

Implementing REDD through Community-Based Forest Management

Lessons from Tanzania

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Abstract

REDD (Reduced Emissions from Deforestation and Degradation) aims to slow carbon releases caused by forest disturbance by making payments conditional on forest quality over time. Like earlier policies to slow deforestation, REDD must change the behaviour of forest degraders. Broadly, it can be implemented with payments to potential forest degraders, thus creating incentives; through payments for enforcement, thus creating disincentives; or through addressing external drivers such as urban charcoal demand. In Tanzania, community-based forest management (CBFM), a form of participatory forest management (PFM), was chosen as the model for implementing REDD pilot programs. Payments are made to villages that have the rights to forest carbon. In exchange for these payments, the villages must demonstrably reduce deforestation at the village level. Using this pilot program as a case study, we provide insights for REDD implementation in sub-Saharan Africa. We pay particular attention to leakage, monitoring and enforcement. We suggest that implementing REDD through CBFM-type structures can create appropriate incentives and behavioural change when the recipients of the REDD funds are also the key drivers of forest change. When external forces drive forest change, however, REDD through CBFM-type structures becomes an enforcement program, with local communities rather than government agencies being responsible for the enforcement. That structure imposes costs on local communities, whose local authority limits the ability to address leakage outside the particular REDD village. In addition, for REDD to lead to lower emissions, implementation will have to emphasize conditionality of payments on measurable decreases in forest loss.

Key Words: REDD, community-based forest management, leakage, Tanzania

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Elizabeth J.Z. Robinson, H.J. Albers, Charles Meshack, and Razack B. Lokina*

Introduction

Throughout sub-Saharan Africa (SSA), there have been numerous efforts to protect forests from deforestation and degradation whilst also addressing rural people's dependence on forest resources (Nilsson, 2005). These initiatives include integrated conservation-development projects (ICDPs), social forestry projects (Brown and Bird, 2008; Albers and Robinson, 2012 forthcoming) and payments for environmental services (PES), including REDD (Reduced Emissions from Deforestation and Degradation). Yet arguably these initiatives have had little success in meeting these dual livelihood-ecosystem services objectives. In many African countries, forest tenure reform policies are also being introduced; these similarly aim to improve the protection of forests whilst enhancing the livelihoods of those most directly dependent on forests (White and Martin, 2002). These reforms typically involve devolution of ownership, and/or the granting of improved access and collection rights for local forest users. The reforms have often been manifested in some type of participatory forest management, as in Tanzania, where community-based forest management (CBFM) in village forests and joint forest management (JFM) in government-owned forests are central elements of the 1998 National Forest Policy and the Forest Act of 2002 (MNRT 1998, 2002a, 2002b; Kajembe and Nzunda 2002; Robinson and Kajembe, 2009). Similarly in Kenya, forest reforms that originated in the 1994 Forest Sector Master Plan aim to move forest management away from a system of predominantly state-endowed power toward the inclusion of local communities' needs and priorities, in part through devolution of forest user rights (Slunge et al., 2011). In Ethiopia, a 2007 forest proclamation allowed for a number of institutional arrangements, including the joint

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ownership and control of forests by forest users, which is a form of community forest management (Mekonnen and Bluffstone, 2008).

Few comprehensive papers review of the impact of these reforms on forests and the livelihoods of those dependent on forests, in part because many of the reforms are recent. Some positive findings have, however, been reported. Wily (2002) suggests that “PFM is sufficiently widespread and effective in Africa today to be recognized as a significant route towards securing and sustaining forests,” with more than 30 African countries (as of 2002) having implemented or implementing PFM. Blomley et al. (2008) found that community involvement in forest management is indeed correlated with improving forest condition. Their analysis looked only at the particular forests under PFM and could not take account of leakage (displacement of forest extraction from the protected forest to other forests) at the landscape level. Lokina and Robinson (2011) find that, although PFM does appear to have improved forest quality in Tanzania, considerable leakage into non-PFM forests occurs and households feel that PFM reduces their access to forest resources.

There has been widespread introduction of various forms of participatory forest management throughout Africa. The implementation of REDD often occurs within these structures, with one aim the expansion of participatory approaches to forest management. Still, it remains unclear whether REDD implemented through PFM will succeed in creating the appropriate incentives and behavioural changes that are required to ensure the reduction in the aggregate rate of loss of forest biomass. Our experience and observations in Tanzania suggest some particular difficulties for REDD implementation in the region. First, much of the REDD literature has emanated from other regions, including a large literature based on South America’s experiences. Though important at a global level, this literature emphasizes deforestation policy discussions, whereas, in sub-Saharan African countries, forest degradation contributes an estimated one-third of biomass loss on the continent (Murdiyarso et al., 2008; Lambin et al., 2003). Although data limitations prevent a detailed accounting, those numbers could be higher in some countries. For example, degradation in central Mozambique contributes two-thirds of net biomass loss in that area (Ryan et al., 2011).

Deforestation and degradation occur through different processes. The main direct drivers of deforestation are generally agreed to be logging and the expansion of agriculture and infrastructure. Demand for wood fuels drives much of Africa’s forest degradation. Though the role of firewood in forest degradation is somewhat contested, charcoal dominates cooking energy choices in urban areas and is widely recognised to contribute to forest degradation. Successful

REDD in Africa must contain degradation, which requires changing people's fuel demand and production in both urban and rural areas (Ahrends et al., 2010).

Second, the overlapping land property rights common in many African countries create controversy over who owns the "rights" to the carbon stored in the forests and therefore the rights to benefit from the rents associated with REDD. Similarly, even clearly demarcated property rights do not solve problems of leakage/displacement of degradation and deforestation into forests that are not protected by REDD. Understanding the drivers of deforestation and forest degradation can help policy makers determine the likely response to REDD policies and improve policy design by addressing these drivers directly.

In this paper, we use Tanzania's REDD pilot scheme as a lens to consider whether REDD implemented through CBFM-type structures is likely to succeed. We suggest that implementing REDD following the approaches developed for CBFM has the potential to create appropriate incentives and behavioural change when the recipients of the REDD funds drive forest change. However, when other forces external to designated REDD communities drive forest change, REDD through CBFM becomes an enforcement program that faces similar issues to all previous "fence and fine" deforestation prevention programs. In addition, local communities rather than government agencies are responsible for the enforcement, and this imposes costs on communities whilst doing little to reduce leakage outside of the particular villages.

We structure the paper in the following way. First we provide a brief background to REDD and the role of forests in climate change in the context of sub-Saharan Africa. We next address earlier efforts to protect forests in low and middle-income countries and the extent to which they have been successful, focusing particularly on community-based forest management. We then consider how attention to incentives, enforcement, and leakage can improve the likelihood of successful implementation of REDD. We use the example of Tanzania, where devolution of forest management, participatory approaches to forest management, and REDD pilots are already well developed, to illustrate our points.

The evolution of REDD in the context of sub-Saharan Africa

Loss of forest biomass is estimated to account for between 12 and 17 percent of annual greenhouse gas emissions (van der Werf, 2009). Though forests sequester carbon while growing, they contribute to atmospheric greenhouse gas emissions when carbon is released through combustion of forest biomass or decomposition of the remaining plant material and soil carbon (Anger and Sathaye, 2008; van der Werf, 2009). These high levels of emissions motivated forest-

oriented climate change policies. The Clean Development Mechanism (CDM), part of the Kyoto Protocol that was adopted in 1997 and came into force in 2005, made afforestation and reforestation activities eligible for carbon credits. There was low demand for CDM forestry carbon credits, particularly in African countries, in part because of the complications surrounding leakage, permanence (the longevity of a carbon pool and the stability of its stocks), and additionality (paying only for carbon storage that would not have occurred without the payments). These issues remain of particular practical concern for REDD (West, 2010; Dutschke, 2010). Unlike CDM, the more recently proposed REDD allows carbon credits to be allocated for avoided degradation and deforestation – a slowed rate of forest biomass loss – in low and middle income countries. The more recent REDD+ provides for additional explicit consideration of sustainable forest management and afforestation/reforestation in developing countries, and therefore places REDD firmly within the scope of current forest reforms and participatory approaches to forest management. African countries appear to have embraced REDD, whereas CDM seemed to have little relevance for the continent. However, currently no firm commitments have emerged regarding how and to what extent to finance REDD, and so REDD initiatives in sub-Saharan African countries and elsewhere remain at the pilot stage.

REDD and its links to earlier forest conservation initiatives

Over the last few decades, governments and NGOs have pursued many initiatives to protect forest resources, including integrated conservation-development projects; social forestry projects; participatory forest management, encompassing joint forest management and community-based forest management; ecotourism; and PES programs, also called environmental services payments or ESP (Brown and Bird, 2008). Although REDD emphasizes avoided greenhouse gas emissions, success follows from reducing deforestation and degradation, just as in these earlier initiatives. Yet much of the current discussion of REDD policy provides no obvious reason why REDD will be any more successful than these earlier forest protection initiatives. In addition, because reducing forest loss has ancillary benefits, development and conservation groups increasingly emphasize REDD's potential to channel funds toward biodiversity conservation, forest-dependent countries, and possibly impoverished forest-dependent communities, which makes REDD projects even more like earlier forest conservation programs (Brown and Bird, 2008). In these earlier initiatives, many individual projects and policies have been deemed successful when the local communities have received benefits, but insufficient attention has been paid to forest outcomes. For REDD to lead to lower emissions,

implementation must differ from many earlier initiatives, possibly through the emphasis on conditionality of payments on measurable decreases in forest loss.

Many countries in Africa are now developing or implementing national REDD strategies. These include Ghana, Liberia, Madagascar, Tanzania, Zambia, and the Congo Basin (Minang and Neufeldt, 2010). However, there are few fully operational REDD programs in Africa as a whole, with most initiatives currently at the “readiness” or demonstration stage, and most of the countries involved lack technical and institutional capacity (Mbow et al., 2012). Many organizations have based pilot schemes on a type of participatory forest management approach that has already been implemented in the country.

Tanzania, one of the countries that is most advanced in implementing REDD, chose community-based forest management, a specific type of participatory forest management, as the natural model for implementing REDD pilot projects. By choosing to emphasize CBFM as a forest conservation tool, Tanzania implicitly recognizes the impact of villagers’ actions on forests and the importance of forests to villagers. Forest conservation policy in Tanzania thus grounds itself in the local setting rather than imposing more top-down or pure enforcement approaches to forest conservation. This approach is increasingly common in low-income countries.

Tanzania’s CBFM has two key objectives that link very closely to REDD+ objectives: to reduce loss of forests and forest degradation, thereby increasing ecosystem services, and to improve the livelihoods of local forest-dependent villagers (MNRT 1998, 2002a, 2002b).¹ Under CBFM, villagers take full management responsibility, setting and enforcing rules and regulations over the management and use of the forest, including the collection of forest products. Villagers therefore have considerable control over how they realize the value of the forest. However, due to high initial levels of degradation in forests designated as CBFM, many forest management committees imposed moratoria on collecting from the forests for five to ten years to allow the forests to regenerate, after which villagers can again extract through a sustainable community management scheme. These moratoria place burdens on local people, because CBFM rarely provides compensating rewards in the short to medium term while the forest regenerates (TFCG, 2009; Robinson and Lokina, 2011). Further, implementation of CBFM typically ignores how

¹ PFM has been manifested in Tanzania as community-based forest management for village forests and joint forest management of government forest reserves with catchments or biodiversity values.

CBFM changes villagers' incentives to use the nearby forests within the broader landscape, particularly given the high costs imposed on villagers and the low benefits in the early years of implementation. Enforcement of access restrictions has typically relied on voluntary patrols by villagers and encouragement of villagers not to degrade "their" forests, with mixed results, and with considerable leakage into nearby but less protected forests (Vyamana, 2009; Robinson and Lokina, 2011).

Critical issues for successful implementation of REDD in sub-Saharan Africa

Much of the REDD literature highlights the complexities of implementing REDD, including establishing baselines; monitoring deviations from these baselines; accounting for leakage out of monitored REDD areas; ensuring permanence; and clarifying who "owns" the carbon. Here, we emphasize that successful REDD must also imply changing forest users' behaviour, whether through incentives or disincentives. To change behaviour, REDD must aim at the drivers of deforestation and degradation. For example, if REDD cannot reduce total extraction of wood fuel for charcoal from forests, and thus address a widespread and dominant cause of forest degradation in sub-Saharan Africa, it cannot produce avoided forest degradation at the national level (Murdiyarso et al. 2008). The lack of attention to these topics hindered earlier forest initiatives such as ICDPs and joint forest management. Indeed, failures of many past forest initiatives imply that REDD cannot be successful without resolving these issues of incentives in order to change behaviour.

Monitoring forest degradation

Important direct causes or factors of forest degradation in SSA are wood fuels and non-timber forest product (NTFP) extraction, reflecting the high dependence of resource-poor rural households on forest resources (Campbell et al., 2007; Brown and Bird, 2008; Mercer et al., 2011). Conceptually, REDD payments based on the quality of the forest requires monitoring and assessment of the REDD forest. Researchers, policy makers, and practitioners, including the Tanzania-based NGO TFCG (Tanzania Forest Conservation Group), recognize that they lack methodologies for determining forest degradation. Indeed, in Tanzania's REDD pilot villages, avoided forest degradation is not incorporated into the system of carbon payments in exchange for avoided loss of forest biomass because currently there is no agreed methodology to measure reduction in forest degradation. The "Verified Carbon Standard" (VCS) methodology estimates and monitors GHG emissions of project activities that avoid unplanned deforestation (AUD) but excludes credits for reducing GHG emissions from avoided degradation. This lack of a method

for monitoring forest degradation creates several problems for countries where degradation causes much of the forest biomass loss. Thus, in Tanzania, currently no mechanisms link changes in levels of these activities to credits for reduced GHG emissions. It is true that baseline REDD activities and project activities in the pilot villages may include efforts to reduce degradation, such as limiting charcoal production in the natural forests. But deforestation and forest degradation may be linked. For instance, households might switch labour from activities that deforest to activities that degrade. In that case, ignoring degradation is particularly problematic for REDD (Delacote and Angelsen, 2011).

Recognizing the difficulties in measuring degradation (and even the baselines against which to measure the avoided degradation), some practitioners such as TFCG look for a model or institutional setting in which communities that manage their forests receive rewards for effort at the initial stage of REDD design rather than for performance. Given the difficulties with assessing effort, an alternative is to use proxies that indicate changes in degradation but do not rely on effort; instead, they rely on tangible measurable outcomes, even if these outcomes are tangential. For example, if the collection of fuelwood and charcoal cause the most forest degradation, then measurable changes in the use of fuelwood and charcoal from natural forests could proxy for reduced degradation. Other proxies could include the adoption of fuel-efficient stoves, sustainable production of charcoal using more efficient kilns, and the planting of fuel woodlots. However, such proxies present other issues because people may increase fuel use in response to fuel-efficient stoves or woodlots or may sell wood from woodlots, as the authors have observed in Tanzania's forests in Kibaha, located close to Dar es Salaam. This type of approach requires a good understanding of the amount of fuel that households in rural and urban areas use, how much of the fuel derives from forests, and how the use of forest-sourced fuels can be manipulated through technology, regulation, availability, or pricing. Further, it implies a national rather than village-level approach, which has implications for where REDD funds are spent. Though complex, such an approach is likely to be more straightforward than attempting to measure degradation directly (until satellite-based technologies for measuring forest quality become less expensive); may be more acceptable than an effort-based approach; and avoids the need to monitor and measure local-level leakage.

Leakage and permanence

In the context of REDD, "leakage" refers to any additional deforestation, forest degradation, or carbon emissions that occur outside of a REDD policy area in reaction to that REDD policy or project. For example, a project that closes a forest to villager collection of

NTFPs generates leakage if those villagers relocate some or all of their collection activities to other forests in response to the project. Indirect leakage occurs if villagers switch to purchasing forest products that others have collected from more distant forests for sale in the market. Given the global nature of carbon, calculations of the net carbon emissions reductions from REDD policy should include these potentially offsetting emissions. The necessity of measuring offsite deforestation and degradation implies monitoring beyond any specific REDD-designated forest. It also requires changing the incentives for individuals to relocate their forest use.

Leakage poses a central concern for Tanzania's REDD pilot projects, yet was a virtually neglected issue for PFM in Tanzania. Stakeholders working on PFM have naturally evaluated its impact on the particular protected forest. For example, Blomley et al. (2008) undertake a comprehensive assessment of PFM in Tanzania, comparing PFM and non-PFM forests. Recent research has found that, after the implementation of PFM, some villagers displaced, or leaked, their NTFP collection to more distant forests that sheer distance alone had protected in the absence of PFM in local forests (Robinson and Lokina, 2011). More broadly, evaluations of forest conservation policies such as parks have only quite recently begun to incorporate leakage into considerations of the policy's net benefit. For example, Ferraro (2002) found an intensification of resource use outside a park in Madagascar, and Lewis (2002) suggested that "concentrating previously dispersed ... activities into certain parts of the forest may actually increase the negative ecological impact". Tanzania Forest Conservation Group (TFCG, 2009) writes that "specific, community-level measures will be needed to reduce the risks of leakage from PFM areas to non-PFM areas. This could include a range of options that look more holistically at the use and management of forest resources at a landscape level and understand and address the drivers of deforestation".

Theoretical research suggests that the extent of leakage is a function of market access: in general, where products and labour markets function more efficiently, less direct leakage occurs, because villagers switch from relying on the forests to using markets; indirect leakage through markets, though, may be a problem (Robinson et al., 2011). But in isolated areas where markets function less efficiently or where the transactions costs of getting to product markets limit market access, direct leakage to other forests becomes a primary method of meeting demand for forest products. This direct leakage is likely to occur unless villagers are encouraged and able to plant trees or switch to biofuels, for example, to substitute for the lost access (Robinson et al., 2011). Where REDD-induced restrictions impose costs on villagers, REDD payments are designed to offset those losses. However, the resource demand may remain, for instance, in remote areas

where villagers are particularly reliant on forest biomass. In sum, leakage stems from unmet demand for resources following REDD restrictions and their enforcement.

To address leakage, the relevant landscape needs to internalize any displaced loss of forest biomass. Tanzania's pilot REDD program addresses village level leakage but leaves extra-village leakage and market-based leakage unaddressed. The extent to which the decision to choose the village as the relevant scale understates total leakage depends on the particular circumstances and the particular driver of forest loss. For example, the likely inelastic demand for wood fuels in SSA implies a high level of leakage. Both local and distant people still demand fuelwood and charcoal following REDD, and that fuel must come from some forest or plantation, which indicates a strong need to assess the location and amount of leakage in that setting, unless alternative sources of fuels are substituted for collected wood fuels. In contrast to charcoal as a driver of forest loss, when shifting cultivation and the expansion of smallholder agriculture into forests are key drivers of forest loss, as in many African countries, REDD projects to limit those drivers may have fewer direct spillovers beyond the village-level landscape.

Carbon stored in trees is eventually released back into the atmosphere, whether because trees eventually die or because trees are removed, and so permanence (inter-temporal leakage) is an issue for REDD. To address permanence, TFCG is working to integrate REDD into the traditional land use planning and participatory forest management approaches, and is encouraging communities to move away from shifting agriculture by introducing new agricultural technologies and approaches that also improve livelihoods. TFCG is also working with communities to establish village land registries that can formalize rights over village forest lands.

Some commentators have expressed concerns that, once a community has been paid for reducing emissions through reduced forest loss in any particular period, there may be no incentive to continue to protect the forest from degradation and deforestation in the future, particularly if REDD payments stop, implying high potential for non-permanence. However, Skutsch and Trines (2010) suggest that the imperative is not necessarily to ensure that conditions are created so that forests remain permanently, or at least until peak atmospheric carbon levels have passed. Rather, they suggest that the role of REDD is to slow down the rate of forest loss, and any year in which the average rate of loss is reduced below its baseline scenario represents a gain for the environment, "even if the original rate of loss is later resumed".

Enforcement and other costs of complying with REDD regulations

The total cost of providing additional avoided deforestation and forest degradation requires creating incentives to change the behaviour of all potential forest degrading actors. That group may include non-local people who are drawn to the area due to high forest quality resulting from the REDD project and people who have REDD or other initiatives in their forests that encourage them to “leak” their forest use to other forests. To create appropriate incentives, both “carrots” that provide rewards for not degrading forested areas and “sticks” that reduce the returns to degrading the forest can be employed. Yet recent forest policy discussions downplay the importance of enforcement, in part because of a shift from adversarial forest management approaches that rely on excluding people from resources to more cooperative approaches where communities participate in managing the forests (Robinson et al., 2010). Still, even within a regime of cooperative forest management like CBFM, enforcement remains critical yet under-researched. Even though REDD pilot villages receive payments to provide positive incentives to village participants, enforcement remains critical in preventing degradation by “outsiders” who are not eligible for project “carrots.”

The costs of enforcement, both in terms of the costs of equipped patrols and the costs of the conflict between groups, often go overlooked or ignored in determining budgets for forest protection initiatives such as REDD. The optimal enforcement literature based on Becker (1968)’s seminal paper finds that enforcement is rarely “perfect,” in part because, at the margin, the cost of a unit more of enforcement outweighs the benefits. In the context of protecting forests, enforcement budgets have typically been so low as to generate quite incomplete enforcement. When people are caught and punished, conflict can arise between those collecting forest resources and those responsible for enforcing extraction restrictions, who may come from the same community (Robinson et al., 2010). Both patrol and conflict costs of enforcement alter the outcomes of REDD policy but have received limited attention in the planning and implementation of REDD in Tanzania’s pilot projects. REDD payments to villages create incentives for villagers to enforce access restrictions on their own community and on outsiders who try to extract from the forest. Enforcement of community-agreed rules extends naturally from CBFM but enforcement against other extractors differs from community enforcement. In locations in which non-local forest extraction drives much of forest loss, REDD through CBFM leaves untrained and ill-equipped rural villagers in charge of property rights enforcement.

The TFCG/MJUMITA REDD project adopted an integrated approach to participatory forest management, land use planning, and REDD+ with a view to achieving better protection for those forests that are at immediate risk for deforestation and degradation. The CBFM-based

process has involved developing village plans for village land use and forest management, and the development of by-laws which are approved by the village assembly. The Village Natural Resource Committee enforces the by-laws, such as conducting patrols and fining the accused. However, we have found that, where payments have already been made to REDD pilot villages, in some cases none of that REDD payment has been set aside for funding enforcement activities. This omission implies that the only revenue available for enforcement activities comes from any collected fine revenue (authors' village-level meetings, 2012). This budget issue implies that some illegal activity must occur in order to generate revenue to cover enforcement costs (Robinson and Lokina, 2012). Even if patrols incur only opportunity costs of time, other enforcement activities require costly activities such as demarcating boundaries.

Overall, REDD payments can create incentives for a reduction in forest use. However, if those payments do not accrue to all potential forest users, incursions by non-REDD participants imply that someone must incur the costs of enforcing forest property rights. Implementing REDD through existing CBFM-type structures can alter local behaviours through incentives and disincentives. If, however, non-REDD participants drive forest loss, CBFM-based REDD can only be as successful as the villagers' enforcement against outside users

Creating incentives and distributing REDD benefits

A key problem for conservation initiatives has been, and remains, how to create the appropriate incentives for all forest users, including forest-dependent households, to conserve forest resources. The economics literature that addresses Integrated Conservation Development Projects has typically found a disconnect between conservation objectives and development objectives, with the latter rarely creating the direct incentives that are required for conservation by villagers (McShane and Wells, 2004). REDD attempts to make that connection by having payments conditional on forest quality. With REDD payments operating at the village level in Tanzania's pilot projects, however, questions remain about individual responses and incentives, in part because the costs imposed by REDD differ household by household, while payments to households within a particular village are equal.

Prior to a forest conservation intervention, typically many people extract from the forest, often *de facto* illegally and in an uncoordinated fashion. Forest use restrictions impose a cost on these individuals. Efforts to compensate villagers for the costs imposed by the intervention rarely reach all these villagers. For example, ecotourism benefits typically accrue to only a small fraction of the villagers living in and around protected forests, which limits the incentives for conservation by the local population as a whole (see Hughes and Flintan, 2001, for a literature

review; Behera and Engel, 2006; Ghimire, 1994; Johannesen, and Skonhoft, 2005; Ligon and Narain, 1999; Muller and Albers, 2004; Shyamsundar, 1996). We have similarly found that in some of Tanzania's marine protected areas, such as in Mnazi Bay, only a small proportion of fishers in any particular village received improved boats and nets or livelihood projects to compensate for lost resource access (Robinson et al., 2012).

Because of the external and potentially large levels of funding, REDD provides a new way for countries to realise more of the value of standing forest, and may therefore have scope to reach more people who are harmed by reduced access to the forest. That outcome will only obtain, however, if the funds create appropriate incentives across the landscape, both in terms of deterring people from using the resource and allocating compensatory benefits to align with incurred costs such that REDD targets are achieved.

The large academic literature on the management of common pool resources includes models and discussions of the role of institutions and incentives to cooperate, building on the seminal work by Ostrom (e.g. Ostrom, 1990; Ostrom et al. 1994; Ligon and Narain, 1999). The literature increasingly emphasises the potential negative impact of protected areas on local people and mechanisms to create incentives for cooperation by local people (recent examples include Ferraro, 2002; West, and Brockington, 2006; Albers and Robinson, 2010). A similar institutional issue arises with REDD payments made at the village level. Village community institutions must devise and enforce mechanisms to prevent free-riding on others' conservation actions, to create appropriate incentives for individuals, and to avoid elite rent capture.

CBFM in Tanzania struggled with the fact that the costs imposed on villagers due to reduced access to forest resources can outweigh the realizable benefits for villagers, particularly in the early stages of implementation. REDD funding could well provide sufficient funds to more than compensate villagers for the costs that REDD imposes. However, ensuring compensation to villagers for any costs imposed by the more restrictive access rules implied by REDD may be necessary but is not sufficient to ensure forest use change. Specifically, offering "compensation" does not ensure that villagers will change their use of the forests unless the conditionality of the compensation closely relates to each individual's losses from restricted forest use. In the early stages of REDD pilot implementation in Tanzania, however, the first tranche of payments have been based only on village efforts to undertake appropriate actions to reduce deforestation, rather than conditioned on changes in forest loss rates. This pre-payment considered that the time taken between implementing REDD and being able to demonstrate verifiable reductions in deforestation would impose unacceptably high costs on villagers and render REDD implementation infeasible. Whether the required conditionality of payments on decreased

resource use will develop prior to further payments remains to be seen, and with it, the ability of REDD to operate in a manner different from failed prior efforts to slow deforestation.

Benefit sharing is not a core explicit element of REDD. Indeed, conceptually, nothing stops a government from taking the REDD funds and using them to enforce new forest regulations that keep people out of the forests. Still, governments, NGOs, and communities widely perceive REDD as a policy that should improve rural welfare. This raises expectations about incentives rather than enforcement disincentives as the primary tool for changing forest use. Although pilot projects make payments at the village levels, practitioners in Tanzania, as elsewhere, are only now thinking through how REDD payments will be shared at the village level. Critical issues concerning the implications of specific sharing mechanisms on forest outcomes are under-researched in the literature. Questions remain as to whether individuals will be given cash or whether funds will be spent on village-level projects. TFCG are currently working with REDD pilot projects where villages choose how to allocate funds. There is considerable scope to explore how these choices shape the effectiveness of the REDD initiative.

In Tanzania, several financing models have been discussed that mirror those taking place in other countries preparing for REDD. They focus broadly on two financing approaches. One involves the establishment of a national REDD fund (or credits system) that oversees the transfer of financing from national to local levels, based on performance against a national reference level. There can also be sub-national scale approaches in which incentives flow to a sub-national government entity such as a state, municipality, province, or district, also based on performance against a reference level. The second involves incentives flowing directly to project developers based on performance against a project baseline. A combination of these two broad-based approaches is a “nested” approach, whereby payments can be made directly from the buyer to the seller (without having to be routed through a national REDD fund), but linking to and informing the national carbon accounting system. Some NGOs, including TFCG, prefer the nested approach because it has greater potential to ensure that benefits reach the local forest level managers – the REDD villages. It allows the seller of carbon credits, the village in this case, to negotiate carbon prices directly with private sector buyers and reduces the likelihood of carbon financing being diverted to what are perceived to be expensive or bureaucratic government systems. It should also ensure access to funds at the national government level. Critics are concerned that REDD will make only a small contribution to decreasing global emissions if it is integrated into carbon markets through offset markets (West, 2010). Anecdotal evidence suggests that Tanzania’s government has concerns that, if REDD funds flow directly to projects, it could lead to inequality, inasmuch as those living near REDD-designated forests would get

access to financial benefits that other people could not. Funds accruing at a national level to the government could also be used for adaptation strategies, given the evidence that climate change is already affecting African countries, and to address drivers that are external to the REDD villages, such as urban charcoal demand.

The current TFCG-MJUMITA model of REDD is based on direct payments to REDD communities. Payments for emission reductions are calculated on a village by village basis and are performance-based, commensurate with measurable reductions in emissions relative to a historical baseline. Emissions reductions are currently sold on the voluntary carbon market. Therefore, implicitly, the full rents from the avoided carbon emissions are paid to the villages, with no payments available for addressing drivers external to the villages.

Overall, effective REDD requires that all forest users face appropriate incentives that lead to lower levels of forest degradation and deforestation. Implementing REDD through CBFM-type structures implies that village level institutions determine the incentives that individual villagers face. Allowing villages to determine their benefit-sharing mechanisms, as in the pilot projects in Tanzania, earns plaudits for fairness and village self-management but also raises questions about whether individual villagers' incentives will lead to behaviour that creates large levels of avoided forest degradation and deforestation.

Concluding comments

REDD is to many a highly appealing way of bringing low and middle-income countries into global efforts to reduce climate change and a possible way of enabling reduced emissions at a relatively low cost. Yet implementing REDD, particularly in areas where poor households are highly dependent on forests for fuel, foods, and income, and where degradation is a significant part of forest biomass loss, is likely to prove difficult. Challenges include monitoring forest degradation; finding fuel alternatives for urban and rural households, and other methods of stemming leakage; enforcing forest property rights against non-REDD beneficiaries; and creating long-term incentives individually or through benefit sharing in ways that generate avoided forest degradation and deforestation in an equitable manner. To achieve its goals, ultimately REDD needs to address all the drivers of forest loss, both internal and external to forest-adjacent communities.

By focusing REDD payments at the village level and using the CBFM institution as a basis for implementing REDD, the Tanzania REDD pilot focuses on village-level behaviour changes. Where the key drivers of forest loss are local shifting cultivation, local expansion of a

smallholder farm, or local extraction of forest products, then an approach based on CBFM institutions potentially creates the necessary incentives for local people to alter their forest loss behaviour. Where forces external to the village drive forest loss, CBFM-based REDD puts villages in the position of becoming enforcers of forest rules against non-locals attracted to charcoal production, timber, or agricultural land. To protect the REDD forests and thus capture the REDD rents, the only option for the villages is “fence and fine” deforestation prevention programs, with local communities rather than government agencies responsible for the enforcement. NGOs such as TFCG strongly advocate enabling REDD villages to directly access REDD revenues generated from reduced emissions on village land. Others express concern that, if villages are able to capture the full value of the avoided carbon for their villages, there will not be REDD funds available to influence drivers external to the local REDD communities. Like earlier policies to slow loss of forest biomass, REDD must change the behaviour of all potential forest degraders, which implies changing the behaviour of both households living close to forests and more distant users of forests, such as urban households reliant on charcoal for cooking.

In addition to the issues of whether CBFM-based REDD adequately addresses non-village drivers of forest loss, the choice of CBFM raises other issues. Authority at a broader scale than the local community may better attend to controlling and monitoring of leakage. Also, non-village managers may have a better capacity than CBFM managers to generate permanence and measure changes in forest cover over long time periods.

Given the considerable uncertainties surrounding the impact on forest degradation and deforestation from REDD implemented through CBFM-type structures in Tanzania, some researchers and managers have suggested that REDD be implemented in forests that would be conservation targets for other reasons, such as catchment areas, high biodiversity forests, or fragile lands. REDD payments would strengthen Tanzania’s ability to protect these forests through enforcement of already existing, but inadequately enforced, access restrictions. This approach would produce REDD forests that provide ancillary ecosystem benefits, in contrast to the REDD-CBFM approach’s production of ancillary community welfare benefits. Focusing on these long-managed forests avoids the tensions that occur in the REDD-CBFM approach of sharing benefits with local communities that have traditionally used REDD-designated forests for extractive purposes. Still, although more effective enforcement provides new avoided forest degradation (additionality), issues of leakage, assessing changes in forest degradation, and patrol-community conflicts would remain.

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