

The challenges and opportunities conservation initiatives may present on livelihoods to smallholders in Mgori Community Based Forest Reserve

¹Abdallah, J.M., ²Majule, A.E. and ¹Mwakisu, A. I.

¹Sokoine University of Agriculture,

²University of Dar Es Salaam

Abstract

Changes of conservation initiatives aim at balancing sustainability of forest resources and rural livelihoods. Little is known on influence of conservation to livelihoods. This study assessed people's livelihood assets and the way conservation institutions modify access to the assets, and its implications to poverty. Both qualitative and quantitative data were collected. Ninety seven households were randomly selected from three villages. Content analysis was used to analyze qualitative data while SPSS computer software was used for quantitative data analysis. There was reduced access to livelihood assets especially natural assets attributable to conservation initiative. Respondents (60%) felt that they pay for conservation more than they benefit from the conservation. Household income sources were: agriculture (54.1%), environmental income (5.6%) and non-farm and off-farms contributed (40.3%). The total household income increased with increase in agricultural crop sales (especially finger millets) and the relationship was significant ($P < 0.01$). Majority (75%) perceived that climate change may impact smallholders' livelihoods directly through a change in rainfall and temperatures, but 90% observed that mitigation such as REDD initiatives may also lead to serious challenges to smallholders due to restrictions on access to land. Restrictions attributable to conservations (environmental income), increased income inequality. The inequality as measured by the Gini coefficient increased significantly without environmental income in Mughunga (0.1), Ngimu (0.01) and Pohama (0.01). Generally, without environmental income, the overall Gini coefficient decreased to 0.08 units. Community's perception on increased conservation initiative e.g. towards REDD for poverty reduction was negative. Under current conservation initiative the wildlife conflicts were reported high (88%), among them 58% of the respondents attributed the extent of conflicts due to conservation. Pressure on land around Mgori Community Based Forest Management increased due to population growth and the demand for cultivating drought resistant crops (e.g. finger millets). REDD introduction, should be handled in a broader context in order to try avoiding adverse effects on smallholders' access to resources and, hence, to their livelihoods.

Key words: REDD, smallholders, livelihood security, land access, equity

1.0 Introduction

Forests and woodlands cover about 38% of the total land area in Tanzania (URT, 1998), supporting livelihoods of 87% of the rural households in terms of income and services, overcome unexpected income shortfalls, and prevent households from falling deeper into abject poverty (Goldman, 2003; Vedeld *et al.*, 2007). It is a source of 90% of the energy used in the country (*ibid*). However, deforestation,

wildlife habitat and biodiversity loss, land degradation are among major six challenges identified to affect forest and woodland in the country (NEP, 1997). Therefore the Government perspectives is communities has to adopt environmentally sustainable natural resource management practices in order to ensure that long term sustainable economic growth is achieved (NEP: 1997).

Conservation discourses in Tanzania has long history, the fortress approach that has been implemented before independence, exclude local people in the management of forest resources. Even after independence, the approach has been showpiece management of forests in Tanzania (Iddi, Undated). Change of forest ownership from a traditional/ customary system to centralised regime among other things caused old rules that were regulating land tenure, production and distribution on a sustainable basis began to break down (Barracough and Ghimire, 1995), as a result communities' interest to conservation forests and woodlands declined (Akida and Blomley, 2006).

In early 1990s, the participatory approach ("Community-Based Forest Management" and Joint Forest Management) was adopted by the Government in order to ensure sustainability of forest resources and generation of benefits to local communities (Monela *et al.*, 2000; Adams and Hutton, 2007). This was a significant step to increase attention to local communities' access rights and improvement of management of forest resources. The participatory approach was introduced in Tanzania with facilitation from Government of Tanzania and various development partners such as the World Bank, NORAD, DANIDA, FINIDA and Sida. The Swedish International Development Agency (Sida) facilitated Duru-Haitemba in Babati, Suledo in Kiteto District and Mgori Village Land Forest Reserve in Singida. The facilitations aimed to pilot participatory forest activities through the Land Management Programme (LAMP). Under this programme villages were capacitated to manage forests using their own resources for their own benefit as per the 1998 National Forest Policy, Village Land Act (1999), National Forest Programme (2001) and a Forest Act (2002).

Despite the importance of participatory approach as an intervention to environmental problems and development needs of local people, the livelihoods of communities have not been improved (Goldman, 2003; Ashley *et al.*, 2002). Researchers and other actors in a broader subject of conservation argue that conservation related initiatives leads to the appropriation of land with the aim of conserving the environmental (James *et al.*, 2012) – is an emerging process that attract global debates from the fact that appropriation for protection might have ramification to small-holders' livelihoods. land acquired for protection, land for food production in other countries, now the Agricultural Development Corridor approach, and land for CDM and REDD, according to Kaarhus (2010), are forms of land agro-investment (including forestry) that are leading to 'land rush' and negative ramifications to rural communities' livelihoods.

Regarding green investments such as expansion of protected areas, CDM and REDD less is known as to how much these conservation initiatives contribute to well-being of the communities, what challenges and opportunities the investment provide to local communities livelihoods. The questions were examined using Mgori Village land Forest Reserve as a case study in Singida region. Mgori was used because is one of among the first area in tanzania to pilot community conservation. The forest which is dominated by miombo woodlands has increased. The case is therefore a relevant to examine to what extent the conservation efforts has contributed to poverty reduction, is there poverty traps due to the conservation initiative, what are people's livelihood assets and how various social relations and conservation institutions modify access to such assets. This article demonstrate how the application of conservation initiatives, to what are highly variable local situations, can have unintended consequences for to

community development. These are relevant in explaining the situation even under large conservation such as RED. These will input on on-going discussions regarding conservation and REDD + in particular.

1.1 Theoretical Framework and Methodology

The concept of poverty can be derived from different dimensions of deprivation that relate to ability of community to earn income, consumption and food security, health, education, clean water and shelter. Madulu (2003) elucidated that poverty is a dynamic concept which change with time and space. It also includes human rights, voice and some influence over public policies and political priorities whereby deprivation of basic political freedoms or human rights is a major aspect of poverty because of unjust and even violent action by authorities to poor people (OECD, 2001). However, the challenge is how to measure the poverty for comparison, and tracking poverty over time for the purpose of monitoring progress while considering other dimensions of poverty.

Some dimensions of poverty are difficult to measure and quantify (Broca, 2002). For instance, the poverty line of one dollar a day has been used as a measure of poverty level at the global level while it was originally defined as expenditure in a country equivalent to one dollar a day in the United States in 1985. The author (ibid) pointed out that even though the concept of poverty is considered acceptable, attaching a monetary value to food grown, harvested and consumed at home as a primary source of food for many rural households in developing countries is also a challenge. Thus, poverty measures should base on lack of economic resources, supplemented with information on other forms of deprivation.

Tanzania is ranked as one of the poorest countries in the world despite it declared a

war against poverty in year 1961. The extent of poverty among Tanzanians is still high because average earnings do not meet requirements for basic needs. It is estimated that 48% of Tanzanians live under the poverty line, 36% live in a very poor conditions, getting a single meal per day (URT, 2003; Kidane, 2010). There is big difference in levels of poverty between urban and rural areas (ibid). In Tanzania, poverty is higher in rural than in urban areas. Estimates show that 39% of rural citizens are poor compared to 24% of urban (Ellis and Mdoe, 2003). Agriculture is the main economic activity that accounts for more than 40% of GDP and provides employment opportunities to about 80% of the workforce (CIA, 2008). In households headed by people working in the agricultural sector the poverty incidence is about 57%.

1.2 Tanzania and Poverty

Soon after independence, the Government of Tanzania declared a war against three development impediments –ignorance, diseases and poverty (URT, 2003; URT, 2001). Various plans and programmes were implemented to strengthen social services including education, health, infrastructure, agriculture and economy in general. A decade after independence, there was a significant improvement in per capita income, access to education, health and other social services due to national efforts put forward through medium-term and long-term development plan (Zahabu *et al.*, 2009; Kidane, 2010).

Tanzania through Millennium Development Goals is making considerable progress in various aspects such as education in which about 97% of girls and boys are able to access primary school, 30% parliamentary seats are occupied by women. Others include HIV prevalence among 15-24 years population is 3.5% although poverty remained to be a big challenge in the country. These gains could not be sustained in the preceded

years due to various shocks including Tanzania and Uganda war. Other shocks include poor implementation of policies such as decentralising power to local communities in managing natural resources to continue decreasing land area covered by forests e.g. 46% (1990), 41% (2000) and 37.5% (2005) (Mwanri 2007).

There has been a marginal change in consumption levels from 2000 to 2007 as almost 98% of Tanzanians have extremely low consumption levels. In the year 2000 the consumption level was TAS 30 000 per month, in 2007 the consumption rose to TAS 58 000 (URT, 2009). About 50% of the population from poor households usually engaged in physically exhausting activities with greater calorie intake but do not consume sufficient calories. Gini coefficient in Tanzania has decreased between 2000 and 2007 whereby in Dar es Salaam the Gini decreased from 0.36 to 0.34; in other urban decreased from 0.36 to 0.35 and in rural areas decreased from 0.35 to 0.33 units (URT, 2009). The trend shows that there has been an increase in income inequality across the country. Mgori being one of the rural areas is faced with the similar situation. Therefore, determining the value of Gini coefficient is very important in order to understand the poverty status in the area and distribution.

Tanzania joined the international community in 1995 at the Copenhagen Social Summit in determining strategies to eradicate poverty globally. In the year 2005/06, the Government through National Strategy of Growth and Reduction of Poverty (NSGRP) with two phases register an improvement the in well-being. NSGRP I focused on planning, stakeholder participation, engagement in policy dialogue, improving quality of life and social well-being particularly of the poorest and most vulnerable groups in the population; and reduced inequalities in allocation of national resources e.g. education, health, income and other

attributes. NSGRP II focused on growth for reduction of income poverty, improving quality of life and social well-being and good governance and accountability. The NSGRP puts emphasis in improvement of governance and participation in the management of natural resources for community income generation and food security.

1.2.1 Poverty traps

Poverty trap is a self-perpetuating condition where an economy, caught in a horrible period or point, suffers from persistent underdevelopment (Jeffrey *et al.*, 2004). The essential message of poverty traps is that poverty tends to persist, and that it is difficult, though not necessarily impossible, for the economy to escape. In the presence of terrible shocks such as drought, civil wars, floods and disease outbreaks, the economy may occasionally and recurrently escape or fall into poverty. Poverty trap is often interpreted as an explanation for the income difference in a country (Aart and Claudio, 2007). Sources of poverty traps include continuous low productivity agriculture, diseases outbreak, poor infrastructures and market availability may reflect extent of poverty and income distribution among social economic groups.

1.2.2 Contribution of forests to poverty reduction

In Tanzania, forests play a big role in poverty reduction because of their high biodiversity values. The forestry sector contributes significantly (about 92% of ecosystem services) to the reduction of poverty in the country. The majority of rural communities depend on forest products for their livelihoods (MNRT, 2003). A variety of wood (timber, poles, fuel wood, charcoal) and non-wood products (fruits, honey, fodder, mats) are obtained from forests. Fuel wood and charcoal account for about 90% of the total energy consumption in the country in

which they are main sources of bio-energy for both urban dwellers and the rural population (Blomley and Iddi, 2009).

Based on 2006 prices, the value of forest goods and services is estimated at USD 2.2 which is equivalent to 20.1% of Gross Domestic Product (GDP) per annum (MNRT, 2006). The forest sector provides about 3 million person-years of employment (MNRT, 2006). Employment is provided through forest industries, government forest administration and self-employment in forest related activities. Forests are important especially to the poor by reducing vulnerability and risks. Their loss is a significant barrier to the achievement of Millennium Development Goals particularly to those related to the reduction of poverty, hunger and diseases. Therefore, sustainability should be a central component of poverty reduction strategy efforts (MNRT, 2003). In Mgori, a Village Land Forest Reserve was established for the purpose of ensuring sustainable conservation by reducing poverty through benefit sharing arrangements.

1.2.3 Environmental Income, Poverty and Rural Inequality and measurement

Environmental income significantly brings about reduction in inequality and it is important in mitigating poverty (IMF, 2011). Recently, interests in the economic relationship between rural households and environmental resources have increased (Vedeld *et al.*, 2007). Environmental issues have been linked to growing income inequality and poverty. The poor live in areas where arable land is scarce, agricultural productivity is low; drought and environmental degradation are common (Madulu, 2003). Rich households use greater quantities of environmental resources in total than poor households thereby bringing inequality (Cavendish and Campbell, 1994).

Julie (1999) defines inequality as “mean differences in income”. Here the author conceptualises inequality as the dispersion of income or other welfare attributes of a population. IMF (2011) underlines that continued environmental degradation emanates from limited incentives for sustainable management, limited alternative livelihoods and unsustainable land management practices which further propagate the poverty cycle. Areas that lack sustainable income generation and employment opportunities, basic social services and infrastructure tend to push the poor to environmental degradation and stimulating further poverty (Madulu, 2003).

Measuring environmental income requires insight on basic income concepts, gross income, value added and rent, the relevant sources for such incomes as well as ways by which it differs from other types of income in terms of location, market chains, supply chains and production processes (Vedeld *et al.*, 2007). Income inequality can be measured by using Poverty Line, Poverty index, Theil's entropy index T, Theil's second measure L, Lorenz curve, the Coefficient of Variation and the Gini coefficient, Gini index, Relative poverty line and relative income criteria.

These measures are used to describe contribution of different sources of income to total income inequality. In this study, Gini coefficient was used, as is a common means of measuring income inequalities (Adams, 1999; Mutagwaba, 2009; 2006; Zhu and Luo, 2008). Adams (1994) used Gini coefficient to examine the impact of non-farm income on inequality in rural Pakistan. The technique was applied in this study to measure income inequalities in Mgori Village Land Forest Reserves.

The theoretical foundation of this study is line-up with household economic models by Ellis (2000) (Figure 1).

Challenges/opportunities conservation initiatives may provide could possibly limit or expand growths that are reflected on livelihoods asset. The local communities could be poorer or increase vulnerable to poverty traps under increased conservation. The reasons behind vulnerability to poverty traps include: shocks resulting from expansion and development of conservation or limit earns due to restrictions or increased bureaucratic procedures; high incidences of crop raiding, a burden of diseases, livestock killings, people's lives endanger and damage to property. Lack of benefits at community and individual level may local communities' expectations.

Observation variables might vary, but may including rising costs of protection, rising costs and diminishing availability of

veterinary services such as vaccine and dip facilities as well as forest encroachment and infrastructure destruction, increased deforestation and forest degradation, low livelihood diversification strategies. The transforming structures include formulation or scaling up of governance structures and facilitating private sector so as to provide services that would increase access to livelihood assets. The transforming processes include policy reforms and law amendmen9ts that lead to the improvement of livelihood and well being of the local communities. Empowerment of institutions that govern resource use by using laws and cultural norms will enhance sustainable use of natural resource base and this will in turn lead to improved income, reduced vulnerability, improved food security and increased well-being of the communities.

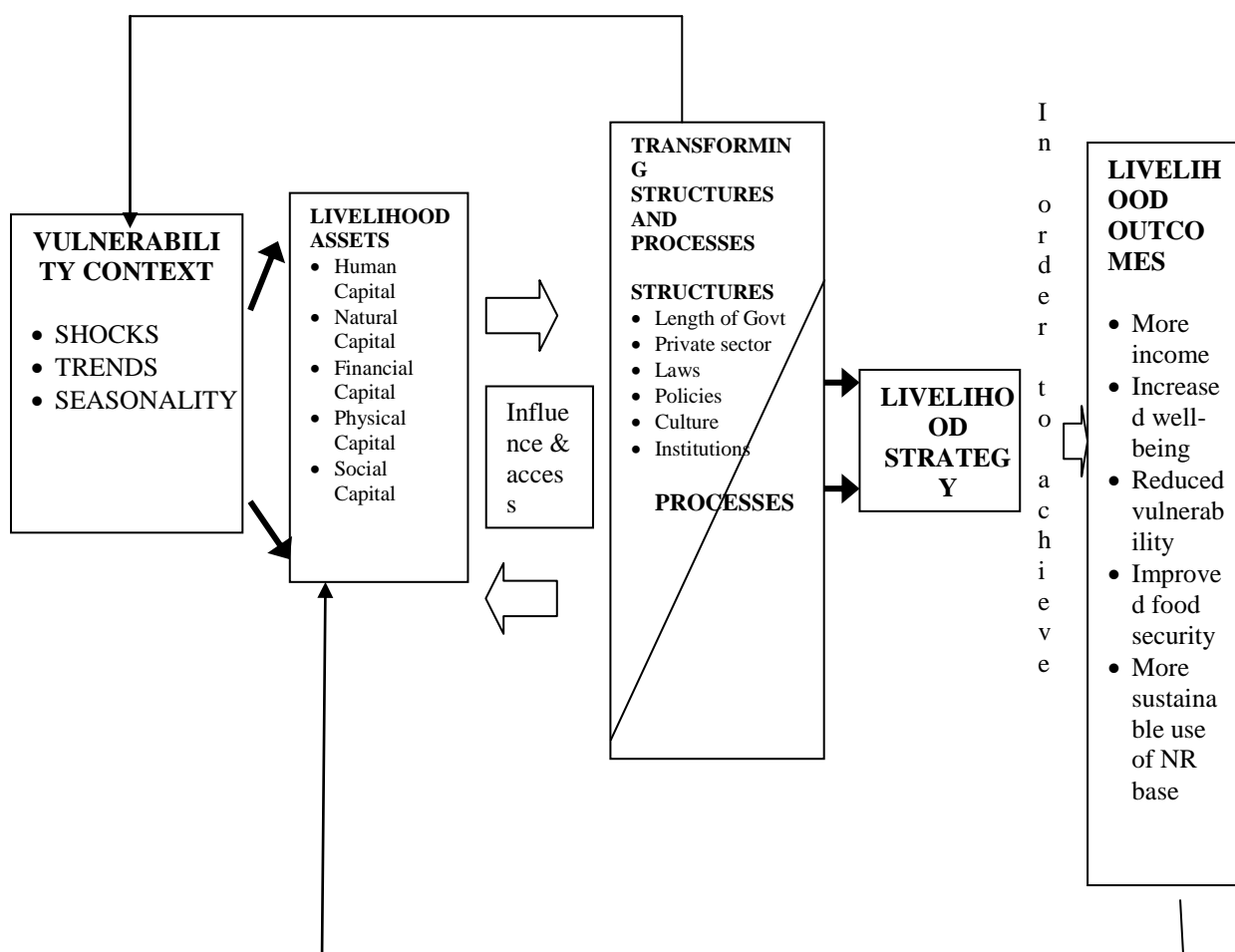


Figure 1: The Sustainable Livelihood Framework adopted from Ellis (2000)

2.0 Methodology

2.1 Mgori Village Land Forest Reserve as a Case Study

2.1.1 Topography, geology and climate

The larger part of forest reserve is on plateau with gentle slopes. The forest reserve is located in altitude between 1400 and 1 600 metres above the sea level. The rock that dominates the area is batholithic granite, which has been modified due to basalt flows from old volcanoes. Higher elevated areas comprise sandy loam soils whose fertility are slightly lower and can't hold water for a long time. There has been siltation in the lowlands and valley areas due to various economic activities such as clearing of forested land for agriculture expansion. Gullies can be seen in areas with poor vegetation cover which also encourage soil erosion especially in sloping areas (CAWM, 2002).

The area receives an average annual rainfall of 790 mm, a typical characteristic of semi-arid areas. The wet season is from December to the end of April while dry season is from May to October. Due to semi aridity, temperature varies between 15 ° C and 30° C. The major land based economic activities in the area include agriculture, livestock keeping and beekeeping. Because of semi aridity, dependence on rain-fed agriculture by the local community is very high.

2.1.2 Vegetation cover

Miombo woodland dominates the area with a diversified species distribution. The area is endowed with valuable species such as *Afzeliaquanzensis* (mkola), *Dalbergiamelanoxylon* (mpingo), *Brachystegia spp.* (miombo), *Pterocarpus angolensis* (mninga), *Combretum spp.*, *Lannea schimperi* and *Julbernardia globiflora*. It is also is endowed with species that make a good source of charcoal, timber, and firewood and non-timber forest products such as mushrooms which contribute significantly to income

sources, especially during the rainy season. The most important source of income from the forest to the surrounding community is honey. About 7 500 beehives were hanged in the forest in the year 2008 and which yielded approximately 151 000 litres of honey. Brown and Robbin (2005) found that approximately 189 000 litres of honey is currently produced from the forest each year.

2.1.3 Status of the forest reserve

Mgori Village Land Forest Reserve was established (Box 1) solely for the purpose of addressing the conservation challenges and rural livelihoods. Among the steps taken to ensure sustainable conservation and utilisation included demarcation of village forest reserves, preparation of village forest management plans and by-laws, formulation of village environmental committees, village land use committees and village game scouts. Initially, villages demarcated the forest through marking boundaries between VFRs using paints on trees and rocks. With government support facilitation from LAMP under Sida, the forest boundaries were marked with permanent beacons. This gave a sense of community ownership, legal basis to protect this invaluable resource and reduced resource use conflicts. The forest management plans describe the VLFRs location, boundaries and zones for collecting forest products. The plans were then used as guiding tools for the management of the forest reserve. Although, the emphasis in the plans was on protection, the villagers were allowed to harvest some of the products from the reserves under technical guidance from District forestry staff. The VFMP had a section guiding on how to handle issues related to offences. The formed VEC took forest management responsibilities by enforcing the by-laws, and the the Mgori Forest Coordination Committee (MFCC) was formed. This created a sense of ownership.

Box 1: Village Land Forest Reserve facilitation process in Mogoti

According to Masawe (1999) the facilitation process proceeded as follows:

- The process involved community mobilisation through village meetings,
- Formation of village committees,
- Preparation of village forest management plans. Each village zoned its own forest reserve,
- Formation of village land use plans - different uses or use categories to different areas,
- Each village forest committee opened a forest management bank account in the district capital,
- The five villages formed a Mgori Forest coordinating Committee. This committee meets two or three times a year. It is chaired by a district councillor.

Local control and ownership has contributed profoundly to the regeneration of this miombo woodland and create conducive environment that harboured wildlife (Nelson and Blomley, 2007). Availability of various species of fauna and flora may provide investment opportunities. The forest stands have improved, Table 1 shows considerable improvements on forest conditions since its establishment in the 1990s.

The above findings imply that the conservation initiative has contributed to the increase in the stems per hectare, basal area and the volume. This is therefore a very good case for studying the challenges and opportunities conservation may provide.

2.2 Population and Sampling

Mgori is inhabited by a number of ethnic groups that include Nyaturu who constitutes 97.9% of the total population followed by a small number of Barbaig, Rangi, Nyiramba, Maasai and Taturu tribes. There has been a demographic change before and after establishment of the forest reserve. The population in the area has increased from 6 281 people in the year 1995 to 9398 people in the year 2009 as shown in Table 3.

Table 3 shows that before establishment of Mgori Village Land Forest Reserve, the total population in sampled villages was 6871 in the year 1988 but it increased to 9398 in the year 2009. The population increase has both economic and conservation implications. Homer-Homer-Dixon and Blitt (1998) explained that population increase has a direct relations to demands, and it has social and economic dimensions, including changing consumption patterns, trade liberalisation, rural enterprise development and changes in technology and land use (clearing land for habitats and agriculture in order to meet increased food demand at household level).

Three villages namely Mughunga, Ngimu and Pohama were sampled. The sample population was categorized into three social economic levels namely poor, intermediate and rich based on the criteria set (Table 3) out during focus group discussions done in the villages. Household was used as sampling unit, and strata identified by using the criteria, were used as sampling frame guided by village registers.

The total number of households in the three villages was 1431 (July, 2010 village counts) of which 97 households equivalent to 17% were randomly sampled from the three strata as presented in Table 4.

Table 1: Previous studies on the status of the Mgori village land forest reserve

Year	N (Stems/ha)	G (m ² /ha)	V (m ³ /ha)	Source
1994	988	9.1	43	Malimbwi and Mwansasu (1994)
2002	70		20	CAWM (2002)
2010	1 155	15.1	90.8	Mbwambo <i>et al.</i> (In press)

Table 2: Population trend in Mgori forest community

Year	Village	Population size	Source
1988	Mughunga	1 140	Opole (1994)
	Ngimu	3 200	in CAWM (2002)
	Pohama	2 531	
1996	Mughunga	1 210	Village register (2009)
	Ngimu	2 671	
	Pohama	2 400	
2002	Mughunga	1 382	URT (2003)
	Ngimu	3 738	
	Pohama	2 991	
2009	Mughunga	1 684	Village register (2009)
	Ngimu	4 758	
	Pohama	2 956	

Table 3: Wealth groups and criteria in Mgori VLFR

Social economic group	Criteria
Rich	Modern house
	Have animals (Cattle)
	Own big farms
	Have ploughs
	Has a shop
	Rents a house
	Own Cars, tractors and motorbike
	Certain of 3 meals per day
	Government employee/Political leader
Intermediate	Modest house
	Own modest farm plots
	Have few animals (cattle/ goats)
	Has a plough
	Own a motorbike/ bicycle
	Certain of 3 meals per day
	Government employee
Has a kiosk/canteen	
Poor	Poor housing (Mud wall/thatch grass)
	Own very few animals (Mostly goats/chicken)
	Food insecurity
	Two or less than 2 meals a day
	Physically disabled/ widow (er)/aged
	Work as casual labourer
Neither bicycle nor radio	

Table 4: Sample size by social economic groups

Village name	Total households number	Social economic group			Sample size (HH) n=97
		Rich (HH) n=26	Intermediate (HH) n=23	Poor (HH) n=48	
Mughunga	310	5	5	21	31
Ngimu	565	12	8	14	34
Pohama	556	9	10	13	32

Note: HH-Household

2.3 Data collection and analysis

Household surveys were done using a standard livelihood questionnaire; containing closed and open ended, in-depth interviews with key stakeholder were done using. The in-depth interviews were implemented to District Forest Officer, District Forest and Game officials, Court clerks and Village Government leaders. Others were Village Game Scouts, Singida Land Council, Religious leaders, Village elders and Influential people. Secondary data were collected by reviewing various sources including annual reports of Singida District Forest office, Forest and Beekeeping Division, Singida Police Post, Court, Wildlife Department, Mgori Village Land Forest Reserve, books, scientific papers, journals, Sokoine National Agricultural Library (SNAL) and other information from the internet. The reports reviewed include inventory of Game in Mgori (CAWM, 2002), impact of CBFM to the rural livelihoods (MNRT, 2005; Blomley and Said, 2009; Nelson and Blomley, 2007), management of trade-offs between conservation and rural livelihoods (CIFOR, 2009) as well as poverty, environmental income and rural inequality (Cavendish and Campbell, 1994). Reports from the villages included population trend, records of various events such as the farms plots destroyed by wildlife, the number of villagers and livestock killed by wildlife and management and benefit sharing patterns.

Qualitative data were transcribed and analysed through content analysis and

from which the researcher drew conclusion through triangulation of the generated information. Fundamental issues analysed included community's access to livelihood assets, institutions and social relations modifying access to livelihood assets, trade-off between conservation and wildlife conflicts. The detailed analysis of some documents such as research and other reports, historical records, policy manuals and books were also done so as to generate information that could be used to explain the situation in the field regarding poverty traps and wildlife conflicts.

Data collected household questionnaires were summarized and coded. Statistical Package for Social Sciences (SPSS) computer software was used for data analysis. Descriptive statistical analysis was used in exploring the data for distribution of responses, central tendencies and dispersion. Cross tabulation was performed to ascertain responses and percentages. Gini coefficient was used to measure inequalities in households' incomes from forest and non forest products in order to examine the extent to which conservation has either reduced or increased income inequalities between households in the study villages. Gini coefficient (Buchan, 2002; Burkey, 2006) was calculated using formula:

$$Coefficient\ t = \frac{1}{n^2 \times \mu} \sum (2_i - n - 1)x_i$$

Where n is the number of individuals in the sample, x_i is the observed value, and μ is the mean value. The Gini coefficient

takes the value between 0 and 1 with zero interpreted as no inequality (i.e. perfect equality) and the value of 1 reflecting inequality (perfect inequality).

Forest resources contribute substantially to the household income. The relative forest income was used to measure the degree to which household depended on forest income.

3. Results

3.1 Access to physical property

Less than one percent of the respondents from rich income bracket group had milling machines, shops, ploughs for hiring and some mini-bus, making a total income of about 30 million annually. About 45% of the rich category of farmer groups had capitals to make sunflower and finger millets business; majority of these business men can buy up to 300 bags of sunflower or finger millets per annum. Some rich and intermediate households stored crops to sell when prices are high. This tendency was not observed in the poor group category which sells crops immediately after harvest.

Livestock was among major assets in Mgori (Table 5). The main types of livestock kept include chicken, cattle, goats and sheep. Many households (over 90%) kept chicken. The livestock were kept under free range system. Since the area had long drought seasons, some families owned donkeys which were mainly for fetching water and carrying languages - crops, bricks and forest products. The donkeys were available for hiring. Livestock ownership within households was gender imbalance. Women owned chicken, while larger animals like cattle, goats and sheep were considered to be under men. Grazing milking and processing were women activities, livestock financial matters were handled by men.

Rich group that constituted 25% of the total sampled population owned the majority of cattle, goats and sheep compared to the rest of the groups. The poor group category possessed the least number of livestock and was just 5% of those possessed livestock in Mgori (Table 5).

Environmental resources were accessed by all wealth categories at various levels of extraction and use (Table 6). Extraction by poor category (71%) was mainly for home use. Intermediate (65%) and rich (40%) groups extracted the resources for commercial within and outside the village. Main products extracted were poles, timber and logs for beehives and bricks making.

Firewood, poles and logs were extracted under permit or gate passes. The permit fees for poles ranged from TAS 500 to 1500 per unit, and that of logs was between TAS 5000 and 10000 per unit. About 80% of the products extracted that were supposed to be under permit or gate passes evaded payments¹. Products that were allowed by law to be extracted without fees were hoe handles, wooden spoons mortar and pestle, beehives, sticks and thorns for fencing.

Table 7 implies that majority (61%) of the respondents reported to collect firewood from the forest. Most of firewood collectors were from poor group as compared to honey and pole collectors who were from the rich group. The frequency of collection by the poor category was 10 bundles per month per household.

Honey production activities were dominated by rich group, and was mainly for commercial purposes and very few (3%) beekeepers produced honey for

¹ Interview by VEOs, Village Chairmen and natural resource committee members September 2011

subsistence use. Most of beekeeping activities were carried out individually. Honey harvests have increased after the adoption of CBFM approach because of improved skills through training on modern harvesting techniques and use of

modern technologies. The increased forest health provides raw materials that encourage beekeeping activities in the area.

Table 5: Livestock ownership by social economic groups

Livestock species	Social economic group			
	Rich	Intermediate	Poor	Total
Cattle	1019	446	121	1586
Goats	579	268	198	1045
Sheep	84	72	25	181
Donkey	11	13	8	32

Table 6: Access to environmental resources among social economic groups

Individuals responses	Social economic group		
	Rich	Intermediate	Poor
Yes	40	65	71
No	60	35	29
I don't know	-	-	13
Total	100	100	100

Village bylaws banned charcoal making and wildlife hunting activities in the forest. But, illegal charcoal making was performed by the poor group and sold to rich group for cash earning. Trees species used for charcoal include; *Brachystegiaspp*, *Ptrocarpus angolensis* and *Azeliaquazaqnsis*. Wildlife hunting was illegally practiced; most of the respondents were not transparent in providing information on wildlife hunting. Very few (2.7% of the respondents) reported to use bush meat for consumption or commercial. One respondent said:

“Most of the village leaders cooperate with illegal hunters for bush meat either for subsistence or commercial uses”².

Participant observation revealed that bush meat is widely consumed in the area. The availability of bush meat is very high during rainy season. Another statement was given by one of the respondents:

“Fingers have been pointed to the rural peasants that we are the agents of environmental degradation while the greater quantities of the total environmental resources are consumed by rich households”³.

This was also confirmed by both district forest and game officials:

“Bush meat has a good market in Singida town, for instance, topmson gazelle which were being sold by business men at a price of TAS 10 000 and 20 000 each while local communities who bare the cost of protection consume wild vegetables and mushrooms as sources of protein”⁴.

Cavendish (1999) pointed that although, poor households depend on natural resources for their livelihoods, a large portion of environmental resources are being consumed by rich households.

² Answers by four different respondents in Mughunga and Ngimu villages July, 2011

³ Interview with one of the Village elders in Mughunga village on 15th July, 2011

⁴ Interview with Game and Forest Officer on 3 Nov, 2010

Table 7: Access to various forest products in Mgori

Forest product	Social economic group				
	Rich	Intermediate	Poor	Total	Percentage
Wild fruits	4	7	10	21	5.5
Fuel wood	13	15	208	236	61.9
Honey	12	9	3	24	6.3
Building poles	16	10	6	32	8.4
Mushroom	10	8	12	30	7.9
charcoal	15	5	3	23	6.0
Wild vegetable	6	8	5	19	5.0
	76	94	226	396	103.9

3.2 Access to social services

About 71.1% of the respondents had primary education. Some primary schools reported a shortage of teachers; this might lower education quality. Many teachers and nurses transferred to Mgori or recruited by the District Council reported to fail to appear to their respective working stations. The reason mentioned was lack of accommodation. In Ngimu village there were seven teachers teaching 480 pupils, in Pohama there were six teachers required to teach 600 pupils.

There was only one dispensary located in Ngimu village, and has a single building and three nurses to serve more than 7714 people from the three villages namely Ngimu, Pohama and Lamba. In Mughunga dispensary, only one nurse was there servicing. Dispensaries in the mentioned villages were built by villagers' voluntary labour forces; and TASAF provided technical and financial backstopping.

Majority (68%) tapped water from traditional wells (Table 8). In some water points it is shared with livestock and wildlife. Only one drilled well was in Ngimu village and one community tank in Pohama village where communities access water at a fee. The traditional wells were not covered and protected, the focus group discussions reported frequent cases of typhoid, cholera and diarrhoea in the villages. Poor group were more vulnerable

to the diseases because they said their incomes were not enough (also see Table 8) to afford fee charged to get water from the community tank where one twenty litre-bucket costs TAS 20. Out of 80.4% who were not able to pay a fee for water services, 70.3% were from poor social economic group. According to Madulu (2003), the major cause of mortality in rural areas is poor access to clean and safe water because.

The average time spent for water fetching was one hour and the distance covered to water sources averaged to 1.5 km. The maximum time one could spend in searching water was eight hours and the maximum distance covered was 10 km. one of the respondents said:

"Water is a very big problem in our village; we are spending a lot of time in fetching water instead of doing other economic activities such farming and businesses".⁵

This was reported to increase workload to women and children as was part of their responsibilities. They wake-up early in the morning at a time the risks of encountering wild animals were high.

⁵ Interview with One female respondent in Pohama village on 23 Nov, 2011

Table 8: Households' sources of water for domestic use in Mgori

Source of water	Social economic group			%
	Rich	Intermediate	Poor	
Stream/river			1	1
Community tank(at a fee) and drilled well	7	4	5	16
Traditional wells	17	14	37	68
Water ponds (in dry season)	3	4	5	12
Total	27	22	48	100

3.3 Income, variations and diversification by source and wealth groups

In all the three villages, agriculture represented the main source of cash income by 79.4% of the sample households, agropastoralism (10.3%) other non-farm economic activities constitute 11.3% despite their importance. The rich households had more diversified economies than the intermediate and poor households. The richer households obtained incomes from non-farm activities such as milling machine, transportation and shops (Table 9). In the past twelve months, rich households' income (TAS 70 million) has been about eighty times greater than that of poor households (TAS 8 471 400). For example, last year one respondent in Pohama village collected TAS 20 million from his mini bus.

About 68% of the respondents from rich economic bracket were involved in sunflower and finger millets cultivation (which were considered to be profitable crops) while only 30.4% of the intermediate and 36.73% of the poor households cultivated sunflower. Sunflower and finger millets contributed 22.7% to total income of rich group category. Other cash crops grown by the local communities adjacent to Mgori forest include coriander, chick peas, beans, sweet potatoes and groundnuts which are grown in small scale.

Local markets commonly known as “*minada and or gوليو*” operate once in a week. These local markets operated in Ngimu and Pohama but not in Mughunga. Villagers from Mughunga usually walk 26 km to the market places. Market proximity influences the prices of various products. For example, a cow sold at TAS 250 000 in the market place is sold at a price ranging 70 000 to 150 000 TAS in Mughunga village.

Poor households (12.1% of the total sample) engaged in selling local brewed alcohol. Little *et al.* (2001), point out that more than 40-45% of the average household income of farmers in Africa was obtained from non-farm sources which increasingly become important livelihood source to many. In all the three villages, forest income was mainly for subsistence needs.

Selling of chicken was one of the main sources of income for the poor group (Table 10) in spite of high chicken death due to fowl typhoid disease and wildlife such as pole cat, wild cat and foxes. Annually, one could earn up to TAS 135 000 or even more from chicken sales which worth an average of TAS 3500 per one chick. Therefore, if a fowl typhoid disease is prevented, predation to chicken reduced; market assured and prices increased; chicken sales would have a significant contribution to the rural poor economy.

Table 9: Household income sources as percentage among social economic groups

Income sources	Rich		Intermediate		Poor		Mean	
	TAS	%	TAS	%	TAS	%	TAS	%
Agriculture	24 283 000	35.1	2 453 000	20.1	2 704 000	33.6	9 813 333	32.9
Livestock	12 913 700	18.7	4 166 000	34.1	1 972 500	24.5	6 350 733	21.3
Forest products	1 363 500	0.6	2 169 000	11.1	1 089 400	8.2	1 540 667	2.7
Livestock products	216 000	0.3	582 000	4.7	391 000	4.9	396333	1.3
Non-farm	31 414 000	45.4	3 130000	25.6	1 291000	16.1	11 945000	40.0
Off-farm			532 000	4.4	1 023 500	12.7	518 500	1.7
Total	70 190 200	100	13 032 000	100	8 471 400	100	30 564 533	100.0

Table10: Income from livestock among different social economic groups in Mgori

Item	Social economic group			
	Rich	Intermediate	Poor	Total
Number of cows sold	47	22	11	80
Number of cows traded	17			17
Cows sold (%)	58.8	27.5	13.8	
Cows traded (%)	100			
Total income from cow sales	12 390 000	2 888 000	1 135 000	16 413 000
Number of goats sold	18	33	15	66
Number of goats traded	5			5
Goats sold (%)	27.3	50.0	22.7	
Goats traded (%)	100.0			
Total income from goat sales	650 000	620 000	304 000	1 574 000
Number of sheep sold	2	6	18	26
Sheep sold (%)	7.7	26.1	69.23	
Total income from sheep sales	160 000	84 000	328 000	572 000
Number of chicken sold	51	36	53	140
Number of chicken traded			9	9
Chicken sold (%)	36.4	25.7	37.8	
Chicken traded (%)			100.0	
Total income from chick sale	317 500	270 000	253 000	840 500

About 21% of poor households faced food insecurity. The main causes of food insecurity include declined soil fertility that lead to low yield and crop raiding by wildlife (Wildlife conflicts discussed to be discuss later on). There was also one agricultural extension worker with no transport operating in a whole ward. Majority of the households have weak agricultural impliments. Extensive farming through clearfelling of the forests was dominant in Mgori. Finger millet flourish well in a new land obtained from forest,

this was recorded to be the main driver for forest deforestation/degradation.

3.4 Forest Resource Dependence

3.4.1 Relative forest income

Relative forest incomes for the wealth groups were 12.8% for the poor, 16.6% for intermediate and 42% for the rich. The correlation between relative forest income and total income was significant ($R^2=78$, $P<0.03$, $N=97$) imply forest income constitutes a larger share of the total household income of the rich group than to the other groups. In Mgori, about 36% of

the total environmental income came from honey business. Income from honey contributed about 3% of the total household income. About 1276 litres of honey were produced by 45.4% of the respondents. The 39.4% of high wealth group that practised beekeeping earned TAS 944 000 while poor wealth group (33.3%) earned 125 000 TAS (Table 11). The average prices per litre range between TAS 1250 and 2750 and the total income from honey production in the last year was TAS 1 765 500. The challenge to honey production was increased theft events and destruction by honey badgers.

Firewood constituted 12.1% of the total environmental income. The price per head load ranged from TAS 400 to 600 and one push-cart was sold at TAS 10 000. About 8882 head loads of fuel wood worth TAS 450 000 were collected. The results show that firewood sales benefited the poor social economic group. But the earnings were very little. The rich group did not engage in firewood sales.

About 6% of the respondents reported to engage in the collection of wild fruits. The average price per kg of wild fruits ranged from TAS 50 and 500. The total income earned was TAS 590 200 which contributed about 13% of the total environmental income. Wild fruits were preferred by the young.

Wild vegetables offset the costs of purchasing food supplements to a great extent. About 46% of the respondents collected wild vegetables during rainy season and dried for storage. Only 3% of respondent sold wild vegetable at TAS 37000 contributing 0.8% of the total environmental income. Wild vegetables were important as food and income sources, but focus group discussions reported harvests have reduced substantively due to increased threats from wildlife. Income from mushroom contributed about 2% of the total environmental income. About 269 kg of

mushroom were collected by 50.5% of the respondents for domestic use and 308 kg were collected for commercial purposes. The average prices per kg ranged from TAS 250 to 500 and the total income from mushroom sale was TAS 112 600.

3.4.2 Forest income and wealth distribution

We use Gini index to measure the extent to which the distribution of income among households, villages and the strata deviates from a perfectly equal distribution. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. The Gini coefficient results for household income both with and without forest income per village are presented in Table 12.

Table 11 shows that forest income influences the total incomes. In Mughunga village the Gini coefficient with forest income was 0.22 and value decreased to 0.12 when forest income was excluded. This implies that forest income has a significant contribution in the observed differences between rich, intermediate and poor groups in terms of forest income extractions. One village game scout quoted that:

*“We are fed up of volunteering to protect the forest, because we catch illegal timber harvesters and hunters but the whole money goes to the village and eaten by few leaders. We risk our lives but we are not given any incentives, rather we use our own money to buy food and field gears”.*⁶

Marginal effect was observed in Ngimu and Pohama village with a unit change approximate zero; but the villages had a relatively smaller forest income. For all villages, the Gini coefficient was found to increase by 0.08 units when forest income was omitted (Gini value decreased from

⁶ Interview with a Ngimu Village Game Scout on Nov, 2010

0.65 to 0.57 when forest income was excluded). These findings reflect a similar argument by Velded *et al.* (2007) that

forest income has a significant contribution to household's total.

Table 11: Overall income from various forest products among wealth groups

Type of forest product	Social economic group		
	Rich	Intermediate	Poor
Timber		40 000	
Ropes		540 000	
Wild fruits	400 000	60 000	130 200
Charcoal	19 500	480 000	
Firewood		69 000	385 000
Hoe handles, wooden spoon		1000	26 000
Mushroom		72 000	40 600
Wild vegetable		12 000	25 000
Poles		462 500	25 000
Mortar and Pestles		36 000	30 000
Honey	944 000	396 000	125 000
Total income (TAS)	1363500	2169000	586800

Table 12: Gini coefficients for total and without forest income in Mgori

Villages	Gini coefficient without forest income	Gini coefficient without with forest income	Change (units)
Mughunga	0.12	0.22	0.1
Ngimu,	0.25	0.26	0.01
Pohama	0.36	0.37	0.01
All three villages	0.57	0.65	0.08

Table 13: Impacts resulting from wildlife conflicts in Mgori forest reserve

Type of impact	Wild animal species involved	Crop/ Livestock/ Human	Extent of destruction (No/ ha)
Crop raiding	Elephant	Millet	91.5
	Birds, bush pig	Maize, sorghum	40
Livestock killings	Lion	Cows	20
	Leopard/ hyena	Cattle calves	27
	Leopard/ hyena	Goats	201
	Foxes/ wild dog	Sheep	5
Injury	Polecat	Chicken	203
	Hyena	Cows	24
	Leopard	Goats	25

Millet, one of the drought persistent crops, is highly preferred by elephants. As said by a village game scout: "Elephant prefer millet than other crops because of the sugary taste present in millet stems"⁷

⁷ Personal conversation with Mughunga Village Game Scout on 8th April, 2010

3.5 Wildlife conflicts

The study results show that 87.6% of the respondents reported conflicts between wildlife and the communities adjacent to forest reserve. Elephants can be seen more than once in a week as opposed to the time where the forest wasn't in a good condition i.e. before establishment of CBFM approach. One key informant noted responded that:

*"You can see a range of seven to nine elephants per day"*⁸

Elephants have been reportedly destructing crops as well as threatening people's lives. Households whose farm plots are closer to the forest were the most affected ones. Lions and hyenas kill livestock frequently, villagers had no rights to kill, harvest or manage the wildlife in their village forest reserve. An inventory carried out by CAWM (2002) showed that game species in Mgori community forest revealed have increased due to improved condition of the forest. Wildlife conflicts were directly linked to poverty because of reduced productivity among many villagers especially those in the poor social economic group. Crop raiding by elephants is a major consequence of wildlife increase in the area as was reported by 48.8% of the respondents. Livestock predation was another problem as was reported by 26.4% of the respondents. Human killings were not mentioned but people's lives were highly threatened. Extent of destruction is shown in Table 13.

4.0 Discussion

Community based forest management was introduced into law with the passing of the Forest Act of 2002, which provides a clear legal basis for communities, groups or individuals across mainland Tanzania to own, manage forests under a wide range of

conditions (Blomley, T. and Iddi, 2009).

After all years of conservation social co-benefits are supposed to be associated with conservation initiative have not been realised as expected in Mgori. Water is still a big problem, and other social services were still weak. For instance, the money earned from conservation could be used to improve primary education and health services. Contribution of CBFM to household's cash income in Mgori was not sufficient as expected. Majority of the poor group were unable to diversify economic activities - diversification of livelihoods. Local community lack to access physical assets in including livestock as observed Mgori, and pointed out by Ellis and Bahigwa (2001) to strongly have linked to rural poverty community access to physical assets is crucial. Thus, some of the villagers cut down poles and harvest timber illegally and sell them to rich villagers or businessmen from Singida.

Rich group and village leaders received more access and benefits to Mgori forests than the poor group who were the majority in Mgori. After community adopted CBFM and formulated the VLFR, honey production increased because of improved skills through training on modern harvesting techniques and use of modern technologies, but the rich group domineers honey production activities. Majority reported that some district officials accessed and used forest products for their own benefit. Others who benefited from the forest products were from Singida and some from Manyara. This implies that decentralization as a core aspect of community conservation to allow local actors more authority over the use and management of resources (Ferraro, 2005; Ferraro and Pattanayak, 2006; Ferraro, 2008) hasn't been realised as expected.

About 73.8% of the respondents replied that CBFM had a significant contribution to the forest regeneration but not to the

⁸Interview with Key informant at Mughunga village on Nov, 2010

livelihoods of local communities. As Andam et al. (2010) argued, it is possible for the protected areas to alleviate poverty among the rural communities living in or adjacent to these reserves as experienced in Thailand and Costa Rica. However, there were no equitable benefits sharing among villages due to selfishness and corruption. Corruption is implied in the permit and gate fees' evasion practiced in the area.

Environmental income had significant influence on the total income. This means that the environmental income is very important in explaining the socio-economic situation of Mgori. One would expect the community conservation initiative to influence benefit sharing, but the situation is different in Mgori that majority of the environmental incomes were accrued by the rich group. As a result the inequality was higher with environmental income and lowered without the environmental income. However, this is not surprising because in most African countries the Gini coefficient decreased from 0.51 to 0.41 when forest environmental income was excluded, which is a rather significant increase. Only in one case (from India) the income inequality increased slightly when forest environmental income was excluded (Velded et al., 2007; Vedeld et al., 2011). Nonetheless care should be taken when calculating the Gini using annual data as used by this article, as pointed out by Gibson et al. (2001), shocks occurring in a particular month are often offset by shocks of the opposite sign in some other month. Therefore monthly data could provide more insight on inequality.

Findings show the succesifal conservation increased forest regeneration and cover, attracted wildlife habitation, and wildlife conflicts as a side effect. Kideghesho (2008) reported that majority of poor Tanzanians in community conservation areas are vulnerable to abject poverty because of low crop productivity, livestock

killings, increased threats, destructed infrastructures and injures wresulted from wildlife conflicts. Jeffrey et al. (2004) also reported that one of the sources of poverty traps is cycle of low-productivity due to wildlife crop raiding and communities spend most of thier time and resources to protect thier farms, livestock and families against wild animals.

A study by Ashley et al. (2002) reported a potential link between wildlife conflicts and poverty among the communities surrounding the forest reserves. Since, infrastructures such as water wells are not well protected, destruction of wells is frequent especially during dry seasons when elephants compete with human for water. Women are the most vulnerable group among household members because they sometime fetch water even early in morning. According to Wildlife Conservation Act 2009, Part VIII Section 69 discuss managment of problem animals, Section 70 declare dangeorus animals (as provided in the Fourth Schedule; Section 71(1) the Minister can make regulations specify the amount to be paid as consolation, Section 71(2) ...in relation to destruction of crops, no payment shall be made in eccess of five acres, and 70(3)... if proved that person in the cause of unlawful activity under this the Act loss life or injured by the dengerous animal will not be entitled for consolation consideration. The word 'Consolation' means that the compesation will just be as a token – not the market value, the limit put foward with regards to crop raiding/damage implies that many acres will not be compesated as conservation increases and attract more dengarous animal (elephants). This means that more costs will be accrued to the communities even under large conservation.

Mgori was facilitated to own the forests under VLFR arrangement. The institutions have been capacitated at various levels,

and tools for managing the resources were provided. However, for more than fourteen years since its establishment, there are neither plans nor arrangements for legal harvesting of forest products in near future in Mgori VLFR. The forest has not served as an incentive to local communities because power and ownership are not yet fully devolved to the local people. As Blomley (2006) observed, unwillingness of the Government to let the power, ownership and benefit go to the local levels is an obstacle to successful CBFM. This has totally disappointed local communities who have been protecting the forest for all this long period of time. As Galvin and Haller (2008) argued, loss of access to these resources can lead to poverty and livelihood insecurity in the area. Local communities had a negative perception towards forest conservation that leads to improved livelihoods of community members at an individual level.

Consequently, Mgori VLFR is perceived as a land where the Government has denied its people the right to use and control while their needs for land and forest products are rising. About 20.6% of the respondents complained of shortage of land due to the presence of forest reserve due to most of them saying that crop harvests have been lowered and the income has decreased due to reduced grazing land. The district officials argued that:

“Some selfish people wanted more land for their personal interests but the local community does not face shortage of land due to presence of the forest reserve”.⁹

Population increase is among challenges of conservation initiatives. In the year 1996 during the establishment of Mgori VLFR the population in Ngimu village was 2671

⁹ Interview with Singida District Forest Officer on 6 April, 2010

but doubled (4758) in 2009. The enormous increase of population might cause pressure on forest resources in Mgori community forest. This is supported by a dominant narrative of environmental change and ecoscarcity which elucidated interrelation between human and environment for a couple of years (Robbins, 2004). From Malthus argument, ecoscarcity is when population growth outweighs environmental carrying capacity (Robbins, 2004). Therefore unless the conservation efforts are implemented in a holistic manner otherwise their impact will be minimal.

Recommendation

- Community conservation initiatives need to devise mechanism to ensure that all wealth groups access and gain benefits in a fairly equal ways.
- The community could explore more opportunities for investment. The availability of various species fauna and flora of wild animals are one of opportunities could use especially by the poor group to invest on sustainable business (off-farm activities).
- Investment policies should promote and empower rural enterprise developments such as beekeeping activities which contributed significantly to the households' income in the area. Focus should be to the poor households who can easily be trapped in poverty cycles because they had less diversifying economy.
- A tendency of poor households to clear bushes to increase the sizes of cultivation land may result into increased forest degradation. Thus, integrated land use is inevitable.

References

- Aart, K. and Claudio, R. (2007). Poverty Traps, Aid, and Growth. *Journal of Development Economics* 82: 315–347.
- Adams, R. 1994. Non-farm income and inequality in rural Pakistan: a decomposition analysis. *Journal of Development Studies*, 31(1): 110–33.

- Adams, R. H. (1999). Non-farm Income, Inequality, and Land in Rural Egypt. World Bank Policy Research Working Paper 2178. 28pp.
- Adams, W. M. and Hutton, J. (2007). People, Parks and Poverty: Political Ecology and Biodiversity Conservation. *Conservation and Society* 5(2): 147-183.
- Akida, A. and Blomley, R. (2006). Trends in Forest Ownership, Forest Resources Tenure and Institutional Arrangements: Are they Contributing to Better Forest Management and Poverty Reduction? A Case study from Tanzania. Unpublished Report. FAO, Rome, Italy. 27pp.
- Andam, K. S., Ferraro, P. J., Simsc, R. E. K., Healyd, A. and Hollande, M. B. (2010). Protected Areas Reduced Poverty in Costa Rica and Thailand. *Sustainability Science PNAS Early Edition*: 1-6.
- Ashley, C., Mdoe, N. and Reynolds L. (2002). Rethinking Wildlife for Livelihoods and Diversification in Rural Tanzania: A case study from northern Selous. LADDER Working paper 15. 36pp.
- Barracough, S. and Ghimire, K. (1995), Deforestation; Forests and forestry; Social aspects; Developing countries, xiii, 259 p. SD418.3.D44 B37
- Blomley, T. and Iddi, S. (2009). Participatory Forest Management in Tanzania: 1993 – 2009. Lessons learned and experiences to date. Dar es Salaam, Tanzania. 66pp.
- Broca, S. S. (2002). Food Insecurity, Poverty and Agriculture. *ESA Working Paper* 2(15): 3-75.
- Brown, A. and Robbin, B. (2005). Building a future with our forests: Experiences of Community-based Forestry. Land Management Programme, Hyltebruks tryckeri, Sweden. 24pp.
- Cavendish, W. and Campbell, B. (1994). Poverty, Environmental Income and Rural Inequality. *Fielding Worldwide*. Indonesia. 734pp.
- CAWM (College of African Wildlife Management) (2002). Inventory of Game in Mgori Forest Final Report. Singida, Tanzania. 46pp.
- CIA World Fact Book (2008). Tanzania Economy 2008. [http://www.theodora.com/wfbcurrent/tanzania_economy.html/] site visited on 20/10/2011.
- CIFOR (2009). Managing Trade-offs between Conservation and Development at Landscape Scales. [http://cgmap.cgiar.org/documents/MTPPProjects/CIFOR_2010-2012] site visited on 17/08/2009.
- Homer-Dixon, T. and Blitt, J. (1998=). *Ecoviolence: Links Among Environment, Population and Security*. Boulder: Rowman & Littlefield Publishers.
- Ellis, F. (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford University Press Inc., New York. 270pp.
- Ellis, F. and Bahiigwa, G. (2001). Livelihoods and Rural Poverty Reduction in Uganda. LADDER Working Paper 5. 26pp.
- Ellis, F. and Mdoe, N. (2003). Livelihoods and Rural Poverty Reduction in Tanzania (2003). *World Development* , 31, (8) 1367–1384.
- Gibson, J., Huang, J. and Rozelle, S. (2001). Why is income inequality so low in China compared to other countries?: The effect of household survey methods, *Economis Letters*, 71: (3): 329-333.
- Goldman, M. (2003). Partitioned Nature, Privileged Knowledge: Community-based Conservation in Tanzania. *Development and Change* 34(5): 833-862.
- Iddi, S. (Unkown). Community participation in forest management in the United Republic of Tanzania. Second International Workshop on Participatory Forestry in Africa defining the way forward: sustainable livelihoods and sustainable forest management through participatory forestry, 59-67.
- IMF (International Monetary Fund) (2011). Tanzania: Poverty Reduction Strategy Paper Progress Report. IMF Country's report 11(17): 5-168.
- James, F., Melissa, L. and & Ian, S. (2012). Green Grabbing: a new appropriation of nature? *Journal of Peasant Studies* 39 (2): 237-261.
- Julie, A. L. (1999). *Inequality: Methods and Tools*. [<http://www.worldbank.org/poverty/inequ/index.htm>] site visited on 05/09/2009.
- Kaarhus, R., Haug, R., Hella, J.P. and Makindara, J.R. (2010). Agro-investment in Africa - Impact on land and livelihoods in Mozambique and Tanzania, NORAGRIC Report No. 53.
- Kidane, A. (2010). The Poverty Demography Trap in Third World Countries: Empirical Evidence from Tanzania. *Environment for Development* 8: 4-24.
- Kideghesho, J. R. (2008). Who Pays for Wildlife Conservation in Tanzania and Who Benefits?[<http://www.iasc2008.glos.ac.uk/conference/papers/kideghesho-10230>] site visited on 25/08/2009.
- Madulu, N. F. (2003). Linking Poverty Levels to Water Resources Use and Conflicts in

- Rural Tanzania. *Physics and Chemistry of the Earth*, 28(20-27): 911-917.
- Massawe, E. L. (1999). Community Management of Mgori Forest in Tanzania. Proceedings of the International Workshop on Community Forestry in Africa, Banjul, Gambia, 30 April, 1999. 423pp.
- MNRT (Ministry of Natural Resource and Tourism) (2003). Resource Economic Analysis of Catchment Forests in Tanzania Annual Report. Government Printer, Dar-es-Salaam, Tanzania. 222pp.
- MNRT (Ministry of Natural Resource and Tourism) (2005). The Social, Economic and Environmental Impacts of Forest Landscape Restoration in Shinyanga Annual Report. Government Printer, Dar-es-Salaam, Tanzania. 205pp.
- MNRT (Ministry of Natural Resource and Tourism) (2006). Participatory Forest Management in Tanzania. Facts and Figures Annual Report. Government Printer, Dar-es-Salaam, Tanzania. 13pp.
- Monela, G. C, Kajembe, G. C, Kaoneka, A. R. S. and Kowere, G. (2000). Household Livelihood Strategies in Miombo Woodlands of Tanzania: Emerging trends. *Tanzania Journal of Forestry and Nature conservation* 73: 17-33.
- Mutagwaba, B. (2009). Government Expenditure and Income inequality in Tanzania: A Policy Dimension. Proceedings of IAABD Annual Conference, Dar es Salaam, Tanzania, 11 October, 2009. 185pp.
- Mwanri, E.S. (2007). Tanzania socio-economic data base, Bureau of Statistics, <http://www.docstoc.com/docs/4202192/Tanzania-Socio-Economic-Database>
- Nelson, F. and Blomley, T. (2007). Eating from the Same Plate: Integrating Community-based Wildlife and Forestry Management. *The Arc Journal* 21: 11-13.
- NEP (1997). National Environmental Policy, 40p, <http://www.tzonline.org/pdf/nationalenvironmentalpolicy.pdf>
- OECD (Organisation for Economic Co-operation and Development). (2001).
- Opole, M. (1994). Socio-economic survey of forest adjacent dwellers of Mgori Forest Reserve in Singida Region, Forest and Beekeeping Division, Ministry of Natural Resources and Tourism.
- Robbins, P. (2004). *Political Ecology*. Blackwell Science Ltd., Oxford. 242pp.
- URT (United Republic of Tanzania). (1998). The National Forest Policy. Ministry of Natural Resources and Tourism. Government Printer, Dar es Salaam. 69pp.
- URT (United Republic of Tanzania). (2001). United Nations Development Assistance Framework for Tanzania. Ministry of Natural Resources and Tourism. Government Printer, Dar es Salaam. 42pp.
- URT (United Republic of Tanzania). (2009). Poverty and Human Development Report. Government Printer, Dar es Salaam, Tanzania. 190pp.
- Vedeld, P., Abdallah, J.M., Wapalila, G. and Songorwa, A. (2012). Protected areas, poverty and conflicts, *Forest Policy and Economics*, doi:10.1016/j.forpol.2012.01.008.
- Vedeld, P., Angelsen, A., Bojö J., Sjaastad, E. and Kobugabe, B.G. (2007). Forest Environmental Incomes and the Rural Poor. *Forest Policy and Economics* 9(2007): 869–879.
- Zahabu, E., Eid, T., Kajembe, G., Mbwambo, L., Mongo, C., Sangeda, A., Malimbwi, R., Katani, J., Kashaigili, J. and Luoga, E. (2009). Forestland Tenure Systems in Tanzania: an Overview of Policy Changes in Relation to Forest Management. *INA fagrapport* 14: 6-24.
- Zhu, N and Luo, X. (2008). Impacts of Migration on Rural Poverty and Inequality: a case study in China. [http://www.ged.u-bordeaux4.fr/Zhu_Luo] site visited on 17/10/2010