

STATUS OF REDD READINESS IN TANZANIA

R. Otsyina, F. Kilahama, G. Kamwenda G. and A. Nashanda.
Meeting of the East and Southern Africa Katoomba Group.
White Sands Hotel, Dar es Salaam
September 16-17, 2008.

1.0 Background.

Despite the importance of avoiding deforestation and associated emissions, developing countries have had few economic or policy incentives to reduce emissions from land-use change (Santili et al 2005). Moreover, avoided deforestation projects were excluded from the 2008–2012 first commitment period of the Kyoto Protocol because of concerns about diluting fossil fuel reductions, sovereignty and methods to measure emissions reductions (Zahabu 2008, Gullison et al 2007). More recently the importance of including emissions reductions from tropical deforestation in future climate change policy has grown significantly. The United Nations Framework Convention on Climate Change (UNFCCC) recently agreed to study and consider a new initiative, led by forest-rich developing countries, that calls for economic incentives to help facilitate reductions in emissions from deforestation in developing countries (REDD).

The REDD concept is—at its core—a proposal to provide financial incentives to help developing countries voluntarily reduce national deforestation rates and associated carbon emissions below a baseline (based either on a historical reference case or future projection). Countries that demonstrate emissions reductions may be able to sell those carbon credits on the international carbon market or elsewhere. These emissions reductions could simultaneously combat climate change, conserve biodiversity and protect other ecosystem goods and services.

Political acceptance and implementation of climate policies aimed at reducing carbon emissions from deforestation will require resolution of policy, institutional, social, methodological, capacity and scientific challenges. Foremost among these challenges is identifying feasible approaches to assess national-level carbon emissions from deforestation and degradation. For Tanzania to participate fully and benefit from the REDD carbon trade, it needs to make adequate preparations by putting in place policies, strategies and mechanisms which would facilitate involvement of communities, the private sector and the government in establishment, management and benefit sharing.

This paper presents opportunities and challenges for effective implementation of a REDD programme and the status of REDD readiness in Tanzania.

2.0 The Tanzania Forest Resource Base

Tanzania has about 33.5 million hectares of forests and woodlands that constitute 38% of the total land area in the mainland. About 13 million hectares of the forests have been gazetted as forest reserves including 83,000 hectares of industrial plantations and 1.6 million hectares of strategic forests such as water catchment and mangroves owned and managed by the central and local governments through the Forest and Beekeeping Division (FBD) in the Ministry of Natural Resources and Tourism (MNRT). Forests on general lands and which are classified under the Forest Policy, Land and Village Acts cover 19 million ha (Table 1).

The forests distribution by type, use and legal status is summarised in table 1 below.

Private and community forestry involves farm forestry, natural forest on leasehold lands and traditional forest areas/trees.

Table.1 Forest Distribution by Type, Use and Legal Status

Forest type	1 000 ha
Forests (other than mangrove forests)	1,141
Mangrove forests	115
Woodlands	32,299
Total	33,555
Use of forest land	
Production forest area	23,810
Protection forest area (mostly catchment areas)	9,745
Total	33,555
Legal status	
Forest reserves	12,517
Forest/woodlands within national parks, etc.	2,000
Non-reserved forest land	19,038
Total	33,555

Sources: FAO (2002) Forest Resources Assessment for Tropical Countries & FBD statistics

Forests on general lands are ‘open access’ characterized by insecure land tenure, shifting cultivation, annual wild fires, harvesting for wood fuel, poles and timber, and heavy pressure for conversion to other competing land uses, such as agriculture, livestock grazing, settlements and industrial development.

The area under private and community forestry is estimated to be 70,000-150,000 ha including community woodlots which are mainly small ranging from 0.25 to 1000 hectares. Big private companies generally own the larger plantations.

2.1 Economic and social benefits of forest

Forests are important in Tanzania due to the numerous goods and services they offer, both in the national economy and to the society. These include wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs. They also provide a range of unique natural ecosystems, biological diversity and genetic resources. Forests are as well an important economic base for development in terms of providing revenue from various direct value products and services such as timber and non-timber products, export earnings and tourism. In terms of linkage and support to other sectors, forest functions in stabilizing stream flows and therefore reduces disasters such as landslides, erosion and floods in areas of steep topography and high precipitation. Forests also have an important function in the supply of irrigation water for lowland farming and fish production. Furthermore, due to increasing water shortages, public expectations on the role of forests have widened to include provision of stable supply of good quality water. Biological product demands has increased the need for forests and conservation of biological diversity. The forestry sector is one of the key sectors contributing to the achievements of the national development objectives, and currently contributes about 3% to the Gross Domestic Product (GDP) in Tanzania.

2.2 Deforestation and Degradation.

According to a recent FAO Global Forest Resource Assessments the global forest loss is estimated to be about 11 million hectares annually, amounting to a net loss of 7.3 million hectares per year for the period 2000–2005. The highest rates of deforestation occurred in South America, with 4.3 million hectares per year, followed by Africa with 4 million hectares per year. Forest degradation is caused by human activities that change the structure, composition and integrity of forest ecosystems and can have a serious and negative impact on the utilization and social role of forests. The pace of desertification in some arid and semi-arid regions is a serious threat to societies and to sustainable use of forest resources . Wood fuel accounts for approximately 15 per cent of primary energy supply in developing countries and up to 80 per cent in some countries in sub-Saharan Africa and Asia. Rising fuel prices, growing energy demand, domestic energy security and concerns over global warming caused by greenhouse-gas emissions from fossil fuels have led to the promotion of bio-energy development in general, and bio-fuels in particular.

Deforestation in Tanzania is estimated at a rate of 91,200 ha per annum, which is a result of heavy pressure from agricultural expansion, livestock grazing, wild fires, over-exploitation and unsustainable utilization of wood resources and other human activities mainly in the general lands (FAO 2007). The creation of Forest Reserves is aimed at reversing this trend, but studies revealed a considerable level of human disturbances even inside so called protected forests, including encroachment on forest areas, expansion of agriculture, illegal mining, pit sawing, illegal harvesting for building materials, firewood collection and harvesting for medicinal components.

Deforestation is by far the largest source of emissions from developing countries, contributing an amount greater than total US fossil fuel emissions. Despite the significance of emissions from deforestation and forest degradation, trading carbon credits generated from avoided deforestation and degradation is currently not eligible under the Kyoto Protocol.

Although completely stopping deforestation is not possible, Tanzanian forestry policy has been relatively successful in reducing rates of forest loss through its emphasis on the involvement of local communities in forest management. Establishment of village forest reserves was found to retard deforestation in unreserved forestland. This policy was enacted with a view to maintaining sustainable forests, rather than to reduce carbon emissions. Nevertheless it results in reduced carbon emissions as a secondary benefit. However, only 11% of the country's forests are under this type of management at present. There is considerable evidence that Community Forestry Management (CFM) is effective at reducing rates of degradation and at increasing the carbon stocks in the forest through improved management and reduced off-take of different forest products. REDD policy can be used to promote CFM on a wide scale, and to bring the maximum benefit to the communities involved. It is therefore very important that the carbon saved by reducing degradation and deforestation rates and the carbon storage increases that result from this management are both rewarded.

Policy and Institutional Framework.

The current national macro policies such as the National Strategy for Growth and Poverty Reduction (MUKUKUTA) and the Vision 2025 advocate for poverty reduction and improved livelihoods for all Tanzanians. National Forest policy (1998) and National Forest Programme (NFP 2002) as well as other cross-sector policies provide a favourable environment for REDD. Other policies and programmes in place at the national, and sub national level include the Beekeeping Policy 1998, Land Policy 1999 and the village lands Act 2002, Environmental Policy 1997, National Land use plan,

Poverty and Business formalization Programme (MUKURABITA). Specific objectives of the policy include;

- Ensured sustainable supply of forest products and services by maintaining sufficient forest area under effective management;
- Increased employment and foreign exchange earnings through sustainable forest-based industrial development and trade;
- Ensured ecosystem stability through conservation of forest biodiversity, water catchments and soil fertility; and
- Enhanced national capacity to manage and develop the forest sector in collaboration with other stakeholders

The National Forest Programme (NFP) provides the framework for implementation of the forest policy at national and local levels.

Key challenges in forest sector governance include:

- Inadequate technical capacity,
- Weak law enforcement especially at local levels,
- Undefined ownership of large areas of forest lands and general lands,
- Inadequate capacity to enforce laws,
- Inadequate technical capacity for forest assessments and data management
- Inadequate financing of the forest sector and
- Inadequate human resources at district and ministry levels.

3.0 TOWARDS TANZANIA REDD READINESS

3.1 What is REDD?

At present forest carbon trading is only possible through the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC). The option of reducing rates of carbon emissions by improved forest management and by avoided deforestation is not eligible. This evidence of the contribution of tropical deforestation to global carbon emissions has prompted re-negotiation of climate change policy for post 2012 to include Reduced Emissions from Deforestation and forest Degradation (REDD). REDD policy entails the idea that a developing country which is experiencing deforestation (loss of area of forest e.g. through conversion to agriculture or through logging) may, on a voluntary basis, receive compensation if it reduces its national deforestation rate, in proportion to the amount of carbon emissions that are reduced.

3.2 Requirements for REDD Readiness

For effective implementation of a national REDD programme, a number of issues need to be addressed. These include a favourable policy environment which favours implementation of REDD programmes and encourages poor people to participate effectively; a conducive institutional setup for decision making, uninterrupted information flow; adequate physical and human capacity at all levels to effectively assess carbon in all pools and measure changes and leakages; a clear and transparent incentive sharing mechanisms put in place; and a financial management system established for flawless funds flow to beneficiaries and stakeholders. Some key questions we need to answer include:

- Is the policy environment conducive for REDD implementation?

- What rates of degradation and carbon loss are typically occurring in natural and unmanaged forests?
- How are forests managed and used by the communities under PFM schemes and how much carbon is saved as a result?
- Is there leakage to other areas? How much?
- What is the opportunity cost of this management?
- How could the carbon stock changes be measured and monitored in a cost effective manner?
- What institutional mechanisms need to be put in place to ensure effective payment of incentives?
- Do we have a REDD strategy in place?
- What would the strategy address?
- Do we have adequate capacity to successfully implement a REDD programme? If not what is missing?
- What methodologies are we going to use to develop baseline scenarios and monitor emissions
- How will incentives be certified? Do we have the capacity in-house

3.3 Current status of preparedness.

In relation to the requirements above, Tanzania has initiated the process of REDD preparedness. On-going initiatives and activities as well as plans for establishment of a functional REDD programme in Tanzania are discussed below.

1. Awareness on REDD created.

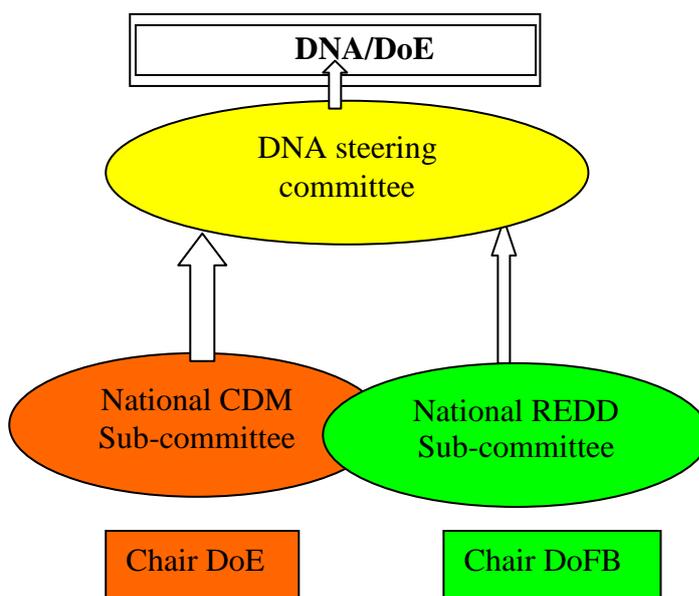
REDD is a new concept and many people at national (ministry) as well as local (district and village) levels are still not familiar what it means and what it can do. In order to initially create awareness at the ministry level, a carbon task force has been formed and a concept note on REDD has been prepared. The key recommendations of the task force was to develop a REDD strategy which links to the current National Forest Programme. Awareness on REDD is also being created at various fora at national and district levels.

2. Institutional framework for REDD implementation

Tanzania has a well defined institutional framework at the national and local levels, through the local government reform process, for implementation of forest and other natural resources programmes (NFP 2002). At the national level, The Vice President's Office (VPO), Department of Environment (DoE) is responsible for coordination and harmonisation of all environmental issues and carbon. The DoE is also the Designated National Authority (DNA) for implementation of the Kyoto Protocol. The DNA is made up of representatives from all sector ministries, NGOs and the private sector. The structure of the DNA is presented in **figure 1** below. The role of the DNA is to approve and certify Clean Development Mechanism (CDM) projects for payment. The DNA Steering Committee is supported by a CDM technical committee whose function is to provide technical guidance.

For the REDD programme, due to its foreseen magnitude and involvement of various stakeholders, an institutional structure and mechanism which will allow transparency, efficient response to issues and challenges at all levels, effective technical support and swift decision making is required. This will require close collaboration between the FBD as overall coordinator at the national level and the FBD who are the main custodians of the forest resources. The FBD would facilitate all technical implementation of the REDD programme through the established institutional framework of the Tanzania Forest Programme (NFP 2002). To address specific REDD related issues effectively, a REDD technical sub committee is proposed. This sub-committee will be responsible for facilitation and coordination of all technical implementation issues at all levels. It will advise the DNA Steering committee.

Figure 1. Proposed National Carbon Coordination Structure



3. Participatory Forest Management Experiences.

The forest policy of 1998 provided opportunities for communities and the private sector to actively engage in forest conservation and management. Two approaches for integrating communities into forest management were introduced, the Joint Forest Management (JFM) and Community Based forest Management (CBFM). Several government and non governmental organizations have been involved in empowering communities to conserve and manage community and private forests.

Currently, about 11 - 13% of forests on general lands are being managed through PFM approaches. The following key lessons and experiences have been learnt;

- communities are able and willing to conserve and manage forest and other natural resources if they own the resources or are given the responsibility to do so.
- democratic procedures are common in most of the local communities to ensure that management of the forest, and distribution of the products, is carried out in a transparent manner. Village-level organizations in many cases have demonstrated themselves to be strong enough to enforce sets of forest by-laws and to ensure that the forest is guarded against fire and against intruders.
- Participatory Forest Management (PFM) programmes which involve local communities provide valuable opportunities for REDD.

4. Forest monitoring and implementation:

Forest Cover and Land use change are currently monitored by the Forestry and Beekeeping Division, through Forest Inventories, Forest Assessments and ground truthing. A National Forest Database (NAFOBEDA) has been established, however it is limited by non detection of forest degradation. A National Forest Resource Assessment and Monitoring (NAFORMA) an initiative between the FAO and FBD is about to be initiated in 2008. This will provide the tools to monitor REDD strategy and programme implementation at national and community levels. It is envisaged that REDD activities will be monitored through the National Forest Database (NAFOBEDA), National Forest Resource Assessment and Monitoring (NAFORMA), Communities and district level monitoring systems, Private sector entities and remote sensing.

5. Case Studies and Lessons Learnt.

In response to the challenges of empowering communities to measure and monitor forest resources for carbon, The Think Global Act Local projects provide valuable lessons (Daniel Murdiyarso and Margret Skutsch 2006). The project was implemented in several countries in Africa and Asia including the Dhali Village in India, the Tomboroconto Forest in Senegal, the Ikalahan Ancestral Domain in the Phillipines, the Laguna Lake basin and Sierra Community Forests in the Philippines, Sidrap Community reforestation in Indonesia, the Handei forest reserve in Tanga, and the Kitulangalo Forest all in Tanzania present valuable lessons for the Tanzania REDD programme.

These case studies are based on empowering communities to manage and conserve forest resources for various economic and material benefits. Essentially, communities already engaged in local forest management (PFM) have been trained in the use of a small, hand-held computer with global positioning and geographic information systems equipment, which enables them to accurately map the boundaries and the strata in the forest—a prerequisite if carbon savings are to be verifiable. Further they have been trained in standard forest inventory methods, using fixed sample plots, and in entering this data into a tailor-made database on the computer. Local NGOs helped in the training of the communities to ensure that carbon measurements meet rigorous scientific standards.

Through the *Beyond Kyoto* project, methodology for measuring carbon storage in community forests (based on trees but not on soil storage and loss rates) has been developed. Community-based monitoring systems which reduce transaction and management costs have also been developed and piloted in a number of community forests on an experimental basis.

The following lessons have been learnt from various REDD case studies.

- It appears that degradation is the main process by which forest carbon was lost on community lands. Losses through deforestation are minimal.
- Small-scale, low-key forest management activities by local communities may be an effective way of reducing rates of degradation and increasing the rate at which natural forest is able to sequester carbon.
- The local communities are easily capable of mitigating carbon in a variety of ways through better management of existing forest, provided that they will benefit financially through the sale of the resulting carbon credits. Thus Participatory Forest Management (PFM) programmes which involve local communities provide valuable opportunities for REDD.
- Simple analysis indicated tree-based agricultural or agroforestry systems (many of which involve fruit trees or other multiple-benefit species) may in the long run be more profitable than the subsistence crop agriculture now being carried out. In such cases, start-up money would be needed for farmers to make the shift. Up-front payments for the carbon credits to be generated may provide just the stimulus farmers need to make this change.
- The case studies, under the *Kyoto: Think Global, Act Local* project have piloted a field methodology in which villagers with low levels of education (4–7 years of primary school) use hand-held computers to map the forest areas and store data gathered by standard forest inventory methods. This shows that local people are well able to make such measurements themselves.
- Remote sensing technologies, though useful for assessing changes in forest area, cannot yet easily pick up degradation (loss of biomass under the canopy). Thus accurate, ground-level measurements are required, both in construction of the baseline and in later monitoring of stock changes. Involvement of the communities in these measurements is important.
- For monitoring growth rates after the project starts, trained local people in the communities, may be able to provide accurate data at a much lower costs.

- There are democratic procedures in place within most of the local communities to ensure that management of the forest, and distribution of the products, is carried out in a transparent manner. Village-level organizations in many cases have demonstrated themselves to be strong enough to enforce sets of forest by-laws and to ensure that the forest is guarded against fire and intruders.
- It is very important and appropriate to involve local institutions which have the support and confidence of local people. The local institution will have to oversee the distribution of these rewards, and as such it needs to have the trust of the participants.
- It is important that a national system of Payments for Environmental Services (PES) is in place. Within this payment system, each project should be able to clearly measure its own contribution, so that it can claim its fair share of the rewards.

6. Capacity Development

Human and physical capacities for assessments of carbon, development of carbon projects, monitoring and evaluation of carbon increments as well as leakages, certification and reporting has been identified as a major limitation to REDD implementation at national and local community levels. At present, human capacity for detailed forest resource assessments is limited to the Universities such as SUA and the Institute of Resource Assessment at the University of Dar es Salaam. Very little capacity is currently available in the Ministry of Natural Resources and Tourism (MNRT) and related ministries due to low numbers of qualified staff in areas specific to forest assessments such as GIS, satellite image analysis, remote sensing, forest inventories, mapping and database development and management. The situation is much worse in the Districts and local community levels.

Physical capacity in terms of infrastructure, databases, maps, computers, data loggers, precision GPS equipment, and weather monitoring equipment necessary for forest cover assessments and monitoring is also limited.

REDD programmes are envisaged to be implemented and coordinated at National (ministry), District and local community levels, thus human and physical capacities will need to be built at all these levels. Identified human and physical capacity requirements at various levels are discussed below:

National Level

- Training of ministry staff in forest inventories and assessments including the use of GIS, satellite image analysis, remote sensing, forest inventories, mapping and database development and management. This training could be done through short and long courses conducted at the national universities (SUA) and external universities.
- Training and capacity development in collection and assessment of social and development information.
- Support for the development of physical infrastructure in the form of computers, data loggers, precision GPS equipment, databases, aerial and topographical maps and weather monitoring equipment.

District level

- Training of Local government foresters and planners in the use of simple techniques for forest and natural resources inventories and assessments, the use of GPS and other inventory tools, data entry techniques, database management.
- Training in participatory forest and natural resources management techniques.
- Training and capacity development in collection and assessment of social and development information
- Support the districts with physical infrastructure in the form of computers, data loggers,

precision GPS equipment, databases and weather monitoring equipment with training to effectively use them.

Community Level

- Training of selected community members in the use of simple techniques for forest and natural resources inventories and assessments, the use of GPS and other inventory tools, data recording, monitoring and evaluation of resources and developments at the community level.
- Training and capacity development of communities in collection and assessment of social and development information such as population changes, recording of events likely to influence the natural resources such as fires, encroachments etc.
- Development of skills in group organisation, facilitation, bookkeeping and simple accounting as well as leadership and governance skills.
- Training in participatory forest and natural resources management techniques.
- Support the districts with physical infrastructure in the form of computers, data loggers, precision GPS equipment, databases and weather monitoring equipment and train them to effectively use them.

The training at the community levels will be conducted by NGOs, private companies as well as officials from the Division of Forest and Beekeeping (FBD) through seminars, workshops and short training sessions.

5.0 STEPS TOWARDS ESTABLISHMENT OF A NATIONAL REDD STRATEGY

In order to establish a REDD programme which cuts across different ministries and sectors which have a stake in the management and use of forest resources, a comprehensive national strategy for REDD, is required. The following activities have been initiated and at various levels in preparation of the strategy.

a) Development of the Forest Carbon Partnership Facility (FCPF) Readiness Plan Idea Note (R-PIN).

A readiness idea note has been prepared by the Ministry of Natural Resources and Tourism as an input into the possible participation of Tanzania in the FCPF.

b) Common understanding of REDD: At present the REDD concept is not very well known to many people. This requires extensive consultations among stakeholders, especially at the national level to identify roles and responsibilities and to agree on fundamental principles of REDD. A consultation roundtable involving key stakeholders is planned.

c) Identification of areas of implementation: Tanzania has vast and diversified forests with many possibilities. For effective implementation of REDD, there is a need for prioritisation of entry points. The participatory forest management (PFM) approach provides a good entry point since communities are already involved in managing village forests. Degradation hotspots will be identified for initial demonstrations.

d) Identification and analysis of potential stakeholders: The process of identification and analysis of potential stakeholders to be involved in decision making, coordination, training, certification, implementation and reporting of REDD activities as well as beneficiaries has been initiated. These include Government institutions, Local Authorities, Universities (SUA & UDSM), research institutions (TAFORI), International and local NGOs and private development companies involved in forest related activities.

e) Development of the REDD Strategy.

For a coordinated implementation of REDD programmes, a strategy is required to provide a common framework for effective implementation. It is suggested that the MNRT will take the lead in the implementation of the strategy development process in close consultation with the DoE. The strategy would address policies, strategies and mechanisms which could facilitate involvement of communities, the private sector and the government in the establishment, management and benefit sharing.

It will, among others, address the following issues;

- Institutional Set-up and Co-ordination of REDD issues at national and local levels
- Financing mechanisms and sharing of incentives.
- Strategies and modalities for promotion and awareness creation on REDD
- Modalities for REDD information development and dissemination
- Methodologies development and tools for baseline, monitoring and certification
- Assessment of markets for carbon and other forest products
- Facilitation of communities for effective Participatory Forest Resources Management
- Modalities for increased private sector and community participation in forest management
- Strengthening Extension Services and Awareness Creation in Forest Management
- Training and human resources capacity building in all aspects of project development, management and certification.
- Forest law compliance and good governance
- Improving livelihoods through sustainable forest management and REDD
- Mechanisms to ensure intersectoral coordination and complementarity
- Forestry Research and technology development
- Planning, monitoring and evaluation at community and national levels
- Data base management and information sharing
- Certification mechanisms and procedures

A roadmap towards the preparation of the country REDD strategy has been developed and is presented in Table 2 below.

Table 2. REDD strategy development road map.

WHAT NEEDS TO BE DONE (Activity)	DETAILS	WHEN	WHO	HOW	EXPECTED OUTPUTS
1. To conduct round table meeting of development partners	Discuss REDD readiness and implementation modalities	August 2008	DPGE/NORAD	Round Table	Common Position on REDD financing
2. To conduct Stakeholders Analysis	Identify REDD stakeholders and their interests	Early September 2008	Consultant	Consultancy	List of stakeholders and their interests
3. To conduct National stakeholders Consultative meeting	Inform stakeholders on REDD and readiness including views on strategy development	Mid - September	Consultant	Meeting	Awareness on REDD raised Stakeholders' views on strategy development documents To identify issues for REDD strategy development
4. Carry out studies on emerging issues	Preparation of terms of reference for studies Analysis of the scope and potential influence of the issues on REDD. Site visits/study tours	End September End September	Task Force/DoFB Consultant Consultants	Consultancy	ToR for studies developed Study reports produced
5. To develop REDD strategy	Preparation of terms of reference for REDD strategy	Mid October 2008	Task Force/DoFB Consultant	Meeting	ToR for REDD strategy developed Draft strategy
6. Conduct stakeholders workshop	Presentation of the draft strategy for soliciting inputs	End November 2008	Task Force/ Consultant	Workshop	Stakeholders inputs
7. To finalize the REDD strategy	Incorporation of stakeholders' comments	Mid December 2008 (before	Task Force/DoFB Consultant	Meeting	Final REDD strategy in place

WHAT NEEDS TO BE DONE (Activity)	DETAILS	WHEN	WHO	HOW	EXPECTED OUTPUTS
		Christmas)			
8. To submit the final draft REDD strategy to FBD	Review of REDD final strategy by FBD technical committee and approval by DFoB	Mid January 2009	DFoB		Approved REDD Strategy in place
9. To establish REDD demonstration/Pilot projects	Establishment of REDD demonstration projects for learning and gaining experiences (<i>but this should not be in forest reserves managed by the central government</i>)	Starting from September 2008 and later continuous	Task Force/DoFB Consultant	Community consultation and setting the projects and facilities	Demonstration projects in place

f) Establishment of pilot REDD Demonstrations

Strategic REDD demonstrations or pilots in specific areas are being planned. These demonstrations would cover the major ecological zones (miombo, coastal forests mangroves, alpine forests, etc) and major forest ownership and management situations. These demonstrations will provide learning opportunities to develop resources assessment methodologies, monitoring and assessment of carbon and leakages, incentive sharing mechanisms, social data collection and analysis as well as issues likely to influence implementation of REDD.

Conclusions

The vast forest resources, the high rates of deforestation and degradation, especially on general lands, and the institutionalisation of PFM initiatives, provide good opportunities for REDD in Tanzania. The REDD readiness process has been initiated and a roadmap towards the development of a national REDD strategy has been prepared. The process is being supported by the Government through the DOE and MNRT and development partners such as the Royal Norwegian Embassy, the WB and FAO.

REFERENCES

FAO (Food and Agricultural Organization of the United Nations) 2000 Global forest resources assessment 2000 FAO Forestry paper 140 479

FAO (Food and Agricultural Organization of the United Nations) 2005 FAO Statistical database 2005 available at <http://faostat.fao.org/> (accessed 2005-09-06)

Holly K Gibbs, Sandra Brown, John O Niles and Jonathan A Foley 2007. Monitoring and estimating tropical forest carbon stocks: making REDD a reality. Center for Sustainability and the Global Environment (SAGE), Nelson Institute for Environmental Studies, University of Wisconsin, 1710 University Avenue, Madison, WI 53726, USA

Gullison R E *et al* 2007 Tropical forests and climate policy *Science* **316** 985–6

Houghton R A 2005 Tropical deforestation as a source of greenhouse gas emissions *Tropical Deforestation and Climate Change* ed Mutinho and Schwartzman (Belem: IPAM)

Houghton R A and Hackler J L 1995 Continental scale estimates of biotic carbon flux from land cover change: 1850–1980 ORNL/CDIAC-79, NDP-050

MacDicken K 1997 *A Guide to Monitoring Carbon Storage in Forestry and Agroforestry Projects* (Arlington, VA: Winrock International)

Means J E, Acker S A, Harding D J, Blair J B, Lefsky M A, Cohen W B, Harmon M E and McKee W A 1998 Use of large-footprint scanning airborne lidar to estimate forest stand characteristics in the western cascades of Oregon *Remote Sens. Environ.* **67** 298–308

Mette T, Papathanassiou K P, Hajnsek I and Zimmerman R Forest biomass estimation using polarimetric SAR interferometry, 2003 *Proc. POLnSAR* (Italy: Frascati).

Murdiyarto, D. and Herawati, H. 2005 Carbon forestry: who will benefit? Proceedings of a Workshop on Carbon Sequestration and Sustainable Livelihoods. CIFOR, Bogor, Indonesia.

Patenaude G *et al* 2004 Quantifying forest above ground carbon content using lidar remote sensing *Remote Sens. Environ.* **93** 368–80

Penman J *et al* Good practice guidance for land use, land-use change and forestry, 2003 *IPCC National Greenhouse Gas Inventories Programme and Institute for Global Environmental Strategies, Kanagawa, Japan* available at: <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.htm>

Santilli M, Mouthino P, Schwartzman S, Nepstad D, Curran L and Nobre C 2005 Tropical deforestation and the Kyoto protocol *Clim. Change* **71** 267–76

Eliakimu Zahabu and George Jambiya (2007). Community based forest management and carbon payments: Real possibilities for poverty reduction? The ARC Journal. No. 21. pp 25-27

URT (1999): The Tanzania Development Vision 2025. The Planning Commission, Dar es Salaam.

URT (1998). The National Forest Policy, Ministry of Natural Resources and Tourism, Dar Es Salaam.

URT (1998). National Beekeeping Policy, Ministry of Natural Resources and Tourism, Dar es Salaam, March 1998.

URT (2005). “National Strategy for Growth and Reduction of Poverty.” Final Draft. Dar es Salaam.