Implementation of REDD+ Mechanisms in Tanzania

Paula Cordero Salas

The World Bank
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Abstract

This paper explains the major issues and lessons derived from the national forest management program and REDD+ initiatives in Tanzania. It finds that addressing the most important drivers of forest degradation and deforestation, in particular the country energy needs and landownership, is essential for success in reducing emissions regardless of the type of program implemented. It also finds that, through the national program, forest users have learned to maximize profit from the sustainable use of the forest; however, the program reports great variability in the success of forest conservation. REDD+ may complement the national program by adding funding and other resources to

start projects at the local level while giving additional payments for the permanence of carbon stocks may help to improve the social outcomes of those villages practicing sustainable forest management. However, a careful characterization of the national projects is necessary to generalize how REDD+ can be effectively implemented so that additional economic and environmental benefits are generated over what the national program is already achieving. Addressing this issue is key for identifying the conditions under which REDD+ achieves environmental additionality in Tanzania.

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1 Introduction

Reduction of carbon emissions from deforestation and forest degradation (REDD+) is part of the post-Kyoto protocol effort to mitigate climate change through the implementation of conditional incentives for the abatement of forest-based emissions. A REDD+ mechanism that offers enough incentives for participants to practice forest conservation without a deep third-party involvement—to be self-enforcing—offers a potential solution for reducing transaction costs and overcoming governance and institutional issues. However, the structure and sustainability of such a REDD+ mechanism depends on the informational and institutional gaps specific to the countries where REDD+ is implemented.

Developing countries play a key role for a successful large-scale mitigation effort from the global community. Among these countries Tanzania is a strong candidate for the implementation of REDD+ schemes. Tanzania has a well-established program for participatory forest management (PFM) (the katoomba group, 2009) and has started the REDD+ readiness process. With vast forest and biodiversity, Tanzania suffers from high rates of deforestation and forest degradation. The National Framework for REDD reports 412,000 hectares

¹The author is an Assistant Professor at the Department of Economics, Finance and Legal Studies at the University of Alabama. Tel.:+1 205-348-5633. Email address: pcordero@cba.ua.edu. Postal address: 361 Stadium Drive, 250 Alston Hall, Tuscaloosa, AL 35487-0224. This paper was prepared for the Development Economics Group of the World Bank as part of the project “Self-enforcing, Cost-effective REDD+ Contracts in developing countries.” Financial support was provided by the Bank’s Trust Fund for Environmentally and Socially Sustainable Development. The views expressed in the paper are the author’s alone and do not necessarily reflect views of the World Bank or its member countries. I am thankful to Dr. Eliakimu Zahabu for assisting in the planification of the activities in Tanzania and to Masota Abel for coordinating and assisting the interviews and field work. I also thank interview participants including collaborators at the Sokoine University of Agriculture and the Climate Change Impacts, Adaption and Mitigation program in Tanzania (CCIAM). I am also grateful to Catherine Porter for her contribution to this research on the role of organizations and to Mike Toman for very useful comments and valuable feedback.

as the rate of annual forest loss in the country, of the approximately 35 million hectares (TFWG, 2009; URT, 2012c). Therefore, implementing REDD+ may generate important benefits in terms of tropical forest conservation and long-term climate objectives.

Nevertheless, Tanzania faces some challenges for the implementation of REDD+. In this paper we explain the major issues and lessons derived from government forest conservation and REDD+ initiatives in Tanzania. We emphasize the concerns with respect to monitoring, enforcement and sustainability of REDD+ based on the criteria of parties involved in the REDD+ program in the country and how those can affect the implementation of REDD+ self-enforcing contracts. We interviewed stakeholders that are participating in the development and implementation of the REDD+ strategy at the national and district levels as well as in the PFM program. Interviewees included government officials and members of NGOs and international organizations. We also visited villages that have joined the participatory forest management program to obtain the perspective of land users. In addition, one of the visited villages is also a REDD+ pilot project which allows us to understand differences between the sole PFM implementation and the addition of REDD+ incentives.

We find that there is only a loose connection between PFM and REDD+. PFM is conceived as a government program that aims to manage the national forest stock in a sustainable manner. REDD+ brings additional payments for maintaining carbon stocks on top of the returns from sustainable forest management while improving social outcomes. Nevertheless, it is not clear what REDD+ implementation would achieve in addition to the PFM program. Some PFM projects report great success in forest conservation. In these projects, villagers have learned how to maximize profit from the use of the forest resource through technical support. As a result, communities have great incentives for forest conservation while improving levels of income.

Despite the favorable outcomes, there are still many PFM projects that are not successful in achieving conservation goals or delivering benefits to the villagers. A possible

explanation is the limited resources available to expand and sustain the PFM program. We observe that the REDD+ pilot projects have more resources for technical assistance and initial investments for social projects. Therefore, REDD+ may complement the PFM program in bringing additional funding and other resources to start-up projects at a local level. Even if REDD+ complements the national conservation program, more research is needed to understand the reasons behind its failures. A careful characterization of successful and unsuccessful PFM projects is required to generalize how REDD+ can be implemented effectively so that additional economic and environmental benefits over what PFM is already achieving are generated. Addressing this issue is key for identifying the conditions under which REDD+ has environmental additionality.

We also find that addressing the most important drivers is essential for any success in reducing deforestation and forest degradations regardless if it is through PFM or REDD+ programs. Charcoal making and shifting agriculture are the most important drivers. Over 90% of the energy consumed comes from the forest resources, wood and charcoal. The demand for charcoal is very high and keeps increasing with population growth and urban development. Firewood is also needed in massive quantities, especially in those regions where tobacco is produced. The reason for this is that energy sources other than charcoal and wood are scarce and very expensive. High tariffs and low investment on other fuel sources have restricted the development of the energy sector in Tanzania. A national strategy is necessary to address this problem through interventions like lowering tariffs for energy sources and improving the production of charcoal, for instance by introducing sustainable plantations for charcoal-making and the use of briquettes to produce fuel.

Addressing shifting cultivation is also key. Increasing farm yield and productivity will allow farmers to increase production without expanding the farmland. As a complement, it is important to decrease transaction costs of taking products to markets so that farmers can get better prices for their production. REDD+ pilot projects have incorporated technical

assistance and support for market linkages which has had good results. Additionally, it is important to look at household level data to explore the income dependency on forest activities.

Another major limitation for REDD+ in Tanzania is landownership. Most forests are on general land and even though villages are situated near to those forests and can potentially protect them, many villages do not have legal rights to their land. As a consequence, there are not incentives for forest conservation. The government has been surveying and registering villages around the country and giving them land tenure. Nevertheless, the process has not been a priority for the central government. Thus, lack of resources and discontinuity on the allocation of land use rights have characterized the process. REDD+ funding can potentially support the survey and registration process to resolve the land tenure problem that is key for the success of any forest conservation program as pilot projects have demonstrated. In addition, a map identifying surveyed villages and non-surveyed villages can be of great help to see what land is and will be out of the allocation of village land so that resources can be directed effectively.

REDD+ pilots and PFM have also shown that social norms within the villages allow for cooperation in forest monitoring and conservation. Villagers participating actively in performing the forest conservation duties are released from other duties in the community. These appointments change through time so everybody collaborates in the provision of forest conservation while everybody also receives the benefits. However, uncertainty of the international process on REDD+ provides perverse incentives as it is not clear if benefits of REDD will be delivered.

Finally, there are some concerns on how the money flows from the national structures to the local levels and villages. In addition, there seems to be large unrealized opportunity for improving practices and maximizing returns from land use reforms and conservation practices; in this sense it is not clear why the government does not access international loans

to implement these kinds of programs which will have great social benefits. More research is necessary to understand the issues that prevent the government from pursuing this strategy.

The rest of the paper is structured as follows. Section two describes the fieldwork and interviews. Section three presents a description of the REDD+ initiatives in Tanzania. Section four presents the lessons and challenges from forest conservation programs and REDD+ while section five presents some discussion and conclusions.

2 Description of the fieldwork and interviews

We interviewed stakeholders to identify the issues of greatest impact for the design and application of REDD+ self-enforcing contracts in Tanzania. The interviews took place between November 29th and December 7th of 2012. Participants were stakeholders that are involved at the national and local levels in the development and implementation of the REDD+ strategy. Interviewees included government authorities working at the national and local levels; NGO members implementing pilot projects; members of other institutions involved in the development of the REDD+ strategy; and members of academic institutions.

We also visited three villages in the Morogoro region that have more than 100 hectares of forest on their village land. All villages are part of the nine villages that have established PFM in the Kilosa district and have some knowledge of REDD+. However, only one of them is a REDD+ pilot project and it is assisted by an NGO, the Tanzania Forest Conservation Group (TFCG). We refer to villages that have only PFM established as PFM1 and PFM2 villages while we use REDD+ to refer to the village engaged in the REDD+ pilot project. In the next sections we contrast the perspectives on REDD+ and the challenges described by the interviewed parties. We first describe the REDD+ initiatives in Tanzania.

3 REDD+ initiatives in Tanzania

Various REDD+ initiatives are being implemented in Tanzania. The Government of the Kingdom of Norway is a major supporter of the agenda through a partnership and joint agreement with the Government of the United Republic of Tanzania (URT). The program has three pillars: research on climate change adaptation and mitigation, policy at the national level and the implementation of pilot projects. As a part of the research pillar, the Climate Change Impacts, Adaption and Mitigation program in Tanzania (CCIAM) is a 5-year program that has the objective *“to develop and sustain adequacy in national capacity to participate in climate change initiatives and address the effects and challenges of climate change with particular emphasis in REDD+ initiatives”* (CCIAM, 2012). The Norwegian government funds the program and collaborators include the Sokoine University of Agriculture (SUA), the University of Dar es Salaam, Ardhi University and the Tanzania Meteorological Agency in Tanzania, and the Norwegian University of Life Sciences through its Department of International Environment and Development Studies (Noragric) in Norway (CCIAM, 2012). The program components are research activities, capacity building and training, strategic interventions, and documentation and dissemination.

Research topics include mitigation and estimation of carbon content, socioeconomic aspects of REDD+ and the role of government and governance issues. In addition, some case studies on REDD+ and gender are being performed. The capacity building and training component grants full scholarships and funds research projects for 17 doctoral students and 51 masters students recruited from the government. Students enroll in one of the participating universities, have the opportunity to participate in an exchange program with the University in Norway, and their research and activities are attached to selected research topics within the nine pilot projects. As a part of the strategic interventions and documentation component, monitoring and evaluation teams are assigned to the pilot projects. In addition,

infrastructure and equipment are being improved through strengthening the Internet connection and GIS use, and improving facilities, laboratories, weather stations and machines to examine ocean measures. Finally, within the documentation and dissemination component, CCIAM transfers information generated from the CCIAM projects and the national REDD+ initiative to interested parties. A scientific conference and workshops are held to disseminate results and policy makers, researchers, academics and NGO members participate.

The second pillar of the program relates to the national policy that is in charge of the vice president's office and the Ministry of Natural Resources (MRT). As part of the national policy, the REDD+ task force was formed. It includes both of these offices as well as local governments, the Ministry of Agriculture, the Ministry of Gender and the Ministry of Finance. The goal is to coordinate national level efforts on the development of the national REDD+ initiative and on actions addressing the drivers of deforestation at the national level.

The third pillar is the implementation of nine pilot REDD+ projects in a period of three years. The project sites have been geographically identified and some of them are already working. The pilot projects include different ecosystems and different socioeconomic profiles. Non-governmental organizations (NGOs) implement and supervise the projects on-site while academic stakeholders perform research within the pilot projects. The primary activities of the projects involve exploring alternative economic activities and other sustainable activities in the forest, improving means of energy (the use and production of charcoal), sustainable agriculture, and addressing fire management. We explain the major challenges and lessons learned from the PFM implementation and REDD+ initiatives in the following section.

4 Lessons and challenges from REDD+ implementation in Tanzania

In this section we present the most important lessons and challenges highlighted by interviewed participants with respect to REDD+ implementation, drivers of deforestation and forest degradation, enforcement, monitoring and other institutional issues.

4.1 Forest governance

Land tenure is a fundamental issue in the implementation of forest conservation in Tanzania. Many threats to the forests depend on the tenure regime where the forests are. Most of the forests in Tanzania are on general land with open access (57% of area); as a consequence the uncertainty about land tenure promotes the unsustainable use of the resources and overexploitation.

At the national level, there are several laws aiming to address this issue but they are not coherent or consistent. The MRT in partnership with other ministries has made efforts in surveying village land and working with the villagers to establish land-use plans. Buffer zones have been established within the villages and forest management plans have also been established. For all this work, the national authority tries to involve everyone: villagers and the district government. However, it is still a slow process because there are not enough resources to complete the task. Only a few villages are registered and surveyed and the government has not prioritized this process. In fact, the past unwillingness of governments to transfer property rights to villages has been of concern in this process (Bluffstone, Robinson, and Guthiga, 2013). The registration and survey process is very costly and the central government argues that there is not enough staff to perform the task rapidly. Furthermore, government officials have concerns about their safety when performing these activities and complain about the lack of resources that they have. In addition, financial resources to

perform the registration task come often from external support through different projects, which slows down and discontinues the process. As a result, most villages are still in general land and have not been surveyed or assigned land user rights. Therefore, these villages do not have incentives to protect the forest.

In those registered villages, the communities through the village government, i.e., the village council, control the forest. Some villages are part of the government's PFM program through which they regulate forest use by establishing bylaws. The PFM program has two modalities: the Community Based Forest Management (CBFM) and the Joint Forest Management (JFM). The JFM program involves forests owned by either central or local governments on reserved land while the CBFM program is implemented on forests that are on village land. Through JFM the communities get user rights of state-owned forest land and the government and the communities co-manage the forests. In contrast, under CBFM the communities act as the managers and owners of the forest (URT, 2012c). An environmental or natural resources committee supports the village council and the community in the operationalization of the forest use. Decisions on land use and management practices are made by the village council and approved by the village assembly, which includes all adult women and men. At the household level, the head of the household, traditionally a man, makes decisions about land use. However, in the REDD+ village participants pointed out that nowadays decisions are jointly taken within the family.

Local governments generally assist the villages to establish forest management plans through PFM with the objective of addressing the problems of illegal deforestation for charcoal making and other uses. In the case of the REDD+ pilots, NGOs also assist the villages. The perspective of the NGOs is that REDD+ should work for the community. To achieve this, the NGOs often assist in the design of guidelines for forest management and create initiatives for community participation. For example, in the pilot project we visited in the Kilosa district the NGO set up baselines to identify which areas within the village land

boundaries were subject to deforestation and degradation and from which activities.

Procuring strong participation and extensive consultation of the villagers is key for the success of the forest management plan and the initiation of a REDD+ pilot project. Although the NGO assists the process, villagers must decide on the project objectives and guidelines. The process includes several meetings at the district, village and sub-village levels until all participants agree on the premises of the project.

A village land-use plan is established and areas or zoning for sustainable land use are defined. Within the village, the NGO works closely with the Environmental or Natural Resources and Land-use committees. Sometimes each committee has separate guidelines for land-use and forest management implementation and often these guidelines contradict each other on the expected outcomes. In these cases the NGOs help to combine the guidelines, which are shared with the local government and then are approved. Furthermore, a consolidated message on land-use+PFM+REDD is established. As the official party, the local government supervises the development of the REDD+ pilots and participates in the establishment of PFM and land-use management plans.

4.2 PFM and REDD+ connection

Tanzania has implemented PFM for several years. In 2006 there were 3,672,854 ha of forest under PFM management with 1,821 villages involved in such arrangements (URT, 2012c). PFM serves as base for the implementation of REDD+ because through it the Forest Act of 2002 gives local communities full ownership and management rights of the forest resource. That is, a village must have PFM established for initiating a REDD+ program so the village actually has the rights on the forest resource. If a village has not established a PFM scheme, the NGO starts by assisting in the creation of PFM using the national guidelines and with the participation of the district government. Within some localities, there are villages participating in PFM and others are also participating in REDD+ pilot programs.

For example, in the Kilosa district, nine villages are participating in PFM while one village is a REDD+ pilot program.

PFM aims to manage the national forest stock in a sustainable manner while REDD+ brings additional payments for carbon storage on top of the sustainable forest management while improving social outcomes. Although PFM also aims to improve social welfare for villages, the goal seems not to be as explicit as in the REDD+ framework in which the idea for implementers is to make REDD+ work for the communities. In fact, how benefits from forest management are distributed between the government and the communities has been a major concern in the PFM execution, especially in the JFM modality. Research shows that benefits to the villages participating in the PFM projects are not clear (Blomley and Iddi, 2009; Robinson and Maganga, 2009; Vyamana et al., 2008) and that households feel that PFM limits their use of the forest resources (Robinson and Lokina, 2011). Thus, the addition of REDD+ may improve PFM in delivering social objectives.

Solely from the climate change mitigation perspective, if PFM reduces forest degradation and deforestation to the socially optimal level, then REDD+ implementation would not be necessary. In fact, some PFM projects report great success in forest conservation. PFM experiences have been more successful in its CBFM modality than its JFM modality. Interviewees highlighted that the main reason is that there is not a clear sharing rule for distributing benefits between the government and the villages. Therefore, the incentives are not well defined for the community to protect the forest. In contrast, under CBFM villages have the rights on the forest benefits so that sustainable management maximizes people's welfare. Duru-Haitemba is an example where CBFM is working well as deforestation and forest degradation reversed once the villagers, who previously overexploited the forest, got secure² ownership and management rights (Blomley and Iddi, 2009). As in this case, managing the

²Secure ownership refers to that the villagers can enjoy the benefits of the forest conservation and management.

forest resources through PFM has given some communities incentives for forest conservation because through technical support villagers have learned how to profit-maximize the use of the forest resource. Villagers then wait until the optimal moment for sustainable timber harvesting in which environmental and economic goals are aligned. In this context, if the villagers drive forest change, REDD has the potential to create the incentives for forest conservation as Robinson et al. (2013) point out.

Yet PFM performance is quite uneven around the country and there are projects that are not achieving conservation goals. A reason may be that villagers keep exploiting forests because of the lack of alternative energy sources (Robinson and Maganga, 2009). In addition, PFM implementation may cause significant leakage as villagers may displace forest exploitation into non-PFM forest (Robinson and Lokina, 2011). Understanding the reasons why PFM is or is not successful and how its implementation affects non-PFM forests are key for determining the role of the REDD+ programs. For instance, an important problem that PFM faces is the lack of resources to be expanded and sustained. PFM start-up costs are high and although the government has channeled resources through NGOs and local governments, implementation is still limited and weak. The role of REDD+ in this context may be as a source of funding and resources to start-up PFM projects at a local level. Nevertheless, other issues can also determine the success or failure of PFM projects. We discuss factors mentioned in the interviews and to gain more insight on this we contrast the perspective on PFM and REDD+ of the three villages we visited.

4.3 Drivers of deforestation and forest degradation

Perceived risk of deforestation and forest degradation (DD) exist for all woodland in the country. Table 1 shows the most common drivers mentioned in the interviews. Land ownership and location were stated as the most important determinants for DD. Land ownership affects forest conservation throughout the whole country. General land does not have any

Table 1: Major drivers of deforestation and forest degradation

Economic activities	Institutional, cultural and others
<ul style="list-style-type: none"> -Illegal timber extraction -Charcoal-fuel wood production -Shifting cultivation and burning -Livestock and grazing -Commercial farming -Mining in coastal areas 	<ul style="list-style-type: none"> -Land property rights - Urban development and human settlement -Cultural wildfires

user rights assigned and it is public land; this characteristic facilitates forest deforestation as everybody can exploit it without much control from the government.

Moreover, the lack of land user rights deters people from participating in forest conservation. The problem is pretty obvious when REDD+ pilot projects are initiating; when property rights are not defined people are not willing to participate. Even in pilot projects where a registered village has a plan for land use, there are concerns about the uncertainty in recognizing the land rights in the long run. This is especially true in productive areas that can attract conflicts between large agriculture and subsistence use of land. For example, multinationals can get land from the government for biofuels activities and extensive farming displacing villages. In past experiences the government has granted the land use to these companies without licensing and they only extract the resources without generating much food or employment. Furthermore, communities have many immediate needs and rent their land to multinationals that end up displacing communities without solid land-use rights.

Other drivers depend specifically on the location of the forest. For example, illegal timber extraction for building or exporting is an issue in particular locations and near urban developments. Regions such Ninga and Taboga have tree varieties that are highly valuable for furniture and are illegally harvested. Foreign investors have been observed buying illegal timber derived from those valuable species. Nevertheless, other interviewees stated that all trees that are usable for charcoal making are in danger.

A consensus among the interviewees exists that areas close to cities are in major distress. Urban expansion requires more land to be converted to this purpose. It also induces rural-urban migration which increases land conversion for human settlement. Besides requiring additional area for expansion, cities like Dar es Salaam and Arusha generate high demand for charcoal. Cities and towns across the country lack alternative energy resources and rely on charcoal use for energy. Charcoal can also be exported from Dar es Salaam which increases the opportunity cost of forest conservation in this region. Part of the charcoal comes from forests that are on general land that does not have any protection. Even when forests are on village land near the urban areas, villagers that have the land-use rights find it very difficult to protect the forest because charcoal pirates are able to obtain charcoal produced with wood from those forests. For instance, regardless of the established management plan, charcoal making was mentioned as a major problem in the PFM2 village. Although, some charcoal is produced legally and following forest management regulations, it is impossible to differentiate charcoal produced from legal and illegal sources.

Forests near new access roads are also at great risk. For example, there are new infrastructure projects in the southern region and in the central region close to Tabora. Previously with no access forests were intact but with the new road access exploitation is highly likely to take place. New access roads decrease transaction costs for exploiting the forest resources but also allow for population expansion, already discussed as an important driver. Human settlements are also putting additional pressure on land use and forest conservation in rural areas. For example, the Kilosa area is receiving ethnic groups that have built housing within village land without permits of the villages' general assembly.

Moist forest was also mentioned as being at high risk due to agricultural activities. Moist forests are near to catchment areas which are an excellent source for irrigation. Agriculture is fundamental for the livelihoods of many Tanzanian. About 80% of farmers are small, cultivating on average 2 hectares of land (URT, 2012a). In the visited villages in-

habitants cultivate produce for own consumption and for commercial purposes. Maize is commonly grown and is mostly for own consumption while the surplus is commercialized in the local market. Other products grown are rice, beans, cassava, groundnuts, peas, banana, sorghum, plantain, simsim and other fruits. But villagers use rudimentary agricultural practices as do most farmers around the country. These poor agricultural practices affect soil fertility. As a consequence most farmers practice shifting cultivation and convert forest land to agricultural land constantly. An example is the REDD+ village where shifting cultivation was mentioned as the major driver of deforestation and forest degradation. Subsistence farmers also practice slash-and-burn which is an important source of CO₂ released and that often results in uncontrollable forest fires. In fact, inhabitants have an appreciation for these wildfires because they have a cultural meaning. Traditionally it is believed that the longer the fire stays the longer you will live.

An additional problem farmers face across the country is the lack of proper access to markets. The lack of market access and high transportation costs reduce the returns from agricultural commercialization and make producers more vulnerable to price changes. Villagers in PFM1, PFM2 and REDD+ villages sell some of their products at the local market; but they also must sell to intermediaries that pay lower prices. For example, there is not a centralized market in village PFM1 so that a middleman goes house to house buying villagers' products. Producers in PFM2 also sell to the intermediaries that come to the village to buy. Villagers argued that the prices a middleman offers are not stable and vary a lot which make it difficult to know the value of their production. Inhabitants of the REDD+ village are able to take some production to the district market of Kilosa when the roads are transitable by bicycle. Prices are more stable and higher in the district market, increasing their returns. However, in the rainy season, when roads are not usable, villagers depend on the middleman to sell their products.

On the other hand, large commercial farms were also mentioned as an important driver

in some areas of the country. There are large-scale investors for agricultural production that have worked with the government to create a development corridor for these activities. As already mentioned, the government has granted permission to use general land for this purpose.

Miombo forest near grazing areas was also mentioned as at risk. Livestock and grazing also represent a threat, especially near river basins, while mining is an important driver in the coastal areas, threatening mangroves. In fact, mining law surpasses all other laws and it is argued that there is no transparency in mining contracts. As a consequence coastal ecosystems and mangroves have suffered irreversible damages.

Although most interviewees did not have a clear idea about the economic returns of the major drivers of deforestation and forest degradation, they stated that returns are very high in those areas close to the cities given the demand for housing and especially for charcoal. The returns on agricultural activities vary according to the crops cultivated, gender and level of education. The value of subsistence farming is not as high as if it was for commercial purposes. Generally, women grow subsistence crops such as beans and vegetables while men grow cash crops that are sold in the markets. Therefore the returns are higher for males than females.

While economic returns induce villagers to exploit the forest, there was a common feeling that wealthy and powerful people are those who drive deforestation and forest degradation in Tanzania. From the demand side, interviewees stated that available electricity off the grid is too expensive even for wealthy people to afford. As a consequence these people demand more charcoal as a substitute. From the supply side, these wealthy people are business individuals that hold monopsony power when buying charcoal, timber and agricultural production from poor households. Therefore, they get most of the returns of the activities. Villagers confirmed this when they stated that they normally sell the production to the middleman. An interviewee characterized the situation as “Poor people deforest because they

are being used by the big lords.” A middleman sells the charcoal at a price ten times more expensive than the price he pays to the poor household. These people take advantage of the poor people’s lack of means to directly sell in the consumer market as well as the lack of education.

Initiatives to address the most important drivers are highlighted by the government. On agriculture, the country has engaged in significant agricultural reforms as part of the Agricultural Sector Development program (ASDP). The objective of the ASDP is to transition the agriculture sector from subsistence to export agriculture through a variety of approaches (Derksen-Schrock and Leigh Anderson. 2011. Tanzania: Agricultural Sector Overview. EPAR Brief No. 133. Evans School of Public Affairs, 2011). For example, subsidies for fertilizers and improved seeds have increased in the country (URT, 2012b). Although conventional wisdom may say that these subsidies are not so great, in combination with technical assistance subsidies may serve as a tool for introducing uneducated farmers to the effective use of strategic agricultural technologies such as the proper use of fertilizers. As explained below the REDD+ project has achieved good outcomes through interventions that involve low-cost fertilizers and technical assistance. Other efforts include initiatives to link smallholders to markets (Pica-Ciamarra et al., 2011). In the case of charcoal production, a proposal for using special bags that identify legally produced charcoal has been considered, but not implemented yet. This initiative may help to determine the charcoal origin; nevertheless there is always the possibility that it will be easy to counterfeit the bags. In addition, there are plans to build a gas pipe at the national level that can supply alternative energy. However, this has not been done yet.

On the other hand, the REDD+ program is implementing research initiatives and activities in the pilot projects for addressing drivers of deforestation and forest degradation. Correcting shifting agriculture is important not only for forest conservation but also because it is the best strategy to maximize farmers’ returns. To achieve this, REDD+ projects

have interventions to identify the best uses for the land and to educate the farmers to maximize land productivity. As an example, the CCIAM team has partnered with two international fertilizer companies to improve the use of fertilizers and minimize the use of tillage. Multidisciplinary teams from different institutions work with project participants in the utilization of these more efficient techniques. The results have been an increase of yield and increased adoption on the use of fertilizers.

TFCG has also implemented minimum tillage and terraces in pilot projects in Kilosa and Lindi. They have involved about 20 households in each village who have increased significantly their productivity on maize production. In addition, there is an effort to link producers to new markets. For instance, producers from Kilosa have been taken to a national fair so that they can present their products and network with potential buyers.

Finally, sustainable agriculture such as beekeeping and other small businesses other than agriculture are among the alternative activities that are being introduced into the REDD+ communities. For example, in Kilosa, villagers have engaged in beekeeping and sell the honey at the local and national levels.

The local government has also provided assistance to villages enrolled in PFM to improve agricultural productivity and engage in beekeeping as an alternative economic activity. But the amount of resources dedicated to it significantly contrasts with what is available in the REDD+ village. Nevertheless, there is some success. As the REDD+ village PFM1 has been successful in beekeeping; but the lack of necessary tools and access roads to get the honey to the markets has been an impediment for this activity to be successful in PFM2.

With respect to charcoal making, projects are improving production of charcoal. In one of the interviews it was pointed out that 70% of the potential charcoal is wasted due to inefficiencies during the production process. To improve efficiency, projects are implementing better techniques for charcoal-making. On the demand side, an improved fuel stove has been introduced in the pilot project in Kilosa. Improved cooking stoves are performance based

and reduce charcoal consumption. The improved stove only needs two pieces of wood instead of 20 cwt. Furthermore, villagers are being taught how to build the stoves in town and this generates additional business activities.

The implementation of PFM and REDD+ at the national level is the main effort to regulate timber extraction. At the village level, all projects have a management plan that guides the use of the own forest. Firewood collection is allowed under the forest management plan in all visited villages. Firewood comes from deadwood and it is normally used for own consumption. In the REDD+ village, firewood is mostly collected from the established transition zone.

Yet, the experience on how timber extraction is managed differs among villages. Inhabitants of PFM1 stated that they are not extracting timber from their own forest anymore because the PFM program does not allow them to do it. In fact, they argued that since PFM was established, external buyers for timber and charcoal do not come as often looking for these products anymore. Villagers buy timber from a market that is located 50 kilometers away at a price of 5,000 TSH/ 2x6 piece of wood (US\$3.04).

In the REDD+ village, timber extraction is allowed for own consumption of building poles. Commercial supply of building poles is also allowed following the management plan. A transition zone has been established for these purposes but licenses are required for extracting timber; the license costs 500 TSH/piece (US\$ 0.30) if the timber is for consumption of the villagers while it costs 1,000 TSH/piece (US\$ 0.60) if the timber is for commercial purposes or for consumption of external people to the village. The price for a 2x6 piece of timber is 3,000 TSH/piece at the village level while 7,000/8,000 TSH/piece in the Kilosa market. After paying the commercial license, the net benefit from selling timber at the village level is 2,000 TSH/piece (US\$ 1.22) while the net benefit from selling timber at the district market is 6,000 to 7,000 TSH/piece (US\$ 3.65 to US\$ 4.26). While benefits from selling timber in town are accrued by the villagers, intermediaries normally get the benefits from selling the

timber in the Kilosa market.

In village PFM2, timber extraction is supposed to be for own consumption. However, forest products are also collectively sold to finance village's needs. In the transition zone no permits or licensing are needed while nobody is supposed to exploit the forest in the protected zone. A villager can get up to 10 pieces of timber without a license, but needs to give back three of them for village use. If an external person is interested in getting timber from the village, he must contact a forest officer at the district level and must get approval from the village after paying a fee. The price of a 2x6 piece is 10,000 TSH/piece (US\$ 6.09). Although villagers first argued that the management plan was followed, it was not clear if some timber extraction was allowed in the protected zone. Furthermore, they also pointed out that charcoal is still produced for commercial supply. For example, one medium tree is equivalent to one bag of charcoal, which can be sold to an intermediary for 8,000 TSH (US\$ 4.87) or can be sold along the roads for 13,000 TSH/bag (US\$ 7.92). There was some ambiguity on the strict compliance of the management plan when it came to the charcoal making and timber extraction.

In addition to managed timber extraction, villages have started to use the forest for landscaping, especially for educational and research purposes. For example, the REDD+ village charges a fee for researchers to visit their village and forest. This is not the case for all villages though. PFM2 participants argue that their forest is too far away and tourist and research activities are not viable.

4.4 Monitoring

Monitoring of forest conservation takes different forms depending on the involvement of the organization. From the national perspective, there is an effort to build capacity for monitoring, reporting and verification (MRV) from the central government to the bottom as a part of the REDD+ institutional development. The National Forest Resources Monitoring

and Assessment project (NAFORMA) is being established to monitor carbon changes. An FAO forest inventory is being used to set up the baseline while satellite imaging, biomass measurement and GPS are being used for verification in the field and for filling any gaps in the forest inventory. The government has also worked closely with NGOs to develop MRV protocols that will be taken to the villages where local people will be trained to use them.

National level teams also perform visits at the district and village levels to monitor forest conservation; but it is clear that local governments and NGOs have a very important role in REDD+ monitoring. In fact, the local communities essentially perform the monitoring tasks with random supervision of other parties. Local governments and NGOs work closely with the village leaders and environmental committees.

NGOs often use satellite imaging and remote sensing technology to set up a baseline for the village forest. NGOs normally have a station in the vicinity of the villages and use local monitoring of trees through their personnel working closely with the communities. Thus, monitoring is performed at a small scale according to a list of indicators/outcomes for specific activities. NGOs use project managers at the village level to report the outcomes through emails/phone communication and scheduled visits. The monitoring visits are random and every year there is monitoring and evaluation of each project relative to pre-established outputs.

The local government monitors forest conservation by keeping records of permits and also working closely with village committees. The environmental committee acts as the authority at the village level and keeps records and collection of licenses. The process of monitoring forest conservation from the point of view of the local government is as follows. The village patrols the forest and if somebody is found illegally harvesting, the patrol fills out a form reporting illegal activities and issues a fine. A copy of the report it is sent to the district office that keeps a record of it. The local government also uses some funds from the central and district governments to assist in remote patrolling through collective

participation.

Villagers perform monitoring tasks on a more daily basis. Following forest management plans, the community works together to maintain the forest protection and to apply the bylaws. For example, as a part of the management plan in the REDD+ village, the forest boundaries have been defined, the forest has been marked as conservation land and a baseline on forest mass has been established. In general, within each village some people have more conservation duties than others. For instance, in village PFM1 households located near the forest have more responsibilities for forest protection while the rest of the community performs non-systematic random patrols. In the REDD+ village the environmental committee, formed by 12 people including 3 women, patrols the forest at least twice a month. Environmental committees are also in charge of patrolling the forest in PFM1 and PFM2.

In addition, in the REDD+ village, NGO carbon officers train village members to measure carbon stocks. Patrols randomly monitor the forest by using GPS technology and measure the carbon storage. These measurements are taken back to the NGO's office to feed an Excel sheet. The goal is to collect data on carbon storage per year and feed the carbon storage model to look for trends in the village's carbon storage. This method will allow for measuring additionality and also to sell the carbon credits in the market. Furthermore, some projects are performing experiments to calculate additionality. In these experiments, part of the village forest is leased for uses other than forest reserve while the rest of it is separated for conservation. The leased forest serves as a control to estimate additionality with respect to what the forest under conservation achieves. Once this has been calculated, the results are taken to the district level to share with other stakeholders.

Although important advances have been made for the MRV systems, several issues were mentioned as limitations for monitoring. Interviewers claimed that it is difficult to measure the progress because people do not understand the protocols and the usefulness of developing

such a system. There are also governance issues at the national level where political tension between offices about who is responsible for the use of the financial resources has been observed. Moreover, consistency in the estimation of carbon stocks is concerning because there are different measurement protocols which lead to inconsistent estimations of the carbon stocks. In addition, the carbon-monitoring center is expensive and it is not clear from where the funding will be obtained for long-term functions. As well as financial resources, there are not enough human resources that can perform MRV tasks at the national level. In this sense, there are no sharing mechanism established that can give some idea on how funding is going to be distributed from the national level to the local levels and cover everybody's needs. A sharing mechanism is very important because transparency in the use of REDD+ funding is key for the success of the program. If villagers believe the government is keeping most of the resources, they may be reluctant in performing under REDD+ commitments. In this sense it is not clear how monitoring is going to be implemented in the future.

Moreover, as monitoring is done at the local level by the civil society, there is no feedback on the lessons learned from the pilot projects to the government. The monitoring depends on the availability of resources at the different villages and districts, which are also scarce. In fact, monitoring costs were mentioned at the local level as a major issue.

Monitoring costs at the local level can be divided in three: starting costs, cost external to the village, and village's monitoring costs. Starting costs are the initial investments to characterize the business-as-usual scenario. These costs are very high. The first thing is to demarcate the forest; there are about 1.3 million hectares of forest in the country and only one-third of it, about 400 hectares, has been demarcated as forest. Once the forest is identified, a baseline must be set as well as establishing remote sensing and training personnel to use satellite images. There is also a cost for monitoring the financial mechanism through which payments for conservation are implemented.

The monitoring costs external to the village are also substantial. Monitoring costs

from the national perspective or at the district level are very high because there is a need for capacity building and training while the personnel would have to cover long distances to patrol and fuel and staff costs. Monitoring costs at the local level are related to the scale of projects because transaction costs are high. Staff is the major monitoring expense for the local government and NGOs. A local NGO stated that the monitoring budget was set to \$30,000 which includes personnel, living costs and transportation. Although the NGOs have staff to perform these duties, they believe it is significantly costly. In the case of the local government, funding from central and district governments is used to patrol. However, there are claims that local offices do not have enough staff to execute the task; for example in the Kilosa office there are 36 officers but only 10 guards for forest patrolling. Furthermore they only have one vehicle and do not have enough resources to contract independent forest officers that can perform the monitoring.

At the village level the costs of management and monitoring are also high. The costs include having transportation, usually a bicycle, packing lunch and spending the time patrolling. Patrolling can take villagers up to two to three hours at the minimum, depending on the area they monitor. This is a big issue because within the projects, the people that monitor forest conservation do not get paid; although monitoring is their community task, villagers have to patrol under poor conditions. In some PFM villages there are strong committees that monitor forest conservation; but the income villagers receive is very low; thus the incentive for forest conservation is only the future value of the forest. Villages get money from fines according to the bylaws but fines are not more than 50,000THS (US\$30.45) depending on the value of the forest. Furthermore, patrollers can get revenue from bribes which influence the level of effort put in monitoring and enforcement activities (Robinson and Lokina, 2012). In non-PFM villages there is not much monitoring so there is more illegal timber extraction.

When comparing monitoring costs with the value of forest products, the parties have

different views. Some consider that the monitoring costs are low with respect to the value of forest conservation including environmental services such as water and non-timber products. This is especially true when the environmental committees at the village level perform the monitoring. For example, the forests of PFM1 and REDD+ villages are very close to town, which implies that the monitoring costs can be very low if the forest utilization is high. The monitoring costs are also related to the type for forest. For example, in Kilosa the monitoring costs are high with respect to the carbon payment but in Lindi, the costs are low with respect to the carbon payment. The reason is the difference in opportunity cost of the land and the time of the villagers.

4.5 Enforcement

There is a consensus among interviewees on the difficulty of enforcing forest conservation and REDD+, especially until the major drivers of deforestation and degradation are addressed. At the national level the government is responsible for compliance and the National REDD Task Force is in charge of the execution. The problem is that there is no legislation that can guide enforcement. Because of this, some argue that REDD+ enforcement is not possible.

When lack of performance in carbon sequestration is detected at the national level, the implementation continues and NGOs try to find alternative interventions that may stop deforestation. However, some projects allocate to villagers the same amount of money regardless of compliance; in other cases there is not a specific plan that stipulates the actions to follow when forests have been deforested.

The government often confiscates illegal timber through checkpoints along the roads; nevertheless, corruption has been detected in the confiscation process which undermines the enforcement effort for forest conservation. Moreover, it is very difficult to distinguish which timber is legal when it is being transported. An identification certification for legal timber should be issued but in many cases it is not implemented.

At the village level, there are processes that must be followed to enforce forest conservation. The bylaws are applied when forest degradation takes place. The actions depend on the norms of each village. For example, a patrol arrests a person who is believed to have committed illegal harvesting. The offender is taken to the office, the timber is confiscated and the person is locked up for 24 hours. Fines are usually 50,000 TSH per piece of timber and the village keeps most of this money. If the crime deserves a fine higher than 50,000 TSH or the person is a repeated offender, the person is taken to a court at the district level.

Parties involved at the local level and villagers stated that fines are enforced in the projects and that there has not been much problem in enforcing forest conservation at the village level. In fact, inhabitants of the PFM1, PFM2 and REDD+ villages believe that the laws and norms in the bylaws are working well and are followed consistently. However, other parties, especially those at the national level, pointed out that the fines sometimes are not reported and people do not apply the bylaws either because bribery is involved or because of relationships with members of the community. In this context, patrol members face tradeoffs when enforcing forest conservation. Enforcement effort can diminish patrollers' revenue whether from fines or bribes as Robinson and Lokina (2012) show. Even more, enforcement effort can also decrease patrollers' social capital. For instance, the offender could be a family relative and enforcement could create tensions within the social network; as a result enforcement is unlikely to happen. Another mentioned example is that people that start fires are taken to the office and supposed to get a fine, but it does not happen. Therefore, even though NGOs work closely with the pilot project and monitoring committees on a daily basis, reporting and application of rules is not always complete. This situation highlights the need of governance improvement at the village level so that monitoring and enforcement can be effective.

Other identified problems are that fines are too low and that bylaws are not approved to the required level for them to be enforceable. The fine size in these villages is consistent with

the level of fines that has been observed in poor countries in which fines are low relative to their social cost (Robinson, Kumar, and Albers, 2010). Having the appropriate fine size and allocating the fine revenue to the villagers can provide the right incentives to enhance forest quality and at the same time improve the villager's livelihoods as Robinson and Lokina (2011) find. Nevertheless, policy makers face tradeoffs between forest protection, illegal extraction and revenue generation when funding enforcement and monitoring depends on fine collection (Robinson and Lokina, 2011). On the other hand, if an offense is too big, the person is taken to the local government office to be processed at the district level; the district authority highlighted the following process. When the offense is reported, paperwork is filled out and the timber is confiscated. If the offender agrees on the committed crime, the offender pays the related fine. If the person disagrees on the crime, he is taken to the police and then to the court. The process depends on the court, which must account for the damage to the forest. The problem is that the court system is slow and at the end fines are very small relative to the crime. Therefore, a lot of people prefer to not admit the crime and go through the court process. The legal process takes years to be resolved and although in most times the offender is found guilty, they pay very little money so it is better to take the case to court from their perspective. Many stakeholders consider this as a big problem; furthermore, from the NGOs' perspective this process is not clear and it is not followed consistently.

In some of the pilots there is another institutional layer that is used to enforce forest conservation. It is called the Community Users Network and it is a legal entity that operates parallel to the village governments. It includes inhabitants of three villages with CBFMs that are located near each other. The network oversees the compliance of bylaws by all villages. Members are trained and develop skills to analyze compliance. If there is lack of compliance on the part of one of the villages, it is reported to the NGO and the district level authority. Villages not conforming are talked to and asked for performance. If they do not do it, this is advertised in the media, so the approach functions as a reputation mechanism.

4.6 Viability of the use of contracts and the effectiveness of REDD+ payments

Informal agreements are more commonly used in Tanzania. Binding written contracts are desirable because they give investors confidence on the outcomes of the carbon sequestration projects and then more resources may flow to the country. However, interviewees argued that written contracts are not being use for REDD+ because they do not work. For example, contracts were signed for one of the pilot projects; the problem is that there is no legal base for them to be binding which created a big conflict with the central government. Having binding contracts is very difficult for two additional reasons. First, villagers normally do not understand contracts and all villagers would have to participate in the contract because the community owns the forest. Second, the court system is very weak and it is very unlikely that contracts can be enforced.

On the other hand, how to set up payments including the size, the periodicity and to whom to pay are major issues to resolve if the desire is for REDD+ incentives to work. A perspective is that the payment mechanism must be set up as a national policy so that people in each country where REDD+ is implemented should decide how and to whom to pay. There are two views in Tanzania on who should get paid. One view is that REDD+ funding should be use to pay communities that make conservation efforts as most surveyed forests are on village land. The second view is that all communities in the country should be paid equally. Most people share the first point of view. That is, at the national level payments should depend on the public good generated and according to the conservation effort. Furthermore, payments must be designed to change behavior; thus, payments should ideally be performance based and differentiated. Others also argued that payments should by according to forest dependency and account for the opportunity cost of the land and the time spent in forest conservation tasks.

Following these arguments, some projects are implementing pilot payments for conservation. An example is the payment for environmental services in watershed areas. Academic partners and the CCIAM team have also proposed an alternative payment scheme that is implemented at the pilot level by NGOs; feedback on the performance of such payments is produced as a way of testing. Once the payment is made to the village, the community has bylaws through which they decide how to use money from REDD+ and whom receives payments at the individual or household level. The bylaws, approved by the village assembly and the district government, determine the revenue sharing rules within the village. The sharing rules must be tested before approval from the district level and have the objective to establish a mechanism for sharing the benefits from REDD and involve all community participants in the decision-making process. In this way, there is transparency and participation in the establishment of the revenue-sharing rule so that villagers have incentives to use guidelines to enforce bylaws so that the system works.

The ideal is that payments reflect opportunity costs or forgone income. In fact REDD+ projects are using payments to compensate for returns of alternative economic activities. However, the success of these payments depends on the location of the project. For example, in Lindi project managers argue that the REDD+ program pays more than shifting cultivation while in Kilosa shifting cultivation and charcoal-making give higher returns than the REDD+ payments. A bag of charcoal in Kilosa is sold for about 10,000 TSH and an individual can sell ten bags per week. REDD+ programs only give 10,000 TSH per household member per year to up to six members in a family. That means that at the most REDD+ payments can add up to 60,000 TSH/year/household, which is much lower than the charcoal making returns. Given the returns of alternative economic activities in Kilosa, a REDD+ program is not sustainable in the long run if payments are not higher.

Interviewees also mentioned several constraints to implement performance based and differentiated payments on an individual basis. First, it is not viable or practical because

the logistics would be too complicated and the institutional capability does not exist. An additional land reform would also be necessary to make individual payments as most land is under village control. Therefore, payments should be at the village level and must be under village governance. Even at the village level, paying according to conservation efforts or opportunity costs is difficult because they are self-reported. Another concern is that differentiated payments will certainly marginalize poor people because, as usual, wealthy people have the means to capture rents.

At the village level the payment should also be related to the effort level; if a household invests more in forest conservation, it should get paid more. However this is not possible because the forests are on village land and belong to all village members. Therefore, everybody has the same right over any conservation payments and everybody should be paid regardless of the effort supplied. In current projects, payments go to the village government and they must be distributed equally among villagers according to the approved bylaws. An example of the rules is that a person has to live at least for 5 years in the village to receive a REDD+ payment; or a person must be older than 18 years old to be eligible for a REDD+ payment.

As Bluffstone, Robinson, and Guthiga (2013) point out, there are major complexities related to compensation mechanisms and forest governance for REDD+ in the context of “community controlled forests”. The way that individual households are compensated within such communities may erode the existent social capital and the systems through which communities have administered their forest (Bluffstone, Robinson, and Guthiga, 2013). Differentiated payments can create a conflict between villagers and eventually can induce people receiving lower payments or no payments to exploit the forest illegally. Therefore, a balanced approach must be used to deliver payments within the village so that rewarding people must be harmonious. Even within the household there could be conflicts depending on how the payment is distributed. For example, conflicts may arise if the head of the

household, the male, receives the payments but who performs the conservation duties is the woman. Cultural tradition determines who the head of household is. In some areas of the country villages are traditionally matrilineal societies while in others the males make decisions according to custom. Pilot projects have taken this in consideration, however a balanced gender approach is proposed when setting up the project in which both females and males participate and are paid equally. Some villages have adopted this policy and women are more likely to participate in village meetings so there is more interaction. In the REDD+ village participants pointed out that nowadays decisions are jointly taken within the family. Female participation seems to be stronger in this village relative to the others. The REDD+ program has a gender component that may be influencing the bargaining balance between husband and wife within the household and also the gender interaction at the village level. Female members of the households have also received REDD+ payments that have given them confidence and empowerment.

Although differentiated payments are not possible within the village, pilot projects are paid according to performance. That implies that they are paid differently depending on the carbon sequestered. The projects also collect data on carbon storage so it can be sold in the carbon market. Furthermore, NGOs are trying to develop the mechanism to monitor and sell carbon through carbon enterprises at the local level (e.g., TFCG in Kilosa).

Finally, there are high expectations about the benefits and the money derived from REDD+. Local people may have high expectation about REDD+ payments but they may not receive what they are expecting. This has important implications for the sustainability of the program: if expectations do not match what they receive, villages may stop participating in forest conservation initiatives.

4.7 The role of organizations

The organizations involved in the REDD+ program may be key to its success. Each type of organization faces separate and unique difficulties and there exists a variety of opinion on who could best implement REDD+. For example, the national government has infrastructure that stands in a better position to implement REDD+ at the national level. An implementation plan supported by the national government would also likely be less expensive. However, the national government also faces significant hindrances. Those interviewed voiced concerns over corruption, political volatility, lack of resources, and the lack of commitment to the REDD+ implementation process.

At the local level, a whole new set of advantages and challenges arise. Obviously the local government faces an advantage over central government in its proximity to participating communities. This could make implementation and monitoring easier and more accurate. However, there exists a conflict of interest between the local governments and the goals of REDD+ projects. Since the local government collects taxes from the sale of forest products, any sort of forest management programs have the potential to affect a considerable source of income for these local governments. They also would have no incentive to monitor the forests if the money were to go directly to the community. In contrast, if the money were to go directly to the local governments, some villages expressed significant wariness and distrust of the local government, questioning why the local government would need the money and what it would purchase. Some villagers did say local implementation would be fine, but added they felt as if the government did not remember they existed. Clearly at this level of organization, trust is a characteristic of great importance to the landholders. Benefits of more local interaction and ease of monitoring need to be balanced with the lack of rapport the local government has with surrounding villages before any realistic plans can be made involving local government oversight of REDD+.

International organizations and NGOs face similar advantages and disadvantages. The

primary advantage NGOs have is their ability to attract unique human resources. Interviewees characterized those working for NGOs to be dependable, invested in the community, and trustworthy. Some villagers preferred NGO implementation because of the education and community-building capacity associated with NGO involvement. The very hands-on approach employed by NGOs in conjunction with the importance placed on forestry awareness and education makes most NGOs unique in their level of involvement, dedication, and genuine concern over issues the communities face.

While NGOs have been beneficial in Tanzanian communities for building trust and awareness, they also face significant costs, particularly in start up and continuity of the projects as they need to set up an office and maintain the personnel. Local NGOs expressed a desire to do much more, but admitted they were limited based on available resources.

Almost directly opposite to the NGO is the private firm. There is a definite lack of experience with private firms and the reason highlighted for this is a considerable lack of trust due to past experiences. Past experiences were typically characterized by firms promising money in exchange for natural resources, extracting the resources, then leaving without fulfilling their promise.

The final category is that of community organization. Most REDD+/Participatory Forest Management (PFM) pilots are currently operating at this level, with some interaction with agencies like local NGOs and limited local government involvement. The advantages gained through organization of the community into a self-implementing, self-monitoring, and self-enforcing entity are that the villages are provided with important knowledge directly relating to their conservation efforts, as well as specialized training in areas such as monitoring and establishment of a baseline. In addition, costs of enforcement would conceivably be lower as compared to other options like national government intervention, if only purely due to costs associated with travel to remote areas. Involving the community, even at some basic level, is valuable in its empowerment and human capacity building. In addition, payments

directly allocated to villages rather than the government or local agencies would be beneficial, as communities expressed greater trust in village council management of funds than outside management.

Nevertheless, there are some drawbacks related to the community participation, specifically in terms of resources. Villages expressed a great need for materials like raincoats and rain boots if they were expected to adequately monitor the forests and ensure compliance. The communities would also still need to undergo training. Lastly, there is still the issue of property rights. Only if villages are registered and recognized REDD+ can be implemented.

5 Discussion and Conclusions

Tanzania has great potential to collaborate with the international community in achieving climate change mitigation. The country has implemented a forest management program, PFM, with the objective of administering the forest resource. With successes and pitfalls, the program serves as a base for REDD+ implementation. In this paper we have discussed the lessons and challenges derived from the implementation of PFM and REDD+ initiatives in Tanzania. Land tenure is a major constraint for forest conservation. There are many villages whose land has not been surveyed and is classified as general land. The uncertainty about land tenure promotes the unsustainable use of the resources and overexploitation. Thus it is absolutely necessary that the process of surveying and registration of villages is complete so that an appropriate forest management plan can be developed at the national level.

The REDD+ initiative has dedicated some resources to aid the government in this process when establishing the pilot projects. These projects have been successful to plan for land use that works in the short term; however, there are concerns about the uncertainty in recognizing the land rights in the long run. This is especially true in productive areas that can attract conflicts between large agriculture and subsistence use of land. Directing

additional resources at the national level for registering villages can speed up the process of establishing forest management plans at the local level and give more security for REDD+ implementation in the long run.

Addressing direct drivers of deforestation and forest degradation is also necessary to achieve successful forest conservation. As 90% of the energy consumed comes from wood and charcoal, a national strategy addressing the availability and costs of energy is essential to reduce the pressure on the forest resources. The strategy should tackle the problem from several avenues; for example, finding alternative energy sources, lowering tariffs for alternative energy sources such as liquefied petroleum gas (LPG) and developing infrastructure to distribute such alternative sources of energy around the country; also, introducing sustainable plantations and better techniques for charcoal-making, implementing a measure such as special bags to identify illegal and legal charcoal; and broadening the use of improved stoves that are being tested in the REDD+ pilot projects. The MRT has been working with NGOs and the Ministry of Energy on some of these initiatives. The government should allocate additional financial and human resources to perform these activities.

Additional technical assistance is also necessary to increase agricultural productivity and reduce land conversion from forest to agriculture. For instance, as a spillover of the REDD+ pilot projects, farmers have adopted the use of fertilizers and have improved their agricultural productivity. Previous to the pilot programs and the CCIAM intervention on the use of fertilizer, farmers did not have the knowledge about how to use fertilizers and how much to use. Some of them would apply too little to see any effect in their yields. The great uncertainty that farmers faced about the results of use of fertilizers made shifting cultivation the preferred technique, which caused deforestation problems. After observing the results of those farmers coached through the REDD+ initiative, more farmers are adopting the use of fertilizers. Furthermore, the research from the project has shown that the farmers have the willingness to pay for the fertilizer, they just need technical assistance to learn how to use

it and obtain positive results. In this sense, the challenge is how to expand the activities from pilot projects to other communities around the country and disseminate in an effective manner the results of improved agricultural practices on agricultural productivity at the village level.

In terms of monitoring and enforcement of forest conservation, community involvement is key. This is especially true for reducing monitoring costs. At the national level, the establishment of the National Forestry Resources Monitoring and Assessment of Tanzania (NARFOMA) will allow measurement of carbon emissions and that may help to reduce monitoring costs. Training and building capacity can cut transaction and monitoring costs. Once a monitoring scheme is set up and the projects are established, the cost will potentially be less. If community involvement were high in PFM villages and land tenure is resolved, villagers would feel that they own the forest and they will patrol the forest using local resources; in this sense, the social capital at the village level can be used to reduce monitoring costs.

Nevertheless, solidifying village involvement will require education efforts through which people learn about the added value of the forest. In successful PFM and REDD+ projects, training and education in conservation practices and sustainable forest management was given to villagers. In general, communities in these projects state that forest conservation is important and villagers are well aware of the environmental services derived from forest protection. Some of the environmental services they mentioned are: watershed protection, rain, plant and animal diversity, fresh air, and protection from wind/erosion. Participants in the REDD+ pilot pointed out that before the project was established conservation was not important. The difference is that with the project villagers now have the rights to the forest. That is, they have the responsibility to manage the forest and incur the protection costs but they are also entitled to the returns of sustainable forest harvesting, licensing and carbon payments. Solving the land tenure problem and training and education have been

indispensable for villages to engage in successful conservation practices.

Improving trust and governance at the village level is also necessary for reducing monitoring and enforcement costs. That means that rules and protocols should be applied. Finally, training more people in REDD+ monitoring and involving more the local government may help to reduce monitoring costs.

Payment structure is another important issue to be resolved for successful REDD+ implementation. There is consensus that communities that are involved in conservation effort must be paid. However, it is not clear how funding is going to flow from the national government to the villages. Furthermore, differentiated payments are possible between villages, as pilot projects have shown. Yet differentiated payments within villages may create a conflict between villagers and eventually may induce people receiving lower payments or no payments to exploit the forest illegally. Therefore, a balanced approach must be used to deliver payments within the village so that rewarding people must be harmonious. Furthermore, high expectations about the benefits and the money derived from REDD+ must be managed adequately. If villages receive lower benefits than what they expect, they villages may stop participating in forest conservation initiatives, threatening sustainability of REDD+. In addition, an agreement from the global community on the future of REDD+ is necessary to create trust at the local level for future performance.

Finally, organizations involved in forest conservation and REDD+ face advantages and disadvantages. REDD+ success would result from the actions of partnerships between the national and local governments; NGOs and community groups within the villages. The ideal strategy starts with strong central government oversight for REDD+ at a widespread, national level. Next would come involvement of NGOs or local government at the local level to provide initial training, education, and support. After providing initial assistance, these agencies might then act simply as liaisons between the national level and the community level, so as to reduce costs associated with verification without jeopardizing the veracity of

reported compliance. In the long run the communities would be largely responsible for most implementation at the village level after drawing on initial local support. Periodically, local agencies could verify compliance and report on the success of each community.

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