

Community based forest management and carbon payments: Real possibilities for poverty reduction?

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Introduction

Forests play an important role in the carbon cycle. Biomass acts as a source of carbon when burned or when it decays and when soil is disturbed it releases CO₂ and other greenhouse gases into the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) estimates that 20-25% of current annual carbon emissions are the result of loss of tropical forest (IPCC, 2000). Forests also act as carbon sinks when their area or productivity increases, resulting in an increased uptake of CO₂ from the atmosphere. This is known as carbon sequestration. They absorb CO₂ and release oxygen into the atmosphere through the natural process of photosynthesis where carbon dioxide is converted to carbon and stored in the woody tissue (biomass) of the plant. The rate at which carbon is sequestered varies by the site, age, management, and species characteristics of forests. This article looks at the carbon sequestration potential of community-managed forests in Tanzania in the light of international climate policy, and assesses whether international carbon payments under such policy could provide real possibilities for poverty reduction.

Community Based Forest Management in Tanzania

Since villagisation in the early 1970's most of rural Tanzania has established villages with a system of village governments voted into office for a span of five years. Currently there are about 10,500 villages in the country with clearly recognized village lands, though only some are properly surveyed. These village lands are demarcated for various uses including forestry.

Community Based Forest Management (CBFM) involves management of village forest lands or so-called village forest reserves. In most cases it is designed to transform unsustainable management of existing natural forests in the villages, to more sustainable management. These forests are managed by village governments through established Village Forests Committees (VFCs). Members of the VFCs are selected with equal representation from each sub-village in each village.

The VFCs are responsible for the day-to-day forest management activities such as patrolling,

gap planting, and fire fighting in collaboration with other villagers. With assistance from local supporting organizations, they use forest management guidelines and by-laws formulated and approved by the respective district council for use in each village. All these guidelines and by-laws have the same goal of advocating sustainable forest resource use and management. In the process of managing well the forests, carbon is inevitably sequestered.

Carbon sequestration potential of CBFM

Recent studies from around Tanzania (Zahabu, 2006 a & b)² have shown that CBFM halts deforestation and forest degradation while also sequestering carbon and conserving biodiversity, protecting watershed, and conserving soil and water. Until recently, little was known about carbon sequestration in community-managed forests in Tanzania. The carbon sequestration potential of CBFM was assessed as part of the *Kyoto: Think Global Act Local* research project.³ A total of four villages practicing CBFM were involved. In each study village, between 4 to 7 villagers were trained in mapping and forest inventory techniques to assess carbon stock changes in their forests. The number of sample plots was in each case calculated based on estimates of standard



Community members demonstrating use of hand held GPS / data recorder for measuring carbon sequestration. Photo by Tom Blomley

¹ Both authors are members of *Kyoto: Think Global Act Local* research project. The latter advises on policy issues for WWF Tanzania Programme Office.

² Zahabu, E. (2006 a). Case Study Handei village forest reserve, Tanzania. In Murdiyoso D. and M. Skutsch (eds). *Community Forest Management as a Carbon Mitigation Option Case Studies*. Bogor, Indonesia: Center for International Forest Research (CIFOR), ISBN: 979-24-4660-5, 16-19 p.

Zahabu, E. (2006 b). Case Study Kitulangalo Forest Area, Tanzania. In Murdiyoso D. and M. Skutsch (eds). *Community Forest Management as a Carbon Mitigation Option Case Studies*. Bogor, Indonesia: Center for International Forest Research (CIFOR), ISBN: 979-24-4660-5, 20-25 p.

³ See www.communitycarbonforestry.org

error, from preliminary sampling using methods outlined in the IPCC Good Practice Guide (Penman, *et al.*, 2003)⁴.

Table 1 presents the results of carbon assessment in the study villages where apart from conserving the existing forests and hence carbon stocks, most of the forests were found to sequester considerable amount of carbon over time. This is most encouraging given that there are no rewards for the carbon sequestered.

Table 1. Carbon value from five CBFM forests in Tanzania

Forest Name	Village Name	Vegetation type	Year	Carbon (t/ha)	CO ₂ (t/ha)	Area (ha)	Total CO ₂ (t)	Annual CO ₂ (t) Increment	Value (US\$) (at assumed \$5 per ton)
Kimunyu	Gwata	Miombo	2005	19.8	73.3	420	30,769		
			2006	22.1	81.8		34,343	3,574	17,871
			2007	19.5	72.2		30,303	(4,040)	(20,202)
Mangala	Ludewa	Lowland	2005	74	273.8	28.5	7,803		
			2006	74.8	276.8		7,888	84	422
			2007	87.1	322.3		9,185	1,297	6,485
Handei	Mgambo	Montane	2005	74.2	274.5	156	42,828		
			2006	77.4	286.4		44,675	1,847	9,235
Haitemba	Ayasanda	Miombo	2006	35.9	132.8	500	66,415		
			2007	36.6	135.4		67,710	1,295	6,475
Warib		Miombo	2006	15.5	57.4	50	2,868		
			2007	16.1	59.6		2,979	111	555

Source: Own field data

Forest Carbon Trading

Forest carbon trading is possible through the Clean Development Mechanism (CDM) of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC). Under the Kyoto Protocol, developed countries (called Annex 1 countries) are required to reduce their emissions of greenhouse gases to about 5% of their 1990 levels by the years 2008 – 2012. These countries can meet their reduction targets for CO₂ emissions in a variety of ways: through improved energy efficiency; by substituting fuels that produce less CO₂ and by using renewable energy sources. Although they can do such activities domestically, the CDM enables them to invest also in projects in developing countries (non-Annex 1 countries) and to use these to offset their reduction commitments. The CDM essentially provides a market mechanism for the sale of carbon credits, called Certified Emission Reduction Credits (CERs), from developing countries.

Most CDMs involve investment in energy conservation or renewable energy but certain kinds of tropical forestry may also be included. The term used to describe all activities involving bio-carbon under the Kyoto Protocol is ‘land use, land use change and forestry’ (LULUCF). It has been agreed that in the first commitment period (2008-2012), eligible LULUCF under CDM will be limited to afforestation and reforestation projects. These activities result in new, additional sinks through sequestration, in areas where there has been no forest in living memory or no forest since 31 December 1989, respectively. The option of reducing rate of carbon emissions by improved forest management and by avoided deforestation, i.e. the kinds of activities currently carried out under CBFM in Tanzania, is not eligible under CDM at present.

However, there is also an emerging ‘non-compliance’ or ‘voluntary’ market from private sector organizations that are interested in purchasing carbon offsets even if these are not officially certified by the UNFCCC. Most non-compliance projects involve tree planting at present, rather than management of natural forest. An example is the Dutch FACE Foundation (Forests Absorbing Carbon dioxide Emissions) established by NV SEP (The Dutch electricity generating board). This foundation is seeking to establish forest projects to sequester the equivalent CO₂ emitted by Dutch power companies. It has projects in Uganda, Malaysia, Ecuador, the Czech Republic and the Netherlands that undertake Enhanced Natural

Regeneration/Reforestation (ENR) of degraded areas with native species. FACE works with partners who are genuinely interested in forests and are able to plant and maintain the forests sustainably. An independent organization certifies the forests and verifies the amounts of CO₂ they store.

There are however one or two examples of non-compliance projects based on management of natural forest. In 1998, the New South Wales state parliament passed carbon right legislation allowing investors to record ownership of carbon rights sequestered in forest which has provisions for separate ownership for land, trees and carbon (Brand, 2002). Such policies are within the longer-term objective of the Australian government to develop a market-based approach that values biodiversity, water and carbon sequestration at a landscape level

CBFM, carbon payments and poverty reduction

The observed carbon stocks for the CBFM in Tanzania (Table 1) could potentially be traded through the non-compliance market. If carbon is priced at US\$ 5 per ton of CO₂⁵, we have estimated that an average village could earn US\$ 6,500 or TShs 8,125,000/= (at current exchange rate) annually from the sale of their forest carbon credits. The carbon being sequestered here is through avoided degradation and deforestation and not through afforestation or reforestation.

Currently most communities carrying out CBFM get certain access rights to fodder, firewood and poles and these form the only direct benefits that they obtain. Given the levels of poverty prevailing in many villages, this may not be enough of an incentive to get adequate participation from

4 Penman, J., Gytarsky, M., Hirashi, T., Krug, T., Kruger, D., Pipatti, R., Buendia, L., Miwa, K, Ngara, T, Tanabe, K and Wagner, F. 2003. IPCC Good Practice Guide for Land Use, Land-Use Change and Forestry. Institute for Global Environmental Strategies.

5 The future value of forest carbon in markets is not known. Currently carbon from energy projects markets at around US\$ 10 but since forest carbon is seen as temporary and because the credits have to be replaced later, the value will be much lower.



Villagers from Haitemba inside their village forest management area where significant regeneration has taken place leading to carbon sequestration. Photo by: Tom Blomley

local communities in forest management, since protecting the forest means losing out on other economic benefits that could be gained by forest clearance. The question is, whether payment for the carbon sequestered could make the difference, although in the long run, selling other environmental services, such as biodiversity and water protection might also be possible. The logical incentive package for CBFM would be to 'bundle' different forest services and sell them together, which would result in adding more values to CBFM projects and provide more benefits and tangible incentives to the local communities. An income of \$6,500 from carbon alone is a considerable incentive however.

The evidence from the field suggests that with good forest management (this comes easily with the right interventions package) greater benefits can be obtained through

ample opportunities for this (see Table 2) through Goal 4, operational target 4.7 and cluster strategy 4.7.2 and the appropriate intervention strategies.

Next steps

The Minister for Natural Resources and Tourism recently established a team of experts to lend advice regarding the possibility of accessing carbon payments from reduced deforestation and degradation in the country. It will be necessary to establish a mechanism for registering the carbon sequestered from the numerous forests being managed through CBFM and modalities would need to be initiated for local communities practising CBFM to access funds for the services they generate. In order to overcome the cost burden (transaction costs) the communities need to be connected directly to the buyers, through a trustworthy and dependable clearinghouse and also to conduct the measurements themselves. This has already been tested in Tanzania and other parts of the world in the *Kyoto: Think Global, Act Local* research project (www.communitycarbonforestry.org). A participatory methodology on carbon assessment and monitoring by local communities was developed. The methodology utilises mobile GIS technologies on handheld computers. Experiments were done in different sites to determine: to what extent villages could, after a short training: accurately map the forest area; stratify the forest by ecotype; accurately locate permanent sample plots using GPS; measure parameters relating to forest biomass in the field using standardized procedures; reliably record all this data, analyse the collected data, draw conclusions and, retrieve the permanent sample plots for future assessment. The study also aimed to assess to what extent and for what tasks additional (external) support needed for these tasks. Further the study explored the long-term prospects for villagers to be able to carry out such tasks and what risks such as lack of accuracy, cheating etc would be involved.

It was demonstrated that after a short practical training the villagers with support from the local forest field staff were able to take all the plot measurements necessary for forest carbon stocks computations (Table 1). The local communities were also able to retrieve and take plot measurements of the same trees in the following years.

The Kyoto project has demonstrated that the measuring of sequestered carbon in community managed forest, by communities is technically feasible and economically viable. The next step should be to

operationalise the payments to communities for this service and thus contributing towards both sound conservation and poverty eradication.

Table 2. Possibilities for poverty reduction through the National Strategy for Growth and Reduction on Poverty (MKUKUTA)		
GOAL 4: Reducing income poverty of both men and women in rural areas.		
Operational Target	Cluster Strategy	Intervention package
4.7 Increased contributions from wildlife, forestry, and fisheries, to incomes of rural communities.	4.7.2 Scale up Participatory Forest Management in all districts, as a mechanism for increasing income of rural communities from natural resources management.	Revisions of Policy and strategy, laws and regulations, enhance community management

Source: United Republic of Tanzania (2005) National Strategy for Growth and Reduction in Poverty Vice-President's Office, Poverty Eradication Division. June 2005

CBFM, and more carbon can be sequestered creating an upward spiral of incomes. The National Strategy for Growth and Reduction in Poverty – MKUKUTA provides