

## **Implications of Landuse/cover changes over three decades on community livelihoods within the context of REDD: A case of Mgori Forestry in Singida.**

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### **Abstract**

*The majority of communities living in rural areas of Tanzania depends on natural resources in particular forests and woodlands for their livelihoods. As a result forests and woodlands have been under pressure with declining tendencies in terms of their cover in many parts of Tanzania. Apart from their potential in supporting community livelihoods, forests also contribute to climate change mitigations by reducing carbon emissions. Few remaining forests if well managed can effectively support communities in a number of ways including carbon trade if REDD initiative is well implemented. It therefore very crucial to investigate the dynamics of landuse changes over time and possible implications to community livelihoods to forest depended communities within the context of REDD. The present study investigated landuse change over time at Mgori where PFM involving a total of 5 villages is involved. The study also established that woodlands decreased by 53.8% within a period of 10 years from 1990 to 2010 on the expense bushland which increased by 22.9%. In general agricultural land also increased by 4.8% and this was linked to expansion of crop land due to much dependence on community livelihoods by between 65 and 70%. In general the area is potential for REDD project because of the presence of woodlands, experience of communities on forest governance under CBFM as well as realizing various opportunities REDD may present which are more than challenges. However much more effort is needed to ensure that communities are well educated on potential benefits associated with REDD.*

**Key words:** *Forest, Land cover, Mgori, REDD.*

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### **1.0 Introduction**

Tanzania is a forest rich country covering 34 million ha, which is about 40 % of the total land area. It is estimated that the annual value of forest goods and services is 20.1% of Gross Domestic Product (GDP) (URT, 2007). The sector also provides employment to about 3 million Tanzanians particularly in the main land. Forests and woodlands also play an important role in the regulation of the climate through carbon sequestration. But, the present high rate of deforestation and degradation rate are significant contributors to climate change around the world, accounting for 17.4% of the Green House Gases (GHG) emissions (IPCC, 2007). In Tanzania alone, it is estimated that the rate of deforestation at 412,000 ha per annum (URT, 2010). This poses a great threat to the community livelihoods and biodiversity (Majule and Kalonga, 2008; Majule, 2011). As an intervention,

Reduced Emissions from Deforestation and Forest Degradation (REDD) was broadly welcomed as a mitigation strategy into the United Nations Framework Convention on Climate Change (UNFCCC) and is likely to be included in a post 2012 regime. Different forest management practices have been in place over time in Tanzania. Experience from such practices can be used as a basis for understanding what REDD can add in terms of contributing to climate change mitigation and addressing poverty to the majority through carbon trade.

Participatory Forest Management (PFM) including both Community Based Forest Management (CBFM) and Joint Forest Management (JFM), constitute 3.7 million ha of forest land (Bond, 2008) form indispensable areas for REDD readiness. There is an assumption that REDD could propel land grab from forest communities

(Schalatek, 2009). This is manifested in four folds, first, many forest communities' land tenure are insecure (Vatn et al., 2009; Knox et al., 2010). Second, there is contradiction between customary and statutory laws (Campese, 2011), putting women who live in a patriarchy system at even greater disadvantageous position. Third, there may be a rise of forests' commercial values as a result of carbon market trends (Gurung and Quesada, 2009) and hence the powerful groups will be at a better position to buy to the detriment of poor local people. Fourth, rapid expansion by governments in lands set aside for REDD projects will push and marginalize even further forest dwellers (Vatn et al., 2009; Schalatek, 2009).

The list could go on, but what is worth noting is that secured land tenure in the context of REDD+ cannot be overemphasized and the consequence of it being otherwise is a consequential on gender dimension. In order to identify the potential impacts of REDD projects for smallholders, it is important to see these projects in the context of other on-going large-scale land uses in Tanzania. Africa in general, and Tanzania, can still be characterized as land-abundant despite a high population growth. This means that in many rural areas, labour – in addition to capital - and not land constitutes a limiting factor for agricultural development (Tiffen et al., 1994; Benjaminsen, 2001). However, this situation has started to change in many places as pointed out clearly by Maitima et al. (2009) and Pressure on land is increasing leading to a rising level of land tenure conflicts in parts of rural Africa. In addition, today we see an unprecedented international interest in cheap and available African land. Some of the new land deals that have emerged have by some observers been labeled 'land grabs' (e.g. Zoomers, 2010).

Introducing REDD projects in Tanzania that requires land acquisition necessarily

means to further increase pressure on land and to take more land away from the access of rural smallholders (farmers and pastoralists). Whether this is ethically defensible or not depends on the level of compensation given to the smallholders, which is not the topic of this proposal. Instead we want to map the various types of large-scale land uses and assess the impacts for the smallholders of these land uses in terms of access to land (farm land, pastures and forest resources) in the areas in question. Before introducing REDD or REDD+ project to an area where a particular forest management practices exists it is very important to understand a number of issues including historical land use changes and predict the future, implications of current landuses on community livelihoods and also explore any opportunities and challenges REDD initiative may pose. This paper presents findings on implications of landuse change on community livelihood for communities living around Mgori Forest in Singida region and opportunities as well as challenges REDD+ may present.

## **2.0 Research methodology**

### **2.1 Description of study area**

The study area and Mgori Forest is located in Singida rural District and is managed by five villages which surrounds it. The forest itself is located in the eastern part of Singida town (Figure 1) and it represents an area where woodland is managed in a participatory way by communities living adjacent to the forest. The five villages that surround the forest are; i) Unyampana; ii) Mughunga; iii) Nduamughanga; iv) Dohama and; v) Ngimu (Figure 1).

### **2.2 Collection of secondary and primary data**

Secondary data were collected through review of different similar studies conducted in Tanzania and elsewhere. This also included review of different research reports and other documented materials

available in Singida. A dissertation of a master student was also reviewed. Primary data was collected using a number of approaches namely; i) Stakeholders workshop in Singida town; ii) Discussion with key informants in both Singida and village level; iii) focus group discussions (FGD) with a maximum of 15 selected village community members in five

villages surrounding Mgori Forest and finally; iv) household survey to 10% of the total household sizes each in the 5 village surrounding Mgori Forest. A transect walk was used as a Participatory Rural Assessment (PRA) tool to validate some information generated during FGD and discussion with key informants.

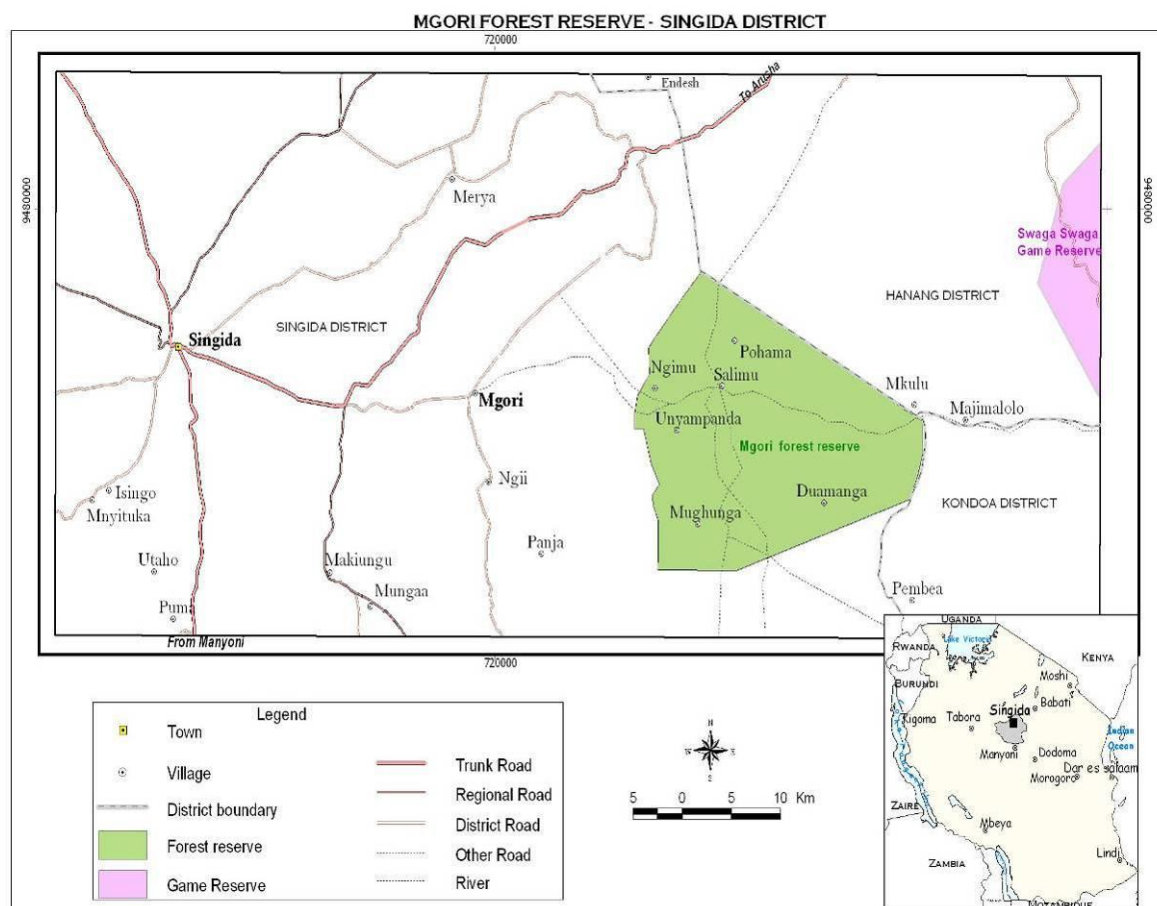


Figure 1. Location of Study Area Showing the Forest

### 2.3 Analysis of historical change

The process of data collection was done based on Landsat images to cover the study area that is Singida districts. Five scenes from different years, 1990, 2000 and 2010 were acquired. The obtained images were used for field verification especially the current images so as to recognize the existing situation. Handheld GPS was used to geo-reference and identify the activities conducted in order to use as guidance information on image classification. After fieldwork, image

interpretation and classification was done and digitization process followed a procedure reported by Muganyizi (2009). Image classification started on district level to detect landcover/use changes and potential areas for REDD for Singida and Mgori area. Images for 1990 & 2010 were then digitized and findings presented.

## 3.0 Results and discussion

### 3.1 Social characteristics

Nduamughanga village comprised six sub villages and with 520 households bring a

total population 2970 people. Unyampana village comprised s four sub villages and has a total population of 1926 living in 377 households. On the other hand Ngimu village comprised seven sub villages of 7,655 people living in 662 households. Pohama village comprised eight sub village and 669 households and a total number of 2776 people. In general all villages have the same size of population with the exception of Ngimu village which is the head quarter of the ward.

Most of the villages in Mgori were established in 1974 as Ujamaa villages as part of the implantation of villagilization program in Tanzania. The indigenous ethnic groups common in most villages are Nyaturu which dominate and others are Sandawe, Mbungu, Mang’ati, Mbulu, Kimbu, Gogo and few Nyiramba. Most villages have three main social economic groups according to their wealth namely as Mghware in Nyaturu (the rich), Bahubahu in Nyatur (the middle) and Mtuki/Mruki in Nyaturu (the poor). On average the proportion of the rich people is around 10%, the middle 50% while the poor 40% similar to proportions reported by Kangalawe et al. (2005) under similar areas. A very strong network exists among the three main wealth groups and this forms a very strong relationship between them similar to that reported by Lema and Majule (2009).

### **3.2 Main socio economic activities**

The main social economic activities in most villages that surround Mgori forest is agriculture (see Table 2). Agriculture is mainly subsistence and depended on rainfall and this is reported to be challenged by several social and environmental factors including lack of productive seeds, attack by pest and diseases, poor and declining soil fertility and frequent drought associated with seasonal climate variability. Major crops grown are only annual including maize, sorghum, milled, cassava and bulrush millet. The second main activity across villages is livestock keeping which provides income and food to community as well as meeting demand of cultural aspects in particular payment of dowry. Most of the livestock kept are local and therefore are subject to several challenges including diseases and pests.

Although all villages surround Mgori Forest one would expect much of the livelihood to be contributed by use of natural products from the forest. This is not the case for the moment as less than 10% is reported in all cases not to be from the forest products. This therefore shows that conservation through CBFM is very effective and this provides opportunities for effective REDD implementation.

**Table 1. Main social economic activities per village (%)**

<b>Economic activities</b>	<b>Nduamughanga</b>	<b>Unyampana</b>	<b>Ngimu</b>	<b>Pohama</b>	<b>Mughunga</b>
Agriculture production	70	65	70	60	68
Livestock keeping	20	20	15	25	20
Small Business	03	05	04	05	04
Crafting	02	-	04	02	02
Beekeeping	02	05	1.5	03	02
Timber	01	03	01	01	02
Charcoal	01	03	01	01	01
Fire wood	01	-	02	02	01
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

### 3.3 Patterns of landuse/cover changes over 30 year (1990-2010)

Different landuse cover types were identified to exist at Mgori Forest and surrounding villages as presented in Figures 2 and 3. Major land cover types identified are also presented in Table 1 are quite similar to those one reported for Tabora region by Majule et al. (2011). Within the context of REDD the area was very much potential in 1990s because

much of the land was covered by miombo which have been reported to store large amount of measure carbon stock and hence mitigate climate change (Munishi *et al.*, 2011). With the observed changes in woodland area (Figure 3) the ability of Mgori to sequential carbon might have been reduced on the expense of deforestation and degradation of miombo woodlands in the area.

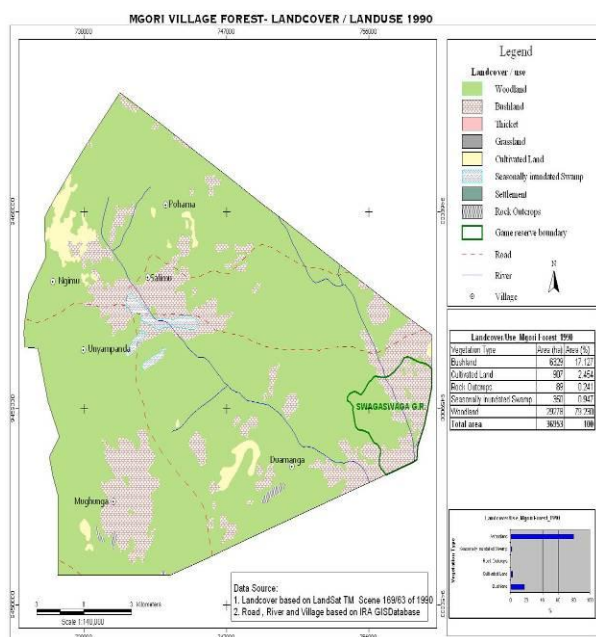


Figure 2. Land cover types in 1990

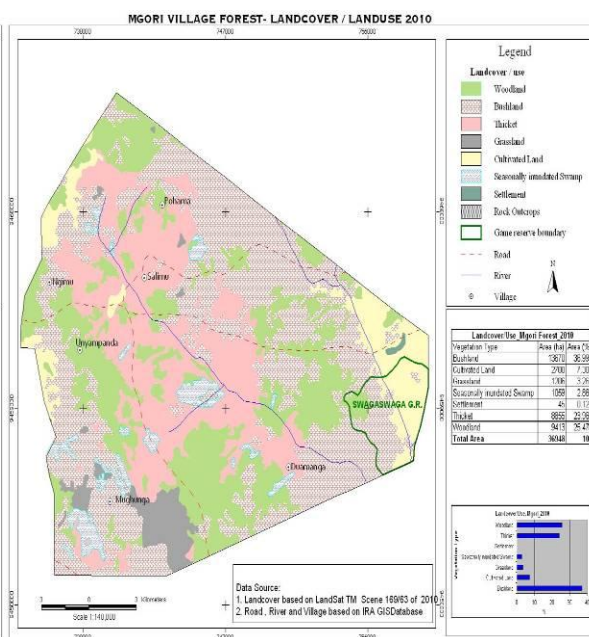


Figure 3. Land cover types in 2010

In Table 2 a significant land use cover change has taken place despite of implementing Community Based Forest Conservation (CBFM) initiatives in the area. For example the area under woodland in 1990 covered 29,905 ha and by 2010 this area covered only 9,399 ha of land indicating degradation and conversion to other landuses. Table 2 also shows that there has been a significant increase in Bushland area (by 23%) and this may indicate that once woodlands are degraded through deforestation and degradation bushland emerges. Similar results have been reported for woodlands in Tabora region (Majule *et al.*, 2011). The observed changes have implications on community livelihoods and ecosystems by affecting a balance between ecosystem service

provision by communities demands as described within the context of ecological gradients (Majule *et al.*, 2008).

In general woodland decreased by 53.8% over the last 30 years indicating that this may compromise with REDD+ initiatives if that tendency will be allowed to continue. Since most of woodlands appear to have been converted to bush land or thickets there are opportunities for reversing the situation once REDD+ is in place and this will not comprise much with agricultural land since a change to agricultural land is not significant. Improving productivity of agricultural land will balance the food demand to allow other benefits from REDD+ as the population grows. Other landuse have

remained almost the same and one should not expect much change under REDD+. However prediction of future land use changes considering all other changes such as population and economic growth in the area.

### 3.4 Implications of REDD+ project on community livelihoods

The community livelihoods of the majority of communities living in villages surrounding Mgori forest depends their livelihoods on agriculture (Table 1). In this

case a significant change in the size agricultural land on the expense of conservation will have a significant impact on farmland sizes and grazing land for livestock production. REDD+ concept in this study is still been seen as a new concept to the communities but if this is explained within a context of CBFM communities in case study area were able to explain and describe different opportunities and challenges that REDD+ may pose on their livelihoods.

**Table 2. Land use/cover between 1990 and 2010 at Mgori Forest**

Years	1990		2010		2010
	Area (ha)	%	Area (ha)	%	
<b>Vegetation Type</b>	<b>Area (ha)</b>	<b>%</b>	<b>Area (ha)</b>	<b>%</b>	<b>% change</b>
Bushland	6305	17.1	13642	40.0	+23.0
Cultivated Land	909	2.5	2678	7.3	+4.8
Grassland	0	0.00000	1207	3.3	+3.3
Rock Outcrops	89	0.2	0	0	0.0
Settlement	0	0.00000	45	0.12	+0.12
Swamp	351	0.95	1059	2.87	+1.92
Thicket	0	0.00000	8873	24.04	+24.0
Woodland	29249	79.3	9399	25.5	-53.8
<b>Total area</b>	<b>36903</b>	<b>100</b>	<b>36903</b>	<b>100</b>	

#### 3.4.1 Opportunities

There are a number of opportunity areas on livelihoods which have been identified by communities living adjacent to Mgori Forest. These are briefly described in sub sections that follow.

##### 3.4.1.1 Increased availability of non timber forest products

REDD+ entails reducing emission from deforestation and forestry degradation as well as conservation of natural resources. When the forest is put under REDD+ communities recognized that different non timber forests vital to their livelihood are going to increase in terms of quantities and qualities. For example honey, traditional fruits and vegetables (mushrooms) are going to increase due to sustainable conservation.

##### 3.4.1.2 Mitigating effects of green house gases

Forests and woodlands are known already by communities for bringing conducive environment such as conserving water and ecosystem integrity. Trees are also known by communities for their ability to fix carbon and hence reduce the emission of GHG. Communities living in villages surrounding Mgori Forest realize that when REDD+ is introduce communities are going to benefit in that way. It is also recognized that through water conservation by trees drought is going to be reduced and this will result into increased crops and livestock production. This observation is in broad agreement with what was observed in privately owned forest in Singida.

### **3.4.1.3 Increased income to the communities**

Through increased wild animals and other natural products as well as increased biodiversity tourist activities will be established and this will attract tourists to visit the area. This together with harvesting and sale of different products will bring income to the communities and local governments. On the other hand because REDD+ will involve carbon trade, the payment accrued by communities will increase their income and this will also increase opportunities for further investment in new areas.

### **3.4.1.4 Conservation of land and forest biodiversity**

REDD+ entails conservation and this means that the Forest will be already under proper land use plan. Land in this case will be avoided from degradation and this will lead to increased number of biodiversity and species richness in the areas. As a result both timber and non timber forest products are going to increase and community needs on natural products are going to be met.

### **3.4.1.5 Improvement of social services**

REDD will bring income to the communities and this will change the life style of communities in the area. Social services to accommodate such changes will be required as more people will be coming to the area. Good roads will be required, health services will improve, water services will also be improved as well as others including banking institutions that would have to be in place.

### **3.4.1.6 Increase employment opportunities and reduced poverty**

Based on the above discussion different employment opportunity will emerge in the area and this together with other benefits mentioned earlier will bring about poverty reduction in the areas.

## **3.4.2 Challenges**

Despite of a number of opportunities REDD+ will bring to the communities leaving adjacent to Mgori Forest there are also some challenges that are likely to emerge. The challenges have also been identified by communities are discussed accordingly.

### **3.4.2.1 Changes in land tenure and land compensation**

Through stakeholders' consultation workshop, discussion with key informants in case study villages many people feels that their land will be grabbed by whoever is going to implement REDD+ project in their land. This is based on experience from other areas where community land has been taken. This is due to the fact that education on the benefit and cost arising from REDD+ are not well known to them. Either communities are not aware on whether they will be compensated their land and the mechanism to be involved.

### **3.4.2.2 Threat to wild animal**

Mgori Forest has a number of animal including elephants, lions, monkey and others which pose threats to both human life and their properties in particular crops. This is an issue of concern to the communities and one control mechanism has been to clear some parts of the forest. Elephants are likely to increase and damage to the field crops is likely going to increase and thus affects field crop leading to hunger. Other damaging animals mentioned to be threats to the community livelihoods include monkeys, wild pigs and birds including *qualea qualea* because their habitat will be improved.

### **3.4.2.3 Limited access to forest products**

Many communities believe that accessibility of different forest products will not be easily accessible to them because of restrictions that may be posed under REDD+. This may not be the case because under REDD+ there is a room for sustainable use of natural resources.

#### **2.4.2.4 Increased poaching activities**

According to stakeholders consultations and FGD conducted to village communities REDD+ will lead to an increase in the number of wild animals to the area. Due to an increase in the number of different wild animals poaching is likely to increase and this will add burden to the local authorities in controlling poaching.

#### **4.0 Conclusions**

Different land use types at Mgori provide opportunities for a wide range of community livelihood activities to take place. However agriculture and livestock production still remains to be major sources of livelihoods to majority of communities surrounding the Forest. Over the last 30 years a significant reduction of woodland area has taken place on the expense of bushland and thickets which have increased in the area. Major reasons for that is probably forest or woodland degradation through a number of processes including fire and selective encroachment. Agricultural expansion does not seem to contribute very much based on the analysis of landuse change over the last 30 years. Mgori forest is potential for REDD+ implementation due the nature of the intact woodlands that still remains as well as existence of strong forest governance involving communities in surrounding villages. More ever, more opportunities pointed out by communities compared to challenges presented signifies implementation of REDD+ project at Mgori.

#### **5.0 Policy recommendations**

Based on the present study the following policy recommendations are put forward;

There is a very strong need to providing education to the communities on the importance of sustainable conservation of natural resource base at Mgori.

There is a need for including Mgori Forest into REDD+ because the area have all

qualities and conditions that suit the project. This should go in hand with capacitating communities on REDD+ issues.

Agriculture being the major source of livelihood to the majority of communities at Mgori, there is a need for strengthening the capacity of communities to manage both crops and livestock production in order to address both food and income insecurities.

Different land cover types identified may present a very high biodiversity value of forest land at Mgori and this requires an economic valuation of land resource in the area to be done.

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