21	0.0338
Ficus natalensis	Mvumo	1	7	7.0	19.0	0.56	0.2463
Flacourtia indica	Mkongoo	2	4	2.0	9.0	0.26	0.0511
Galiniera saxifrage	-	1	1	1.0	8.0	0.12	0.0113
Garcinia buchananii	-	1	1	1.0	11.0	0.25	0.0491
Maytenus acuminata	-	3	6	2.0	16.0	0.22	0.0392
Maytenus senegalensis	-	1	1	1.0	6.0	0.14	0.0154
Myrica salicifolia	Mshengheshe	2	3	1.5	12.5	0.23	0.0415
Ochna insculpta	-	1	17	17.0	8.0	0.29	0.0661

Appendix 9: Continued

Species Scientific Name	Species Local Name	No. of Quadrats	Total No. of tree	Mean number of Trees per quadrat	Mean Height of trees specie (m)	Mean DBH[29] of tree species in meters	Mean Basal Area (m^2)
Ocotea usambarensis	Mkulo	1	3	3.0	14.0	0.20	0.0314
Podocarpus usambarensis	Shuuti	2	4	2.0	16.0	0.40	0.1257
Psychotria riparia	-	1	1	1.0	4.0	0.11	0.0095
Rapanea melanophloeos	-	2	3	1.5	7.5	0.16	0.0201
Ritchea albersii	Mwoozanyama	3	4	1.3	5.7	0.16	0.0210
Syzygium guineense	Mshihwi	1	1	1.0	25.0	0.85	0.5675
Teclea nobilis	-	3	4	1.3	11.7	0.23	0.0415
Turraea nilotica	-	1	2	2.0	14.0	0.28	0.0616
Turraea robusta	Mdwayu	5	6	1.2	11.6	0.21	0.0340
Vangueria apiculata	Mvilu	3	5	1.7	10.3	0.15	0.0177
Zanthoxylum deremense	Kidimdim	2	3	1.5	23.0	0.51	0.2003

Source: Own Computation from Vegetation Surveyed Data (2012).

[29] ***DBH:*** the Diameter at the Breast Height – trees circumference.

Appendix 10: Land Deals in Tanzania, their Negotiation and Implementation Status

Location	Investor name	Investor country	Intention	Negotiation status	Implementation status	Intended size	Contract size	Production size	Nature of the deal
Tanzania	Chongqing Seed Corp	China	Agriculture	Contract signed in 2008			300		
Kilimanjaro	DWS GALOF	Germany	Agriculture	Contract signed	In operation (production)		5000		
Mngeta, Kilombero Valley	Agrica, Rufiji Basin Development Authority (RUBADA)	Britain and Northern Ireland, Tanzania	Agriculture	Contract signed in 2008	[2010] In operation (production)	5818	5818	3000	
Bagamoyo, Tanzania, Handeni	CAMS Global	Britain and Northern Ireland	Agriculture, Renewable Energy	Under negotiation		45000			
Rufiji River	Karuturi Global Ltd	India	Agriculture	Expression of interest in 2011		1000			
Pwani	Lion's Head	Britain and Northern Ireland	Agriculture	Contract signed in 2009	Project abandoned	40000	8211		Lease / Concession
Bagamoyo,	VitaGrain	Singapore	Agriculture	Under negotiation since 2012	Startup phase (no production)	30000		2	Lease / Concession
Rufiji River	Egyptian African Company (EAC)	Egypt	Agriculture	Contract signed in 2011	Project not started	10000	6895		Lease / Concession
Tanzania	Yes Bank (on behalf of clients in the food production industry)	India	Agriculture	Expression of interest in 2009		40000			
Rufiji River	Korea Rural Community Crop (KRC), Rufiji Basin Development Authority (RUBADA)	Republic of Korea, Tanzania	Agriculture	Negotiations failed in 2012		100000			Lease / Concession
Lewiti, Mavuji, Migeregere, Nainokwe	Bioshape Holding	Netherlands	Agriculture	Contract signed in 2005	[2010] Project abandoned	81000	34000		Lease / Concession

Appendex10 continued

Location	Investor name	Investor country	Intention	Negotiation status	Implementation status	Intended size	Contract size	Production size	Nature of the deal
Kigoma	FELISA, Unnamed investor 261	Belgium, Tanzania	Agriculture	Contract signed in 2008	[2012] Project not started, [2008] Startup phase (no production)	5000	4258		Outright Purchase
Kagera, Biharamulo	Africa Biofuel and Emission Reduction Company [East Africa] Ltd. (ABEA), National Investment Company Ltd (NICO)	United States of America, Tanzania	Agriculture, Forestry	Negotiation failed in 2010		20000			
Rufiji River,	African Green Oils		Agriculture	Contract signed in 2008	[2011] Project abandoned	20000	860	360	
Kihesa Kilolo Bwawani, Iringa	New Forests Company Holdings	Britain and Northern Ireland	Forestry	Contract signed	[2009] Startup phase (no production)	30000	5975	1500	
Lindi	Bio Massive	Sweden	Agriculture	Negotiations failed 2009	[2009] Project abandoned	50000			
Bagamoyo	Clean Power TZ Ltd	Tanzania	Agriculture	Negotiations failed in 2009	Project abandoned	3500			
Bagamoyo	CMC Agriculture Bio-energy Tanzania		Agriculture	Contract signed		25000	25000		
Dodoma	Donesta Ltd & Savannah Biofuels LTD	Tanzania	Agriculture	Contract signed	Startup phase (no production), [2012] Project abandoned		7000	200	
Moshi	Kilimanjaro aloe vera plantation Ltd (British)	Britain and Northern Ireland	Agriculture	Contract signed	[2008] Startup phase (no production)		400		
Bagamoyo	Tanzania Biodiesel Plant Ltd		Agriculture	Under negotiation since 2012		25000			
Chimala	ETG Farming	Tanzania	Agriculture	Contract signed in 2006	[2012] In operation (production)	7800	7800		Lease / Concession

Appendix 10 continued

Location	Investor name	Investor country	Intention	Negotiation status	Implementation status	Intended size	Contract size	Production size	Nature of the deal
Mofu	Kilombero Farms Company Limited	Tanzania	Agriculture	Contract signed in 2001	[2010] Project abandoned		405		Outright Purchase
Bagamoyo	EcoDevelopment in Europe AB, Government	Sweden, Tanzania	Agriculture, Renewable Energy	Contract signed in 2009	[2012] In operation (production)	250000	22500	200	Lease / Concession
Tanzania	Sithe Global	United States of America	Agriculture	Negotiations failed in 2006		50000			
Lugufu	AgriSol Energy LLC, Serengeti Advisers Ltd	United States of America, Tanzania	Agriculture	Under negotiation in 2011	Project not started	325117	13750		Lease / Concession
Bukoba	Super Group of Companies Ltd	Tanzania	Agriculture	Contract signed in 2001	[2001] In operation (production)		7000		
Bahi	Biodiesel East Africa Ltd.	Kenya	Agriculture	Negotiations failed in 2010		10000			
Bagamoyo	Kitomondo Plantational Ltd	Tanzania	Agriculture	Contract signed	[2009] In operation (production), [2012] Project abandoned		2000		
Mtanga	Tony Elumelu Foundation (TEF), Heirs Holdings, Lion's Head	Nigeria, Britain and Northern Ireland	Agriculture	Contract signed in 2008	In operation (production)	2200	2200		Lease / Concession
Tanga	K.I. Samen B.V., Holland Dairies, Tanga Dairies Cooperative Union, Katani Ltd.	Netherlands Tanzania	Agriculture		In operation (production)	1000			
Rufiji River	Safe Production Ltd	Turkey	Agriculture	Contract signed in 2000	[2007] Project abandoned	5000	5000	300	
Rufiji River	Oxman Tanzania Ltd		Agriculture	Contract signed	Project not started	914	914		
Morogoro Kilombero, Ulanga	Global Environment Fund, Finnish Fund for Development Cooperation (Finnfund)	United States of America, Finland	Forestry	Contract signed in 2011	[2011] In operation (production)	28132	28132	4748	Lease / Concession

Appendix 10 continued

Location	Investor name	Investor country	Intention	Negotiation status	Implementation status	Intended size	Contract size	Production size	Nature of the deal
Tanzania	Bhati Bangla Agrotec	Bangladesh	Agriculture	Expression of interest)		30000			
Tanzania	Nirmal Seeds	India	Agriculture	Under negotiation in 2011		30000			
Morogoro	Aslan Global Management	United States of America	Agriculture			42000	42000		
Makere	TM Global Holdings	United States of America	Agriculture	Contract signed 2005		50000	50000		
Tanga	Boleyn International	China	Agriculture, Forestry	Contract signed in 2007	[2011] Startup phase (no production)	729	324		Lease / Concession
Mkinga	Arkadia Ltd	Italy	Agriculture	Contract signed	Project not started	25000	500		Lease / Concession
Bagamoyo	Unnamed investor 253	Canada, Tanzania	Agriculture	Contract signed	[2012] Project not started	30000	4500		Lease / Concession
Tanzania	Eurotech	Republic of Korea	Agriculture	Under negotiation (2010)		10000			
Rufiji River	Eurovistaa Trading Co. Ltd	India	Agriculture	Contract signed	[2006] In operation (production)	10000	6000		Lease / Concession
Rufiji River	Scheer Foundation	United States of America	Agriculture	Under negotiation (2012)		10000			Lease / Concession
Kilombero	Verein HST	Switzerland	Agriculture	Concluded Oral Agreement in 2008	[2004] In operation (production)		263		
Rufiji River	Lukulilo Farm Holdings	United Kingdom of Great Britain and Northern Ireland	Agriculture	Concluded Oral Agreement (2012)	Project not started	5000	5000		
Kilombero	Mufindi Paper Mills	India	Forestry	Contract signed	[2012] Project not started	15000	10000		

Appendix 10 Continued

Location	Investor name	Investor country	Intention	Negotiation status	Implementation status	Intended size	Contract size	Production size	Nature of the deal
Mkuranga	Nava Bharat Ventures Limited	India	Agriculture, Renewable Energy	Under negotiation (2012)		10000			
Rufiji River	Mahakaushal Sugar and Power Industries Ltd	India	Agriculture, Renewable Energy	Contract signed (2012)	Project not started	12132	12132		Lease / Concession
Bagamoyo	Shanta Estates Ltd	Kenya	Agriculture	Concluded Oral Agreement		14500	14500		
Kilombero	SyEnergy Agriproduction	India	Agriculture	Under negotiation (2012)		30000			
Moshi	Alteo Ltd	Mauritius	Agriculture, Renewable Energy	Contract signed (2012)	In operation (production)	15800	15800	7700	
Tanga	AgDevCo	Britain and Northern Ireland	Agriculture	Contract signed (2012)	Startup phase (no production)	2500	7295	1000	

Source: Extracted and modified from the Land Matrix Website (http://landmatrix.org/en/get-the-detail/by-investor-country/?starts_with=T) (2014).

Appendix 11: Household Questionnaire on Investigating Land Issues, Rural Livelihood and Forest Management in West Usambaras

Villages' Information

Village Name	Ward	Division	Questionnaire number
Date	Interviewer's name		

A: Demographic Characteristic of the Household

1. Name and gender of the head of the household

Name	**Ethnic group**	**Age**	**Gender M/F**

2. Number of members of household

Number of males	**Number of females**	**Total**

3. How would you describe your current marital status? Single (1), Married, (2), Divorce (3), Separated (4), Widow/Widower(5)
4. What is the highest level of education achievement you have attained?
   None education (1), Primary education (2), Secondary education (4), College education (5), University education (6) other, please specify----------
5. Born in this village? Yes (1), No (2)
6. If not, where did you migrate from?

Migrated from	When (year)	Why did you migrate in this village?

7. Do you have another household elsewhere? Yes (1), No (2)
   If yes where? ----------
8. How many members of your household who can work but have no job? ----------
9. Is there any household member left home to look for employment elsewhere? Yes (1), No (2)

Number of male	Number of female	Total	Where is he/she working?	Year left home

10. Please indicate the age of the member of the household who have migrated from this village to look employment elsewhere

Female

a. Under 15---------- b. 15-19 years----------

c. 20-24 years---------- d. 25-30 years---------- 31 and above----------

Male

a. Under 15----------
b. 15-19 years----------
c. 20-24 years----------
d. 25-30 years----------
e. 31 and above

11. Why he/she decided to migrate from this village? ----------

12. How would you describe his/her decision to migrate with land shortage/scarcity?

a. Is very related----------
b. Related----------
c. Not related----------

14. What is your opinion on his/her decision to migrate from the village?

a. Very Okay----------
b. Good----------
c. Very disappointing----------
d. Other, please specify----------

15. If the decision to migrate is good please explain why? ----------

B. Information on Assets Owned by Household

Type of Asset	**Quantity**	**Estimated Current Value (TZS)**
House		
Tables		
Hand hoe		
Chairs		
Beds		
Hand hoes		
Axe		
Sickle		
Radio		
Machetes		
Wood lots		
Video TV/satellite dish		
Bicycle		
Motor cycle		
Buckets		
Flour milling machines		
Cars		
Water pumps		
Generator		
Beehives		
Iron		
Mobile phone		
Butterfly farming nets		
Spade		
Cooking port		
Spraying machine		
Others		
Estimated Value TZS		

C: Household Membership in Various Local Institutions and Credit Facilities

1. Please identify if any of your family members is a associate in any of the following institution

Joint forest management	**Number of Men**	**Number of Women**
Religious institution		
Savings and credit cooperation society (SACCOS)		
Village community Bank (VICOBA)		
Butterfly Farming		
Village government (environment, finance, health, land committee etc.)		
Labor association groupings		
Others: please specify		

2 If there is no any member of your family who is involved in any organization, explain why? ----------

3 Does any member of your household operate a serving or current account? Yes (1), No (2)

4 If no, why? ----------

5 Is this village having any credit facility? Yes (1), No (2)

6 If yes mention them.

a. ----------
b. ----------
c. ----------
d. ----------

7. If credit facilities will be introduced in this village would you be ready to borrow? Yes (1), No (2)
8. If yes how much money you will borrow?
9. For which purpose you will use that money?
   a. ----------
   b. ----------
   c. ----------
10. If no explain why you are not ready to borrow money----------

E: Information on Land Issues

1. Do you possess any field for crop cultivation? Yes (1), No (2)
2. If yes how many farms/fields do you have?

No of farms/fields	Total size in term of acre

3. If no explain why you do not own any farm ----------
4. What is the estimated value of the total land you own if you had to sell today?----------TZS
5. Dou you rent field for agriculture? Yes (1), No (2)
6. If yes, how many acres have you rented in or out last season?

Acres rented in	Acres rented out

7. Please identify the number of acreage allocated for the following land use
   a. Number of acres allocated for crops ----------
   b. Number of acres under woodlots----------
   c. Number of acres left for fallowing----------
   d. Land under tree crops (agro forest) ----------
   e. Land under garden ----------f. Number acre rented----------

8. How did you obtain your land?
    a. Through buying ----------
    b. Through inheritance----------
    c. Through Village allocation----------
    d. Through clearing forest----------
    e. Gift from friend or relative----------
    f. Through renting ----------
    g. Other, please specify----------

9. If I would like to obtain land in this village for cultivating it next season would it be possible to get it? Yes, (1) No (2)
10. If I have to buy how much an acre of land it cost in this village? ----------TZS
11. If yes, how much time it will take me to get it?
    a. Less than one month----------
    b. Two to five month----------
    c. Six to ten month----------
12. What procedures one needs to follow in order to obtain land for farming? ----------
13. Which criteria are used in allocating agricultural land to the villagers?
    a. ----------
    b. ----------
    c. ----------
14. Are all people equally considered during land allocation process? Yes (1), No (2)
15. If no, please explain why all people are not equally considered during land allocation process----------
16. Please, explain how poor people are considered during land allocation in this village? ----------
17. If agricultural land is difficult to obtain when you started to notice the problem in this village?
    a. 1970- 1980 ---- ----------
    b. 1980- 1990 ----------
    c. 1990- 2000----------
    d. 2000s----------
18. Please, can you mentions different reasons that have contributed to land scarcity in your village?
    a. ----------
    b. ----------
    c. ----------
19. Is there any connection between land scarcity and forest conservation in the village? Yes (1), No (2)
20. If yes, explain how forest conservation has caused such problem----------
21. Is there any bureaucracy or corruption when it comes to getting agricultural land from the responsible authority? Yes (1) No (2)
22. If yes which kind of bureaucracy do you face?
    a. ----------
    b. ----------
    c. ----------
23. How would you describe the procedure of obtaining land in this village?
    a. Very good----------
    b. Good----------
    c. Bad----------
    d. Very bad----------
24. If bad please, explain why? ----------
25. Which steps have you taken personally to solve the problem of land scarcity? ----------
26. Is the village government or district government helping you to solve problem of land scarcity? Yes (1), No (2)
27. If yes, please explain how? ----------

28. Please provide suggestion on how land scarcity problem could be solved.
    a. ----------
    b. ----------
    c. ----------
29. If the government would decide to give you land in other district would you be ready to migrate from this area? Yes (1), No (2)
30. If no, please explain why? ----------
31. What would you like the government to do before moving away from this area? ----------
32. Have you ever experienced conflict over land in this village? Yes (1), No (2)
33. If yes, what was the nature/cause of that conflict? ----------
34. How such conflict was handled? ----------
35. Are the following machineries organs responsible for land administration available in your village and ward?
    a. Village land council----------
    b. Ward Tribunal----------
    c. Village Land Registry ----------
    d. I don't know----------
36. How would you describe the efficiency of these bodies in terms of administering land issues in this area?
    a. Very efficient----------
    b. Moderately efficient----------
    c. Not efficient at all----------
37. If these bodies are not efficient, please explain why? ----------
38. Is your village having land use plan? Yes (1), No (2)
39. If, yes how would you describe the compliance of the villagers to the existing land use plan?
    a. Compliance is very high----------
    b. High----------
    c. Very little ----------
    d. They never comply to it----------
40. If the villagers do not comply with the exiting land use planning what is the reason for that? ----------
41. Were villagers involved in formulating the current land use plan? Yes (1), No (2)
42. If no, explain why----------
43. How would you explain the failure of compliance with the existing land use plan with lack of their participation in formulating it?
    a. Very related----------
    b. Not related----------
    c. I don't Know----------
44. What do you suggest to be done in order to improve land administration in this village? ----------

F: Livelihood Activities

2. What is your main source of income?
    a. ----------
    b. ----------
    c. ----------

3. What is your average annual income?

    a. TZS Under 100,000 ----------
    b. TZS 100,000 – 250,000 ----------
    c. TZS 250,000 – 400,000 ----------
    d. TZS 400,000 - 550,000 ----------
    e. TZS 550,000- 700,000 ----------
    f. TZS Above 700,000 ----------

G. Agriculture

4. What types of crops do you grow?

    a. ---------- c.----------
    b. ---------- d. ----------

5. If you don't engage in agricultural activities what is the reasons? ----------
6. Please explain the type of cropping pattern you are using in growing your crops----------
7. Does your household member get employed by others in this village? Yes (1), No (2)
8. If yes, where is employed? ----------
9. What is the nature of that employment? Permanent employment (1), Seasonal employment (2)
10. Kindly provide the details of the type of crops you grew last season, the amount harvested, sold and consumed.

Type of Crop	**Area grown (acre)**	**Harvested(Unit)**	**Value (TZS)**	**Amount sold**	**Amount consumed**
Maize					
Beans					
Rice					
Irish potatoes					
Cassava					
Coffee					
Tea					
Cabbage					
Onion					
Carrot					
Tomatoes					
Yams					
Others					
Total value of agricultural produce last season (TZS)					

11. Do you apply fertilizers in your farm? Yes (1), No (2)
12. If yes which type of fertilizer do you apply? Artificial fertilizers (1), Farmyard manure (2) Other, please specify----------
    ----
13. If you don't apply any fertilizers in your field, please explain the reasons which make you not to apply fertilizers? ----------
14. What challenges do you face in conducting agriculture?

    a. ----------
    b. ----------
    c. ----------

15. Please explain how land shortages complicate your agricultural activities ----------

H. Information on Domesticated animals

1. Please give details on your livestock

Type	Quantity	Estimated Value (TZS)
Cow		
Goat		
Sheep		
Duck		
Pig		
Chicken		
Donkey		

2. If you have no big animals like cow, goat and sheep please explain the reasons----------

I: Information on Income obtained per Year from Other Activities (none agriculture)

Activity	TZS
None timber forest product (herbs, poles, firewood, mushroom, fruits, charcoal, wild meat etc.)	
Timber product (wood and logs)	
Honey	
Pension	
Remittance	
Wage or Salary	
Butterflies	
Shop	
Carpentry	
Basketry	
Fishing pond	
Others	
Total estimated income obtained in TZS	

J: Information on Food Security

1. How many meals does your household eat per day? ----------Meals
2. Do you experience any food shortage during the year? Yes (1), No (2)
3. If yes, on average how many months in a year your household experience food shortage?
    a. Two months ----------
    b. Three Months ----------
    c. Five Months ----------
    d. More than five Months ----------
4. What is the source of your food for your household consumption in percentage?
    a. Own production----------%
    b. Buying ----------%
    c. Donation----------%
    d. Other, please specify----------%
5. If you buy the food for your household on average how much do you spend per year? ---------- TZS
6. How do you compare your overall economic situation with one year ago?
    a. Same----------
    b. Better----------
    c. Worse now----------

7. How would you compare the overall economic situation of the community in this village with five years ago?
    a. Same----------
    b. Better----------
    c. Worse now----------
8. What copying strategies do you use during food shortage period?
    a. ---------- b. ----------
    c. ----------
9. If you're overall economic situation has improved what is the reason for that? ----------
10. If you're overall economic situation has worsen what is the reason for that? ----------
11. If the overall economic situation of the community has improved what is the reason for that? ----------
12. If the overall economic situation of the community has worsened what is the reason for that? ----------

K: Information on Tree Planting

1. Have you planted any trees in your farm? Yes (1), No (2)
2. If yes, what is the major reason for planting such trees? ----------
3. If you have not planted trees, please explain why? ----------

L: Information on utilization of forest products and conservation issues

1. Please, provide details on how your household utilize forest resources as indicated in the table below

Forest Product	**How often did members of Households collect (…) per month**	**How many (…) did you member of households collect per trip**	**Where did you collect these product Reserve forest---------(1) Village forest----------(2) Farm land----------(3) Open access area------(4)**
Fire wood (bundle)			
Wood for charcoal			
Building poles			
Wood for timber			
Medicine/herbs			
Wild fruits (number of bags)			
Withies (number of pieces)			
Reeds (bundle)			
Grasses (bundles)			
Palm leaves (bundle)			
Honey (liters)			
Wild meat			
Wild vegetable			
Butterflies			
Mushroom			
Rope (bundle)			

2. What are the uses of the forest products you get from the forest?
    a. Domestic----------
    b. For sale----------
    c. Both for sale and domestic----------
    d. Other, please specify ----------

3. If those forest products are for sale please, provide an estimate amount of money you get per year
    a. Under TZS 50,0000 ----------
    b. TZS 50,000 – 100,000 ----------
    c. TZS 100,000- 150,000 ----------
    d. TZS 150,000- 200,000 ----------
    e. Other, please specify----------
4. How would you compare availability of forest products now and three years ago?
    a. Availability is the same----------
    b. Availability is low----------
    c. Availability has increased? ----------
5. How would you explain the time spend to collect forest products now and the five years ago?
    a. The time spend is the same----------
    b. We spend less time now----------
    c. We spend more time now----------
6. If availability of forest products has improved explain the reason behind this improvement? ----------
7. Are the timber forest products more or less important to the household livelihoods (ability to survive) more (1), less (2), indefinitely (3).
8. How would you explain access to forest products in this village?
    a. Very easy ----------
    b. Not easy----------
    c. Difficulty and very complicated----------
9. If it is very difficult and complicated to access forest products explain the reasons----------
10. Has forest conservation contributed to the improvement of your livelihood? Yes (1), No (2)
11. If no, please explain why? ----------
12. If Yes, please explain how forest conservation has improved your livelihoods----------
13. How is the accessibility to the forest reserve determined? ----------
14. Are you aware if any revenue is generated from surrounding forest? Yes (1), No (2)
15. If yes, are there any benefit sharing mechanisms between village government, District Council and Central Government? Yes (1), No (2)
16. If yes, explain the method for revenue sharing ----------
17. Do you think the method of revenue sharing is appropriate Yes (1), No (2)
18. If no, please explain why----------
19. How revenue generated from forests is utilized in this village? ----------
20. If you're not satisfied with the current revenue sharing, please suggest how forest revenue would be distributed in percentage between different stakeholders
    a. Village ----------%
    b. District council----------%
    c. Central government----------%
21. Have you been involved in the decision making process regarding forest management? Yes (1), No (2)
22. If yes, please explain how you were involved----------
23. If no explain why? ----------
24. Which problems as a member of this village you're facing following conservation of forest?
    a. ----------
    b. ----------
    c. ----------
    d. ----------

25. Please provide suggestion that could improve forest management in this village----------

M: Qualitative Assessment of Forest Conditions

How would you describe the following forest indicators that can partly explain improvement or degradation of forest conditions?

1. Incidence of forest fire over five years
    a. Have substantially increased----------
    b. Have substantially reduced----------
    c. Is the same----------
2. Regeneration of forests over five years
    a. Have substantially increased----------
    b. Have substantially reduced----------
    c. Is the same/no any changes----------
3. Reappearance of wildlife and spring water over five years
    a. Have substantially increased----------
    b. Have substantially reduced----------
    c. Is the same/no any changes----------
4. Forest cover over past five years
    a. Have substantially increased----------
    b. Have substantially reduced----------
    c. Is the same/no any changes----------
5. If the forest covers have substantially decreased which factors you attribute to such decline?
    a. ----------
    b. ----------
    c. ----------
6. Are the following factors responsible for the decline of forest cover?
    a. Agriculture expansion----------
    b. Charcoal making----------
    c. Lumbering ----------
    d. Forest Fire----------
7. If the forest condition has improved over the past three years what are the reasons?
    a. ----------
    b. ----------
    c. ----------
8. If the forest conditions have deteriorated over a period of three years what are the reasons?
    a. ----------
    b. ----------
    c. ----------
9. What initiatives your village has undertaken to rescue forest deterioration?
    a) ----------
    b) ----------
    c) ----------

N: Measurement of Villager's Attitudes/perceptions towards Forest Conservation

After having information on your socio-economic situation, I would like to talk with you more on forest conservation in this village. Here are the different statements that describe in one way or another forest issues in this village. I would like to hear your opinion for every statement whether or not you strongly agree, agree or disagree. In a case you're not sure on the statement just say you're uncertain about the statement. In other words give the answer to the statement which you are confident with it otherwise say you're uncertain on the statement. So we are starting.

Statements	Strongly agree	Agree	Uncertainty	Strongly disagree
Forest conservation has assisted in improving forest conditions (+)				
Forest conservation has assisted in enhancing rainfall and water sources (+)				
Forest conservation has improved availability of forest products (herbs, fruits honey and wild animals) (+)				
Forest conservation has abated soil erosion in the village (+)				
Forest laws are well implemented in the village (+)				
Forest conservation has raised environmental awareness in the village (+)				
Corruption is high when it comes to asking the permission to harvest forest products like poles and timbers (-)				
There is segregation when it comes to giving permit to access forest (-)				
In provision of forest concessions for timber harvesting priority is mostly given to outsiders than villagers (-)				
Forest conservation has created stringent laws that have complicated villagers' life (-)				
Forest conservation has complicated availability of agricultural land (-)				
Forest conservation is worth nothing hence do not want to participate in conservation (-)				
Forest conservation has increased the price of timber in this village (-)				
Forest conservation has assisted in improving none-farm income activities (+)				
Forest conservation has assisted in promoting agricultural services(+)				
Forest conservation has contributed on improvement of social services such as schools and dispensaries (+).				
Forest conservation has increasing social surface net (+)				
Forest conservation has enhanced understanding in the villages (+)				
Forest conservation has increased conflicts over agricultural land (-)				
The government should be solely responsible for conserving forests (-)				

Positive statements carries the following points: *Strongly agree (4), Agree (3), Uncertain (2), strongly disagree (1)*

Negative statement carries the following points: *Strongly agree (1), Agree (2), Uncertain (3), strongly disagree (4)*

Appendix 12: Checklist of Questions for Village Information

A. Village Information

1. Name of the Village Chairman----------
2. Administrative information

Name of the Village	Ward	Division	Year Village Registered

3. Village demographic data

Total Population	Male	Female	Under 15 years	Disabled	Aged

4. Please identify ethnic groups that inhabit this village in percentage
   a) ----------%
   b) ----------%
   c) ----------%
   d) ----------%
   e) ----------%
5. Existing village government committees
   a) ----------
   b) ----------
   c) ----------
6. If the village has environmental committee please explain the structure of such committee
7. To whom this committee is responsible?

B. Village Economic Activities

8. What is the source of village government revenue?
   a) ----------
   b) ----------
   c) ----------
9. What are the main economic activities for the majority of people in this village?
   a) ----------
   b) ----------
   c) ----------
10. Which cash crops are grown in this village?
    a) ----------
    b) ----------
    c) ----------
11. Please identify major problems related to agriculture which your village is facing
    a) ----------
    b) ----------
    c) ----------

12. Please fill in the table below the total number of Livestock found in the village

Type of Livestock	**Total Population**
Cow	
Goat	
Sheep	
Duck	
Pig	
Chicken	
Donkey	
Others	

13. Please identify major problems facing livestock activities in this village
    a) ----------
    b) ----------
    c) ----------
14. Which social services are available in this village?
    a) ----------
    b) ----------
    c) ----------
15. How are local services financed?
    a) ----------
    b) ----------
    c) ----------
16. How would you describe the quality of those social services?
17. Did the village experience food insecurity problem in some season? Yes (1) No (2)
18. What are the major causes of food insecurity in this village?
    a) ----------
    b) ----------
    c) ----------
19. How would you compare the overall economic situation of the community in the village the last five years?
    a) Same ----------
    b) Better ----------
    c) Worse now----------
20. If the overall economic situation is worsened what are the reasons?
    a) ----------
    b) ----------
    c) ----------

C. Information on Land

21. How land matters is administered in this village?
22. How would you explain the availability of agricultural land in your village?

23. What type of land categories exists in this village?
    a) ----------
    b) ----------
    c) ----------
24. What procedures are used by the village to allocate land to the villagers
25. How would you explain the availability of agricultural land in your village?
26. What procedures are used by the village to allocate land to the villagers?
27. Which criteria does the village government follow in allocating land to villagers?
    a) ----------
    b) ----------
    c) ----------
28. Are all people equally considered during land allocation process? Yes (1), No (2)
29. If no, please explain the reasons
30. How poor people are assisted to get access to agricultural land?
31. During the past four years how many poor people were assisted to get access to agricultural land?
32. If agricultural land is scarce what is the reason for that?
    a) ----------
    b) ----------
    c) ----------
33. What steps the village government has taken to address land scarcity?
    a) ----------
    b) ----------
    c) ----------
34. Is there any connection between land scarcity and forest conservation Yes (1), No (2)
35. If yes, explain how forest conservation has complicated land availability for agriculture
36. Are the following administrative land bodies and tools available in this village and Ward?
    a) Village Land Council----------
    b) Ward Tribunal ----------
    c) Village Land Registry----------
    d) Land Use Plan----------
37. If available, how would you explain their efficiencies
    a) Very efficient----------
    b) Moderate ----------
    c) None----------
38. If these land administrative tools they don't work efficiently what are the reasons for that?
39. Villagers were involved during formulation of land use planning? Yes (1), No (2)
40. Are the conflicts over land prevalent in this village? Yes (1), No (2)
41. If yes, what is the nature of those conflicts?
42. How many cases related to land were reported to the village government during the past three?
43. Which mechanism the village' government use to address land conflict?
44. Are those conflict resolution mechanisms effective or not? Yes (1), No (2)

45. Is the village experiencing a situation where some villagers have huge amount of land but fail to develop it? yes (1), no (2)
46. If yes what steps the village government takes to ensure that the land is given to needy people who can efficiently develop it?

D. Information on Forest Management

47. Does village own any forest? Yes (1), No (2)
48. Which village groups or association is working in forest conservation?
    a) ----------
    b) ----------
    c) ----------
49. Which forest conservation projects are implemented in this village?
    a) ----------
    b) ----------
    c) ----------
50. Is village government receiving any revenue from forest? Yes (1), No (2)
51. If yes, please provide in the table below the forest revenue that were obtained in past five years in TZS

2005	2006	2007	2008	2009	2010	2011

52. How revenue generated from the forests is utilized in this village?

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53. Please fill in the table below how the revenue generated from forest was used to implement different village programs

Year	**Activity/program implemented**
2005	
2006	
2007	
2008	
2009	
2011	
2012	

54. What method is used in sharing the revenue generated from forests among different stakeholders?
55. Is the village government satisfied with that method? yes (1), no (2)
56. If not what formula are you proposing?
57. How access to the forest by villagers is determined?
58. To what extent the village government depends on the revenue generated from forest in percentage?

59. If the contribution is high, how forest has assisted in poverty reduction in those areas?
60. If the village does not benefit from forest conservation, what are the reasons?
61. What you think can be done to ensure that the village benefits from these forests?
62. How many village meetings are organized each year?
63. Did you conduct the annual general village meeting last year? yes (1), no (2)
64. If yes, in that meeting village revenue and expenditure were presented? yes (1), no (2)
65. How would you describe the availability of forest products under the following time period
    a) 10 years ago?
    b) 5 year ago?
    c) Current period?
    d) In future period?

Appendix 13: Checklist of Questions for Different Officials (Agriculturalist, Livestock Officers, Land Experts and Forestry Officials) at Different Levels

A. Administrative information

1. Particulars of the administrative area
   Total population ----------Male----------Female----------
   Existing committee----------
2. Particulars of interviewed official
   Name ----------
   Title----------
   Department----------
   Duration of work----------

B. Questions for Livestock and Agricultural Officials

3. What are the main economic activities for majority of people in the district?
   a) ----------
   b) ----------
   c) ----------
4. What are the major sources of revenue in your administrative area?
   a) ----------
   b) ----------
   c) ----------
   d) ----------
5. Mention the major type of crops which are grown in your area.
   a) ----------
   b) ----------
   c) ----------
6. What is the average production of the following crops per acre in your area?

Type of Crop	**Harvest per acre** ***(please specify the Unit).***	**Expected Desirable Production per Acre** ***(please specify unit.***
Maize		
Beans		
Wheat		
Irish potatoes		
Cassava		
Coffee		
Tea		
Cabbage		
Onion		
Carrot		
Tomatoes		

7. Please, identify the major problems related to agriculture which your administrative area is facing.
   a) ----------
   b) ----------
   c) ----------

8. Please fill in the table below the total number of livestock found in this area.

Type of Livestock	**Total Population**
Cow	
Goat	
Sheep	
Duck	
Pig	
Chicken	
Donkey	

9. What are the major problems facing livestock activities in this area?
    a) ----------
    b) ----------
    c) ----------
    d) ----------
10. How would you describe the overall trends of productivity of the following crops over past five years?

Cereal and Legumes	**Trend of Production**
Maize	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3
Wheat	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Beans	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Wheat	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Cassava	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Cash crop	**Trend of Production**
Coffee	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Tea	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Vegetables	**Trend of Production**
Cabbage	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Onion	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Carrot	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Tomatoes	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Chinese	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Spinach	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Yams	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)
Irish potatoes	Have substantially increased----------(1) Have substantially reduced----------(2) Is the same/no any changes----------(3)

11. If the trend is declining what are the major reasons?
    a) ----------
    b) ----------
    c) ----------

12. If the trend is increasing what are the major reasons?
    a) ----------
    b) ----------
    c) ----------
    d) ----------

C. Questions for Land Officials and Agriculturalists

13. What procedures one needs to follow in order to obtain land for farming?
14. How much percentage of land is available for agriculture in this area?----------Sq.km
15. How land matters is administered in this area? ----------
16. How would you explain the availability of agricultural land in your area? ----------
17. If agricultural land is scarce what are the major reason?
    a) ----------
    b) ----------
    c) ----------
    d) ----------
18. When did you start to experience the problem of land scarcity? ----------Year
19. What steps have been taken to address land scarcity?
    a) ----------
    b) ----------
    c) ----------
20. Are there any connection between land scarcity and forest conservation in this area? Yes (1), No (2)
21. If yes, explain how forest conservation has complicated land availability for agriculture.
22. Are the following administrative land bodies and tools available in this area?
    a) Village Land Councils----------
    b) Ward Tribunal ----------
    c) Land Registry----------
    d) Land use Plan----------
23. How would you explain the efficiencies of land administrative organs?
    a) Very efficient----------
    b) Moderate ----------
    c) Not efficient at all----------
24. If such organs are poorly performing what are the major reasons? ----------
25. Villagers were involved during formulation of land use planning? Yes (1), No (2)
26. Are land conflicts prevalent in this area? Yes (1), No (2)
27. If yes, what is the nature of such conflicts? ----------
28. Which mechanisms are there to address land conflict? ----------
29. Are those conflict resolution mechanisms effective? Yes (1), No (2)
30. What kind of land tenure systems exist in this ward? ----------
31. How can you describe the efficiency of land tenure systems in terms of promoting economic, environmental and cultural activities?
32. Are the following land types categories exist in this area?
    a) Public land (open access area)
    b) Sustainable use areas
    c) Land reserved for settlements
    d) Contested or undefined areas
    e) Land reserved for agriculture development
    f) Grazing areas
33. How such lands are managed?
34. Please, suggest measures that you think can be taken to address the problem of land scarcity in this area.
    a) ----------
    b) ----------
    c) ----------

D. Questions for Foresters at Different Administrative Levels in West Usambara

36 How forest resources are managed in this area?
37 How much percent of land is available for forest conservation in this area?
38 What is the distribution of forest by type, use, and legal status in this area?
39 How would you describe the conditions of forests in this area?
40 Does your ward or district own any forest? Yes (1), No (2)
41 If yes, what is the size of such forest? ----------
42 Where do you get fund for forest conservation?
43 How local communities are involved in forest conservation?
44 Which groups or association is working in forest conservation?
   a) ----------
   b) ----------
   c) ----------
   d) ----------
45 Which forest conservation projects are implemented in this area?
   a) ----------
   b) ----------
   c) ----------
46 Is your ward/district receiving any revenue from forest? Yes (1), No (2)
47 If yes, please provide in the table below the forest revenue that were obtained in past five years in TZS

2005	2006	2007	2008	2009	2010	2011

48 How the revenue generated from the forests is utilized in this area?
49 Please fill in the table below how the revenue generated from forest were used to implement different activities in your area.

s/n	**An activity which was financed by the revenue from forest**
1	
2	
3	
4	
5	
6	
7	

50 What method is used in sharing the revenue generated from forests among different stakeholders?
51 Are you satisfied by such method? Yes (1), No (2)
52 If no what formula are you proposing?
53 How access to the forest is determined?
54 How would you describe the availability of forest products under the following time period
   a. 10 years ago? ----------
   b. 5 year ago ----------
   c. Current period----------
   d. In future period? ----------

E. Information related to Reducing Emission from Deforestation and Forest Degradation (REDD) in West Usambara

55. Is there any plan to implement REDD scheme in the area?
56. If yes, what are the existing opportunity for REDD implementation?
57. Which type of forests are you targeting for REDD?
58. What are expected challenges toward implementation of REDD?

Appendix 14: Check sheet for Vegetation Survey Investigating Forest Condition/ Disturbance at West Usambara (focus made on higher trees)

1. Forest general information
Division---------- Ward---------- Village----------
Name of the Forest---------- Quadrat/plot number ----------

2. GPS Reading
Latitude ----------South, Longitude ----------East
Elevation in Meter---------- m.a.sl

3. General topographic feature of the plot

a) Flat--------(b) Valley------(c) Ridge-------(d)Mild slope -------(d)Steep slope-------

4. Cover estimate of the quadrant in percentage----------%

5. **Species information**

Specie s/n	**a) Species Local name**	**b) Species Scientific name**	**c) Total individuals**	**d) Tree Height (m) - fill in the heights of all individual species**	**e) DBH - fill in *DBH* of all individual species**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

6. Information about tree harvesting

Specie s/n	**a) DBH of harvested stump in (cm)**	**b) Scientific name**	**c) Number of tree stumps harvested**	**d) Common use**
1				
2				
3				
4				
5				
6				
7				
8				

Note: Include information of the trees harvested between one and five years period (recent disturbances).

7. Evidence of illegal consumptive disturbance on sampled Quadrat/plot

Event s/n	**Disturbance**	**Yes (1) No (2)**	**If yes, is it major or minor disturbance? Major (1), Minor (2)**
1	Pit-sawing		
2	Firewood collection		
3	Grazing (presence of live animals and dung)		
4	In-situ farming		
5	Medicinal plant harvesting/debarking		
6	Pole extraction		
7	Forest fire		
9	Fodder harvest		
10	Charcoal making		
11	Mining		
12	**Others**		

8. Remarks: general condition of the plot and disturbance level compared to the whole forest condition ***(it should base on evidence of illegal consumptive disturbance on sampled plot).***

Appendix 15: Georeferences for Surveyed Quadrats at the Balangai Forest Reserve

Quadrat No.	Location of Quadrat (GPS)	Altitude (m)	Quadrat Status
A1	3+- 37 M 0439160 UTM 9455480	1,518	Recently highly disturbed
A2	3+- 37 M 0439081 UTM 9455441	1518	Slightly disturbed
A3	37M 0438972 3+- UTM 9455386	1,500	Slightly disturbed
A4	4+- 37 M 0438953 UTM 9455299	1,506	Primary condition
A5	4+- 37M 0438745 UTM 9455269	1,456	Primary condition
B1	4+- 37M 0438703 UTM 9454765	1,520	Primary condition
B2	4+- 37M 0438775 UTM 9454716	1,535	Primary condition
B3	4+- 37 M 0438869 UTM 9454676	1,535	Slightly disturbed
B4	4+- 37 M 0438941 UTM 9454635	1,591	Recently highly disturbed
B5	3+- 37M 0438951 UTM 9454795	1,571	Recently highly disturbed
C1	4+- 37M 0439147 UTM 9454161	1,327	Slight disturbance
C2	4+- 37M 0439043 UTM 9454138	1,486	Recently highly disturbed
C3	4+- 37M 0438882 UTM 9454157	1,520	Highly disturbed many years ago
C4	5+- 37M 0438978 UTM 9454075	1,469	Primary condition
C5	3+- 37M 0438942 UTM 9453969	1,498	Primary condition
C6	4+- 37M 0438873 UTM 9453897	1,479	Primary condition
C7	4+- 37 M 0438890 UTM 9453810	1,466	Slightly disturbed
C8	4+- 37M 0438911 UTM 9453709	1,464	Slightly disturbed
C9	4+- 37M 0438838 UTM 9453662	1,480	Slightly disturbed
C10	4+- 37M 0438721 UTM 9453558	1,517	Primary condition

Appendix 16: Georeferences for Surveyed Quadrats at the Kitara Ridge Forest Reserve

Quadrat number	Location of Quadrat (GPS)		Altitude (m)	Quadrat Status
D1	3+-	37 M 0434782 UTM 9473872	1,710	Recently highly disturbed
D2	4+-	37 M 0434657 UTM 9473761	1,718	Recently highly disturbed
D3	3+-	37 M 0434480 UTM 9473626	1,727	Highly disturbed many years ago
D4	3+-	37 M 0434396 UTM 9473398	1,758	Highly disturbed many years ago
D5	3+-	37 M 0434239 UTM 9473274	1,769	Recently highly disturbed
D6	3+-	37 M 0434102 UTM 9473168	1,831	Highly disturbed many years ago
D7	3+-	37 M 0434041 UTM 9473129	1,881	Recently highly disturbed
D8	3+-	37 M 0434832 UTM 9473911	1,708	Recently highly disturbed
D9	3+-	37 M 0434762 UTM 9474236	1,685	Recently highly disturbed
D10	3+-	37M 0434625 UTM 9474296	1,677	Recently highly disturbed
D11	3+-	37 M 0434469 UTM 9474340	1,659	Recently highly disturbed
D12	3+-	37 M 0434374 UTM 9474209	1,684	Recently highly disturbed
D13	3+-	37M 0434460 UTM 9474165	1,706	Recently highly disturbed

Source: Own Collection (2012).

Declaration/Erklärung

Ich erkläre:

Ich habe die vorgelegte Dissertation selbstständig und ohne unerlaubte fremde Hilfe und nur mit den Hilfen angefertigt, die ich in der Dissertation angegeben habe.

Alle Textstellen, die wörtlich oder sinngemäß aus veröffentlichen Schriften entnommen sind, und alle Angaben, die auf mündlichen Auskünften beruhen, sind als solche kenntlich gemacht.

Bei den von mir durchgeführten und in der Dissertation erwähnten Untersuchungen habe ich die Grundsätze guter wissenschaftlicher Praxis, wie sie in der „Satzung der Justus-Liebig-Universität Gießen zur Sicherung guter wissenschaftlicher Praxis“ niedergelegt sind, eingehalten.

Gießen, im April 2014

_____

Alexander Elias Songoro