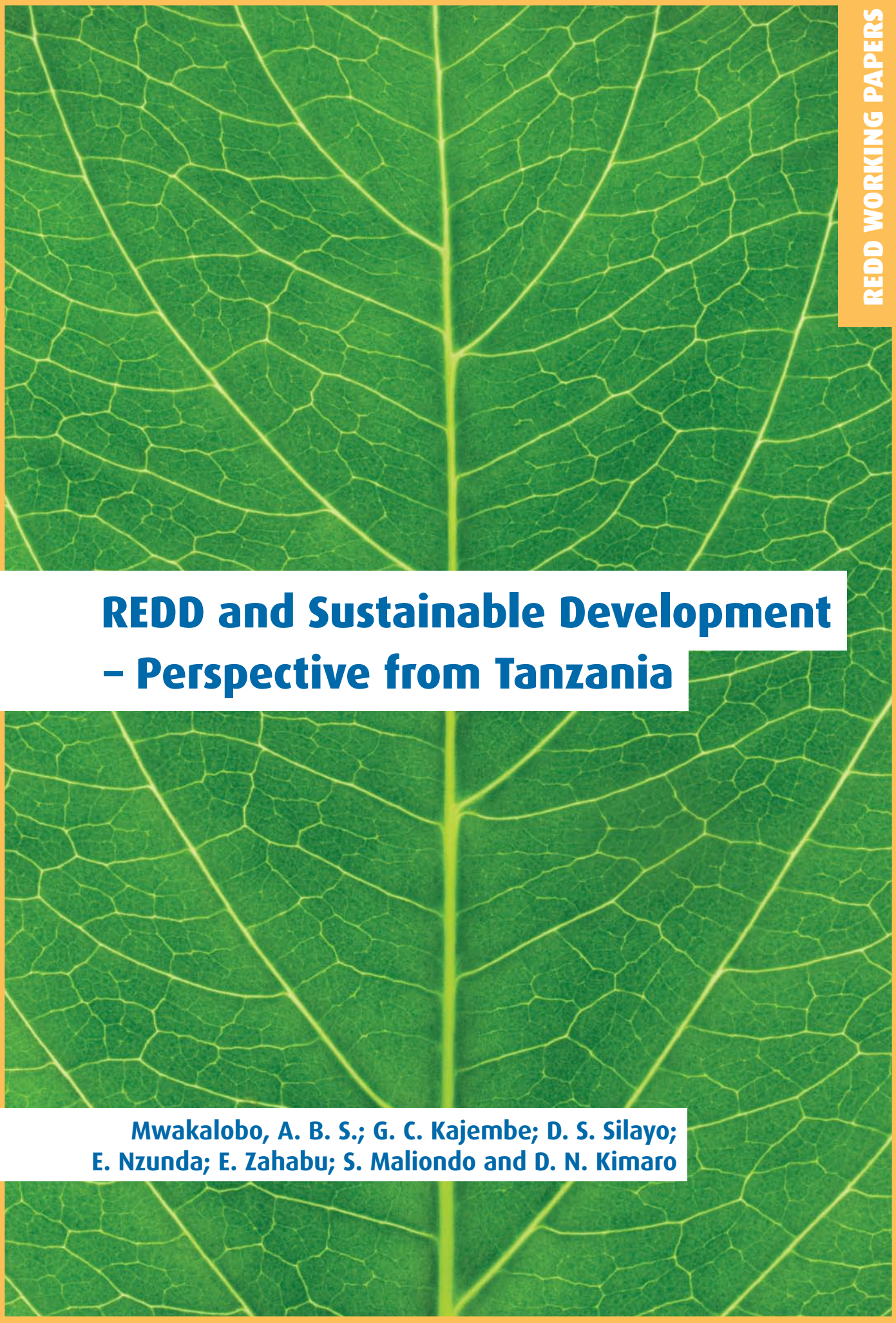

REDD WORKING PAPERS

REDD and Sustainable Development – Perspective from Tanzania

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Poverty and sustainable development impacts of REDD architecture; Options for equity, growth and the environment

About this project...

Poverty and sustainable development impacts of REDD architecture is a multi-country project led by the International Institute for Environment and Development (IIED, UK) and the University of Life Sciences (Aas, Norway). It started in July 2009 and will continue to May 2013. The project is funded by the Norwegian Agency for Development Cooperation (Norad) as part of the Norwegian Government's Climate and Forest Initiative. The first phase of the project (July 2009 to May 2010) has been in partnership with Fundação Amazonas Sustentável (Brazil); Civic Response (Ghana); SNV (Viet Nam); Sokoine University of Agriculture, Faculty of Forestry and Nature Conservation (Tanzania); and Makerere University, Faculty of Forestry and Nature Conservation (Uganda).

The project aims to increase understanding of how different options for REDD design and policy at international, national and sub-national level will affect achievement of greenhouse gas emission reduction and co-benefits of sustainable development and poverty reduction. As well as examining the internal distribution and allocation of REDD payments under different design option scenarios at both international and national level, the project will work with selected REDD pilot projects in each of the five countries to generate evidence and improve understanding on the poverty impacts of REDD pilot activities, the relative merits of different types of payment mechanisms and the transaction costs.

In the first phase of the project, exploratory studies of different aspects of the design of REDD mechanisms were conducted to lay the foundation for the work in Phase 2. These Working Papers are designed to share the preliminary findings of research undertaken during the first phase of this project. They have not been subject to a full peer review process and are being made available online to stimulate discussion and feedback.

...in Tanzania

The following report from Tanzania is a review of available literature regarding current policies and practices that could feed into the design and implementation of REDD in Tanzania, and its implications for poverty, biodiversity conservation and sustainable forest management. It considers what Tanzania has to offer a REDD scheme, and what the upcoming challenges might be.

Considering the current types of national Forest Reserves and the various participatory and community-based management practices already in place, the report looks at the costs and benefits of various design options for REDD schemes and how Tanzania can further prepare for its implementation to ensure equitable benefit-sharing and positive economic outcomes.

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Contents

Introduction

1.1 Background information and rationale

In the ongoing negotiations on the architecture of the international climate change regimes, Reduced Emissions from Deforestation and forest Degradation (REDD) is high on the agenda for discussions leading into the next commitment period for the forthcoming international post-Kyoto Protocol climate protection regime, which starts in 2012. The general consensus is that REDD is potentially a low cost and a win-win option for climate change mitigation (Viana *et al.* 2009; Angelsen, 2008). That is, the option creates incentives for developing countries to reduce deforestation and forest degradation, while at the same time conserving biodiversity and reducing poverty (Karsenty, 2008). It is proposed that developing countries with tropical forests implement activities that can reduce emissions from deforestation in exchange for receiving tradable carbon abatement credits that will be financed by developed countries (Karsenty, 2008; Dutschke and Pistorius, 2008).

Despite a general consensus that REDD provides an opportunity for better climate change mitigation efforts, there are still a number of challenges, complexities, concerns, and controversies that remain unresolved for an effective and successful REDD design. The structure – how REDD will be designed and financed – as well as its implications for poverty, biodiversity conservation and sustainable forest management are unclear (Schmidt, 2009; McNally *et al.* 2009; Huberman, 2007). REDD is yet to take off at a meaningful scale; it is still in its infancy in many developing countries and it is not yet established how these countries and their local communities will participate, how they will be affected and what options they will offer in the design and implementation of REDD (Dahal and Banskota, 2009; Schmidt, 2009). Above all, REDD is a process of negotiation based on theoretical analysis, rather than on empirical evidence (Dahal and Banskota, 2009).

In view of the above, it can evidently be argued that there is dearth of empirical evidence on REDD, and as such, available theoretical support cannot be generalized for REDD policy prescription and strategies for a specific country or local communities. Many developing countries and their local communities differ in many aspects, such as existing drivers of deforestation and forest degradation; institutional capacities; REDD options to be offered and their associated costs and benefits; and the ways in which REDD mechanisms will be designed and implemented. Providing information and analyses that can feed into the REDD mechanisms can potentially contribute to the effective and successful design and implementation of REDD strategies in developing countries.

1.2 The state of forest resources in Tanzania

Tanzania has a total area of about 94.5 million hectares (ha) out of which 88.6 million ha are covered by landmass and the rest is inland water. Current statistics show that the country has approximately 34 million ha of forestland, almost 40 per cent of total land area, out of which 16 million ha are comprised of reserved forests; 2 million hectares are forests in national parks; and the rest, 16 million ha (47 per cent of all forestland), are unprotected forests in General Land (Vatn, *et al.*, 2009; FAO 2007; URT, 2006). The main forest types are the extensive miombo woodlands in lowland areas across the central and southern parts of the country; the acacia woodlands in the northern regions; the coastal forest/woodland mosaic in the east; mangrove

forests along the Indian Ocean coast; and closed canopy forests on the ancient mountains of the Eastern Arc in the east, on the Albertine Rift and Lake Tanganyika in the west, and on the younger volcanic mountains in the north.

It is estimated that of these various forest types, 14.3 million ha are found within gazetted Forest Reserves, 2.5 million ha are proposed Forest Reserves and around 2 million ha are in Game Reserves or National Parks. Forest Reserves fall under the legal authority of central government (National Forest Reserves – NFRs), District Councils (Local Authority Forest Reserves – LAFRs) or village government (Village Land Forest Reserves – VLFRs, Private and Community Forest Reserves) and are either designated for production (managed for timber production and other productive uses) or protection (managed for water catchments and/or biodiversity conservation functions). The remaining 16.5 million ha of forests, found outside the reserve network, lie on village and general land. While most of these unreserved forests are poorly managed, traditional and customary management practices have supported the conservation and maintenance of forest cover for sacred, religious or social purposes in numerous localities across the country (Blomley and Iddi, 2009).

Forests play an important contribution to the Tanzanian economy. Based on 2006 prices, it is estimated that the annual value of forest goods and services is USD $228 million equivalent to 1.9 per cent of Gross Domestic Product (GDP) (FAO 2009). The sector also provides employment to about 3 million Tanzanians (MNRT 2008a). The sector provides employment through forest industries, government forest administration and self-employment in forest related activities. Forests also play an important role in the regulation of the climate though carbon sequestration.

Notwithstanding their contribution to the economy, Tanzania's forests face enormous challenges, including deforestation. Tanzania is reported to be among the countries with the largest forest loss per year in Africa (Vatn, *et al.*, 2009). The rate of deforestation is estimated to range between 100,000 to 500,000 hectares per annum. Deforestation takes place in both reserved and unreserved forests but more so in the unreserved forests. Due to inadequate resources to implement active and sustainable forest management, deforestation through encroachment and over-utilisation has also been taking place in forest reserves, which are under the jurisdiction of the central or local governments. It is indicated that deforestation is taking place at higher rates in the General Land forests (URT, 1998; FAO, 2006). The main reason for this is that forests in General Land are 'open access', characterized by insecure land tenure, shifting cultivation, annual wild fires, harvesting of wood fuel, poles and timber, and heavy pressure for conversion to other competing land uses, such as agriculture, livestock grazing, settlements and industrial development. Main direct causes of deforestation are clearing for agriculture, overgrazing, wildfires, charcoal making, persistent reliance on wood fuel for energy and lack of efficient production and marketing, over-exploitation of wood resources, and lack of land use plans and non adherence to existing ones (Blomley and Iddi, 2009; Zahabu, 2008).

Other reported underlying causes of deforestation in the country include: rapid population growth, poverty, policy and market failures. Population growth, the expanding need for industrial and residential sites, unemployment, search for farmland and general socio-economic needs of forest products all lead to increased deforestation and degradation. Policy failures include a lack of financial incentives and government inability to institute effective management. Market failures include open access exploitation of forests, incomplete information and imperfect competition. Markets are also unable to ensure equitable resource distribution (Blomley and Iddi, 2009; Vatn, *et al.*, 2009).

As one of the countries with a higher rate of deforestation and forest degradation, Tanzania also contributes high CO_2 emissions per annum through deforestation (77,903,442 tonnes) and forest degradation (48,492,402 tonnes), amounting to a total of 126,395,843 tonnes CO_2 emissions per year (Zahabu, 2008). It is ranked twelfth of the global Carbon tropical emitting countries from deforestation (Murray and Olander, 2008, cited by Vatn *et. al.*, 2009). Recognising its significant contribution to global carbon emissions, Tanzania, with support from the Norwegian government, is developing a REDD strategy. It is not clear however how Tanzania will participate in REDD in terms of what options the country will offer and how much these options will cost if Tanzania has to participate in the international REDD architecture.

This paper seeks to provide information that will help to design and implement REDD strategies in Tanzania. By focusing particularly on which REDD options Tanzania will offer; how much they will cost; and their implications for poverty, biodiversity conservation and sustainable forest management; the paper complements other recent studies on REDD initiatives in developing countries and Tanzania in particular.

1.3 The objectives of the study

Although the Tanzanian government has made significant progress towards formulating a REDD strategic framework, however, the design and implementation of a REDD strategy is at a very early stage. As such this paper is a step forward to providing information that will be useful for designing and implementing a REDD strategy in Tanzania. In order to accomplish this, the paper intends to achieve the following objectives:

i. To identify appropriate REDD options the country can offer in the design and implementation of a REDD strategy
ii. To examine opportunities, challenges and uncertainties that need to be addressed for a REDD design to survive in the country
iii. To identify the information gaps and challenges for the design and implementation of REDD options in the country
iv. To propose areas for further research in the next stage of the project

4

REDD perspectives

2.1 Essence of REDD initiatives

Unequivocally, there has been an unprecedented increase in the global average air and ocean temperatures, persistent melting of snow and ice, and rising global average sea level since the mid twentieth century. It has been argued that the observed global warming of the climate systems has been due to the increases in anthropogenic greenhouse gas concentrations (IPCC, 2007). If no deliberate efforts are put in place, poor people in the developing world will be the ones to suffer. This has enormous implications for the efforts put in place and the very modest progress already made for alleviating poverty.

Recognising the threats and challenges being created by the warming of the climate systems, it has been suggested that we need to create a low carbon economy by reducing emissions by around 90 per cent over the long term in order to stabilize the climate. The consensus is that without forestry abatement, the low carbon economy cannot be met. This is deduced from the fact that forestry contributes around 18-20 per cent of total global CO_2 emissions per year, and that can make a very significant contribution to a low cost global carbon economy (Schmidt, 2009).

In the new international carbon trade mechanism, REDD has been proposed to curb global GHG emissions (Schmidt, 2009). At the 13th conference of parties of the United Nations Framework Convention on Climate Change (UNFCC), held in Bali 2007, the agreement was to implement a REDD policy in developing countries, to replace the first commitment period of Kyoto Protocol (2008-12), following the failure of the clean development mechanism (CDM) at addressing the problem. Under the CDM, only afforestation and reforestation were included, excluding avoided deforestation (Huberman, 2007).

The REDD policy is designed to encourage developing countries with tropical forests to undertake measures that will minimize the rate of deforestation and forest degradation in exchange for receiving tradable carbon abatement credits financed by developed countries (Dahal and Banskota, 2009; Karsenty, 2008; Dutschke and Pistorius, 2008). Notwithstanding ongoing heated debate regarding how a REDD strategy should be integrated into the international climate policy in developing countries, it is largely acknowledged that REDD must be part of the international mitigation effort to prevent the adverse impacts of climate change.

2.2 The REDD context

Despite being high on the agenda in the international climate negotiations, REDD remains a theoretical concept rather than an established practice (Huberman, 2007), as there is limited empirical support that could be used as a basis for its design and implementation. The debate on how REDD should be designed remains contentious. The debate revolves around political and technical issues that have remained unresolved. These impede the development of a concrete REDD strategy as an effective and successful climate mitigation option (Huberman, 2007). Some key political hurdles to REDD (Mitchell *et al.*, 2007 as cited by Huberman) include moral hazard, differing national context and priorities, and uncertain integration of REDD in carbon markets.

Technical issues impeding REDD include leakage; lack of permanence of conservation measures due to risks of fires and pest outbreak; additionality – the difficulty in ensuring that a measure has effectively mitigated deforestation threat or that conservation would not have occurred anyway;

and how to establish meaningful baseline scenarios, given uncertain deforestation trajectories in different countries. All these issues have far-reaching implications for the design of REDD activities that need to be taken into account in the implementation of REDD, especially in developing countries where market imperfection is a serious problem that contributes to market failure.

The debates on how to finance REDD is one of the unresolved issues that need to be redressed in the post-2012 climate agreement. More specifically, the question of how the funds should be spent and what shape the international system for REDD transfers should have is an important issue that remains contentious, mainly due to the far-reaching implications this could have. That is, questions over the amount, sources, and means of distributing REDD finance are some of the aspects of the financing that are still being discussed (Schmidt, 2009; Huberman, 2007).

Concerns over how the design of REDD will affect equity issues is another challenging element that is yet to be resolved, due to limited empirical evidence in developing countries. The question about how a REDD strategy will affect multi-level stakeholder participation, poverty, biodiversity conservation and sustainable forest management continues to surface in the ongoing international climate negotiations (Schmidt, 2009). Additionally, the impact of a REDD strategy on indigenous peoples' rights, biodiversity conservation and poorer people is a major concern for the international climate regimes (Schmidt, 2009). Furthermore, it is still doubtful whether REDD will equally benefit each interest or stakeholder group or that it will create a win-win situation.

It is mainly argued that recent debates about REDD have largely focused on technical issues, such as leakages, additionality and permanence, while focusing less attention on the potential impact of REDD investments on the development prospects of people living around forest areas. There is little reference to social concerns in most REDD official statements (Schmidt, 2009; Huberman, 2007). This could be due to there being a limited number of studies on these issues, particularly in developing countries where REDD has yet to take off at a meaningful scale and is more of a prospect than a reality. It is difficult to come up with a meaningful forecast of how it might evolve from scattered project-based initiatives to an international regime. The limited number of empirical studies on REDD also makes it difficult to accurately assess the potential implications for the livelihoods of people living adjacent to forest reserves (Huberman, 2007).

Another important cause for concern over the design of REDD is the issue of governance. This is most serious in the many developing countries that would be the main focus of REDD, as they have weak legal and institutional structures that may limit their capacity to successfully govern REDD. It has been argued that this would be problematic if a mandatory market mechanism is implemented as a means of funding REDD, as many governments in developing countries might not have the capacity to ensure compliance with the market requirements (Huberman, 2007).

2.3 REDD financing mechanisms

REDD financing remains contentious in the international REDD design (Angelsen, *et al.*, 2008; Helme, *et al.*, 2008). The financing question revolves around the amount, sources, and means of distribution of REDD finance (Vatn, *et al.* 2009; Huberman, 2007). A number of options have been proposed that could be considered for REDD financing. The notable financing mechanisms under discussion include: the Clean Development Mechanism, the market based mechanism, the non-market mechanism and the dual market mechanism.

2.3.1 Clean Development Mechanism

It is proposed that forest carbon trading take place through the Clean Development Mechanism (CDM), as specified in Article 12 of the Kyoto Protocol of the UNFCCC. Under the Kyoto Protocol, developed countries are required to reduce their emissions of greenhouse gases by about five per cent of their 1990 levels by the years 2008–2012. The CDM essentially provides a

market mechanism for the sale of carbon credits, called Certified Emission Reductions (CERs), from developed countries. The arrangement is that developed countries invest in projects in developing countries and use these to offset their reduction commitments. It is argued that countries will meet their reduction targets for CO_2 emissions in a variety of ways: through improved energy efficiency, by substituting fuels that produce less CO_2, and by using renewable energy sources. Under CDM, investment in certain kinds of tropical forestry is also a possibility through land use, land use changes and forestry (LULUCF). These activities result in new, additional sinks through sequestration. Most African countries, however, have not benefited from the CDM financing arrangements.

2.3.2 Market-based mechanisms

A market-based approach allows developing countries to undertake voluntary actions that reduce their deforestation rate or maintain carbon stocks to generate carbon credits, which they can offer in the carbon market at a pre-determined price per tonne of CO_2e reduced. The REDD market mechanism would operate in the existing Kyoto Protocol carbon market. Crucial components include credits from reduced deforestation emissions that are tradable with developed countries and CDM credits, deeper targets by Annex I, and additional crediting for early action. This market mechanism would be linked to a 'post-2012' carbon market as an extension of the existing Kyoto carbon market. Credits generated from REDD actions would be equivalent to 'post-2012' carbon credits (such as those generated through the CDM) and could be traded along with or in place of such credits. Reductions would be measured against a reference scenario determined by a reference emissions rate and a development adjustment factor. Market mechanisms are proposed by the Coalition for Rainforest Nations and supported by most developing countries.

The advantage of the carbon market approach is its potential for providing large sums of money to support reducing deforestation by creating a direct channel for private sector investments. A market-based system would also be self-functioning while carbon caps are maintained and would empower many public and private sector players. A market system would likely generate lower-cost REDD credits that can be purchased as offsets by developed countries. However, the global carbon market could be flooded with a large volume of low-cost REDD credits, creating volatility or drops in carbon market prices. It is argued that a strict carbon market approach will naturally incentivise the lowest price emissions reductions; in the long term, addressing the more difficult drivers of deforestation. This may require higher cost incentives than the early stages of the REDD-included carbon market mechanism would generate.

2.3.3 Non-market based mechanisms

Non-market approaches would rely on contributions to a fund or funds from developed country governments and sources such as official development assistance (ODA), international financial institutions and the private sector. Two non-market mechanisms have been proposed; a stabilisation fund and an enabling fund.

A non-market stabilisation fund would finance efforts to maintain or stabilise currently forested areas. This applies to countries with historically low rates of deforestation, to prevent the potential deforestation of their existing forests. This fund could be generated through taxes or levies on the carbon market, or through voluntary contributions. Under this arrangement, funds will then be distributed to activities that either reduce deforestation or reward countries for successful forest protection. An enabling fund, on the other hand, would assist REDD infrastructure development activities in developing countries; for example, capacity-building, monitoring programme development, or establishment of inventories and baselines. This fund would provide early financial resources to countries in need of infrastructure development, so that these countries could eventually participate effectively in a REDD mechanism. Other types of funds have also been proposed; such as to cover REDD capacity-building activities and project implementation.

It is proposed that countries that demonstrate reductions in their deforestation rate through a direct funding mechanism would be rewarded. The funds would be distributed in proportion to the emission reductions achieved, measured against a reference scenario comprised of an historic national baseline. Funds would be awarded only after a reduction is demonstrated from the baseline, as opposed to a projected baseline.

The main advantage of the non-market (fund-based) approach relates to protecting the CDM. As REDD credits would not enter the carbon market, the non-market REDD mechanism would better maintain the integrity of the post-2012 global carbon market. A fund proposal would make REDD actions more dependent on government leadership by reducing private sector forces. The largest drawback is that funding would depend upon voluntary contributions from developed countries or institutions, and would therefore not likely produce levels of funding comparable to market approaches. This approach lacks a crediting component that would incentivise sufficient developed countries' contributions, making the REDD fund less appealing than the carbon market.

2.3.4 Dual market mechanism

This mechanism has been suggested as an effective means of carbon financing. The basis for the dual market proposal is the creation of a new REDD-only carbon market. This market is separate from the traditional (Kyoto/CDM) carbon market. The REDD-only market is expected to begin in 2012 with the next commitment period. In this new REDD market, reductions generated through REDD actions in developing countries would be sold to developed countries to satisfy those countries' REDD commitments. Emission reductions from REDD activities in developing countries could not be substituted for traditional carbon reductions (such as CDM, emissions trading or emissions reducing actions) beyond the level established as that developed country's REDD commitments.

A maximum percentage of the overall national carbon targets that countries could choose to achieve through the new REDD market need to be established. Developed countries will then choose to meet up to that percentage of their post-2012 reduction target through purchasing REDD credits from a new REDD market. Under this mechanism, the proposal highlights a pre-2012 preparatory phase to better enable developing countries to participate in the post-2012 REDD market. Both developed and developing countries would lay some groundwork for an effective REDD mechanism. Developed countries would commit to providing ODA and other financing to fund key activities including the establishment of Land Use, Land-Use Change and Forestry (LULUCF) emissions inventories, capacity-building, research studies of potential mitigation measures and costs, and implementation of pilot projects in developing countries.

The dual market mechanism has many advantages in comparison with other proposed financing mechanisms, as it avoids their key shortcomings. The dual market mechanism provides adequate time for learning-by-doing, allowing the REDD market to mature and stabilise before linking with the post-2012 global carbon market. It would also leverage private sector resources, while minimising the risk of destabilising the post-2012 global carbon market. Specific REDD targets adopted by developed countries would provide a minimum demand for developing countries' REDD credits, thus facilitating planning of their national REDD programmes. Setting a maximum ceiling on developed countries' REDD purchasing would safeguard global stabilisation goals in case REDD reductions prove unreliable. While creating a new dual market system inevitably creates some risk, these are no greater than the risks of integrated-market or fund-based approaches. The dual market approach is suggested as a workable solution for the post-2012 commitment period that can bridge the gap between competing proposals and enable effective action on REDD.

REDD initiatives and efforts in Tanzania

3.1 National REDD related policies and initiatives

In the international climate change regimes, the main objective of REDD policy is to encourage countries to undertake measures to minimize existing rates of deforestation and forest degradation through a payment mechanism. The REDD policy recognises the role of the forests as an essential component of the global climate system. It also emphasises the involvement of local communities because of the far-reaching implications it has for their livelihoods. Tanzania has the potential to design and implement a REDD strategy and other related activities, and has already prepared a National Framework for REDD for that end. The framework indicates that a REDD strategy provides viable and feasible options for managing forests and woodlands in more sustainable ways, while at the same time addressing poverty in the country (URT, 2009).

National strategies that also support carbon emission reduction are the Vice Presidents Office 2006 strategy; integrated coastal management; participatory forest management; private sector involvement in establishment and management of forest plantations; law enforcement and surveillance improvements; payment for environmental services (carbon, water, biodiversity, and so on); and sector-wide approach planning for the forestry and REDD strategy (Vatn, *et al.*, 2009; Lawuo, 2008; Ngeleja, 2008).

Community Based Forest Management (CBFM) and Joint Forest Management (JFM), are commonly referred as Participatory Forest Management (PFM). The CBFM was first implemented in the Duru-Haitemba forest in Bahati district in 1992 and in 1995 in the Mgori forest in Singida district. The forest reserves have been already surveyed, forest boundaries have been reset and zoned based on suitability for land use potential, including for agricultural use, with grazing and protected areas excluded from use. Under this system, each village constituted a management institution of the part of the forest reserve adjacent to it. The forest reserves are controlled by the villages around the forests reserves working under their respective district councils.

Under JFM, forest ownership remains with the government while local communities are duty bearers, who in turn get user rights and access to some forest products and services. With CBFM, on the other hand, the local communities are the owners as well as rights holders and duty bearers. Most of the CBFM areas are demarcated in 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 the land area of rural Tanzania is currently divided into more than 14,000 villages (Ministry of Lands and Human Settlements, 2007); each with land area encompassing homesteads, private farms and General Land. Each village is governed through an elected government responsible to oversee executive and legislative issues in the village community.

To facilitate proper management, manuals have been prepared to assist local forest officials and the communities to draw maps, develop work plans and initiate forest operations. Forests are restricted to members, except for grazing. The communities draw simple management plans and determine which areas of forest are to be looked after by each adjacent sub-village. The villages have title deeds, which identify them as legal owners and managers of the forest reserve under the various new policies, Acts and laws. With a legal title to land, villagers tend to have the power to define their forest boundaries, as well as their legal rights to defend those

forests. The law allows villages to exist as formal government structures and legal corporate entities with the ability to sue and be sued and to own property as a local community (Blomley and Iddi, 2009).

It has been reported that prior to handing over the Duru-Haitemba forest to the community, the villagers were overexploiting the forest as fast as possible, just before its gazettement. After the forest reserve was put under the control of villages adjacent to it that have established secure ownership rights and provided the community with authority and management responsibility however, the trend of forest degradation was reversed and villagers have began implementing management plans and enforcing rules prohibiting uncontrolled use. This has also enhanced security of tenure, which is necessary for the development, and survival of Common Property Resource (CPR) institutions. The village forest management rules have been subsequently accorded a legal authority as bylaws following their endorsement by the legal district council. Consequently, the village forest reserves management rules have a clear legal recognition and backing with judicial authority (Blomley and Iddi, 2009).

Successful experiments of involving local communities in natural forest management in Tanzania in the mid 1990s in the north and western parts of the country, triggered the inclusion of community forest management in the forest policy and legislation in the late 1990s (URT, 2006). Both in the 1998 National Forest Policy and Forest Act of 2002, the role of community involvement in sustainable forest management and utilisation is highly emphasised (URT, 1998; 2002). This is demonstrated by the three policy objectives of PFM which put emphasis on: improved forest quality through sustainable management practices; improved livelihoods through increased forest revenues and secure supply of subsistence forest products; and improved forest governance at village and district levels through effective and accountable natural resource management institutions (URT, 2003a).

Since the early 1990s, Tanzania has been formulating and implementing strategies and policies towards improving the management of its forest resources. These policies and strategies could be considered for a REDD strategy design and implementation. Sectoral policies which support carbon emission reduction in the forest sector include: Forestry, Environment, Energy and Science and Technology policy.

The 1998 National Forestry Policy aims to promote participation in forest management through the establishment of VLFRs, where communities are both managers and owners of forests, as well as through JFM, where local communities co-manage NFRs or LAFRs with central and local government authorities. Furthermore, the policy recognises the substantial area of forest that lies outside the formal forest reserve network – and the levels of deforestation and degradation that take place in these areas due to poor management and uncertain tenure. The overall goal of the forestry policy is to enhance the contribution of the forestry sector to sustainable development for the benefit of the present and future generations. The policy focuses on forest land management, ecosystem conservation and management, forest based industry and products, and institutions and human resources. The 1998 National Forest Policy was followed by the enactment of the Forest Act in 2002, which provides the basis in law for communities to own, manage, or co-manage forests under a wide range of conditions and management arrangements. The Forest Act is notable in embracing the principle of subsidiarity, stating its aim as "to delegate responsibility for the management of forest resources to the lowest possible level of local management consistent with the furtherance of national policies" (URT, 2002).

The environmental policy identifies deforestation as a serious problem. In order to address deforestation, the policy identifies measures that have relevance to carbon emission reduction, among others, including: minimisation of fuel wood consumption through the development of

alternative energy sources and use of efficient wood fuel technologies, production of sustainable renewable energy sources and energy efficiency and conservation.

The national energy policy acknowledges the energy balance in Tanzania to be dominated by biomass-based fuels, particularly fuel wood (charcoal and firewood). The policy emphasises the use of carbon emission reduction technologies such as solar power; electric energy; and conversion of biomass-based fuels by environmentally friendly technologies such as cogeneration, gasification and briquetting.

The science and technology policy is explicit in the application of science and technology in reducing carbon emissions by use of, for example, improved cooking stoves. With regard to forestry and land use activities in the context of climate change, the application of science and technology for both mitigation and adaptation measures are emphasised in the policy document. The application of science and technology is recognised in the monitoring and evaluation of carbon sequestration and land use management. However, there is very limited technical capacity in forest inventories and assessments in the country. There is a need for training and research in order to enhance human capacity and generate information that could be used for the design and implementation of a REDD strategy in the country.

Other notable strategies that have been undertaken in the last ten years are the Vice President's Office 2006 strategy and the Integrated Coastal Management Strategy. These have been mainly designed to curb land degradation and protect water source catchment areas, which can be integrated into payments for environmental services. The Vice President's Office 2006 strategy is an initiative to enhance the carbon sink stock. It promotes afforestation through tree planting. The Integrated Coastal Management Strategy, on the other hand, offers an opportunity to reduce carbon emission through the conservation and protection of mangrove forests in coastal lands. It also promotes the growing of sea weeds that could sequester carbon or act as potential carbon sinks. This protects important coastal resources that are a habitat to a wide range of marine flora and fauna. This strategy also promotes and emphasises the use of science and technology, particularly the use of remote sensing and geographical information systems (GIS) in the management of coastal areas.

3.2 Community-level REDD options Tanzania can offer

Tanzania is underway in developing a national REDD programme. The government has already made significant progress; a REDD national strategy framework has already been developed. The framework emphasises the involvement of the local community in the design and implementation of the REDD strategy. It also recommends that the REDD strategy needs to be pro-poor. There are various REDD related innovations and technologies already in the country that could help to increase carbon sinks, avoid reducing carbon sinks, and reduce emissions from productive activities. Some of the REDD related innovations and technologies that Tanzania can offer in the international REDD architecture are:

a. Afforestation and reforestation activities

In Tanzania, local communities are involved in tree planting. This can form a basis for a REDD project. The project can use this advantage by enhancing the capacity of the communities to select tree species to grow. Villagers can be facilitated to establish nurseries, tending and tree planting. This is likely to be successful as a pro-poor REDD activity, due to its multiple benefits in supplying wood for domestic consumption and acting as a source of household income. The IPCC recommends that the land availability for afforestation and reforestation options include agroforestry, which has the potential to sequester large amounts of carbon. Agroforestry systems sequester carbon dioxide through carbon stored in their biomass. By promoting land

use systems which have higher carbon contents than the existing plant community, net gains in carbon stocks can be realised.

Agroforestry is one of the strategies being practiced by many farmers in Tanzania for sustainable natural resource management. It involves planting of multipurpose trees for fodder, fruit trees, and traditional woodlots (such as "ngitili" and sacred forest). It involves the integration of trees on farms and in the agricultural landscape, diversifying and sustaining production for increased social, economic and environmental benefits for land users at all levels (ICRAF, 2004). The immediate objectives are to increase food and nutritional security, fuelwood availability and household income. In this way it achieves the combined benefits of improving income from agriculture, protecting biodiversity and maintaining or increasing forest cover. The overall goal of promoting agroforestry is to contribute towards better living standards of the small-scale farmers where it is already in place.

b. Protection of existing forests

Under CBFM it is reported that there are 382 VFRs with a total area of 2.06 million hectares (ha) in 1,202 villages, and under CFM there are 3.6 million ha of protected forestland in 1,800 villages. This land provides a significant carbon sink that can be designated for REDD projects in the country. Protected Areas (PAs) are very important as they increases income; stimulate new enterprises through tourism; improve living standards; and create employment for the local people adjacent to it, stimulating and diversifying the local economy, for example with farmers and pastoralists. It encourages local manufacture of goods, such as curio shops; and improves local facilities, transportation, communication and social services through benefit-sharing with local communities. PAs support environmental education for visitors and locals, and establish attractive environments for residents as well as visitors. They also provide intercultural understanding, encourage the development of culture, crafts and the arts and increase the education level of the locals (Eagle *et al.*, 2002).

c. Use and promotion of efficient alternative energy sources and efficient utilisation of biomass

Vast alternative sources of energy do exist in Tanzania that can be scaled up and broadened out to reduce pressure on forests. These sources include improved stoves, improved charcoal kilns, and the use of solar power and biogas. Alternative energy sources have the potential to reduce the increase in demand for forest products and to preserve forest health and diversity. This balance is critical to the survival of forests, and to the prosperity of forest-dependent communities. This also has important implications for emissions reduction, employment creation, monetary saving, and time savings – thus reducing pressure on carbon sinks, and improving livelihoods.

d. Use and promotion of innovations that contribute to reducing carbon emissions from productive activities

There are various innovations and technologies that could contribute to reducing carbon emissions that are already in practice in Tanzania and could be tapped for a REDD strategy. These include efficient nitrogen fertiliser application and agronomic practices, which conserve water – such as mulching, conservation tillage, intercropping, planting of leguminous crops; and encouraging the growing of crops that are resistant to adverse weather conditions – such as cassava, sorghum, millet, sweet potatoes and so on. In addition, the promotion of sustainable production systems that encourage agricultural intensification in favourable areas, relieving pressure on remaining forest lands, and decrease deforestation by increasing agricultural productivity and profitability, provides promising technologies that can be incorporated in the REDD strategy in Tanzania.

Another notable sustainable production system that could be scaled-up for REDD is the promotion of better rangeland management practices for adaptation to climate change, to improve livelihoods in livestock keeping communities. Rangelands are a type of land on which grasses and shrubs dominate the natural vegetation and the land is managed as a natural ecosystem. Rangelands support agricultural activity through the grazing of livestock. These grasslands also provide a habitat for native plants and animals, and support a broad range of economic benefits, including recreational activities related to hunting and eco-tourism, and the provision of genetic stock for biological research and the development of pharmaceuticals. The benefits of improved range management include the conservation of biodiversity, reduced soil degradation and potential for increased carbon sequestration. Grazing management involves planning, and then controlling the timing, intensity and frequency of grazing. Good grazing management such as avoiding overstocking and extensive livestock production form part of the forest management systems that can be tapped under REDD activities.

e. Enhancing human resource capacity for REDD activities

Farmer field schools have been established in some parts of the country to provide farmers with the opportunities to learn and adopt new technologies and innovations. This provides the way forward in creating farmers' networks that can be incorporated in REDD related activities. Farmers' field visits and farmer exchange programmes are a few examples that can be used to learn REDD-related best practices. In order to reach the wider population, education and public awareness materials such as flyers, brochures, newsletters, booklets, stickers, posters, guidelines, policy briefs, banners, calendars, audio visuals, and inserts in existing newsletters are some of the existing communication methods that are in use and could also be used in REDD related activities.

Despite the potential of these options to sequester and reduce carbon emissions, there are numerous challenges that can affect the effectiveness and the ways in which they can be used for the design and implementation of a REDD strategy in Tanzania. There are several questions that must addressed if Tanzania has to create an effective REDD mechanism which will be pro-poor while at the same time ensuring biodiversity conservation and sustainable management of the environment. The challenges and questions to be addressed include:

i. How will areas that are biodiversity hotspots but low carbon areas be managed?
ii. What is the availability of carbon stock data for the different ecosystems and proposed REDD options the country can offer?
iii. How will the emission reductions be monitored, reported and verified?
iv. What are the costs and benefits of the available options in the country?
v. Who will be the suppliers and consumers of these options?

3.3 Costs and benefits of REDD options

Assessing the costs and benefits of REDD options a country can offer, provides a basis for the effective design of a REDD market in that particular country. It is argued that costs associated with the reduction of greenhouse gas emissions from deforestation and forest degradation shape both the demand for, and the supply of, REDD services (Wertz-Kanounnikoff, 2008; Hoare, *et al.*, 2008). Costs and benefits of REDD options also have important implications for the participation of local communities in the REDD markets (Pagiola, *et al.* 2007). For the development of an effective REDD strategy, it is important to adequately provide information and data necessary for the estimation of costs and benefits of different REDD options.

In the ongoing REDD debate, the costs of REDD options a country can offer remains unclear and needs to be resolved for the effective design and implementation of a REDD market. This has potential implications for shaping the REDD structure and financing mechanism. Most studies that have estimated the costs of REDD use three categories, namely: opportunity costs;

implementation costs; and transaction costs (Wertz-Kanounnikoff, 2008; Grieg-Gran, 2008; Viana *et al.*, 2009; Hoare *et al.*, 2008). The estimates are based on the cost per unit of carbon emission reductions. It is argued that the estimates are based on very limited field data, thus leading to uncertainty in the policy dialogue process (Viana *et al.*, 2009). In most cases, the estimates are location-specific, derived from random sample household surveys conducted at the local level in small communities, which cannot be extrapolated to other local communities (Grieg-Gran, 2008; Wertz-Kanounnikoff, 2008). This suggests that country- and location-specific studies are need to enrich the information that will contribute to the design and implementation of a REDD strategy.

A very limited number of empirical studies that could provide important information for REDD design and implementation have been conducted in Tanzania. Zahabu (2008) provides cost estimates and benefits for six participatory forest management projects. He employed transaction and opportunity costs to establish the associated costs and benefits with PFM management activities and forests per hectare per year respectively in the four study villages; Gwata, Ludewa, Mgambo and Ayasanda. In his study, he distinguishes the costs in managed and unmanaged forest resources. The study found that PFM projects (managed forests) sequester and store considerably more carbon than unmanaged forests. The study indicates that the transaction costs of PFM with carbon management include USD $1,580 per village per year for measurement activities, $2 per ha per year for measurement, $3.5 per ha per year for verification and ten per cent of carbon value for other overhead costs. The opportunity costs for forests were $12, $23, $7 and $9 per hectare per year in Gwata, Ludewa, Mgambo and Ayanda villages respectively.

Zahabu (2008) went further by estimating the net carbon benefits that were accrued from both sequestration and avoidance of degradation. The study found that the net benefits are much higher per household, as much as $31 for villages with larger forests compared with those with small forests, which receive only $5 per tonne of CO_2 sequestered. The study also reveals that villages with 156 and 550 ha of forests could earn about $12 and $18 per household per year respectively. With the price of at $40 per tonne of carbon sequestered, which is the prospective selling price, villages with small (between 20 to 50 ha) forests could earn about $30 per household, whereas those with better forests (with more than 1,000 ha) might earn up to $438. However, the study does not clearly indicate whether this kind of arrangement will reduce poverty levels in the respective villages. This empirical question needs further investigation to establish whether or not REDD under PFM will be pro-poor. Nonetheless, information generated from the study provides preliminary information that could be used in forthcoming studies.

If farmers were to be compensated for the land they cultivate, however, a few major food and cash crops could be used. In this example, an opportunity cost for each crop was estimated based on the data obtained from the National Sample Census of Agriculture 2002/2003, (2006), which is the only available data source to date. Tables 1 and 2 summarise the opportunity cost of each crop as average return per ha in Tanzanian shillings and US dollars respectively.

The table suggests that cotton has the highest opportunity cost, followed by tobacco and Irish potatoes, whereas sorghum and then maize have lowest opportunity costs. Tobacco is one of the most prominent crops that contributes to deforestation and forest degradation. This is the result of farmers needing to clear new forest land in order to grow tobacco profitably. This has serious implications for providing alternative sources of income that will compensate farmers in tobacco growing areas, if they have to participate in the REDD market.

Table 1. Return of food and cash crops 2003 nominal price

Crop	Average (tonne/ha)	Price (tshs/ tonne)	Total revenue/ ha (tshs)	Cost of production* (tshs)	Return/ha (tshs)
Maize	0.79	159,532.50	125,233.01	18,784.95	106,448.06
Paddy	0.93	371,455.83	345,453.93	51,818.09	293,635.84
Sorghum	0.63	181,959.17	114,634.28	17,195.14	97,439.13
Finger millet	0.67	271,258.33	180,386.79	27,058.02	153,328.77
Irish potatoes	2.68	203,581.67	544,580.96	81,687.14	462,893.81
Beans	0.46	394,512.50	179,503.19	26,925.48	152,577.71
Cotton	0.56	1,628,748.00	903,955.14	135,593.27	768,361.87
Tobacco	0.71	807,340.00	573,211.40	85,981.71	487,229.69

Source: National Sample Census of Agriculture 2002/2003, June, 2006.

* Cost of production is taken as 15% of total revenue

Table 2. Return of food and cash crops 2003 nominal price (1 US $ = 1038.42 Tshs)

Crop	Average (tonne/ha)	Price/tonne (US $)	Total revenue (US $)	Cost of production* (US $)	Return/ha (US $)
Maize	0.79	153.63	120.60	18.09	102.51
Paddy	0.93	357.71	332.67	49.90	282.77
Sorghum	0.63	175.23	110.39	16.56	93.83
Finger millet	0.67	261.22	173.71	26.06	147.66
Irish potatoes	2.68	196.05	524.43	78.66	455.77
Beans	0.46	379.92	172.86	25.93	146.93
Cotton	0.56	1,568.49	870.51	130.58	739.93
Tobacco	0.71	777.47	552.00	82.80	469.20

Source: National Sample Census of Agriculture 2002/2003, June, 2006.

* Cost of production is taken as 15% of total revenue

3.4 REDD opportunities, challenges and uncertainties

3.4.1 Opportunities

The community forest management and forest policy legislation in Tanzania provides promising foundations for the design and implementation of a REDD strategy in the country, as forest management has helped to curb deforestation and forest degradation. Following the establishment of PFM, forests have been reported to recover under the management of the village governments, as encroachment decreases, unregulated activities such as charcoal burning and timber harvesting have declined, and game reserves increase (URT, 2006).

Current statistics shows that in 2006, CFM was operational in over 1,800 villages and on over 3.6 million ha of forestland in Tanzania (UTR, 2006). These statistics further reveal that there are 382 VFRs under CBFM with a total area of 2.06 million ha in 1,102 villages. In 2001 there were only 78 village forest reserves under CBFM with a total of 186,292 ha. These statistics suggest that between 2001 and 2006, CBFM activities increased by 304 forests over around 1.9 million ha in 1,024 villages. The observed increase in forest reserves within a span of five years is due to the change of forest policy and legislation. The contribution of both local and international NGOs, local governments and bilateral development partners has also played a crucial role in the spread of CBFM in the country (Blomley, 2006). With this emerging trend of CBFM, the unprotected forestland in General Land has been reduced to about 16 million hectares from 18 million hectares. However, much would have been done to increase protected forest areas, but

CBFM takes time to establish due to limited financial and human resources. There is therefore a need to develop strategies to speed up the process. Accessing global carbon financing mechanisms could potentially facilitate the process by providing the needed financial resources to allow CFM projects to be set up at an accelerated rate (Zahabu, 2008).

It is argued that CFM does not provide for cash benefits for local communities' involvement (URT, 2006). Most of the forests under CBFM do not have potential timber to merit harvesting, as they are in the recovery stage, while JFM forest strategy (in more valuable forests) restricts local use to a few non-wood forest products such as medicinal plants, thatching grass and honey (Blomley and Ramadhani; 2006; Meshack *et al.*, 2006). For effective participation of local communities in CFM activities on a large scale, they need to be provided with tangible incentives (URT, 2006), preferably cash incentives.

Sound forest management practices like those under CFM generate a number of environmental services such as water catchments, scenic beauty, biodiversity, and carbon sequestration, which in principle could be valued and paid for by various consumers. Using financial resources from environmental services payment systems is one option for the provision of the required tangible economic benefits, and hence incentives, to local people participating in CFM. Management of water catchments and landscapes can benefit from compensation schemes arranged through governments and NGOs at a local or national level. On the other hand, biodiversity conservation and carbon sequestration activities can benefit from international mechanisms since these provide benefits at the global scale. Biodiversity conservation compensation mechanisms are based on payments for foregone activities such as timber extraction, in forests with high species diversity (Rice, 2002). The determination of the biodiversity compensations based on foregone timber sales is relatively easy. However, there are not many such biodiversity compensation schemes yet operating. There is, however, a growing market for forest carbon due to the increasing recognition of the importance of forest management in reducing emissions and the storage of carbon dioxide gas (CO_2) (Zahabu, 2008).

Forests play an important role in the global carbon cycle. Forest biomass acts as a source of carbon when burned or when it decays. Also when soil is disturbed it releases CO_2 and other greenhouse gases into the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) estimates that 20 to 25 per cent of current global annual carbon emissions are the result of the loss of tropical forest (IPCC, 2000). On the other hand, forests also act as carbon sinks when their area or productivity increases, resulting in an increased uptake of CO_2 from the atmosphere. This is known as carbon sequestration. They absorb CO_2 and release oxygen into the atmosphere through the natural process of photosynthesis in which CO_2 is converted to carbon and stored in the woody tissue (biomass) of the plant. It is because of this that some forms of forestry activities are used as valid means for atmospheric CO_2 reduction as they contribute significantly to climate change mitigation.

3.4.2 Challenges and uncertainties

Despite their potential, participatory forest management and forest policy are not without some obstacles that need to be addressed in order for a REDD strategy to survive in Tanzania. Blomley and Iddi (2009) provide a succinct description of the policy gaps and challenges of the PFM and forest policy in the country. They point out that forest legislation provides a clear and unambiguous legal basis for the management of forests on village lands at individual, group and community levels. The implementation of JFM, however, legalised through the signing of JMAs, has been more uncertain. They argue that while the law allows for a wide range of partnerships within a JMA, as well as the option for delegated management where management rights can be devolved from government to a third party, there are no known cases of this happening on the ground.

Additionally, while several hundred villages have been supported to develop JMAs around a range of forests managed by central or local government, the government has signed only a limited number of these agreements. This is a result of the law remaining silent over how the benefits of forest management can be equitably shared with participating communities. In many cases, benefit-sharing arrangements remain in a indeterminate legal state – with *de facto* management at the local level taking place, in return for vague promises about benefits at a later date. Clearly, this is a situation that cannot be sustained indefinitely. Without benefits reaching a level that equal or exceed the costs being borne, in terms of local forest management, the long-term future of JFM remains uncertain. With the increased discussion in Tanzania over revenues from carbon financing, particularly under REDD; the question of sharing of these revenues is likely to be rekindled (Blomley and Iddi, 2009).

Another major weakness is that the current legislation regarding PFM in Tanzania gives little regard for other natural resources available at the community level. Although both the National Forest Policy and the Wildlife Policy of Tanzania were approved in March 1998, which would suggest some degree of parallel evolution, the sectors have developed divergent ideas about how to devolve management to the village level. The forestry sector, in its provisions for PFM, builds on Tanzania's structures of local government and customary village-based land tenure. The key institutions for PFM are the Village Council, Village Assembly, and VNRC. The basic management tools are village bylaws and land use plans, which are legally grounded in the Local Government Act and Village Land Act, respectively. One of the reasons why CBFM has taken off easily in Tanzania, with over 1,400 villages establishing their own village forest reserves, is that this framework is relatively simple and based on existing local institutions, such as village and district governments (Blomley and Iddi, 2009).

The Village Councils have a relatively limited role in directly managing the WMA, except to receive revenues earned from the CBO and then, through normal village government procedures, budget and use those earnings. A major challenge for communities in forming WMAs is creating this new CBO institution, which will have considerable power over village lands and resources as the manager of the WMA. Agreeing on a constitution, membership, and leadership can be time-consuming and requires a great deal of grassroots engagement if the CBO is to be an accountable and effective organisation.

The institutional mismatch between the WMA process and CBFM has impeded sectoral integration, as communities and donors have generally supported implementation of one or the other sector's procedures. It remains unclear if, for example, the same area of village land can be legally gazetted as both a WMA and a VLFR. From the village perspective, however, obtaining legalised flows of both wildlife and forest products would substantially improve local incentives for forest and wildlife management. The legal uncertainty caused by the parallel and disconnected development of wildlife and forest policies and laws results in inefficiencies and wasted opportunities for poverty reduction and sustainable land management.

Although the legal basis for JFM is clear, uncertainty regarding benefit-sharing, as well as the low level of overall benefits available is undermining its viability in the long-term. Despite the major efforts of government to support JFM over the past 15 years, its long-term viability remains in the balance. Firstly, given the high conservation status of many of the forests under joint management arrangements, the total level of permitted benefits that may be legally harvested from the forests is very low (and may be significantly less than the range of benefits people obtained prior to JFM being established, albeit illegal in nature). Secondly, even where opportunities exist for extractive use of forest reserves, such as in production forests where timber harvesting is permitted, the relative share and type of benefits that can be captured by communities has yet to be agreed on and the mechanism for sharing of benefits is not yet in place.

The highly sectoral nature of natural resource legislation constrains opportunities for communities to obtain multiple benefit streams from the management of forest and wildlife resources on village land. The process for the establishment of community based forest and community based wildlife management differs markedly. Although they do not necessarily conflict, a number of legal "grey areas" constrain community-level managers wishing to manage both forest and wildlife resources in a given area of village land. As a result, the possibility of obtaining multiple revenue flows from wildlife and forest harvesting is being lost, which significantly reduces local incentives for long-term natural resource management.

Other challenges and uncertainties that might affect the REDD carbon market in Tanzania as identified by Kilawe *et al.* (2008), among others, include:

i. Regulatory issues related to rules and regulations under the CDM A/R: these are restrictive and arduous, keeping transaction costs high and leading to a large areas of degraded land being ineligible to generate CERs.
ii. Market problems, with respect to benefit-sharing and bargaining power between developed countries and developing countries: it is argued that most of the benefits will be reaped by the developed countries given their strong bargaining power, as compared with weak bargaining of the developing countries in the international markets.
iii. Information, as related to data required to assess the age of fallows and forest succession using remote sensing is inadequate: this limits the availability of information and data necessary to satisfy the eligibility criteria in relation to the requirement of forest cover now and in the future. Comprehensive studies are needed to map the boundaries of eligible land as well as determine historical land cover. This has enormous implications for transaction costs as this requires high mapping costs, as well as large areas of low carbon land being excluded from inclusion in CDM projects. Another problem relates to asymmetric information, whereby developed countries have better information when compared to developing counties, which has serious implications for bargaining in the international REDD negotiations.
iv. Land tenure issues, issues relating to titling and property rights: this affects the security and entry of local people, particularly smallholder famers, to participate in REDD.
v. Technical capacity: the issues of REDD and carbon trading are very new concepts not well understood by many Tanzanians. Most of them are not sure how will it be traded. There is a lack of capacity with respect to managing technical, legal and financial aspects in the REDD carbon market.
vi. There are no sufficient investments on infrastructure that will provide ground work for the implementation and design of REDD in Tanzania.

4

Conclusion

It is apparent from the literature surveyed that Tanzania has the potential to contribute to the design and implementation of REDD. Both national and local level REDD options are available which have high potential for carbon emission reduction. Despite enormous challenges and uncertainties facing the country in the design of a REDD strategy, opportunities also exist for the country to participate in REDD. What is required is to prepare a favourable environment that will facilitate its participation. This will involve conducting empirical studies that will provide data and information for preparing an effective and successful REDD strategy.

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