The Impact of Population Growth on Managing Forest Resources in West Usamabara, Tanzania

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Abstract

This paper assessed the impact of rapid population growth on forest resource management in West Usambara, Tanzania. It determined the trend of population growth in Tanzania over the past thirty years, socio-economic factors affecting forest resource uses and evaluated intervention measures on forest resources management. Surveyss were conducted in four wards Mayo, Baga, Mgwashi and Bumbuli and assessed the impact of rapid growth of population on forest resource management. The study revealed that the population of the study area has almost doubled from 246,049 in 1978 to 492,441 in 2012 with population density of 120.4 persons per square Kilometer which is above the national population density of 51 persons per square Kilometer. Furthermore, 84% of the respondents collected fire wood from the forest while 96% revealed to depend in forest for different forest products like fire wood, vegetables, fruits and medicine. About 96% revealed to practice PFM which is underperformed due to different challenges mentioned. The study concluded that population growth contributed highly to the forest destruction. Finally, it is recommended that awareness rising on family planning should be promoted, land use plan developed and Participatory Forest Management actively established with equal benefit sharing among the actors. Likewise, the policy and regulations should be reviewed to favour forest adjacent *community's needs.*

Key words: Population growth, Forest management, forest resources.

Introduction

Population increase has resulted to high pressure on natural resource in Tanzania. In many areas, there is an increase in local pressure to extend agricultural activities at the expense of forests and wildlife resources (Madulu, 2001). About 38 percent of Tanzania's total land area is covered by forests and

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woodlands that provide wildlife habitat, unique natural ecosystems and biological diversity, and water catchments (World Bank, 2001). However, the existence of these natural resources is threatened by human disturbances of the ecosystem. Experiences from Forest Reserves in Tabora Region (Shishira and Yanda, 1998), Coast Region (Shishira *et al*, 1998) and Dodoma Region (Madulu, 2001) demonstrate clearly the dwindling biodiversity in most protected areas due to human interference in the ecosystems. Moreover, Estimates of forest losses in Africa (FORMECU, 1999) were observed to be higher in the past two decades. For instance, between 1990 and 2000, the continent lost about 52 million hectares of the forest, accounting for about 56 percent of the global reduction of forest cover (Nwoboshi, 1987).

Rapid population growth has been associated with various aspects of resource degradation, including deforestation, overgrazing, soil erosion, soil nutrient depletion, and other problems (Scherr and Hazell, 1994; Kates and Haarmann, 1992). As population density increases, the supply of people who clear trees increases (Kang and Wilson, 1987; Southgate, 1988; World Bank, 1992) and the demand for products from forest grows too. As a result of it, a larger forest area become deforested and leads to biodiversity loss. In addition to these forest changes, both the number of producers who use degrading agricultural or grazing practices increased (Repetto, 1986). Likewise, the demand for crops and livestock produced with degrading practices increase (Brown and Wolf, 1984).

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

Agricultural expansion is probably the most important human activity that causes deforestation. Between 300,000 and 400,000 hectares of forest and bush land are estimated to be cleared annually for agricultural expansion (UN, 1993). An elaborate example of the Usambara Mountains suggests that almost 70

percent of the rain forests have been destroyed since 1954. While in areas like Tabora and Songea, tree felling for tobacco cultivation and curing is rampant (Shishira and Yanda, 1998), agricultural expansion in forested areas is very common in Kondoa, Iringa, and Mufindi Districts (Madulu, 1998a, 1998b). Slash-and-burn cultivators set in motion a series of events of fires leading to the destruction of forests. These trends have several adverse consequences that include accelerated soil erosion, fuel wood scarcity, high rates of evaporation, and climatic change.

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

Research Methodology

The Study Area

The study was carried out in Lushoto district found in West Usambara Mountain in 10 villages surrounding Baga catchment forest reserve. Lushoto District located in the Northern part of Tanga region between latitude 4° 25' and 4° 55' south of the Equator and longitude 30°10' and 38°35' East Greenwich. According to 2012 population census, the District had a population of 492,441 People, of which 230,236 were males and 262,205 were females. The district has an overall sex ratio of 88 males for every 100 females with the average household size of 4.7 (URT, 2012). It has the population density of 120.4 persons per square Kilometer (Lushoto District Council, 2013).

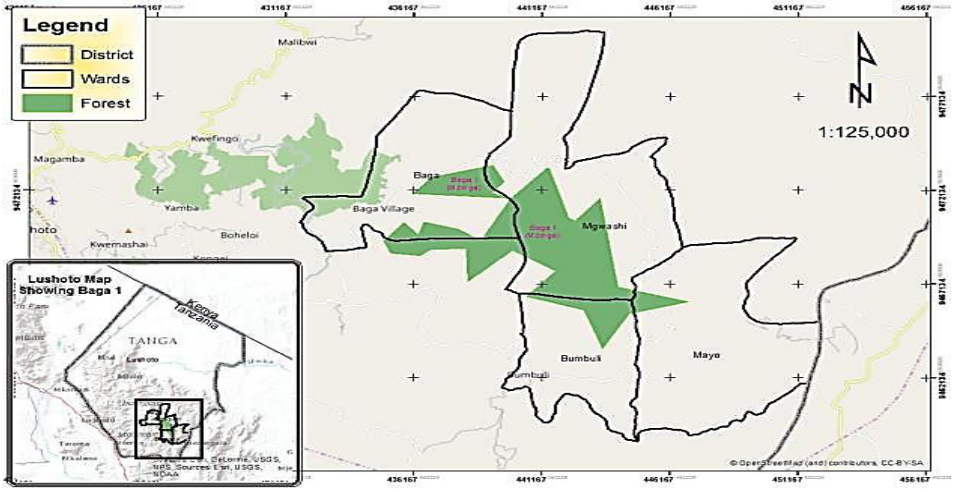

Figure 1: Baga Forest Reserve and the Ward Surrounding the Forest
Source: Field Survey 2016

Data collection and processing

The sampling units for this study were heads of households in the 10 selected villages selected. Since the average households' size varies in ten villages, computation to obtain the total number of households and the sample size needed to be representative of the given population was made. Simple random sampling was deployed to pick household to match the number of households selected for the administering questionnaire. Also, with the help of village leaders, ten informants' respondents from each village were purposely selected for FGD and key informant interviews, respectively.

Findings and discussion

Household Size of the Study Area

The study revealed that the mean households' sizes were 7 people per household and the highest household size was found within a range of 5 -9 people (73%) (Table 1). According to National Population and Housing census of 2012 (URT, 2012), the mean household size in Lushoto District was 5 people. Hence this means that there is a high number of people per household which increases the demand for forest products.

Table 1. Household Size of the Study Area

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

Source: Field Survey Data (2016).

Economic Activities

The study revealed that respondents in the study area were engaged in different economic activities such as crop production, wage employment casual labour and petty business. Data on occupational activities showed that 94% of the respondents were engaged in crop production as their first main economic activity (Figure 2). This implies that the majority of the households depended on farming as their main economic activity. Due to the presence of high numbers of farmers in the study area this can lead them to cultivation fragile soils such as wetland, highlands, and forests. When farmland expands toward fragile lands in order to keep pace with the needs of a growing population, it leads to deforestation, erosion, and desertification. Agriculture remains the main economic activity in West Usambara (Nambiza and Lyatura, 2013). Furthermore, casual labour, wage employment and petty business constituting of 3%, 1% and 2% respectively (Figure 2). This implies that very few people are employed in the study area or engaged on business this had significant effect on forest management as many people depended on forest due to lack of alternative employment. The similar study has been conducted in West Usambara whereby it was revealed that 11% owned kiosks, 2% masonry, 2% food vending business, 2% were selling alcohol (Nambiza and Lyatura, 2013).

Figure: 2: Major Economic Activities of the Respondents
Source: Field Survey Data 2016

Trends of Population Growth in the Study Area

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

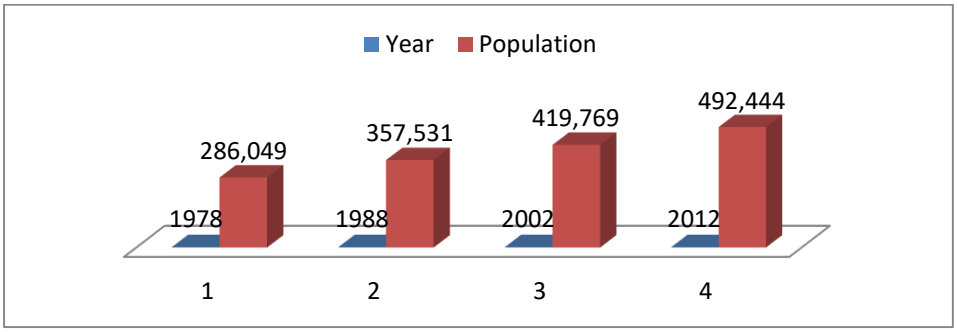

Figure 3: Population trend in Lushoto District from 1978 to 2012
Source: Census, (1978, 1988, 2002, 2012)

Population density in the West Usambara is high at 120.4 persons per square Kilometer (URT, 2012). This high population growth has led to the increase in demand for agriculture production and settlement hence leading to unsustainable management of the forest. The study is similar to Soini, (2002a) who revealed that densely populated areas had led to disappearance of ecological systems. This is also observed in the southern slopes of Mountain Kilimanjaro. A moe recent study in Kilimanjaro indicated that land use change centered on vast expansion of agricultural production over marginal land downward the slopes, extending further into the uncultivated land leading to the disappearance of vegetation cover coupled with ecological disappearance of forests and land degradation. As a whole due to high population growth rate in Tanzania has led to a significant environmental implications in many areas, the environment has been degraded to the extent that it can no longer support ecological balance and the provision of necessary resources to the present and future Population (UNFPA 1991; Green, 1992).

Impact of Population Growth on Forest Resources

The study revealed that the impacts of population growth has resulted to several forest management challenges whereby the respondents (54%) mentioned that it resulted to illegal forest tree cutting in the study area (Figure 4). The study is supported by Zahabu and Malimbwi, (1997) who reported that the most common human activities triggering degradation in Mountane forests included clearing for new farm land, pit sowing, illegal timber harvesting, collection of building poles, cutting trees for medicine, collecting fuel wood, and mining activities. Likewise, Ndagalasi et al. (2007) conducted a study at Magamba Nature Reserve and found that forest degradation of tree species including *Ocotea usambaransis* and *Podocarpus usambaransis* was rampant due to illegal selective commercial logging, subsistence harvesting of tree for building poles and fuel wood collection.

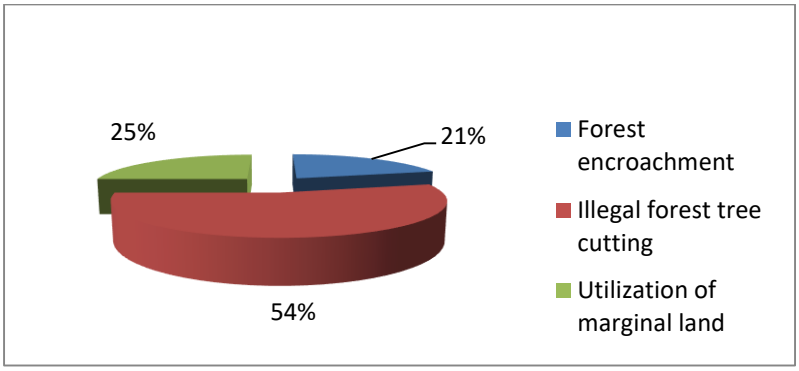

Figure 4: Impact of Population Growth on Forest Management
Source: Field Survey Data (2016)

Moreover, the study revealed that 25% of the respondents utilized marginal land for agriculture and grazing livestock due high population growth (Figure 4). The study is similar to that conducted by Shishira and Yanda (1998) and Madulu (2001) which reported that high population growth had resulted in increasing settlments of farmers in marginal areas and even in the protected area in an effort to earn a living. Furthermore, Saunders et al. (1991) reported that degradation of forest edges arising from small-scale agriculture inevitably leads to fragmentation and eventually deforestation. This deforestation results in isolation of forest patches causing a transformation of microclimate regimes.

Furthermore, the study revealed that the increase in population had led to forest encroachment by 21%. The study is supported by Shishira et al., (1998), who reported that the increasing population pressure around the forest reserve was likely to lead to encroachment into the forest reserve, hence threatening its sustainability. Likewise, Madulu, (2001) reported that forest clearing for agriculture expansion has been rampant around the Swagaswaga Game Reserve in Kondoa District. Moreover, Kaale (1984) reported that in 1980, about 200hectares of Kilimanjaro forest reserve which is an important water catchment forest was encroached by farmers.

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

Due to the increase in population and its effect in natural resource several measures had been taken to rescue the situation. The results revealed that 39% practiced improved agriculture and conservation techniques as the way of maximize crop production in small areas and reduced pressure to forest (Table 2). The result from end-line survey conducted by TFCG revealed that 42% of famers in West Usambara were applying conservation agriculture methods. The focus of conservation agriculture is on soil moisture management, crop rotation, permanent cover crops which apparently contributed to increased crop production (Nambiza and Lyatora, 2013). Moreover, about 32% mentioned that some of the villagers have been shifted to other Districts like Handeni where they can have enough land for cultivation (Table 2). Likewise, many people especially youth, from Lushoto district are migrting to big cities like Dar-es-salaam and Arusha because they are landless due to overpopulation (Lushoto District, 2010). This is similar to Kilimanjaro whereby the region has high population density that increases pressure on land resources. Recently one of the study commented that 70% of the household in Kilimanjaro had insufficient quantities of land resources to sustain their livelihoods for agricultural activities and settlement expansion (Soini, 2002a). These forced the people of

Kilimanjaro to move to other areas looking for settlement and farm fields. Likewise, landlessness was also reported by Mwihomeke (2001) that it led to some people migrating to the lowlands (Johansson, 2001) and urban centres due to increased population. Morever 27% revealed that they were using family planning methods to ensure the number of children matches with the available resources and 2% mentioned that there were no measures taken.

Table 2: Measure to Control the Impact of Population Growth on Natural Resources

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

Access to Forest Products

The study revealed that 84% of the respondents collect firewood from the forest (Figure 5). This implies that firewood is the major source of cooking fuel in the study area. Firewood is the cheapest source of energy in Tanzania for approximately 90% of the population use firewood and charcoal for their cooking and heating needs (Monela, 1999). Even more so in the West Usambara where approximately 99% of the households use firewood for cooking and heating in their households (Kaale, 1993). Lusambo (2009) reported that Tanzania energy balance was dominated by biomass-based fuels, particularly wood fuel (firewood and charcoal) which account for more than 90% of primary energy supply. The findings is similar to Giliba *et al*., (2010) who reported that 92% of NTFPs collected from the forest were firewood in Mbulu and Babati districts. Also the findings are similar to Msaliwa (2013) who reported that 98% of people in Kilolo district used firewood as the main source of energy. Furthermore, the findings are similar to Mainski (2008) who reported that in Malawi 97.0% of the rural houses uses firewood as the major source of cooking fuel.

Likewise, the study revealed that 9% of the respondents depend on forest for medicine (Figure 5). This implies that very few households depend on forest for medicine probably this is because of the availability of dispensaries and Bumbuli Hospital which are found nearby the villages or the medicine inside the forest have been finished due to over utilization. The findings are similar to observation done by Mogaka (1992) who reported that plants from forests have

significant proportion of medicine value that can be useful to surrounding population. This could probably be due to the reasons that firewood is the only cheaper, available and affordable primary source of energy in the study area.

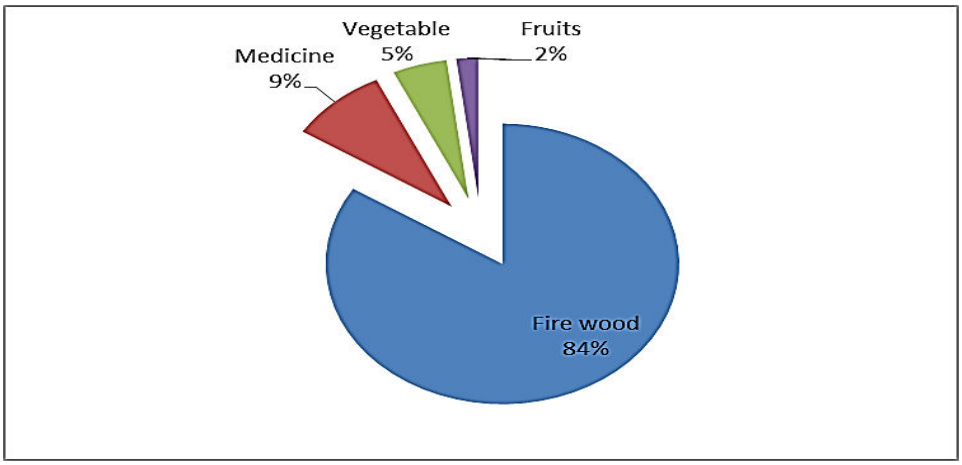

Figure 5: Access to Forest Products
Source: Field Survey Data (2016)

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

Demand for Forest Products

During the study, 93% of the sampled households reported that there is a high demand for forest products when they were comparing with 10 years back (Figure 6). The study further reviewed the reasons for high demand as the increase in population and illegal harvesting inside the forest reserve. The study is similar to NAFORMA (2015) who reported that forest areas in Tanzania have decreased from 3ha/capital in the early 1980s to 1.1 ha/capital in 2012 due to the increase in population. That means there is I m^3 of woodland per person per year available from legal accessible sources in Tanzania. In additional more forest are degraded than were in the early 1980s. This implies that there will be more demand of forest products due the increased degrading of the forest.

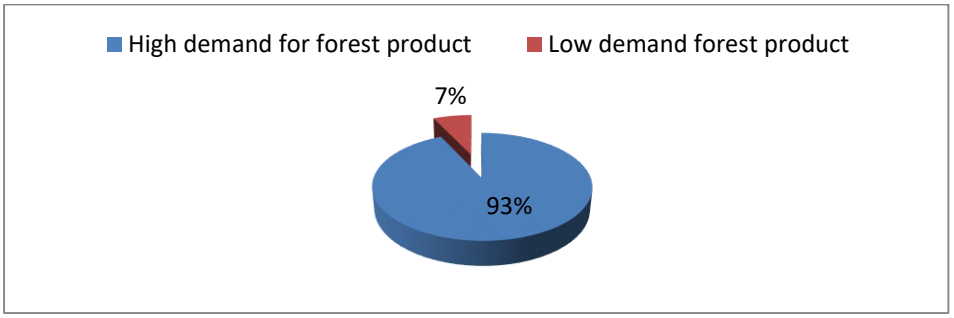

Figure 6: Community Forest Demand
Source: Field Survey Data (2016).

Alternative Sources of Forest Products

Apart from the forest other areas where they can get forest products were from own wood lots, small patched around their farm field and general land. The sample of respondents revealed that 72% owned small wood lots in an area of 0.5 to 3 acres while 28% of the respondents did not own any wood lots (Figure 7). The study shows that many households have woodlots in the study area. This is because the demand for forest products is very high in the area and a lot of awareness concern tree planting has been done in the study area. Most of the planted trees in woodlots technology were exotic species like *Gravillea robusta*, *Eucalyptus* and *Acrocarpus* species. Basically, these species were introduced in order to meet critical fuel wood demands for domestic uses and maintenance of conditions allowing for sustained agriculture and livestock production (Mnzava, 1980; Kaale, 1984). The study is similar to that of Indufo (2011) who estimated that there were about 80,000 to 140,000ha in total of village woodlots and farm plantations in Tanzania. Furthermore, FBD (2005) reported the similar study that tree planting became an entrenched practice by people and when seedlings were not available from local authorities' nurseries, residents used seedlings self-germinating under existing trees. A few individuals also established small nurseries to produce seedling for their own requirements and also for sale to other farmers. This implies the households in the study area highly motived in tree planting to offset the challenges of forest products demand.

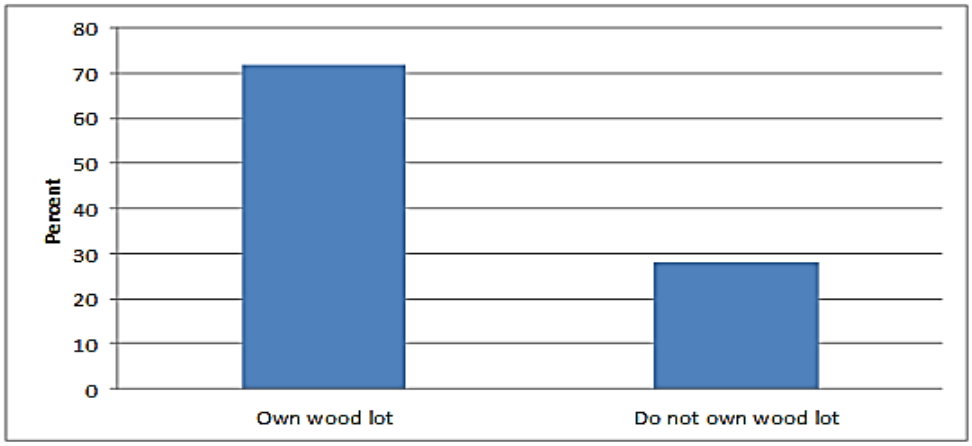

Figure 7: Alternative Sources of Forest Products
Source: Field Survey Data (2016)

Plate 1: Agroforestry Farm Field as Observed at Sagara village, West Usambara

Conservation Challenges Facing the Reserved Forest

The study area experienced conservation challenges on the reserved areas whereby 48% of the household respondent revealed that illegal tree cutting is the main conservation challenges (Figure 8). This implies that illegal tree cutting has greatly influenced the natural resource management in West Usambara. Apart from increased demand for agriculture practiced due to increase in population, shifting agriculture in the past and lack of traditional among the local people for protecting the trees are principle causes of illegal

tree cutting (Huwe, 1988). It also shows that the continuous illegal tree cutting in West Usambara has led to land degradation. This attributed to poor land husbandry, increase erosion and decline of soil fertility and no limited use of fertilizer. The impact of this is declining of crops yields, increased food insecurity and reliance of food aid, poor nutrition and increased dependence on forest for livelihoods (Mwihomeke, 2002).

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

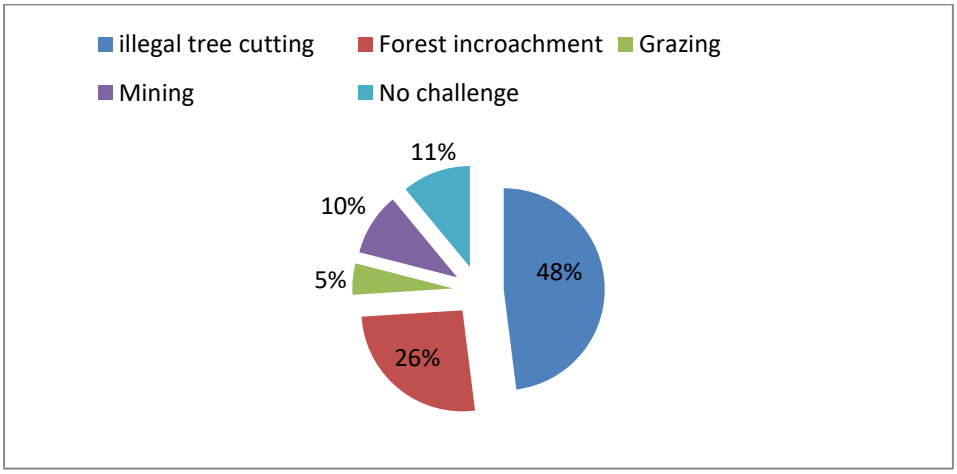

Figure 8: Conservation Challenges Experienced in The Study Area
Source: Field Survey Data (2016)

Likewise, the study revealed that 26% forest encroachment as one of the the management challenges which affect the forest reserve areas (Figure 9). This occurs probably due to high population growth and shortage of cultivation land. According to MNRT report the encroachment and over-utilization has been taking place in the forest reserves which are under jurisdiction of the central and local governments (URT, 1997). Moreover, local people considered protected or reserved areas as constraints to their livelihoods. Since it was not possible to create a rigid separation between land used by local people to obtain natural resource products and those designated by the governments as protected areas, encroachment, poaching, and degradation were innevitable (Primack, 2002).

This is also supported by Hoffmann (2002) who explained that agricultural expansion and consequent land degradation processes; that is, overgrazing and deforestation as experienced in the Southern Slope of Mount Kilimanjaro and West Usambara in Lushoto District explain why land degradation occurs in relation to population density.

The study also revealed that mining contributes to 10% of forest destruction in the study area (Plate 2). Small-scale artisanal miners have invaded the forests, causing severe environmental destruction by felling valuable old indigenous trees digging up for gold. Also it destroys water sources and wetlands. This is supported by Mafupa (2006) who reported that in Eastern Africa severe encroachment and exploitation of mining activities destroying the forest that occurs in fragmented patches.

Plate 2: Illegal Miners atTewe Village in West Usambara

Data from the Landsat image taken between 2002 and 2012 showed a vegetation cover change caused by deforestation by 0.87%, grassland change by 4.4% and Montane and Lowland forest by 94.73% (Table 3). From the analysis satellite data, deforestation rate is minimum in the study area as it is shown in the Figure 9. The data obtained from satellite image differ from the obtained surveyed data which show high deforestation rate in the study area.

Table 3: Forest Cover Change Baga Forest Reserve 2002-2012

Land cover name	Area (Ha)	% of the total area
Montane and Lowland forest	3409.29	94.7
Deforestation	31.41	0.9
Grassland	158.22	4.4
Total	**3,598.92**	**100**

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

Furthermore, according to Bumbuli Forest Officer about 20 illegal tree cutting has been reported from Baga forest and 1200cm3 of timber has been confiscated between 2015 and 2016. Likewise, Halter (2016) observed the stem cut density of 180 stems/ha (>20cm diameter) in Baga II forest reserve which also supported by (Schulman *et al*. 1998) who found that the stem cut density in montane forests to be 200-300 stems/ha. A study conducted by Newmark (1998) revealed that over 2000 year ago the forest cover for Eastern Arc Mountain has changed from 23,000 km2 to 15,000km2 by mid 1900s. Losses were greatest, relative to original cover in Taita Hills (98%), Ukaguru (90%), Mahenge (89%) and West Usambara (84%). Furthermore, based on Tabor *et al* (2010) the finding deforestation rate for Tanzania protected area are -0.05% per year whereas rate of outside the protected areas are -0.26% per year.12% of deforestation occurred inside the protected area.

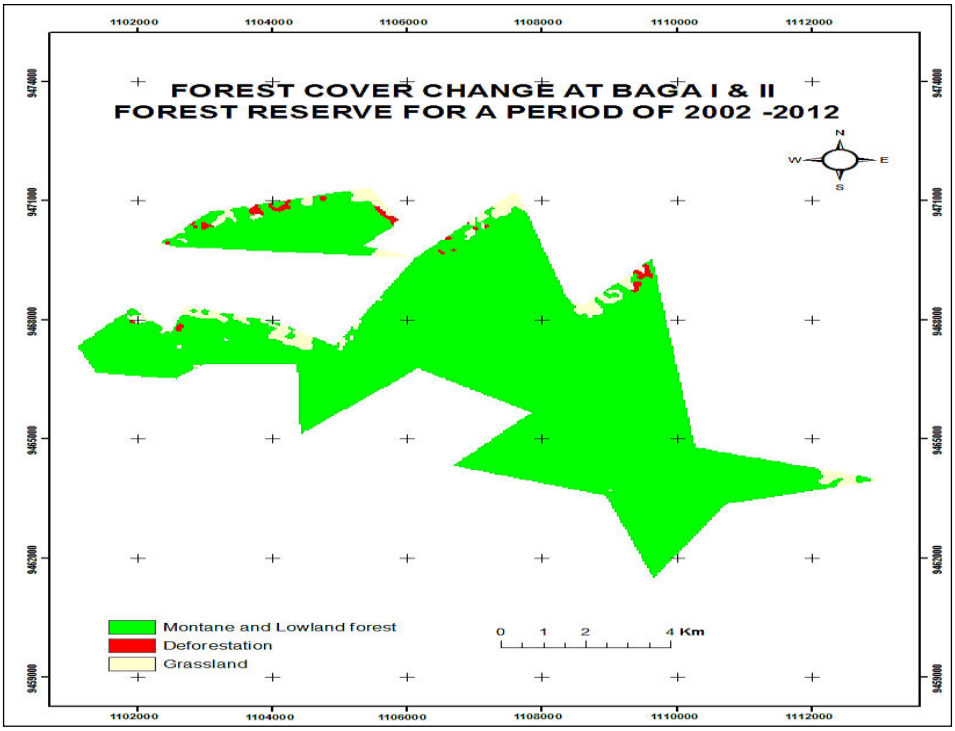

Figure 9: Forest Cover Change Baga Forest Reserve between 2002 and 2012

From the satellite image (Table 3 and Figure 9), it was shown that 31.41 hectare of forest has been degraded in Baga Forest Reserve between 2002 and 2012. This is similar to the study conducted by Temu and Mbwana (1984) who reported that in East Usambara for example, the Amani Forest has been reduced by about 50% while in the Western Usambara, an estimated average of about 7,000ha of forest has been cleared annually between 1960 and 1980. Likewise, NEMC, (1995) estimated that over 70% of the Usambara forests have been cleared since 1905. Finding by Kashaigilia *et al* (2013) in Tanzania revealed that during the period 1980-1995 and 1995-2010, closed forest decreased by 635.5ha (-11.9%) and 1674.9 ha (31.3%), respectively. Hansen et al (2004) observed that the tree cover of the world had decreased between 1984 and 1997 and the annual deforestation rate in tropical Africa was about 0.09%. In his study to identify and map deforestation using Landsat images and Global Inventory Modelling and Mapping Studies (GIMMS) data from 1980s to 2000s Wu (2011) found that Kenya still remained at the deforestation rate of about 0.3% per year. Large loss of forest area was indicated for Tanzania and Uganda, about 1.2% and 2.7% per year, respectively.

Forest Management System Practice

The survey revealed two types of management systems which are Joint Forest Management System and Community Based Forest Management System, Figure 10 shows that 71% of respondents practiced joint forest management system, 25% both community and joint forest management systems, 4% Managed by Government.

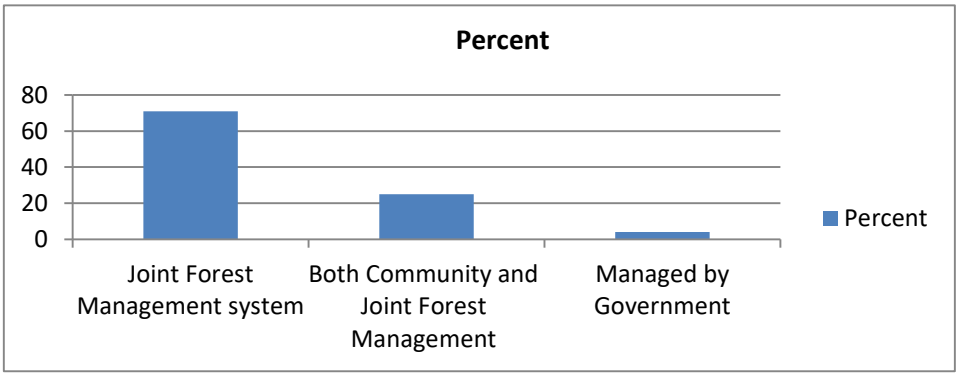

Figure 10: Forest Management System Practice
Source: Field Survey Data (2016).

In 1998, Tanzania approved a National Forestry Policy, the first new forest policy since 1963 which promoted substantial change in the way forests are managed (MNRT, 1998a). The policy aims to promote participation in forest management through the establishment of VLFRs, where communities are both managers and owners of forests, as well as through JFM, where local communities co-manage NFRs or LAFRs with central and local government authorities. As it was revealed the study area practiced both Joint forest management and community forest management as it was stipulated in the Forest Policy. Participatory forest management system involves a high degree of participation of villagers in all stages of forest management planning, implementation, monitoring and evaluation and also sharing of benefit (Bromley and Ramadhani, 2006). Participation of communities to forest management enables sustainable flow of forest products which improves the livelihoods of communities surrounding the forest through creating awareness to them (Iddi, 2002). According to Kessy (1998), recommended approaches in participatory forest management vary from one locality to another depending on group interests. Also it argued that local community interest in participatory management of forest is influenced by the need for forest product, by cultural factors and in the option of using forests as source of household food and income or employment (Kessy, 1998).

Forest Management Challenges

The study area experienced several challenges regarding forest management for about 36% of the respondents mentioned the management plan, Joint agreement and bylaws developed were not being approved by the government (Figure 11). The implementation of Joint Forest Management, legalized through the signing of Joint Management Agreements, management plan and bylaws which has been more uncertain to the study area. Only the management plan and bylaws for community and village forest reserve have been signed but none of the Joint agreement, management plan and bylaws in the forest reserve have been signed which cause problem on the implementation and management of the forest.

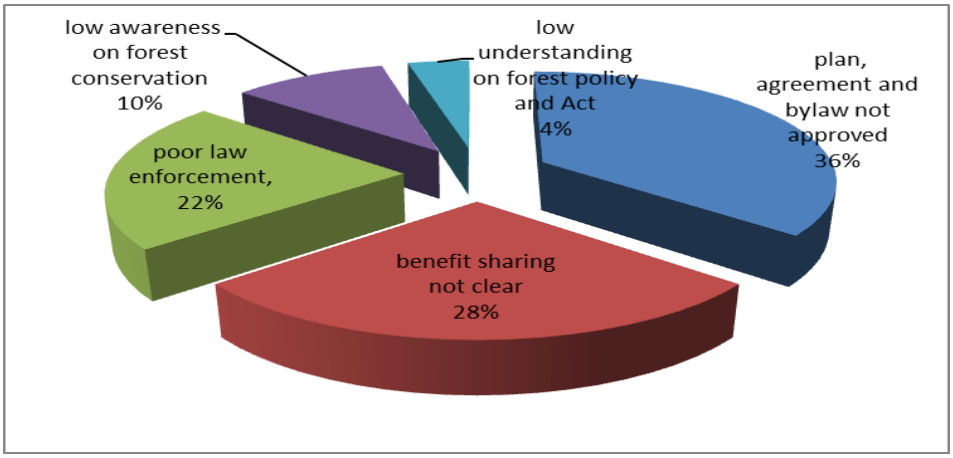

Figure 11: Forest Management Challenges
Source: Field Survey Data (2016).

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

Furthermore, 22% mentioned poor law enforcement (figure 11). The study also observed the existence of weak forest management systems (in particular the

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

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

About 4% of the respondents mentioned low understanding about forest policy and Act which contributed to poor management of the forest. According to National Forest Programme (NFP) of Tanzania it emphasizes the need for awareness creation in forest management among all stakeholders to ensure effective involvement in the implementation of the National Policy and Forest Act (Iddi, 2003).

Conclusion and reccomandations

The finding revealed that forests in the study are poorly managed and community do not adhered to government laws, rules and regulation. Forest has been under pressure due to illegal activity such as tree cutting, fire wood collection, and forest encroachment and mining. The evidence showed that rapid

urban population growth has led to poor forest management in the study area because the demand and supply of the natural resource requirement do not balance.

The study has shown that population of Tanzania has doubled from 17.5 million in 1978 to 44.9 million in 2012 while the population of Lushoto District raise from 246,049 in 1978 to 492,441 in 2012 with a population density of 120.4 Square Kilometer which is higher than the national population density of 51 persons per Square Kilometer. High population density in the study area resulted to shortage of land for cultivation as the result lead to forest encroachment and illegal activity inside the forest. This has significance effect on resource utilization. The study assessed the factors affecting the resource uses in the study area and it has found that about 84% of the community depends on forest for fire wood while the 93% revealed that there is high demand for forest products like medicine, firewood, poles in the study area. The finding from the study area revealed high demand for forest product to support their social and economic needs which required attention from the conservationist to find the alternative solution for it. The study area is surrounded with reserved forest owned by the government, but due to adjacent community population growth; high demand of the forest products and poor forest management practices has led to high pressure to the forest. Some measure should be taken to resolve this such as introduction of agroforestry practices and woodlot establishment.

The finding revealed that proper forest management practices do not exist in the study area, although participatory policies have been adopted, JFM model does not adequately grant local actors the real decision making authority to participate actively and effectively in natural resource management. This is because the JFM model dictate the limit of local actors participation and the vision of resource management remains rather resource state-centric, with very little room for local actors to accurate their own interests. None of Joint forest agreement which explain the distribution of the benefit sharing has been signed, as the result community they don't fill as a part of management. The responds from the key informant revealed that the study area has weak forest management system, poor laws enforcement and lack of cooperation between the community and Forest departments. This has resulted on continuously uptake of the forest products from the forest reserve.

The study recommends that family planning education and campaign should be strengthened in Lushoto District Council, so as to reduce human population

pressure over the land. Likewise, the district should re-mobilize, re-encourage and sensitize people to move to unoccupied/vast land especially in Handeni and Kilindi or to establish employment opportunities that will attract people to settle and work on these suggested areas. The district should develop land use plan to each village which will show equal distribution land according to the use. Furthermore, the community should be trained on optimal utilization of available land using improved agriculture practices.

Social economic benefit of the forest should be considered during the initial stage of the development of the management plan, this includes high cultural, spiritual, or recreational value, employment, value generated from the processing and trade of forest products, and investments in the forest sector. Maintaining and enhancing these functions is a part of sustainable forest management, hence information on status and trends in socio-economic benefits is essential.

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

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

Wide variety of policy statements and legislative and regulatory measures have been established to protect forests but need to be effectively enforced. New modifications/adjustments are of course needed for site specific conditions. Laws, policy and legislation should be such that they encourage local people

and institutional participation in forestry management and conservation along with safeguarding indigenous people's traditional rights and tenure with rightful sharing of benefits. Many formal and informal enforcement/compliance mechanisms can be used to protect forest. These approaches include negotiation, warnings, cancelling work orders, notices of violation, fines, arrests and court action.

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