INCREASING CARBON FINANCING A STRATEGY FOR CLIMATE CHANGE MITIGATION IN UGANDA

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This paper examines the potential for increasing carbon financing as the International endorsement for Carbon sink trade for climate change mitigation in Uganda. Industrial companies have contributed to the increasing levels of carbon dioxide in the atmosphere and to the "green house gas" effects to the global climate. Many scientists believe this has negative impacts on the world's increased flooding from the higher sea levels, accelerating rates of drought, desiccation and desertification. By this, African corporates and governments are implementing projects that are likely to earn carbon credits. African banks and financial institutions are financing trade in carbon credits and/ or projects that can earn carbon credits, and NGOs and environmental groups are seeking finance to promote projects that have earned or can earn carbon credits. Industrial companies in developed countries are supporting Uganda's environmentally-friendly projects in promoting project-based trading of Certified Emission Reductions (CERs) under Clean Development Mechanism(CDM) as well as pre-financing receivables from carbon credits which are earned and traded, there by contributing to reductions in carbon emissions and abating consequential climate change. However, Uganda is faced by the crisis of enormous demand for high quality timber production yet it has to increase its carbon financing demands for carbon credit through afforestation. Some Carbon companies and projects in Uganda are discouraged by the farmers' rush for quick returns after signing agreements and being paid huge amounts of carbon credits, which has created misunderstanding between the farmers and those in carbon financing industry. Most of the commercial tree plantations meant for carbon credit are sold as timber in search for quick returns not waiting for long term rewards. The study was based on an empirical procedure that used a case study of programmes/projects operating in the region as institutions promoting carbon financing. The study used both quantitative and qualitative approach involving semi-structured interviews and focused group discussions used to determine farmers views on carbon financing and climate change mitigation. Different approaches were used to show how carbon financing has been adopted by Uganda through the use of different CDMs, and farmer's perceptions on carbon financing. The study compared the disbursement of carbon finances, with those from timber or poles sales. It also assessed the different interventions applied to mitigating climate change in Uganda. This paper investigated the short term and long term mitigation measures essential to increase payments in carbon financing. Facilitation and advisory services, sensitization of farmers on carbon credits, promoting indigenous tree species as alternatives for increased percentage of carbon accumulation putting into considerations timber availability and accessibility were recommended. The methodology of allowing aggregation of small-scale projects that can help also achieving significant greenhouse gas emission reductions through improved household level biomass technologies, biogas, solar energy, and off-grid electricity systems was recommened.

CHAPTER I: INTRODUCTION

1.1 Background

Carbon Financing Programmes support environmentally-friendly projects in Africa by promoting project-based trading of Certified Emission Reductions (CERs) under the Kyoto Protocol's Clean Development Mechanism (CDM) as well as by pre-financing receivables from carbon credits earned and traded by African businesses and governments thereby contributing to reductions in carbon emissions and abating consequential climate change. The impacts of climate change are already being felt around the world. According to the latest Intergovernmental Panel on Climate Change (IPCC) report, the average global temperature has increased by 0.76°C and sea level has risen by 17 cm since the 19th century (IPCC 2007).

Under the Kyoto Protocol developing countries are not obliged to reduce their Green House Gas (GHG)
emissions, whereas industrialized countries have to fulfill specified targets. They can achieve these by reducing GHG emissions in their own country, implement projects to reduce emissions in other countries, or by
trading. This means that countries that have satisfied their Kyoto obligations can sell their excess carbon credits to countries which find it more expensive to meet their targe ts (FAO 2010).

Tennigkeit, 2008 elaborates on how the Clean Development Mechanism (CDM) established under the Kyoto protocol provides a trading platform for Emission Reductions ERs from developing countries. It is under the Kyoto protocol many industrialized nations have agreed to reduce their levels of carbon dioxide. One way to do this is by taking carbon dioxide out of the atmosphere and storing it in "sinks" such as trees. Buyers can purchase this absorbed carbon dioxide as "carbon credits" and use them to offset their carbon dioxide emissions. Therefore, sustainable forest management is used to avoid the destruction of forests and the release of CO^2, and planting new trees sequesters to more CO^2 (FAO 2010)

Many individuals, companies and governments are concerned by increasing levels of carbon dioxide in the atmosphere are contributing to the "green house gas" effects the global climate. Many scientists believe this will have negative impacts for the world, including increased flooding from the higher sea levels and accelerating the rate of drought, desiccation and desertification. By this, African corporates and governments are implementing projects that have earned or are likely to earn carbon credits. African banks and financial institutions are financing trade in carbon credits and/ or projects that have earned or can earn carbon credits, and NGOs and environmental groups are seeking finance to promote projects that have earned or can earn carbon credits through tree planting.

The International Small Group and Tree Planting Program (TIST) is one of the projects trying realize GhG sequestration through tree planting, creating a potential long-term income stream, and developing sustainable environments and livelihoods. It has empowered Small Groups of subsistence farmers in India, Kenya, Tanzania, and Uganda to combat the devastating effects of deforestation, poverty and drought. Combining sustainable development with carbon sequestration, TIST already supports the reforestation and biodiversity efforts of over 65,000 subsistence farmers. Carbon credit sales generate participants income and provide project funding to address agricultural, HIV/AIDS, nutritional and fuel wood challenges. As TIST expanded to more groups and more areas, it has ensured more trees, more biodiversity, more climate change benefit and more income for more people.

Despite this intervention, commercial plantation forestry have developed enormously in the tropical and subtropical countries over the last 30-50 years, countries with little natural forests like South Africa and Swaziland which have major plantations to meet regional timber market requirements. With demand already exceeding supply, there is a timber crisis is rapidly alarming in Uganda. What is very worrying is that Uganda has a very poor timber plantation resource, with less number of hectares of mature plantations remaining countrywide and not more than 25,000ha of timber plantations in total. This scenario is a serious concern to Ugandans (SPGS 2007).

With the escalating demand for timber in Uganda, these carbon financed trees are exposed acute degradation which is threatening the carbon trade, therefore this study investigated the need for

increase carbon financing to substitute the temptation to cut down the already Carbon Emission Reduction (CER) paid trees or devise other mechanism to mitigate climate change in Uganda.

1.2 Problem Statement

Uganda's Forestry resources have been degraded due to the high demands for timber and fuel wood. With the increasing population, the natural resources have been seriously degraded to the extent of planting to rejuvenate the lost resources especially timber industry.

Uganda is faced by the crisis of enormous demand for high quality timber production yet it has to increase its carbon financing to help the global reduction of greenhouse gas emissions so that projects in developing countries can be eligible to receive funding from industrialized countries or companies. Under this process, that mostly referred to as 'carbon finance', industrialized countries help to arrange the costs for such Carbon projects. This process is regulated through special markets where these emission reductions are traded, where there are demands for carbon credit through afforestation.

According to the (FAO 2010), Uganda lost 86,000 ha of forest per year between 1990 to 2005, falling from 4,924,000 hectares to 3,627,000 hectares. That is 1,297,000 total ha, equal to over 25% loss. It was estimated that 46.4 million m^3 (over bark) of wood products was removed in 2005, which was equal to 29.8% of the country's growing stock. Of this, 42,0416,000 m^3 (over bark) was removed for fuel wood. The specific programme areas under study are part of this environment. The lands are owned and used by the rural residents and are subject to constant pressure to provide timber, fuel wood, food and livelihood for these subsistence-level farmers.

TIST is experiencing the level of deforestation that continues inspite of International convention agreements and government policies of which Uganda is a signatory. Uganda has signed many conventions related to environmental management. Under the Kyoto protocol many industrialized nations have agreed to reduce their level of carbon of carbon dioxide out of the atmosphere and storing in "sinks" such as trees.

Some Carbon companies and projects in Uganda are discouraged by the farmers' rush for quick returns after signing agreements and being paid huge amounts of carbon credits, which

has created misunderstanding between the farmers, auditors and those participating in carbon financing funders. Most of the commercial tree plantations especially plantations meant for CERs are sold as timber to meet the high timber demand and also in search for quick returns not waiting for long term rewards. This is a big loss to the companies after providing the incentives towards carbon accumulation. Therefore this paper is meant to identify short term and long term mitigation measures to resolve carbon financing challenges in the affected areas.

1.3 General Objective

The overall objective of the study is to examine strategies of increasing Carbon Financing for Climate Change mitigation in Kigezi highlands, Uganda

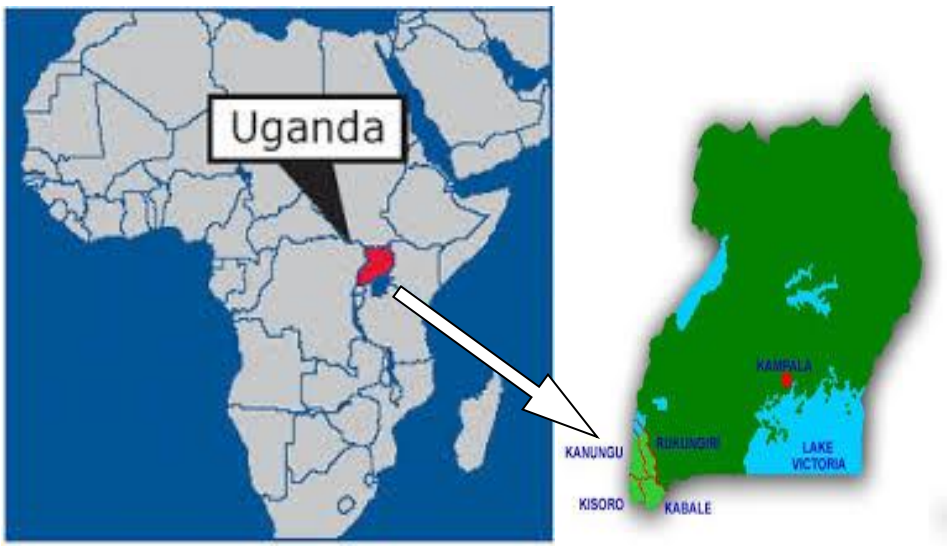
1.3.1 Specific Objectives of the study

(i) To establish the Clean Development Mechanism approaches adopted in Uganda
(ii) To examine the disbursement of carbon funds in comparison with timber production sales
(iii) To assess farmers perceptions on the challenges facing this carbon financing approaches
(iv) To investigate alternative mechanisms of mitigating climate change through CDM.

1.3.2 Scope of the study

The study site was chosen to represent a range of ecological and geographical situations which are already adopting carbon financing through sustainable forestry management.

Map 1: Location of the Study Site: Kigezi Highlands of South Western Uganda



Sources:

The paper is limited to the issues concerning Uganda's Clean Development Mechanisms as far as carbon financing, and the methods of increasing carbon financing in Uganda to curb problems brought about by climate change. The duration of the study considered is ever since TIST started operating in Uganda in 1999. Uganda is one of the East African countries, where it has the Kigezi highlands are located in South Western region. It is bordered by Rwanda and the Republic of Congo in the South Western side of the country.

The Kigezi Highlands are a region of high agricultural potential but density of a high population of about 300per km^3 and a population growth of about 2.2%per annum (Ministry of Finance, Planning and Economic Development 2010). The highlands lie in the SW of Uganda at an attitude of 1500-2700 meters above sea level. The rainfall pattern is bimodal and rages from 1000m to 1500 mm per annum. The temperetures are moderate with mean minimum of 13^0C and a mean maximum of 23^0C. (Bamwerinde, 2006) explains basing (Djimbe & Hoekstr1987) report on the soils of Kigezi as generally fertile although some parts are have less Ferrasols and Andosols.

1.4 Study Approach and Methodology

The study was based on an empirical procedure that used a case study of TIST programme operating in the region as one of the Institutions promoting carbon financing. The study was

both quantitative and qualitative approach involving semi-structured interviews and focused group discussions used to determine farmers views on carbon financing and climate change mitigation. Different approaches have been used to show how carbon financing has been adopted by the Kigezi Highlands through the use of different CDMs, and farmers perceptions on carbon financing. The study a examines the disbursement of carbon finances with those from timber or poles sales, and also assesses the ways of mitigating climate change in the Kigezi Highlands.

The interviews were administered to TIST officials, TIST quantifiers, and TIST farmer benefiting from Carbon financing. Focused Group Discussion (FGDs) were carried out in the already existing TIST groups. Site selection criteria included areas with the most beneficiaries of TIST programme. During the selection the different CDM adopted are put into consideration, that is the benefits, challenges and recommendation for carbon financing in the region.

These study area is Kigezi Highlands where the TIST programme has the majority of the population planting the trees. The study covers the following sites Muko sub county, Bukinda Sub county and Kabale Municipality. Three sub-counties were selected purposively because of accessibility and the number of years the farmers have been involved in the programme. Two groups are randomly selected for FGD from each sub-county. Fifty farmers are purposively selected basing on the number of trees and duration spent in the programme. Farmers with less than 1,000 trees (benefiting less) were selected upto those with less than 10,000 trees (benefiting more) were interviews to get different views from farmers. Data was collected using observations, semi- structured interview and focus group discussions. All these were organized in a way to target interviewing the TIST groups and individual farmers. TIST Quantifiers were also interviewed since they are involved in counting, quantifying and also carbon financing audit process to verify farmer's trees plantations.

Quantitative data was organized and analyzed using Statistical Package for Social Scientist (SPSS). The findings were presented in statistical form of tables and figures for easy interpretation supplemented by qualitative data derived from respondents' feelings and expressions from various interviews. Finally, conclusions and recommendations were drawn in the same arrangement with the study themes accrued from the study.

CHAPTER II: LITERATURE REVIEW

2.1 Forms and Procedures of Carbon financing

Tackling climate change is widely acknowledged as one of the biggest challenges of this century and its negative effects will disproportionately affect poor countries, which make it even more urgent to act. Emissions of various gases that arise from industrial activities and the burning of fossil fuels and biomass need to be reduced in order to limit the negative impacts of climate change (Disch 2010). To help the global reduction of greenhouse gas emissions, projects in developing countries can be eligible to receive funding from industrialized countries or companies if their project reduces greenhouse gas emissions. Under this process, that is mostly referred to as 'carbon finance', industrialized countries help to meet the costs for such projects. This process is regulated through special markets where these emission reductions are traded (Marr 2012).

The Clean Development Mechanism (CDM) is one of the "flexibility mechanisms" defined under the Kyoto Protocol. It's objective is to assist developing countries in achieving sustainable development and to mitigate the greenhouse gas emissions that cause climate change. In addition, the CDM aims to assist industrialized countries in achieving compliance with their quantified emission limitation. Despite its great success, with more than 3,300 CDM projects registered within many countries and within many sectors, some important emission sources, sectors and countries are still underrepresented within the CDM (Marr 2012).

Most rural areas projects try to slow down climate change impacts, by the emissions of Greenhouse Gasses (GHGs) need to be reduced immediately. Several activities in agriculture and forestry contribute to GHG emissions. Some agricultural activities increase the amount of organic matter and carb on in the soil by using cover crops or reduce the emissions of methane through improving feeding practices. Sustainable forest management can avoid the destruction of forests and the release of CO_2. Planting new trees sequesters more CO_2 for example most rural areas apply Forestry activities such as afforestration and reforestation, sustainable forest management, agroforestry, avoiding deforestation or

Reducing Emissions from Deforestation and forest Degradation (REDD+). There also Agricultural activities such as cropland and grazing land management, livestock management (improved feeding practices), peat land management and manure management. Increasing the energy-efficiency at household or community level, sustainable bio fuel production, the employment of Integrated Food and Energy Systems and, Biodiversity enhancing activities such as watershed and soil management through biodiversity conservation are adopted (FAO 2010).

In Uganda, Kalangala District well over 30, 000 ha of public forest land has been planted for oil palm plantations by BIDCO (U) LtD with government, IFAD and World Bank Support. The firm wants 100,000 ha for oil palm. Tree Farms and Norwegian Afforestation Group, through Busoga Forestry Co LtD, have planned 80,000- 100,000 ha of Bukaleeba Forest and replaced it with monocultures of pine and eucalyptus. In Kiboga District Luwunga Forest Reserve was leased to New Forests Company in 2008 and 20,000 hectares of forestland. 20,000 people were evicted from the forest to an uncertain future. They are establishing green, sterile, silent deserts of oil palm, pine and eucalyptus plantations behind the smokescreen of removing, from the atmosphere, excess carbon dioxide gas.

The Tree planting and Small group Programme TIST. It has empowers Small Groups of subsistence farmers in India, Kenya, Tanzania, and Uganda to combat the devastating effects of deforestation, poverty and drought. Combining sustainable development with carbon sequestration, TIST already supports the reforestation and biodiversity efforts of over 65,000 subsistence farmers. Since its inception in 1999, TIST participants organized into over 9,000 TIST Small Groups have planted over 11 million trees on their own and community lands. GhG sequestration is creating a potential long-term income stream and developing sustainable environments and livelihoods. Replication of TIST in Uganda began in 2003, and has grown to over 5,200 TIST participants in over 800 Small Groups. TIST utilizes a high-tech approach to quantify the benefits and report the results in a method transparent to the whole world, which includes palm computers, GPS, and a dynamic “real time” Internet based database.

Several programmes are promoting CDM in Uganda through carbon sequestration other mechanisms are not so much promoted. With the increasing demand for timber other CDM

forms of carbon financing should be promoted. This is due to the challenge being faced by some ERs projects in Uganda

2.2 Disbursement of funds in Carbon Financing Sales compared to Timber Production Sale

Carbon funds are investment vehicles that seek to deliver either carbon credits or a return on investment. The World Bank operates the biggest family of credit-return funds on behalf of private sector companies and governments. The World Bank BioCarbon Fund (BioCF) is dedicated to buying carbon credits from Agriculture, Forestry and Other Land Uses AFOLU projects. BioCF started in 2004 and has an investment budget of about $100 million. Return-on-investment carbon funds are either single purpose exchange traded companies that are involved in project development and carbon asset management, (Tennigkeit 2008)

Environmental Conservation Trust ECOTRUST 2010 elaborates on how it does not give any farmers initial money to plant. Only those who have demonstrated commitment receive a payment in the first planting year, after planting. Institutional awareness raising, information, and capacity building help with this first step. There is an arrangement for already participating farmers to get seedlings on credit. Guidelines are available to ensure the process is not abused.

Clean Air Action Corporation invests in TIST where it has been working since its inception in 1999. The company is able to use its expertise in pollution control to access the worlds marketing the GHG business on behalf of TIST groups. The TIST programme pays the small groups. These groups receive 35 shilling for each tree they planted keep alive. The payment is $0.02 dollars per live tree live per year for the first 20 years. This currently works with 35,000 Ush per 1000trees per year. After 20 years , the small groups will receive 70% of the net revenue generated from the sale of the credit after the programme costs have been covered.

Many carbon projects have been supported by some form of grant funding or institutional support to cover the project's preparation costs, usually the Project Idea Note (PIN) and Project Design Document (PDD) preparation. Alternatively, private sector carbon buyers often enter into agreements with developers to pay for a large part of the project's carbon preparation costs, in return for a lower price for the carbon credits generated. Also after you receive the carbon credits you will have to pay certain fees. In the case of the CDM, the Executive Board will deduct 2% of CERs for the Adaptation Fund unless you are based in a Least Developed Country. Voluntary

market registries will also take their share of the carbon price in the range of 5 - 30 US cents per Voluntary Emission Reduction VER as described by (Disch 2010)

During the TIST first few years the trees are too small to quantify for carbon credits. Therefore CAAC is taking a risk until the trees reach a large enough size to sell the carbon credits. CAAC is taking all the risks of tree mortality, growth rates and regulation changes in the carbon credit market. Without changing the procedure of payment and increasing funds towards Carbon financing TIST is running a risk of loss from the way of it deals with the CDM.

2.3 Perceptions on the Challenges facing Carbon Financing Approaches

It is assumed that the challenges come from different levels of carbon financing strategies where the system starts the farmers and the quantifiers, the projects implementing CDM and the financing companies. The policy makers are as far as carbon financing, Forestry Management Authorities and those partners implementing CDM interventions.

Moses *et al*, 2012 has identified institutional challenges as far as carbon financing is concerned, these are

Inadequate technical assistance at the national level. There has been considerable focus on carbon payments projects as delineated in the report on potential investment areas by the Uganda Investment Authority (UIA 2007). The establishment of the Climate Change Unit (CCU) in the Department of Meteorology of Ministry of Water and Environment and the novel CDM projects by the National Environment Mnagement Autority (NEMA) and National Foretry Authority (NFA) provide considerable evidence of this focus.

Capacity building at community level at the community level, however, capacity building has been limited to the effort of non-governmental organization such as ECOTRUST, NAHI, the Katoomba Group, among others. Whereas, for instance, some of the Collaborative Forestry Management (CFM) arrangements between NFA and communities have also resulted into carbon projects, these results have been mostly due to the efforts of the NGOs engaged in developing the CFMs. There is little evidence that NFA, UWA or NEMA and other government departments are investing in technical capacity building beyond the efforts taking place within these organizations themselves.

Monitoring, compliance and enforcement as market arrangements for ecosystems services, carbon payment schemes often have measurement, verification and monitoring plans. Voluntary market and CDM market credits are measured, verified and certified in compliance to the start under which the credits are being sold. In Uganda, Plan Vivo, Verified Carbon Standard (VCS), Climate, Community and Biodiversity Standard (CCBS), and Carbon Fix are involved in the certifying and selling of credits. Enforcement for the voluntary market is often undertaken within the associations or groups that are linked to the supporting or service-providing organization. For the CDM market, the monitoring, compliance and enforcement roles have been left to the agencies that are part of the agreement such as the NFA and NEMA.

Laws, regulations, and policy at the national level, the National Forestry Policy 2001 mentions the need to consider markets for carbon sequestration. In addition, both the (National Forestry Policy 2001) and the (National Forestry Business Plan, 2003) describe other activities within the Community Forestry Management (CFM) arrangements and revenue generation that would be used as a basis for developing payments or compensation for carbon sequestration and biodiversity conservation. However, it does not mention the roles or types of participants in such markets.

Deforestation and forest degradation is biggest danger to forestry within the district is the expansion of farmlands for upland rice under Uganda National Agricultural Advisory Services (NAADS) and tobacco. The greatest threat is to watersheds. People still see tobacco as lucrative and do not want to give it up. However, community resistance to degradation of wetlands and watersheds is growing. There are examples where people sought to sell trees at the riverbank but the community resisted. Moreover, there is limited and inadequate knowledge about payments for ecosystem services and carbon trade, even among technical officers such as the District Environment Officer (DEO) and the District Forestry Officer (DFO).

Despite the above institutional challenges, beneficiaries also face their own challenge as lack of awareness of benefits of carbon finance and access to information on how to develop carbon credits, lack of funding for validating and registering projects and lack of transparency on carbon revenue sharing.

Forest Carbon Partnership Facility (FCPF) issued in (2011) identifies institutional challenges as far as CDM is concerned, these are Financial Risk to the Carbon Fund, Delivery Risk, Reversal

(Non-Permanence) Risk, Displacement (Leakage). The Social Risk of and Political Risk where Government does not have a long-term commitment to REDD. Regulatory risks exist for both sellers and buyers to compliance value for the Carbon Fund's ERs

The procedure in which funds are disbursed for carbon financing programmes needs to be revised at different level. This is for the benefit of the companies funding, the projects implementing the programme and the beneficiaries. Once issues like Capacity building , Awareness creation, Laws, Regulations, and Policy, and Monitoring and Evaluations of the programme performance

2.4 Mechanisms of Mitigating Climate Change in the Kigezi Highlands

CDM projects in Africa are a new subject and require the building of local communities at all levels to widen the understanding and participation of Africa. Africa's technological background is challenged and the continent has insufficient capacity to meet its growing population needs. For a long time, the continent has relied on 'borrowed technology' making it a dumping site for substandard technologies. The emergence of Clean Technologies is both a mitigation and adaptation strategy for Climate Change in Africa but the big questions have been the affordability, suitability to local needs and the policy to spur local innovations/inventions that are demand driven.

Delayed returns on investment that have cause farmers to cut trees should consider transitioning to sustainable land management systems as a major barrier to adoption according to (McCarthy et al 2011). In Lipper *et al* (2011), explains that two issues stand out in particular, with regard to smallholder
agricultural producers and opportunity costs of foregone income over the transition period extend over a
number of years and these tend to be higher for smaller size operations
(McCarthy et al 2011; Wilkes etal 2011)

Lipper *et al* 2011 promotes tenure security where smallholder tenure rights are highly relevant to the development of carbon finance projects in agriculture. Project developers require that smallholders can ensure that carbon sequestering land uses are not reversed at a future date.

Buyers will also require assurance that land users have rights over the carbon assets sold. Ill-defined or insecure tenure rights are common in many developing country contexts. To take the example of rangelands, the appropriateness of different rangeland tenure policies has long been contentious in many parts of the world. Where land use rights have been privatized and where land right holders are able to exclude other users, this may facilitate eligibility for carbon finance.

Increasing the involvement of the private sector through development of alternative income sources is essential for carbon finances. Developing off-farm income sources, to support farm households during a transition from conventional to a sustainable land management practices. These could include establishing agricultural processing activities that generate employment such as cheese or yoghurt production or carpet and woven goods enterprises. Smaller scale employment activities could include the development of handicrafts or sales of non-wood forest products (Lipper *et al*, 2011)

Collective action through serious memorandum of understanding must be put consideration, when signing carbon funds any, if not most, of the land-based mitigation actions from agriculture require collective action to implement and realize benefits from. Benefits from improved land management practices are often realized in the form of a "local public good", such as reduced pest and disease pressures, improved hydrological functions, and reduction in erosion or degradation. Generating these benefits often necessitates action on a minimum scale and at specific sites, and generally requires collective action to achieve, particularly in areas with small and fragmented land holdings. In addition, in many situations the rights to natural resources such as land, water, trees or grazing are held in common and thus collective action is needed to implement changes in the management of these resources, (Lipper *et al* 2011).

According to Kabogaoza, (2011) there is the need for reducing emissions from deforestation and forest degradation (REDD+) refers whre by projects try to achieve ERs through reducing emissions from deforestation, reducing emissions from forest degradation, conserving forest carbon stocks, managing forest sustainably and increasing forest carbon stocks (Calmel *et al* 2010). Since agricultural activities are the most common driver of deforestation and forest degradation, REDD+ activities can represent a source of carbon income to agricultural producers who reduce emissions by taking actions that reduce agricultural land expansion and/or forest degradation.

According to Moses *et al* (2012), under ECOTRUST the Trees for Global Benefits (TGB) Program aimed at raising awareness of climate change and related issues increasing household incomes through carbon payments, offering the farmers technical advice and allow them access to other markets such as timber- fuel wood, fruit, fodder and poles; and conserving biodiversity by promoting indigenous trees species. The project works through new and established groups of farmers to plan agroforestry and small scale plantations. The activities include: planting of mixed native woodlot for timber, including mahogany, cedar, African cherry; boundary planting for fuel wood and fruit and timber; and protection of wildlife and native forest remnants.

Tennigkeit 2008 advises on the establishing agro-forestry systems which can help meet fuel wood needs as well as improving soil structure (Kürsten 2000). Alternative energy (biogas, solar and wind power) can help control desertification, increase C sequestration and reduce CO_2 emissions, as well as reducing pastoral women's exposure to indoor smoke. Alternative energy technology adoption has already begun with support from carbon finance sources

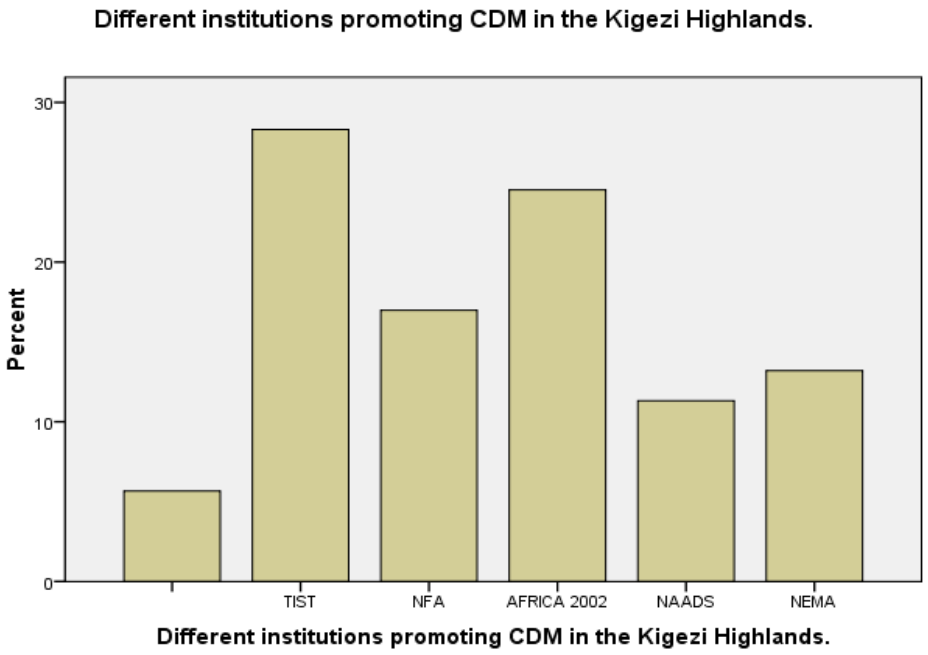
Short term and long term mitigation measures essential for increased payment in carbon financing through facilitation and advisory services, sensitization of farmers on carbon credits, promoting indigenous tree species as alternatives for increased percentage of carbon accumulation putting into considerations timber availability and accessibility. Particularly methodology of allowing aggregation of small-scale projects that can help also achieving significant greenhouse gas emission reductions through improved household level biomass technologies, biogas, solar energy, and off-grid electricity systems need to be put into consideration

CHAPTER III: DATA PRESENTATION AND ANALYSIS

3.1 Clean Development Mechanisms in Kigezi highlands

There several institutions promoting CDM in the Uganda but the one that has escalated is TIST which is carrying out afforestation and reforestation though carbon credits in the degraded hills of the Kigezi Highlands. Other institutions mentioned in the graph below have also tried to promote the system in a way as to mitigate climate change. These are National Forestry Authority (NFA), Afrcan 2000Network, National Agricultural Advisory Services (NAADS) and National Environment Management Authority (NEMA). TIST is the one carrying out the highest percentage of carbon financing in Kigezi Highlands to compared to other institutions.

Figure 1: Graph showing Institutions promoting Clean Development Mechanisms

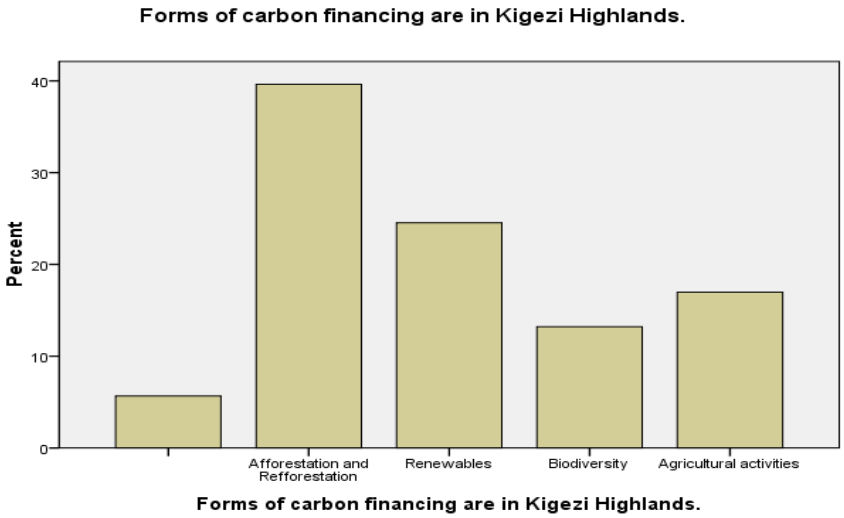


Source: Primary data

There are other institutions that have been able to apply several mechanisms to mitigate climate change through afforestation and reforestation on bare hills of Kigezi, this reforestation is in areas that have been cleared through deforestation for timber and fuel wood. Some institutions implementing the CDM are using Renewable Energy technologies these are biogas technology, solar energies, promoting energy cooking stove extra. Others are improving biodiversity through watershed management and protection and encouraging conservation practices most especially around the conservation area like the Mughinga and Bwindi Impenetrable Forests. Figure 2

below elaborate the CDM used of where by re- afforestation and afforestation is contributed a lot with the biggest percentage of (40%) while the others contribute less.

Figure 2: Graph showing Forms of CDM adopted in the Kigezi Highlands

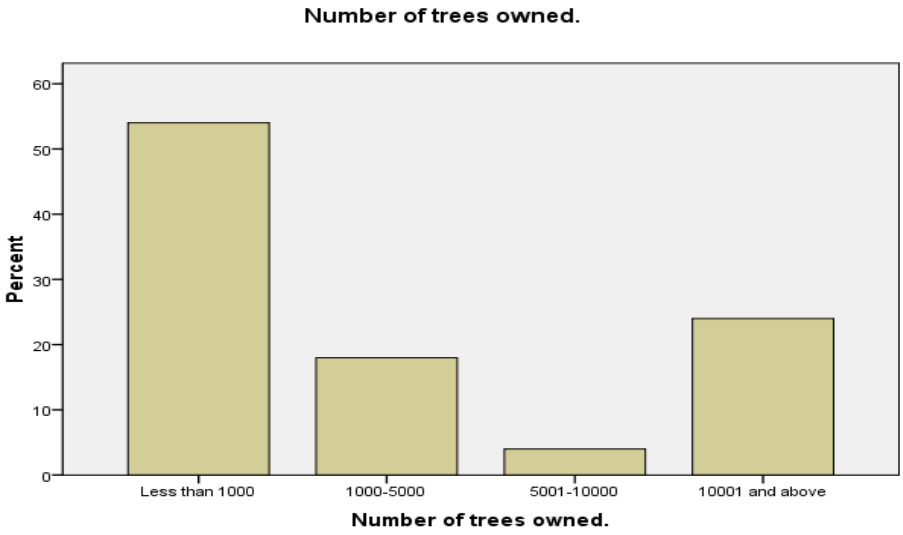


Source: Primary data

There several tree species promoted of which pine patula ranked to be the highest percentage. Other tree species promoted are *Grevillea robusta, Alnus acuminate, Sesbnia sesban*, medicinal tree species and other indigenous tree species. Most farmers have (below 1000 tree) less percentages of tree whereas another lot of (more than 10,000 trees) percentage own small percentage Fig (3). This has indicated a big gap between the poor and the rich an indicator of poverty in the region.

TIST groups have planted the tree species mostly for Carbon financing from the TIST programme to accumulate carbon whereas the rest are for timber, some member did not know the reasons why they should plant carbon trees

Figure 3: Graph showing the Range tree plantations owned in the Kigezi Highlands.



Source: Primary data

3.2 The Disbursement of Carbon funds in comparison with Timber production sales

Farmers were requested to compare the sale from carbon financing and timber production so as to find out the different perceptions from the different types of farmers. The table below was drawn during Focal Group Discussions (FGDs) with the selected groups.

Figure 4: Table showing Comparisons of benefits as carbon financing sales and timber sales

Carbon financing	**Timber Production**
Long- term strategy (Slow growing)	Short-term strategy (Quick growing)
Earns less in long time	Earns more in short time
30 years agreement	15-20 years harvest
Handouts: Planting tools, seeds and seedlings to Farmers	Hand out: Advisory Services, Funding is offers to Nursery Operators
Less money and small investments	Large sums of money are got in one installment
Amount after 30 years. **Payment for carbon** 20 years X 1,000 trees X 37 UG shillings 10years,70% of the total payment	**Timber harvesting after 20 years** **Timber Production** 1000 trees X (average 100,000UG shillings per

Total UG Shillings1,110,000/= **US$ = 36 per year**	timber piece) Total UG shillings 10,000,000/= **US$=334 one payment**

Source: Primary Data

The table 4 above shows some of farmers as to why they have differences in the sales and also reviews comparison as far as benefits are concerned.

Figure 5: Showing farmer who are not satisfied with the funds paid by TIST programme

Yes =Not satisfied No= Satisfied

Source: Primary Data

Satisfaction with Carbon financing payments

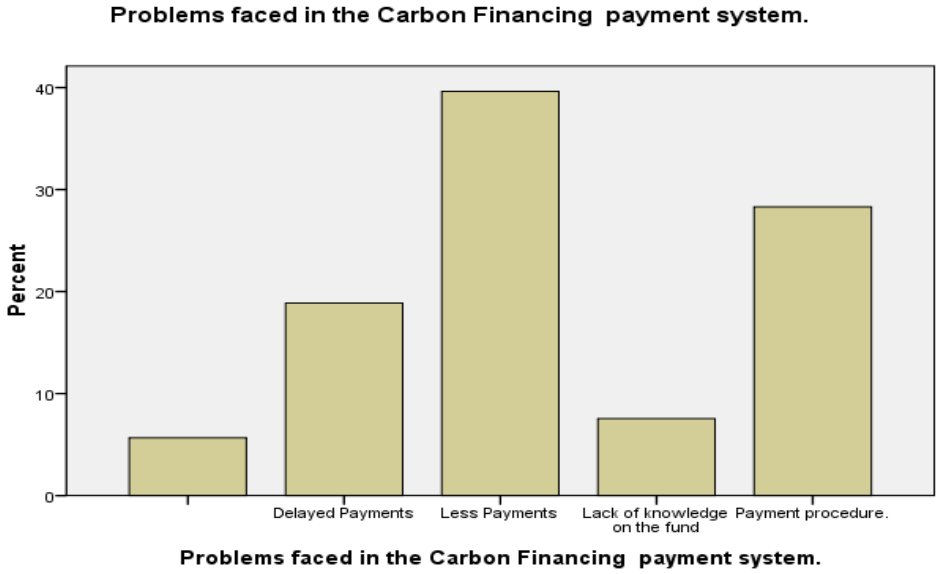
Seventy one percent (72%) of the TIST farmers presented the issue of not being satisfied with the amount of money paid whereas (22%) said that they are satisfied with the funds, the remaining (6%) was invalid. The farmers said that there were reasons as to why they selling off and cutting down carbon trees before the recommended time. Figure 5 below elaborates the percentage distribution. The farmers were requested to give reasons as to why they preferred timber tree and why they were cutting. The farmers were able to present their preferences in their group discussions as shown in Figure 4 above ,Some farmers gave these comments.

"The money paid to TIST farmers is very little so, the farmers see no point keeping the trees when is a lot of money from timber production. A big percentage of the community because of poverty end up selling the plantations", TIST farmers

"One who plants Eucalyptus tree species earns more than the one for the pine species and indigenous tree species although they are being promoted by TIST, they are also slow growing. Therefore some farmers who have resorted and decided to plant Eucalyptus after harvesting the Pine plantations giving up on the funding",Mr Sam Ndaba,TIST group leader

3.3 Perceptions on the challenges of Carbon Financing in Kigezi Highlands

During interviews the carbon farmers were able to give views of the constraints trees they endure during the process of receiving these incentives to retain the carbon. Several issues were raised during discussions, they are well elaborated below. The bigger percentage is being paid by the TIST programme, In order to know the reasons why they are cutting trees, the researcher asked them if they had challenges with the payment system as already elaborated above.



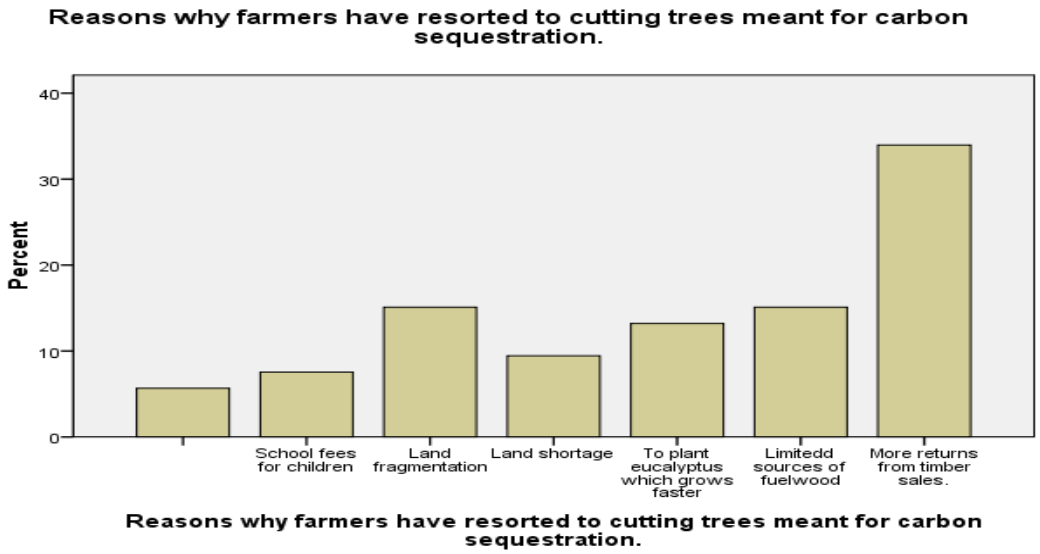
Usually, TIST famers as shown in Figure (6) are given incentives to encourage them plant more trees and also maintaining them. The farmers presented payment constraining issues that are forcing them to cut the tree meant for carbon sequestration. The figure above gives detailed

information of some challenges in the payment system. Approximately (40%) of the respondents said that they felt the payments were low and (28%) revealed that payment system was not clear to some farmers. The others issues presented were delayed payments 19% and not being knowledgeable on the whole process of carbon payments.

Source: Primary Data

Figures (7) above elaborates the major reasons as to why farmers cut their trees before time recommended by the TIST programme. The major issue presented was the pressing demands from the timber market 34% which offer more returns than Carbon trading. The other issues presented are school fees payment, land shortage, uprooting other species trees like eucalyptus which are fast growing species, there is also limited sources of firewood and land fragmentation due to pressure on the natural resources of carbon belongs.

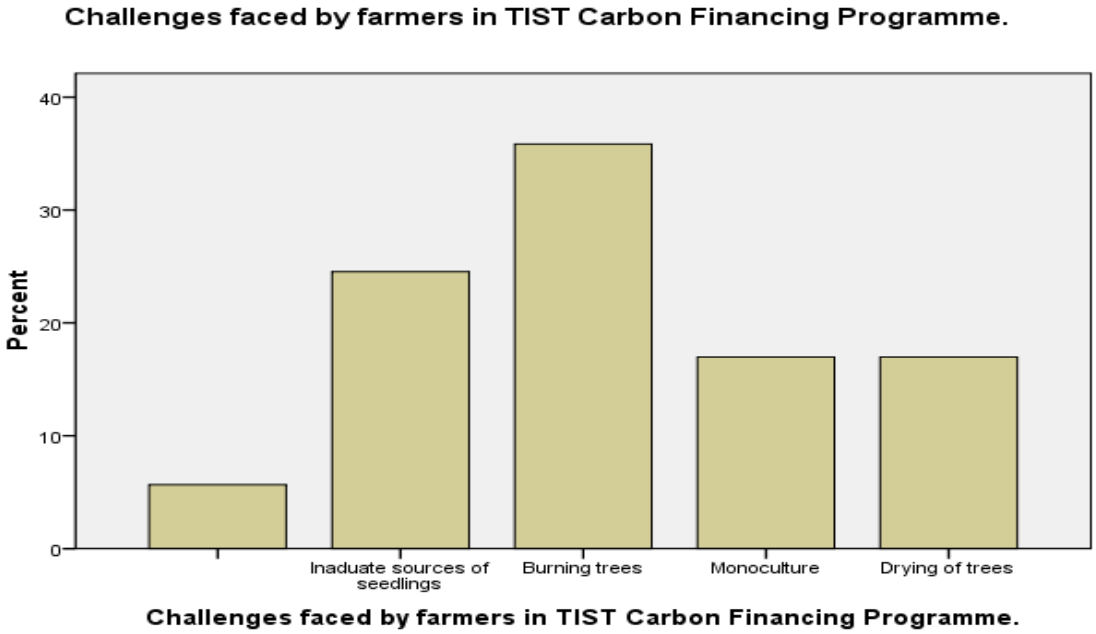
Figure 7: Graph showing reasons as to why farmers cut their trees before recommended time



Thirty four percent (34%) were looking at more returns from timber production (11%) were limited by land and fuel wood leading to the encroachment of carbon trees. Other issues

presented were payment of school fees, eucalyptus being fast growing species and getting quick returns.

Figure 8: Graph showing the challenges when planting trees under the TIST programme



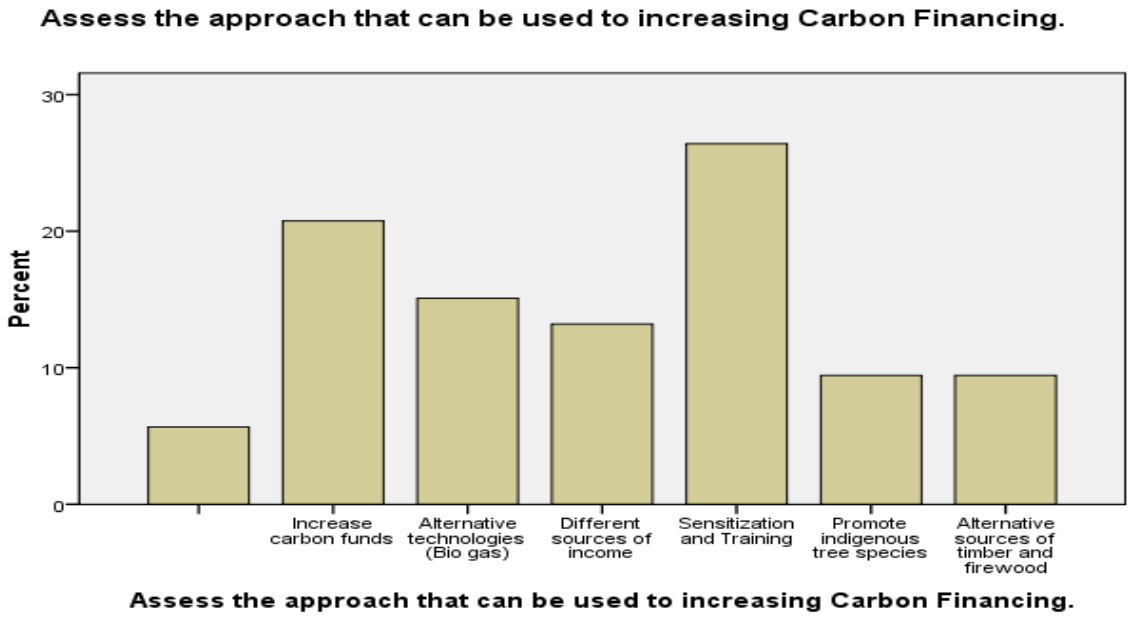
Source: Primary Data.

The challenges facing TIST farmers are of tree burning (35%), inadequate source of quality seeds (19%) for planting, planting of one specie (monoculture) and the challenge of drying trees due to stress in the dry seasons. The famer said that Pine plantations usually over burns beyond recovery because the waxy substrate composition and the bare dry landscape. One of the farmers had this to say.

"Carbon trees are so much exposed to fire out breaks most especially Pine plantations. These fires are set by the livestock grazers in the dry seasons in search of fresh grasses and in the end there is a big loss which is irreversible and so big to be measured and replaced", narrated by MzeNdyabahi a TIST farmer.

3.4 Farmers suggestions on Mechanisms of mitigating Climate Change through CDM

Figure 9: Graph showing respondent suggestions to solutions in carbon financing



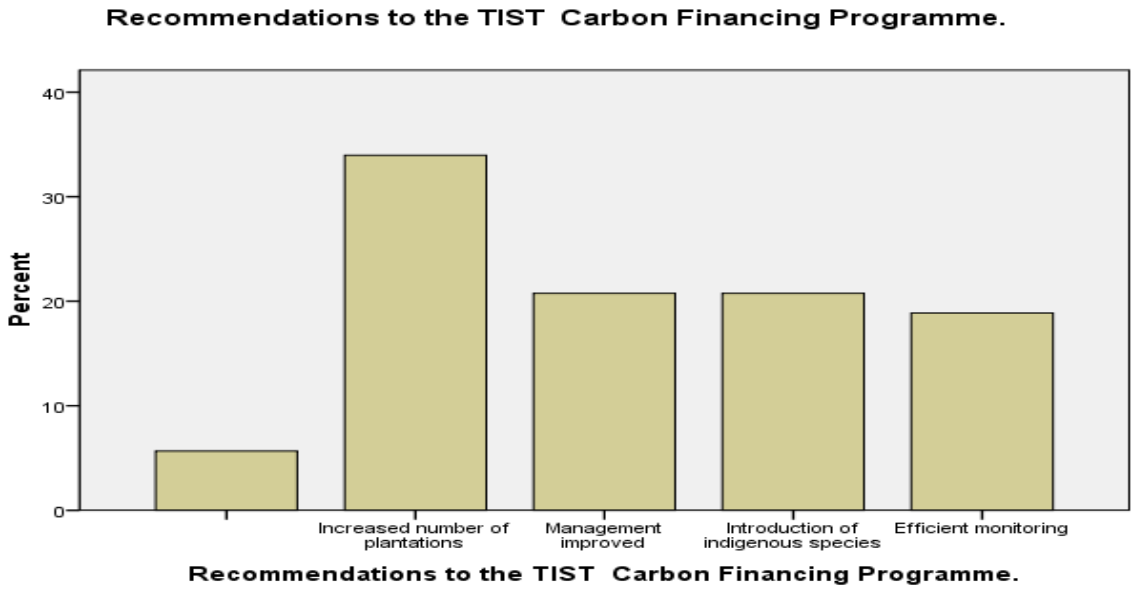
Source: Primary Data

Figure (9) above explains how farmers were requested to give suggestions on possible approaches that can be used to carbon financing in Kigezi. Twenty percent (20%) presented increase in carbon funds whereas 26 (%) were looking at sensitization and training, (30%) said they would prefer alternative or renewable sources of energy. The other approaches presented were to divert to other sources on income not concentrating on carbon trees as the only source of income, promoting indigenous tree species in areas.

TIST quantifiers during their presentation showed in Fig (10) the need for proper and improved management systems, introduction of indigenous tree species, effective and efficient monitoring of the programme so as to benefit from the plantations put in place. They are always involved in

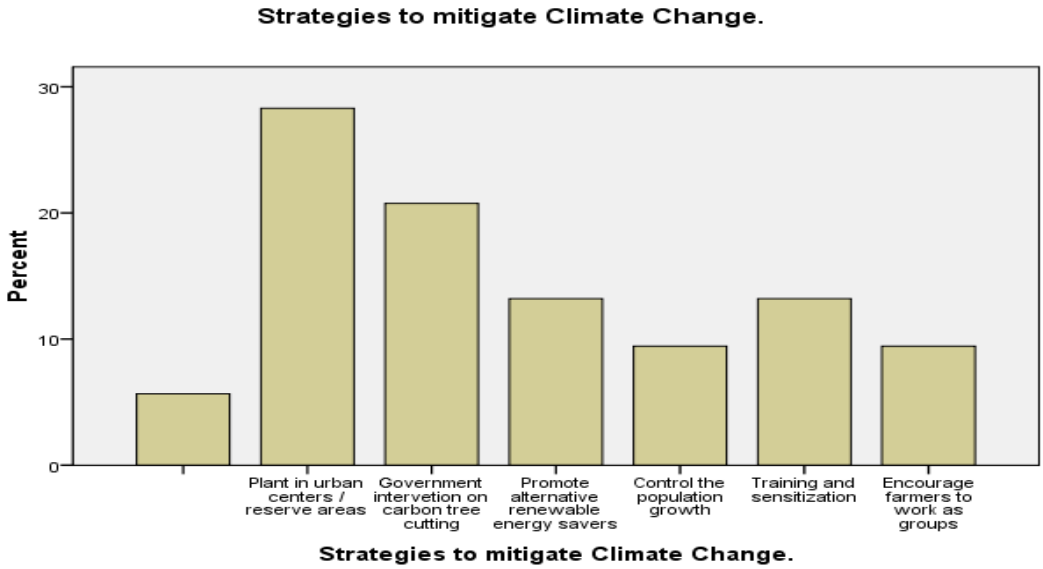
measuring the trees of carbon credits therefore they were recommending planting of more trees in order to overcome deficit required by the fundin companies. They also commented on collective action on issues of working as groups though helps in monitoring and decision making, it also helps in resource mobilization. Farmers at times don't see this as a benefit. Some feel that they should not work as a group. When a group is formed on the basis of family member, whenever there are disagreement they affect the group and one or two decide to cut hence affecting the welling of the whole CDM process

Table 10 : Recommendations to TIST carbon financing programme



Source: Primary Data.

Figure 11: Strategies to Climate Change Mitigation Measures



Source: Primary Data.

The table above show the strategies suggested by farmer on how to mitigate climate change in Uganda as a whole. It was suggested by farmers that since there is land shortage, families have small pieces land as the only source of income, land is also fragmented into small pieces of land due the population tha cannot afford tree planting, where land is just for food and other home requirements, for this they recommended carbon sequestration through tree planting in urban areas and also reserve regions (28%) as shown in the table above

Government Interventions shows (21%) was recommended. Some farmers are confused about issues to do with Carbon finacing. They join several without groups knowing the implications like the way they double deal in two programs hence challenged by the needs of each of the two or more programmes.

The other strategies looked at by farmers were capacity building and sensitization (13%) of the TIST groups, promotion of alternative renewable energy savers (13%), encouraging farmers to work as a groups for collective actions and controlling of the population.

CHAPTER IV:

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

4.0 Discussion

Developing countries will disproportionately bear the consequences of climate change because they are more exposed, less resilient, and have low adaptive capacity to climate hazards (World Bank 2010). Coastal and low-lying cities are particularly vulnerable to the increased incidences and unpredictability of natural disaster.

4.1.1 Clean Development Mechanism strategies adopted in Uganda

Carbon credits are often bought and sold by several intermediary companies who have specialized knowledge in carbon finance. They find and develop projects, provide support and financing for carbon projects and bring them to market as part of their daily business. NGOs usually link to a suitable partner according to (Disch, 2010). Apart from using the afforestration and reforestation projects are practicing a bigger percentage of this particular forgetting other alternative interventions which should also be put into consideration.

Interventions to do with CDM are underutilized therefore Biodiversity promotion through AFOLU as highlight should be consider and highly recommended for as alternatives mechanisms to improve ERs.

(Tennigkeit 2008) and (Kürsten 2000) advice on the establishing agro-forestry systems can help meet fuel wood needs as show in Fig (6) as well as improving soil structure should be taken seriously, if we are to increase carbon finances also alternative energy can help control desertification, increase carbon sequestration and reduce CO_2 emissions.

Other methodologies of allowing aggregation of small-scale projects can be applied to achieve significant greenhouse gas emission reductions through improved household level biomass technologies, biogas, solar energy, wind power and off-grid electricity systems.

4.1.2 The disbursement of carbon funds in comparison with timber production sales

As far as payment for carbon credits concerned there is need for projects development and carbon assets management according to (Tenningkeit 2008). This is in line with increase funds and cross checking the procedure applied where promoting carbon financing.

ECOTRUST (2011) believes that it is not right to give initial funds to farmers once one is not sure of the security at hand for the fund disbursed. Farmers have challenges that expose them to severe to cut trees. The agreements or Memorandum of Understanding (MOU) signed by farmers should be legally recognized and in any way they will possess authority that will not be entertained by the funders.

Delayed payments and less payments should be checked seriously by the funding institutions and compare the payment systems incorporate so as to avoid the carbon trade risks which are at times irreversible. This is in line with (McCarthy et al 2011) on delayed investments, the farmers get discouraged and cut the trees not waiting for the final returns.

All in all a comprehensive set of mechanisms is called for that rewards the sequestration and emission reduction from the AFOLU sector. Such mechanisms need to reward not only the emissions reductions from deforestation but also reward carbon stored in agricultural systems and forests. Failure to do so will further add to the barrier to realizing Africa‘s climate and conservation reduction goals

4.1.3 Perceptions on the challenges facing this carbon financing approaches

Collective action Collective action through serious memorandum of understanding must be put consideration (Lipper *et al* 2001) suggests .The farmers have several constraints shown in Fig (6) that can lead to greater losses of the carbon reserve which is global threat already a menace to our livelihoods.

Land tenure security systems where smallholder tenure rights are highly relevant to the development of carbon finance projects in agriculture is very crucial. Project developers know that smallholders can ensure carbon sequestering land uses that are not reversed at a future date. As demonstrated in Fig.(7). Buyers always require assurance that land users have rights over the carbon assets sold. Ill-defined or insecure tenure rights are common in many developing country contexts as elaborated in (FAO 2010)

Monitoring, compliance and enforcement as market arrangements for ecosystems services, carbon payment schemes often have measurement, verification and monitoring plans. This checks the issues elaborate in Fig (6) and the payment system that has to be streamlined for farmers to be aware of, and avoid doubting on issue to do with carbon financing.

5.0 Recommendations and Strategies to Mitigate Climate Change in Uganda

Strong Carbon financing structures and strategy for projects are needed to monitor funds disbursed to farmers and make proper plans so as to have long term ER strategies hence devise proper criteria for acquiring Carbon finances.

Facilitation and awareness creation is essential in carbon financing. Facilitating the quantifiers ensures effective and efficiency at the work place when sensitizing the farmers about carbon trade and devise hence proper ways to disseminate information to farmers on financing through facilitation and advisory services

Capacity building on issues to do with funds for government official, private sector and the beneficiaries from the incentives on procedures and mechanisms used to promote Emission Reductions

Provision of sufficient incentives or increased carbon payment for carbon sequestration to avoid the challenges pushing famers cutting trees for quick returns hence promotion of Emission Reductions

Biodiversity in the Agricultural, Forestry and Land Use hence promoting the indigenous tree species as alternatives for increased percentage of carbon accumulation putting into considerations timber availability and accessibility. This is through Reduced Emissions from Deforestation and Degradation

Group Dynamics Sensitization and awareness creation of farmers on carbon credits though working as groups since its TIST's way of approach so as to avoid penalties from those who cut the tree, in relation to payments made to group.

Scaling up carbon financing through renewable energy financing the alternative energy sources support programme ensuring sustainable energy at household level thus reducing the dependence of the population on woody biomass. These calls for the establishing agro-forestry systems which can help meet fuel wood needs as well as improving soil structure.

5.2 Conclusion

Africa has got the privilege of acting as a very strong global storage for carbon. This should be used as an opportunity and a tool for sustainable development by incorporating Clean Development Mechanisms. This is particularly in key sectors, such as forestry, agriculture, energy and waste management. Nonetheless, challenges for carbon finance across the region remain significant because of the unpredictable investment climate present in many African countries and lack of capacity in some African private and public sector institutions.

Although Africa contributes very little by way of GHG emissions, most African countries are directly affected by climate change. Through climate adaptation and mitigation of climate change it can devise means as already researched in this paper to increase the finances so as to meet CDM procedures and incentives to assess, reduce, and monitor GHG mitigation initiatives. Although carbon finance is not a means to fund projects fully, it is typically a component in a larger investment strategy to provide sufficient resources and technical expertise to implement these Clean Development Mechanisms

Uganda's national actions in particular those developed under the Kyoto Protocol to reduce GHG emissions have to be proven highly adequate and have produce appreciable impact. Discussions on how to proceed beyond Kyoto should be framed within the overall National Approach Programmes. The main weaknesses and absence of credible measures can be reassured through development agenda that will be reconciled and integrated into climate action at the national level.

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