The Likely Mechanism for Implementing REDD Policy in Tanzania

by

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Abstract

Till 2012, establishing new forest is the only eligible practice for forest carbon trading under the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC). Management of natural forest is not credited at present. Reduced Emissions from Deforestation and forest Degradation (REDD) policy, is an alternative mechanism that is still discussed for the post 2012 regime. Under REDD, countries would, on a voluntary basis, aim to reduce the rate at which their forests are being lost, and receive compensation in proportion to the carbon emissions saved compared to a baseline reference scenario which represent the 'without intervention' case. The REDD policy is therefore likely to be undertaken nationally, the country deforestation baseline would be determined by depicting historical land use changes from satellite imagery and typical carbon stock data for different types of forests to calculate the changes in terms of tons of carbon. After developing national level reference scenarios for the entire country, a system of 'nested baselines' i.e. an interlocking set of baselines that covers the whole country and sums to the national baseline is needed. 'Nested baselines' are necessary to operationalize REDD internally for the different geographic regions and to account for different forest regimes e.g. national parks, forest reserves, community forests, and private forests. This system is needed in order to provide incentives to stakeholders who are responsible for reductions in carbon losses within the country. In line with the current forest policy, the government is urged to consider Participatory Forest Management (PFM) as part of their approach under REDD. The established village framework in the Tanzanian Government offers the opportunity for implementing the REDD policy nationally. This can be achieved through developing and implementing land use plan for each village. From the start of the project, monitoring is done to determine the standing stock in both protective forests and productive forests. For a village to be rewarded carbon credits at any accounting time there must be evidence of forest enhancement or reduced deforestation/degradation. Since there are no data on carbon stocks, studies on forest inventories using methodology such as that developed by the Kyoto: Think Global Act Local research project are recommended. Possible strategy for the scaling up of the participatory inventory methodology is to train villagers and their local supporting forest staff to carry-out forest inventories on their own in the entire country.

1.0 Introduction

1.1 Forest extent and management in Tanzania

Out of 34 million hectares of forestland in Tanzania, only 18 million hectares are reserved and the rest, about 16 million hectares, are unprotected forests in general land[1] (URT, 1998; Malimbwi, 2002; URT, 2006). Forests in General Lands are typically 'open access', and subject to deforestation estimated at between 130,000 to 500,000 hectares per annum (URT, 1998, FAO, 2006) as well as degradation (loss of biomass) over much of the total forest area. Reservation of forests is aimed at reversing these trends, but studies revealed a considerable level of human disturbance even inside the reserved forests (Frontier-Tanzania, 2005; Malimbwi et al., 2005; Forestry and Beekeeping Division, 2005). Participatory Forest Management (PFM), on the other hand, has been found to be effective in halting deforestation and reversing degradation in unreserved forests (URT, 2006; Zahabu, 2006; Blomley et al., 2008)

[1] General Land as used here means all public land which is not reserved or village land (URT, 1999) including unoccupied or unused village land.

and is now included as a major element in Tanzania's National Forest Policy and its subsequent Forest Act of 2002 (URT, 2002).

PFM in the country is undertaken in two different styles, namely: Joint Forest Management (JFM) and Community Based Forest Management (CBFM). These take the forms as described by Wily (2001) whereby under JFM, forest ownership remains with the government while local communities are duty bearers and in turn get user rights and access to some forest products and services. On the other hand, with CBFM the local communities are the owners as well as rights holders and duty bearers. Most of the CBFM areas are demarcated as part of village General Land. Thus, they are also called Village Forest Reserves (VFRs). Since the establishment of self-reliant village-based governments in Tanzania in 1974, most of rural Tanzania is currently divided into more than 14,000 villages (MLHS, 2007); each with land area encompassing homesteads, private farms and communal land. Each village is governed through an elected government responsible to oversee executive and legislative issues (including environmental issues) in the village community. Through donor and government support some of the General Lands in these villages are now reserved as VFRs.

According to the Village Land Act (URT, 1999), the village land is divided into: communal village land, not to be available for individual occupation and use; individual and family land, over which land ownership titles may be issued to villagers; and reserved land, land to be set aside for future individual or communal use. The communal land is then agreed by Village Assembly as their common property for uses such as forest, grazing areas, school area, churches and mosques. Village Forest Reserves (VFRs) fall within the village communal land and to avoid confusion, reserved land could have been termed 'spare land' (Wily, 2003). However, to date about 50% of the villages do not have a land use plan in place as is required by the law. This hinders the establishment of VFRs.

The Forest Act (URT, 2002) provides procedures for the creation of VFRs. Under this law, all VFRs in existence at the commencement of the Act were declared to be VFRs. In order to create new VFRs a village council by resolution declares an area of the land to be a village forest reserve and establishes a committee for its management. The committee is known as Village Forest Committee (VFC). If the village council wants to further formalize the creation of the VFR, it submits an application to the Director of Forestry through district government authority. Although the procedures for establishing VFRs are very clear and there is an established supporting institutional structure, at present only 382 VFRs under CBFM with a total area of 2.06 million hectares in 1,102 villages are in place. CBFM and JFM are operational in 1,800 villages out of 14,000 in over 3.6 million hectares (URT, 2006).

Tanzania has 16 million hectares of forestland that is still unmanaged and which can potentially be sustainably utilized and managed under CBFM. It is important also to note that all this potential land for CBFM establishment is in areas of low population density. Villages in urban and peri-urban areas have no potential areas for CBFM establishment. This is also the case with highly populated areas such as some parts of the Lake zone, Kilimanjaro, Iringa, Mbeya and Usambaras. However in the latter areas, there is much more potential for JFM establishment because these have large reserved forests managed by the local and central governments. Of the 14 million hectares of reserved forests under local and central governments, only 1.6 million

hectares are currently under JFM with local communities (URT, 2006). Thus there is much potential area for JFM activities in reserved forests as well as CBFM in unreserved forests.However, this assumes that all the forestland in the country is in close vicinity to villages.

Considering the distribution of population density by regions for Tanzania, in 2002, apart from few densely populated regions of Dar es Salaam, Tanga, Kilimanjaro and Lake Zone regions, and in Zanzibar, the rest have a population density of less than 50 persons per square km. Further, the regions of Lindi, Rukwa, Ruvuma, Singida, Tabora, Manyara, Morogoro, Iringa, Pwani and Arusha where the lowest population densities are found, have large tracks of forestland under protected areas as National Parks or Forest Reserves. Therefore most of the people in these regions are found only in towns and villages. Even in the regions with highest population densities, most of the population is in some localized areas around towns and major productive areas e.g. mountainous areas of Lushoto compared to dry lowland areas of Tanga region. More areas in the country are also inhabited or unihibited due to the influence of the Operation Villagization of 1974 where people were encouraged to settle in villages closer to social services such as schools, roads, dispensaries and water. Therefore, in places where the forestlands are located far away from villages and therefore inaccessible, PFM activities will be difficult to practice. This does not however, imply that forests in these inhabited areas are intact, as studies provide evidence that almost all forests in the country are not pristine. For such remote areas, an alternative management approach different from PFM such as private forestry may be more attractive to both local and foreign investors in forestry.

1.2 Forest carbon trading mechanisms

At present forest carbon trading is only possible through the CDM of the Kyoto Protocol of the UNFCCC. CDM, as adopted in the first commitment period (2008-2012), however, is limited to *afforestation* and *reforestation* projects only. This is despite the fact that deforestation, particularly in the tropics, has been estimated by the IPCC to result in annual emissions of around 8 Gtons CO_2, which represents almost 20% of anthropogenic greenhouse gas emissions (IPCC 2000; Gullison et al., 2007). Deforestation, as defined under the Kyoto Protocol, means permanent change of land use from forest to non-forest and, therefore, involves, and is measured by, a loss in forest area. Forest is defined in terms of canopy cover (10-30% cover), tree height (2-5 m at maturity of the trees) and area (minimum patches 0.1 ha).

Increasing evidence of the contribution of tropical deforestation to global carbon emissions has prompted re-negotiation of climate change policy for the post-2012 period to include REDD. This new policy is currently under discussion by parties to the UNFCCC regarding crediting or otherwise rewarding reductions in carbon emission by reducing rates of deforestation and forest degradation. Under REDD, non-Annex 1 countries would, on a voluntary basis, aim to reduce the rate at which their forests are being lost, and receive compensation in proportion to the carbon emissions saved compared to a baseline which would represent the 'without intervention' case or some other agreed target (Moutinho & Schwartzman, 2005). The policy, unlike CDM, would operate at a national or possibly regional level, so that average reductions in deforestation over very large areas would be assessed, meaning that 'leakage', at least within the area, would be accounted for.

REDD policy negotiations started at CoP 11 in Montreal, Canada in 2005, and continued at CoP 12 in Nairobi in 2006. During the CoP 13 in Bali in 2007 major advances were made, and there was a clear commitment of Parties to deal with this issue in the context of an overall package for a post-2012 regime. A time span of 2 years was set for negotiations which should culminate in agreement on this post-2012 regime at CoP 15 in Copenhagen (December, 2009). It was also agreed to start demonstration activities to support REDD as a climate mitigation measure. The Decision (CoP 13) expressly focuses on reduced emissions from deforestation and degradation. Other possible options mentioned are 'sustainable forest management', 'forest enhancement' and 'conservation'. The Decision also explicitly recognizes that the needs of local and indigenous communities should be addressed when action is taken to reduce emissions from deforestation and degradation.

If all the deforestation and degradation is halted, the potential of REDD policy for Tanzania is estimated at $ 630 million equivalent to $117 per rural household per year (Zahabu, 2008). This is a substantial income given the average cash income for most of the rural households is less than one dollar per day. The REDD project will contribute to the attainment of the Millennium Development Goal (MDGs) and the goals set by the MKUKUTA (URT 2005), Tanzania's National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA in Kiswahili). In 2000, all UN member states agreed to establish policies and strategies to meet eight critical benchmarks for the eradication of extreme poverty by 2015. Goal number seven of the MDGs seeks to ensure environmental sustainability.

2.0 The likely REDD policy operationalization strategy

REDD policy is likely to be undertaken nationally. The country deforestation baseline is the reference scenario against which achievements made by a country can be measured and credited. This would be determined by depicting historical land use changes from satellite imagery and typical carbon stock data for different types of forests to calculate the changes in terms of tons of carbon. After developing national level reference scenarios for the entire country, a system of 'nested baselines' i.e. *an interlocking set of baselines that covers the whole country and sums to the national baseline* is needed. 'Nested baselines' are necessary to operationalize REDD internally for the different geographic regions and to account for different forest regimes e.g. national parks, forest reserves, community forests, and private forests. This system is needed in order to provide incentives to stakeholders who are responsible for reductions in carbon losses within the country. The sum of the 'nested baselines' for deforestation from different eco-regions, and degradation and forest enhancement (forest growth) from different regimes will add up to the national reference scenario.

With 'nested baselines', individual management regimes would then be credited depending on their mitigation levels in the commitment period. The established village framework in the Tanzanian Government offers the opportunity for implementing the REDD policy nationally. This can be achieved through developing and implementing land use plan for each village. From the start of the project, monitoring will be done to determine the standing stock in both protective forests and productive forests. For a village to be rewarded carbon credits at any accounting time there must be

evidence of forest enhancement or reduced deforestation/degradation.

Land use planning for each village which will participate in the REDD pilot project is a key activity. Each village that will participate in the project will undertake a participatory land use planning process. The community will map its land resources and determine to which use each lot of land will be put. Land will be set aside for housing, agriculture, animal grazing, recreation, forest protection, production forest and/or afforestation. The village land use map is the foundation upon which village bylaws for resource exploitation are developed.

Concurrent with the land use planning process auditing of the villages' forest resources will be done. For productive forests, sustainable levels of harvesting should be determined. A practical approach to achieve sustainable harvesting, selective harvesting of trees with minimum dbh is recommended with careful attention paid to avoiding over-harvesting. Division of the forest into annual coupes will be necessary. Each year one annual coupe is selectively harvested thus allowing the remaining small trees to grow. By the time the last annual coupe is harvested the first coupe which was harvested in year one will have matured, ready for harvesting and hence the phenomenon repeats. The number of years passing before an annual coupe is revisited will depend on time required for the harvested annual coupe to re-mature, which will in turn determine the size of the annual coupe. For example, for the production of charcoal from the woodlands, Malimbwi *et al.,* (2005) estimated the rotation period to be eight to 15 years for selective harvesting of trees with minimum dbh of 10 cm. Any additional wood resources to be used for products such as charcoal and timber must come from afforested land.

3.0 Forest carbon assessment and monitoring in individual forest projects

A key aspect of determining the carbon benefit of any forest carbon project is to accurately quantify the levels of carbon changes to known levels of precision. This requires, among other things, reliable data from forest inventories. However, as is the case with most developing countries, Tanzania has no reliable data on forest extent, characteristics, growth and yield because national forest inventory has not been carried out (FAO, 2006; 2007) due to limited capacity in terms of number of staff and finance.

If PFM projects are to be seen as climate projects under REDD, additional transaction costs for measurements, verification and marketing the carbon will be required. These could be costly for the participating communities. In order to minimize the transaction costs, local communities could be trained and equipped to use reliable, valid, easy to implement and cost effective techniques to carry out some of the activities that would be required, particularly as regards mapping the forest and carrying out annual carbon stock measurements.

An alternative forest inventory approach that will ensure sustainable availability of forest data was developed. This is built on the current forest management approach that puts much emphasis on the involvement of local communities in forest management. It is also built on existing (scientific/professional) carbon estimation and monitoring methodology for sink projects (MacDicken 1997; Weyerhaeuser 2000; Intergovernmental Panel on Climate Change (IPCC, 2003). The experiences of participatory use of Geographical Information System (GIS) by local communities (Theocharopoulos *et al.,* 1995; McCall, 2003; Zurayk, 2003) including the use of indigenous knowledge

in the classification of forest types and species identification were also sourced.

A field forest inventory guide on the procedures and techniques for assessing and measuring forest carbon by local communities was developed and tested for this purpose. Experimentation with this guide formed part of the 'Kyoto: Think Global Act Local' (K:TGAL) research project, involving local NGOs and research institutes in Mali, Senegal, Guinea Bissau, Papua New Guinea, Tanzania, Nepal and Uttranchal (India).

For Tanzania, despite some difficulties encountered during the training such as modifications needed for the user manuals and the need to limit the amount of data to be logged into the computer in the field, the villagers were able to perform most of the important steps. The local communities were also able to retrieve and take plot measurements of the same trees in the following years. Local peoples' knowledge was very useful in identifying trees and different places in the forest. The role of the staff of the local supporting organizations was crucial as regards provision of technical assistance.

However, it was not possible for these actors to tackle measurements of non-tree carbon pools as facilities were not available. Also the capacity for data analysis was lacking in the first instance and a special tool for this was developed by the researcher. This tool was used by the staff of the supporting organizations and facilitated immediate sharing of the results with the villagers. It was also found that, it costs much more to hire professionals for carbon assessments than to employ the local people, even when costs of training and supervision in the early years, and the costs of the equipment are included. In the long run, the trained villagers can work on their own at an average cost of $ 2 per ha, which includes the costs of assistance of the staff from the local supporting organization. The testing in other countries involved in K:TGAL indicates that the field forest inventory guide also worked very well. As was the case with Tanzania, the field teams in the other countries made modifications depending on local conditions such as forest density.

Carbon stock data on different forest types that are needed for baseline determination are lacking in most countries because forest inventories are not carried out systematically or comprehensively. Continuous forest stock monitoring in permanent sample plots covering all vegetation types is therefore imperative and should be pursued with vigour from now on. This will generate not only mean annual increment rates needed for estimating deforestation rate and forest enhancement but also for the determination of the rate of biomass loss for the construction of degradation baselines. Since forest inventories are costly and there is not enough forest staff, national programmes based on the methodology such as that developed by the K:TGAL study for forest assessment and monitoring by local communities is recommended.

4.0 Strategy for scaling up of the participatory approach for forest carbon assessment

The methodology has two components: these are training and actual field data collection. Training involves the training of trainers that are field foresters working under districts or local supporting organization. In each of the 114 districts 2 foresters will be trained to make a total of 228 trained foresters country wide. The duration of the training will be about 2 weeks. These foresters will then train groups of villagers (at least 6 for each village forest) on the field methodology. Thereafter they will depart to their districts

(regions) and train villagers (6 villagers in each village) managing their PFM forests. After this, the actual field work in each village will begin prior to agreement with K:TGAL based at SUA on its proper planning. For the first two years the foresters will be actually working with the trained villagers in the field and the SUA researchers will be observing to see whether they get it right. Constant supervision in all sites will also be done by K:TGAL. After that, the villagers should be able to roll out the field work with supervision from the foresters. This arrangement has been proved to be reliable and cost effective.

The country will be divided into 8 zones as shown in Table 1. Training will be done separately in each zone but the possibility of combining some zones in one training will be considered. In each district, 10 villages will be selected to participate in the pilot project, therefore about 1,140 villages will be covered. With an average of about 1,000 ha of forestland in each village, the total forest area to be covered under the project will be over 1 million ha.

Table 1. Different zones of Tanzania for the training of foresters

Zone	Regions
1. Lake zone	Mara, Mwanza, Kagera & Shinyanga
2. Western	Kigoma, Rukwa & Tabora
3. Central	Singida, Manyara & Dodoma
4. Northern	Kilimanjaro, Arusha & Tanga
5. Eastern	Morogoro, Pwani & Dar es Salaam
6. Southern highlands	Iringa, Mbeya & Ruvuma
7. South	Lindi & Mtwara
8. Zanzibar	Zanzibar

Apart from selecting villages with the aim to cover different vegetation types, other criteria for the selection of participating villages will include villages with one or some of the following prioritized characteristics:

- previous forest carbon stocks data;
- PFM already in place;
- land use plan in place;
- threats of deforestation; and
- threats of degradation.

With these different village characteristics, different activities necessary in the implementation of the pilot REDD project will be required. It is known that villages are at different stages for qualifying into REDD programme. For example some 1,800 villages have PFM already in place and 4 villages have carbon stocks data. Others have land use plans without PFM or carbon data while others are threatened by deforestation and degradation but have neither PFM nor land use plans in place. A typical REDD pilot project village is expected to have: a land use plan, PFM forest, and forest carbon data for both protective and productive forests. Each participating village will be selected based on the set criteria and the missing characteristics will be addressed.

5. Verification of the measurements by the villagers

Before the transactions of carbon credits, verification of the measurements is necessary. After verification, communities' carbon will be purchased by the government REDD scheme. Verification is done by an independent party and establishes that the carbon measurements are reliable and accurate. It is necessary also to avoid fraud at the local level and to ensure that the country does not claim international carbon credits which it has not in fact realized. The independent party would have to be a licensed and registered agent, in the same sense as a chartered accountant, but would not necessarily have to be external to the country.

Ideally the verifier will undertake ground spot measurements to check the accuracy of the field measurements by the villagers.

Alternatively, the use of Airborne LiDAR technology can be employed. Airborne LiDAR, i.e., LiDAR instruments operated from aircrafts, is a rapidly evolving remote sensing technology with great potential for very precise estimation of biomass and carbon stocks of trees and forest ecosystems over large areas.

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