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The Contribution of REDD Pilot Project to Community Livelihoods: A Case Study of Kondoa District, Tanzania

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Abstract

Tanzania has been implementing a project to reduce emission from deforestation and degradation (REDD). The REDD pilot project has been considered as a viable option in enhancing conservation and community livelihoods. Moreover, the contribution of REDD to community livelihoods has not been critically investigated. This study attempts to fill this information gap by using a case study of Kondoa District. The study use mixed methods to capture information from the field, including household surveys, focus group discussions, and key informant interviews. Quantitative data were analyzed using Statistical Package for Social Science (SPSS), while descriptive and content analysis were used for qualitative data. The findings reveal high awareness of the REDD pilot project by the communities. It was further observed that the REDD project has contributed income to the community from carbon sales, improved agricultural production, and has introduced income generating activities. The study concludes that for the REDD project to be successful, community participation should be strengthened in planning and designing strategies for the REDD project. It further suggests that for the REDD project to gain more support from the community, tangible benefits and more income generating activities should be given priority.

Keywords; *REDD, community, livelihoods, Kondoa District*

Introduction

Developing countries are currently in the process of establishing reduced emission from deforestation and degradation (REDD) initiatives to be able to meet the new climate regime and benefit from opportunities that REDD potentially presents. Currently, Tanzania is exploring and identifying a range of actions from pilot activities to address the drivers of deforestation (URT, 2010). The needs of local and indigenous communities should also be addressed when action is taken to reduce emissions from deforestation and forest degradation (UNFCC, 2008). Being one of the nine countries piloting

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the United Nation's REDD programme, Tanzania developed a REDD strategy in 2008 with the assistance of the REDD secretariat in the country (Burgess et al., 2010). It aims to reduce emission from deforestation, and degradation, to enhance forest carbon stock and to deliver livelihoods benefits to forest adjacent communities by rewarding them for forest conservation. There are now a number of ongoing REDD activities in the country. In addition, there is a capacity building, where UN-REDD programme in Tanzania is working in collaboration with the World Bank institute, the Forest Carbon Partnership facility and the agro-forestry centre, to conduct training and workshop on the opportunity cost for REDD (UN-REDD, 2010). Through the initiative there are several pilot projects currently going on in the country, for example in Kilosa, Lindi, Meatu, Pemba and Unguja. In these districts, community members have been practicing shifting cultivation and extraction of other forest resources, for example firewood and charcoal (Government of Norway, 2009). Kondoa District is one of the REDD pilot project by the name of "advancing REDD in the Kolo Hills forests" involving about 18,000 hectares implemented in several villages. The Project aims to reduce greenhouse gases emission as a result of deforestation and degradation. At present, REDD is seen as an opportunity to enhance support for forest conservation as well as promoting sustainable livelihood options as a way to minimize pressure on forest resources. It is argued that REDD system could offer benefits to poor people particularly in terms of increased stable and long-term financial and non-financial benefit flows to rural areas (Peskett et al., 2008).

However, the likely impacts of REDD on forest dependent livelihoods particularly the communities adjacent to the forests in rural areas, has not been critically addressed. Both climate change itself and related policies are likely to have wide- ranging effects on local communities in rural areas, particularly in developing countries (Terry, 2009). To date, forest dependent communities in rural areas have hardly featured in the international policy discourse, including UN-framework convention on climate change and its Kyoto protocol (Terry, 2009).

Current discussion on socio- economic impact of REDD is weak, with respect to community livelihoods in rural areas (Gurung, 2009). The rural communities may suffer especially from the inappropriate solution for climate change, which are being negotiated internationally. In addition, there has been inadequate empirical evidence to test this fear. Indeed, the contribution of the pilot project against its set objectives remains unclear in assessing its effectiveness (Terry, 2009). Therefore understanding the contribution of REDD on community livelihoods is important before the

implementation of a robust policy realized. This study assessed the contribution of REDD pilot projects to community livelihoods in Tanzania using a case study of Kondoa District. Specifically, the study assessed the local communities awareness of REDD projects in Kondoa district, examined the contribution of REDD projects to local communities livelihoods and suggests way to improve livelihoods benefits from REDD projects.

The Theoretical Review

Overview of REDD Projects in Africa

In sub-Saharan Africa (SSA), there have been numerous efforts to protect forest from deforestation and degradation especially in addressing rural communities' dependency on forest resources for their livelihoods (Nilson, 2005). Loss of forest in SSA is estimated to account for 12 to 17 percent per hectare annually. This causes an increase of greenhouse gas emission (Van der Werf, 2009). Through establishment of forests plantations can contributes to carbon sink which reduces the rate of emission of greenhouse gases. The REDD projects has been established and implemented in sub-Saharan African countries and elsewhere in the world. REDD in many ways can be described as a mechanism to address global market where by carbon has become a commodity that pay the forest owners for managing their forests (Gurung, 2009). It is also conceived as a simple instrument of tracking the rate of loss of forest areas and rewarding reduction in rate of loss through reducing emission from deforestation and degradation (Skutsch, 2011).

In Africa, several countries are now developing or implementing national REDD strategies. These include Ghana, Liberia, Madagascar, Tanzania, Zambia and the Congo (DRC) (Minang & Neudefeldt, 2010). Some of these REDD projects are fully operational in Africa, for example in Zambia, Ghana and Tanzania. However, most initiatives are still under pilot stages. Angelsen & Hofstad, (2008) noted that sustainable implementation of REDD projects require great link to poverty reduction and the improvement of livelihoods of rural communities whose life depends solely on forest resources. Indeed, clear property rights to determine the right and responsibility of landholder for transaction and land tenure user rights are very important for positive REDD outcomes (Angelsen, 2009). For sustainability of the REDD projects, payments for environmental resources and services in the communities may demand co-owners of common property, private or state owned land and the performance of community related forest project initiatives.

In Tanzania, the consideration of REDD project implementation is a result of National forest management policy reform of 1998 and the Forest Act of 2002 that promotes financial compensation for avoiding deforestation and

degradation by reducing the unwanted activities in the forest resources (URT, 2010). The reformed forest policy and Act emphasize about the importance of ensuring that people in rural areas adjacent to the forests, voluntarily participate in and benefits from REDD projects as an approach to enhance forest management and reduce poverty in rural areas (URT, 2009). The REDD projects should present opportunities to create new benefits from forest resources to local forest managers and incentives in exchange for the carbon credit (IPC, 2007).

However, the extent of how REDD strategy affects stakeholders participation in forest management and contribute to poverty reduction remain unclear: at the same time, sustainable forest management continues to surface in on-going international climate change regime (Schmidt, 2009). This poses the challenge whether REDD implementation will succeed in creating appropriate incentives to support local livelihoods that will ensure the reduction in the rate of loss of forest biomass (Ryan et al., 2011).

REDD and Livelihood

The livelihood approach dates back to the work of Chambers in the mid-1980s, and the concept was later developed to sustainable livelihood approach by the British Development for International Development (Collminar & Gamper, 2002). Livelihood comprises the component of capability, assets (Stores, resources, claims and access) and activities required for means of earning a living (Chamber & Conway, 1992). According to Ellis (2002), the concept of livelihoods is widely used in relation to poverty and rural development, and considered as a means of living. The livelihoods concept is adopted to express the complex processes and factors affecting livelihood of rural people. The concept linked well to the study, as REDD intends to deliver tangible benefits such as income from carbon sales, sustainable supplies of household products such as fire woods and poles from dry woods, conservation benefits at local level which might be associated with ecotourism (Vyamana, 2009). It is designed to play the role as an alternative to top down state managed approach which has been proved over the years to be associated with limited effectiveness in natural resources management (URT, 2011; Makupa, 2013).

Methods

The study was carried in 2014 in Kondoa district, Dodoma region, Tanzania (Fig. 1). The district was considered worth for the study because of being among the REDD pilot project districts in the country; and thus its contribution to rural livelihood could be easily assessed**.** The district is located between latitude 4 -12^0 and 53 -85^0 South, and longitude 35-6^0 and 36- 2^0 East of Greenwich (URT, 2009).

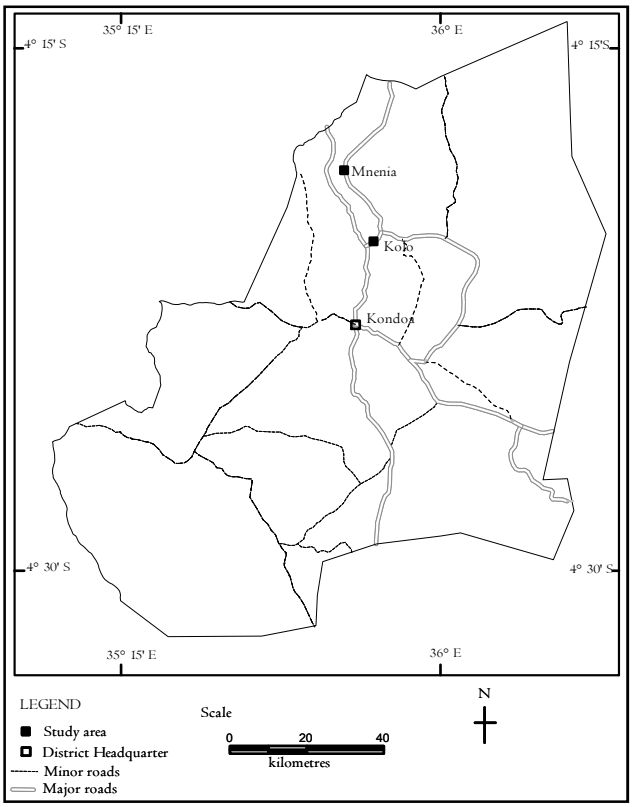

Figure 1: ***Study Area Map***

The district covers a total area of 13,210km^2, of which 50.5% is suitable for agriculture, 25.5% is under natural pasture, 16% under forest reserve, and the remaining 8% comprises of urban areas and water swamps (URT, 2012). More than 80% of the district population is employed in agricultural activities. According to the population housing census (URT, 2012), a few people are employed in formal sectors, while the majority are involved with livestock keeping and doing small businesses (kiosk type). Specifically, the study was carried in two villages, namely Kolo and Mnenia of the Kolo ward. The study villages were selected purposively based on the consideration of villages that are involved in the REDD project.

The sample size for household survey was obtained through the use of Slovin's formula, $n= N/1 +Ne^2$, where n is the sample size, N is the total number of households in the area, and e is the margin of error. Based on this formula, a total of 80 households in two villages was obtained, which presents 5% of all the households found in each of the village (Table 1).

Table 1: Sample Size

Village	No of households per each village	Total Sample size per each Village
Kolo	564	40
Mnenia	713	40
Total	**1277**	**80**

The simple random technique was employed to obtain actual household to be surveyed in the study area as the method provides equal chance for all households in the study area to be included into sample (Evans et al., 2000). The study also interviewed 8 key informants who were selected accordingto their title/job position in the study area; and were thought to be more knowledgeable about the study topic. These included village leaders from two study villages, REDD project coordinators, and district officials. Six focus group discussions were also conducted; three from each study village. Group participants were selected based on age and gender; and were categorized into three groups (youth, adult, and elders)so as to effective elicit information that respond to key research questions and capture dynamic view of respondents perception of REDD based on their age and gender. Quantitative data from the household survey were coded, entered into SPSS software for data analysis; while description and content analysis were used for data obtained from group discussions and interviews.

Findings and Discussion

The study had a total of 80 respondents of whom 80% were males and 20% were females from both villages. The reasons for male to participate more in this study could not be established. However, this could have happened by chance. Regarding the age of the respondents, the majority of the respondents (93.5%) were aged between 18 and 55 years. This indicated that most of the people were economically active. In terms of education, the majority (82.6%) of the respondents had informal or primary education. This implied that most of the villagers had low level of education which might have implication on forest resource management in the study area.

The findings about low education level of the respondents is not far from the study done by Mwakaje (2013), which indicated that majority of local communities in rural areas have informal or primary education. Thus, there is a need for intervention, like REDD+ projects (REDD+ is essentially a vehicle to financially reward developing countries for their verified efforts to reduce emissions and enhance removals of greenhouse gases through a variety of forest management options) to focus on education. This will improve people livelihoods in the study area. As for the household size in the study area, 67 % of the respondents had the size of between 1 and 6 people.

Examination of economic activities revealed that most (73.7%) of the respondents were farmers engaging in various livelihood activities including livestock keeping (45.5%) of the respondents) and some 40.6% engage in non-farm activities such as small kiosk business and timber harvesting. This suggests that a significant number of respondents in the study area depend more on the forest for subsistence and commercial gain such as selling timber, fuelwood and timber products.

Community Awareness of the REDD+ Project

The result of this study indicated that, overall, a majority (95%) of the communities were aware of the REDD+ project in their area (see Fig. 2). The high awareness could probably be due to the involvement of project stakeholders at the early beginning of the project.

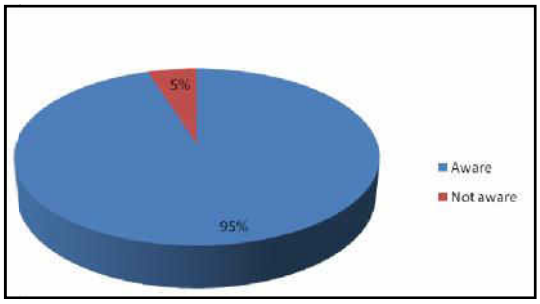

Figure 2: ***Community Awareness of REDD+ Project***

When further probed on their understanding of REDD+, overall a majority (57.8%) of the community members associated the REDD+ project with forest protection, (28.8%) with environmental protection and (13.4%) with improving community livelihoods (Table 2).

Table 2: Meaning of REDD+ project

What REDD+ meant to local communities	**Reponses in % per Villages**		**Average %**
	Kolo (n = 40)	***Mnenia (n = 40)***	
What REDD+ meant to them			
Forest protection	55	60.5	57.8
Environmental Protection	30	27.5	28.8
Improving community's livelihoods	15	12	13.4
Total	**100**	**100**	**100**

Source: Field data survey, 2014 n=sample size

During focus group discussions one discussant had this to say on the meaning of REDD+:

> *"I understand REDD+ as a project for climate change mitigation through forest protection"*

This implies that local communities in the study area were not aware of the meaning of REDD+. As mentioned earlier, REDD+ is a strategy that has been proposed in developing countries as a viable option for reducing emission from deforestation and degradation; as well as enhancing forest carbon stock in addressing climate impacts on community livelihoods. According Burges et al. (2010), REDD+ offers a significant potential for conserving forest to reduce climate the impacts change. On their part, Hirrado and Tanner (2011) considered REDD+ initiatives as a means through which local communities in developing countries can be financially rewarded through forest protection.

This mixed local perception on understanding the meaning of REDD+ projects could be due to a low awareness campaigns during the initiation of the project in the study area. Kaswamila et al., (2010) noted that various conservation practices in Africa, local communities normally remained peripheral to defining ways in which conservation is perceived, defined and managed. This is evident that although conservation projects are initiated in many areas, the local community's awareness and participation remain elusive or passive in nature. Thus, there is a need for conservation projects, like REDD+ project, to create awareness of local communities through education to ensure its sustainability and to gain support from local communities.

REDD+ and Community Livelihood

Access and Sales of Non-Timber Products

Respondents were asked whether they had an access to non-timber products under REDD+ project in the study area. Results indicate that the majority (67%) of them had an access to forest products (Table 3). This was mentioned by 73.5%, and 60.4% of the respondents from Kolo and Mnenia villages, respectively.

Table 3: Accessibility to Non-timber Product under REDD+ Project Forests

Access to non-timber products	**Residence response in terms of %**		**Average %**
	Kolo(n=40)	***Mnenia(n=40)***	
Yes	73.5	60.4	66.95
No	26.5	39.6	33.05
Total	**100**	**100**	**100**

Similar findings were revealed during group discussions, which indicate that local communities access non-timber products from the REDD+ project. This is indicted in the following statement from one discussant when responding to the question about accessibility to forest products:

> *"Non-timber products contribute significantly to the enhancement of the livelihoods of the people in our community. The REDD+ project should enhance sustainable harvesting practices by strengthening the natural resources committee of all participating villages of the Joint Forest Management."*

Respondents were further probed to mention type of non-timber products that they could access. Results indicate that these products included honey, medicinal plants and wild fruits (Table 4).

Table 4: Income from Non-timber Product fromREDD+ Project Forests

Variables	Annual Income per year per household (TZS)	Residence in %		Average %
		Kolo (n=40)	***Mnenia (n=40)***	
Honey	100,000–250,000	67.5	56	61.8
	260,000–600,000	26	31	28.5
	>600,000	6.5	13	9.8
Medicinal product	20,000–100,000	74	60	67
	110,000–200,000	20	28	24
	> 200,000	6	12	9
Wild fruits	20,000–100,000	24	21	22.5
	110,000–200,000	72	68	70
	>200,000	4	11	7.5

Table 4 above indicates income realized from non-timber products which include honey, medicinal products and wild fruits sales. On average, the income range between TZS20,000 to 250,000 per annum. This income was too low for any meaningful strategies for forest conservation. However, statistics from Kondoa District natural resource office indicated relatively a higher income from that obtained in the field. District report indicated that income realized from non-timber products was between TZS300,000 and 1,000,000 per annum. The difference in statistics could be attributed to the estimates that were made by the district officials in accordance with price value of non-timber product in the district and Dodoma Municipality.

The difference of income from that mentioned by local communities in the study villages and that reported at district level may imply that most of the value of non-timber products had not been captured in these figures. People were not very open in revealing the actual consumption and marketing of non-timber products. Findings tally with those of Mwakaje (2013) who

reported that most of the values of non-timber products have not been captured in assessing the impacts of REDD+ initiatives, simply because local communities are not aware of the actual consumption rates and market price of the products. Thus, the REDD+ project should assist the local communities in the study villages, in recognizing the value of non-timber products to people's livelihoods.

Payments from Carbon Sales

Carbon sale/exchange is carbon-based compensation mechanism for project that result in reduced carbon emissions or enhance carbon sinks or both in tropical forests. Results from this study indicated that between 2012 and 2013 carbon sales ranged between TZS5,600,000 to 7,937,200 per annum (Table 5), with Kolo village realizing the highest amount. The difference in the amount of sales was attributed to the area under forest cover, which was used to compute payments for each year. According to statistics from African Wildlife Foundation report, the area under forest in Kolo was about 1,150ha, while that of Mnenia was 900ha (AWF, 2014).

Table 5: Carbon Sales from 2012 and 2013

Village	**Sales in each year in (TZS)**	
Year	***2012***	***2013***
Mnenia	5,600,000	7,937,200
Kolo	6,400,000	6,491,821
Total	12,000,000	14,429,021

Taking into account the number of people in these villages, the amount realized per household per annum is about TZS2,000. This again is a very small amount for poverty reduction strategy. In addition, secondary data on carbon sales indicated that payment received was TZS749,998 in 2014 (African Wildlife Foundation report, 2014). These funds were used for socio-economic development, including village office building and construction of classrooms. However, the amount received is equivalent to TZS 50,122 per ha, which is less to motivate local people interest to engage in afforestation and have significant improvement to their livelihood. To improve the situation, measures should be put in place. Some of the measures could be regulation of conditions for carbon payment in compliance and voluntary market so that provision of compensation for improving livelihood to be reasonable and outweigh the cost of managing the forest. The REDD+ should direct pay the community so that they could benefit more rather than money being channeled to the state, and other non-governmental organizations. Studies by Konlan (2012) indicate that, the regulation of carbon payment conditions in a voluntary market could help the project to fair well. In other words, this could bring significant changes to people's livelihood.

Improved Agricultural Production

Statistics on the impacts of agricultural projects supported by REDD+, could not be obtained. However, the perception of local communities indicated that the initiative had helped to improve people's livelihoods. For example Kolo, 75% of respondents thought that, the agriculture project had improved their livelihood, while in Mnenia village was 66% (Fig. 3).

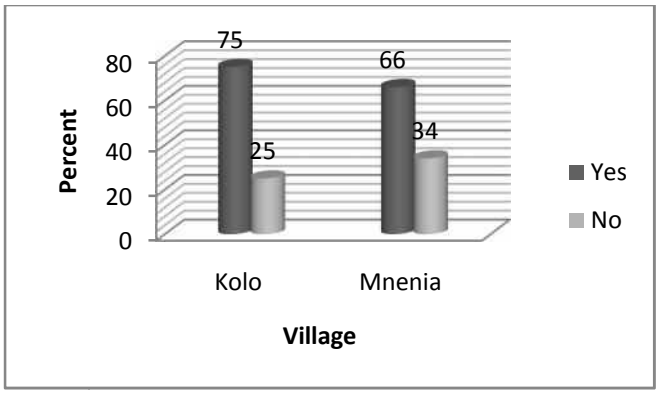

Figure 3: ***Agricultural Improvement by REDD+ project***

The perception of local communities on the initiative for improving people's livelihoods through agriculture projects can perhaps be attributed to the training of farmers on new agricultural technologies and application by farmers in agriculture activities. According to statistics from AWF office, the project used a pilot farmer approach. The project trained 173 farmers on new techniques that would help farmers to reduce the area for cultivation. This could then reduce farm expansion pressure. In addition, farmers were supported to establish and run demonstration farms, and they were given improved maize seeds (AWF, 2014). During focus group discussion, one discussant had this to say for training farmers on new agricultural technologies:

> *"The REDD+ project should build up this success and train more farmers by using current pilot farmers as trainers."*

Meaning that, farmers who were trained should be employed by the REDD+ project, to train other farmers in their area. The secondary data from the African Wildlife Foundation Report (2014) on an improved agriculture in the study area indicated that sixty farmers harvested, found an average maize yield to increase eight-fold from 30 to 39 bags/ha to 40 to 47 bags/ha in Kolo and Mnenia respectively. Thus, the additional yield have increased farmers' earning for an average of TZS640,000/= per ha. The surplus produced were

either taken to the market or sold within the village. It can be argued that REDD+ contribution to improve agricultural, is still insignificant given that there a lot of factors determining agricultural productivity. However, in order to improve agricultural activities in the study area, the REDD+ projects could facilitate the supply of agricultural inputs in the study villages including improved seeds, fertilizers and manure.

On top of that, an access to market for agricultural produce should also be taken as one of the project strategy in improving people's livelihoods in the two study villages. Since the main activity in the two villages was farming, then, even though households members tend to engage in other activities, they still kept land for cultivation. Mswima (2012) indicates that the supply of farming inputs including fertilizers and improved seeds could be one of the potential impacts of REDD+ initiative in Kilosa. This improved people's livelihoods through agricultural production. Even though farmers had been trained, there is also a need for a REDD+ project to have strategies for supplying farm inputs and facilitating access to a reliable market. This will enhance improved agricultural production. Such strategies are very important, if the market for carbon sale fails, communities could still relay their livelihoods from agricultural production instead of relay on forest resources.

Employment

From this study, statistics on employment opportunities provided by REDD+ project were also identified. Many of the respondents (53%) were not employed in various opportunities provided by REDD+ project (Table 6). Those who were employed were in agro-forestry and bricks making. During a discussion with project officials, the agro forestry was an established activity in the project area, where African Wildlife Foundation Organization (AWFO) was promoting its expansion through supporting farmers and women groups in the study villages. The AWFO have created a system of giving subsidies to agricultural inputs to farmers, and buying seedlings from the women's groups. This could attract more villagers to be employed in agro forest activities in the study villages (AWF, 2014). However, income realized from these employment opportunities could not be established.

Nonetheless, taking into account the number villagers, the percentage of those who were employed was very low to warrant any meaningful conclusion in poverty reduction. This implies that the contribution of REDD+ to community livelihoods through employment was insignificant. To improve the situation, the REDD+ project should offer more employment opportunities. These employment opportunities can include sustainable charcoal-making, fuel efficient stove-making, and fish farming. The findings about employment opportunities from the respondents was

Table 6: Activities in Which Respondents are Employed Under REDD+ Project

Employment Opportunities	Villages %		Average %
	Kolo (n=40)	***Mnenia (n=40)***	
Agroforestry	32.5	43.5	38
Brick making	10.5	7.5	9
Not employed	57	49	53
Total	**100**	**100**	**100**

not far from those of the study done by UNDP (2011), which indicated that REDD+ initiatives should contribute to the employment of many of 1.2 billion people living in extreme poverty in rural areas, who are largely poor. Thus, it is important for the REDD+ project to provide alternative means of improving people's livelihoods through employment.

Suggestions to Make REDD+ Project Effective

Respondents were further probed to propose measures that could make the REDD+ project more effective. Their responses are presented in Table 7.

Table 7: Communities Member's Suggestions to Make REDD+ Project Effective

Variable	Responseper village in (%)		Average
Mechanisms/ suggestions	***Kolo (n=40)***	***Mnenia (n=40)***	
More income generating activities	65	50	57.5
Alternative sources of energy	38.8	36.5	37.7
Enforcement of forest by laws.	30.5	33.3	31.9
Trainings on carbon assessment	25	30	27.5
Innovation and introduction of environmental friendly project.	25.6	26.3	26
Extension of project to nearby villages	17.9	2.6	10.3
Land use plan	0	10.7	5.4

Note: Data based on multiple responses, n= Sample size

Results show that an introduction of more income generating activities, the use of alternative energy sources, and the enforcement of bylaws could make REDD+ project more effective. Others include training on carbon assessments, innovation and introduction of environmental friendly projects and land use planning.

As for income generating activities, communities suggested poultry keeping, eco-tourism and aquaculture as activities that could help them generate more income in improving their livelihoods. Kajembe et al. (2003) argues that the REDD+ initiative should improve livelihoods of forest

adjacent communities through the introduction of alternative income generating activities. Regarding energy sources, communities stressed on the use of bio-gas, solar power and wind power, to mention a few. These sources are naturally found in the study area at a low cost. Thus, they could be used by many villagers in the study area at a low cost in enhancing the REDD+ forest sustainability.

Conclusion and Recommendations

REDD projects are viable options in improving local community's livelihoods through participation of all stakeholders. This study demonstrated that, in order to make REDD+ project effective and successful then, more options of income generating activities which include: eco-tourism, fish farming, poetry keeping and tree nurseries should be introduced to the communities as a way of generating income in improving people's livelihoods. In addition, usage of alternative sources of energy such as bio-gas, solar energy and wind energy could help the local communities in reducing the cost of energy in order to improve people's livelihoods. Also, conditions for carbon payments in compliance with and voluntary market should be regulated. This will enable the reasonable provision of compensation for lost livelihood opportunities from forest resources. This will reasonably outweigh the cost of protecting forests. Further, compensation programmes should consider various forms of payments whereby the community could directly benefit from those various forms of compensation rather than money being given through the state and other Non-governmental Organizations. This would help to prevent financial leakage of the REDD+ benefits targeted to local communities.

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