



**CCDARE**  
Climate Change Adaptation  
& Development Initiative



# ECONOMIC ANALYSIS, GUIDELINES ON INVESTMENT AND RELEVANCE OF CC-DARE PROJECTS IMPLEMENTED IN TANZANIA, TOGO, MOZAMBIQUE AND SEYCHELLES





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## **EXECUTIVE SUMMARY**

This report is prepared to show evidence of economic impact, guidelines and relevance of CC-DARE projects implemented in a number of countries in the sub-Saharan Africa. This report is covering four countries; Tanzania, Togo, Mozambique and Seychelles where different interventions on mitigating and adapting to the adverse effects of climate change have been initiated. The projects are short duration, not exceeding one year but have been well focused and produced encouraging results.

The projects in Togo and Seychelles are similar in that they are dealing with water harvesting and storage. However they differ in the methods used to harvest water and utilization of the stored water. In Togo the stored water in two rehabilitated earth dams is used mainly for irrigating cereals and vegetables. The 94,000 m<sup>3</sup> of water in the two dams is enough to irrigate 30 hectares of land sown with vegetables. Availability of water for irrigation has increased the crop yield for example tomatoes from 19 tons/ha to 30 tons/ha. In Seychelles the stored water from roof catchment in 10 schools is used for cooking, cleaning and gardening in schools. It is estimated that in one year the 10 schools can save USD 30,000 in water bills. This is based on the evidence reported by one school having saved USD 250 per month.

The project in Makete district in Tanzania was on research and training. There was no direct monetary gain out of the intervention. However the guidelines that were developed will help the farmers improve their woodlot management for higher income. For example if a farmer follows the guidelines, it is possible to get net income of TAS 27,840,000 per hectare. In addition to monetary gain tree planting has other advantages of soil erosion control, soil organic matter build up, nutrient recycling, beautification of landscape and carbon sequestration. Trees have also been planted in degraded lands where conventional food crops cannot grow due to infertile soil.

The project in Mozambique was on soil erosion control and road protection. It is not easy to convert the intervention into direct monetary terms, but has contributed indirectly in facilitating other sectors that relate to economic development of the community and the city of Xai-Xai as a whole. Protecting roads against erosion will enhance faster delivery of goods and services that lead to economic growth of the city and community. Vegetation grown in the intervention will improve the local micro-climate as well as carbon sequestration.

The CC DARE projects have created interest in the public and private sector and it is hoped that a second phase of the projects will make significant differences in improving the livelihoods of beneficiaries, create investment opportunities as well as mitigating the adverse effects of climate change. This report is written in four chapters according to the distinct topics for clarity and flow of information.

# CHAPTER 1

## INTRODUCTION

### 1. 1 Basic information:

Climate change represents one of the single most important challenges that global society will face over the coming decades and centuries. Understanding regarding the impacts of climate change has evolved substantially in the recent years. People will feel the impacts of climate change most strongly through changes in the distribution of water around the world and its seasonal annual variation. Already people in many parts of the world are experiencing significant changes in water availability resulting in major regional scarcity problems particularly in Africa. Rising intensity storms, forest fires, droughts, flooding and heat waves have become common phenomena. The current stock of greenhouse gasses in the atmosphere is equivalent to 430 parts per million (ppm) mainly carbon dioxide CO<sub>2</sub> compared with 280 ppm before the Industrial revolution. These concentrations have already caused the world to warm by more than half a degree Celsius and will lead to at least a further half degree warming over the next few decades (Stern, 2006). CC-DARE programme has been designed to address some of the negative impacts of climate change and provide crosscutting solutions to improve livelihoods in the most vulnerable communities. Prioritization of CC-DARE projects is based on need-basis for high risk communities, ecosystems and sectors. In order to provide economic incentives for public or private sector investments in adaptation actions, it is important to carry out a cost-benefit analysis of some of the adaptation actions.

The economic analysis presented in this report may not follow the conventional way of calculating cost/benefit ratio of investments. This is because of the nature of the projects that are of very short duration. Some of the actions do not give direct returns in the short term. However the investment in training, demonstration and capacity building of local technicians and communities is expected to bear much fruit in the near future and bring economic transformation and mitigation against the impacts of climate change. The constraint of estimating the costs and benefits of portfolios of activities under data limited conditions can be overcome by working with communities and other actors. Such community based tools are seen as providing an important “first –cut” evaluation of the likely benefits and costs associated with different activities. The economic analysis in this case is based on the scenario of with or without the intervention.

### 1.2 Summary of country projects and major economic impacts:

A summary overview of the projects is given in Table 1. The projects in Togo and Seychelles were similar but different aspects of water harvesting. The two projects brought economic returns in the short term because of increasing water availability that could be used immediately after harvesting and storage.

In Togo two dams were rehabilitated and could store 94,000 m<sup>3</sup> of water. The water is enough to irrigate 30 hectares of land. If the water is used to grow vegetables (Example Tomatoes), it is possible to harvest at least two times in one year. Tomato yield of 30 tons per hectare is achievable. This means that in one hectare a farmer can harvest 60 tons of tomatoes per year. If the tomatoes are sold at USD 0.5 per kg, then the farmer would get a gross income of USD 30,000.

**Climate change represents one of the single most important challenges that global society will face over the coming decades and centuries.**

**In Mozambique,  
the project was soil  
erosion control and  
road protection  
against gully erosion  
and soil deposition on  
roads.**

In Seychelles 40 m<sup>3</sup> of water was harvested from roof catchment of schools and stored in plastic tanks. In one school there was a saving on water bills of USD 250 per month. This means that in one year the school would save USD 3,000. If all the 10 schools covered by the project saved similar amount in water bills, the intervention will save the schools from paying USD 30,000 in one year which is a big economic impact.

In Tanzania the project was basically research and development of manual of best practices in woodlot management. Currently the farmers in Makete district earn between TAS 20,000 and 5,000,000 depending on the size of woodlot. If farmers follow and implement the guidelines that were developed in the CC-DARE project, they are able to achieve population of at least 1,000 trees in one hectare. From the field investigation one mature tree can give a net profit of TAS 27,840. This means that in one hectare the farmer is able to get net profit of TAS 27,840,000.

In Mozambique, the project was soil erosion control and road protection against gully erosion and soil deposition on roads. This intervention is difficult to translate into direct monetary terms. However the Accessibility and ease of transportation has economic significance in time saving while carrying out business. The vegetation establishment has several values including beautification of landscape, soil erosion control, soil amendment through organic matter build up and carbon sequestration.

*Table 1.1: Overview of country projects.*

Attributes	Country			
	Tanzania	Togo	Mozambique	Seychelles
Project thematic area	Woodlots management	Rehabilitation of two earth dams	Soil erosion control and road protection	Roof water harvesting for schools
Implementing organization	Sokoine University of Agriculture	Ministry of water, sanitation and village water supply	Municipal council of Xai-Xai city	Ministry of education. (Environmental Education unit)
Budget allocated (USD)	50,365	100,000	48,500	50,000
Major output	250 copies of guidelines manual on woodlots management produced and distributed to people in 90 villages.	Two earth dams rehabilitated to store 94,000 m <sup>3</sup> of water.	74,800 hollow blocks made. 123 people trained. 26,300 tree seedlings raised. Training of youth and capacity building of technicians.	Plastic tanks of 1000 - 2000 litres installed in 10 schools with total water storage capacity of 40 m <sup>3</sup> . Training of pupils and community.

Target number of beneficiaries	128,520	3,298	15,000	4,000 school children. 800 school teachers.
Economic impact	Willingness of people to implement woodlot management guidelines for high economic returns from sale of tree products.	Increased yield of crops e.g. yield of Tomatoes increased from 19 to 30 tons/ha due to availability of water for irrigation.	1.1 kilometres of road protected from erosion damage.	Saving of USD 250 in monthly water bill in one school. For 10 schools this will be USD 2,500 saving on water bill per month.



**The money allocated to the country projects was almost the same apart from Togo that had double allocation compared to the other three countries.**

## ECONOMIC ANALYSIS OF THE ADAPTATION ACTIONS

### 2.1 Introduction

The money allocated to the country projects was almost the same apart from Togo that had double allocation compared to the other three countries. However in Togo there were two distinct projects in different areas where two earth dams were rehabilitated. The funds allocation and expenditure items are given in Table 1. There was more expenditure in personnel in the Tanzania project than in the other countries. The Tanzania project was research that involved more personnel and production of manuals for distribution to the beneficiaries. The projects in Togo, Mozambique and Seychelles involved construction and installation of structures. The details of expenditure in the four countries are given in appendix.

The Tanzania project was research that involved more personnel and production of manuals for distribution to the beneficiaries.

*Table 2.1 Breakdown of expenditure*

Expenditure item	Expenditure per country (USD)			
	Tanzania	Togo	Mozambique	Seychelles
Subsistence allowance/ coordination/consultants	37,840	8,600	8,500	10,000
Transport	3,750	6,000	1,000	1,500
Materials/labour/installations/ construction	825	58,000	24,000	29,000
Office supplies	430	500	2,000	
Workshops/meetings/farmer visits	720	9,000	10,000	3,000
Communication	200	3,000		
Guidelines/brochures/training materials/development plans/ proposals	6,600	10,900	2,000	5,000
Monitoring and evaluation		4,000	1,000	1,500
<b>Total</b>	<b>50,365</b>	<b>100,000</b>	<b>48,500</b>	<b>50,000</b>

The proportion of funds that went directly to the beneficiaries of the action in Togo, Mozambique and Seychelles were quite different from Tanzania because of the nature of the projects (Table 2).

**Table 2.2 Proportion of funds to the beneficiaries of the action**

Category of expenditure	Percentage of funds to major project components (%)			
	Tanzania	Togo	Mozambique	Seychelles
Personnel implementing the project	75	9	18	20
Beneficiaries of the action	16	78	74	74
Others	9	13	8	6

In Tanzania the major output was the woodlot management guidelines that were distributed to many farmers as well as to government institutions. The adoption and implementation of the guidelines will increase productivity of woodlots as well as the farmers' income. In Togo there was less expenditure on personnel because the major work of earth dam's rehabilitation was done by machinery in excavating the water storage area.

## 2.2 COUNTRY PROJECT ANALYSIS

The following section gives analysis of country projects.

### 2.2.1 TANZANIA PROJECT:

Improving smallholder livelihoods through woodlots management: an adaptation to climate variability & change in Makete District, Tanzania.

#### **Objectives of the project:**

The main objective of the project was to assess the contribution of smallholder woodlots to household income and poverty alleviation in Makete district.

The specific objectives were to:

- Assess the silvicultural management practices and growing stocks in the woodlots.
- Identify the existing marketing channels and practices for softwood timber from smallholder woodlots.
- Develop management guidelines and marketing strategies that would increase income to the people through sale of tree products.
- Identify alternative adaptation strategies to climate variability & change that can reduce dependence on woodlots and forests.
- Examine the role of gender, local knowledge and tenurial arrangements for land to enable planning and development of alternative adaptation strategies and forest management practices.
- Initiate experience sharing sessions among stakeholders.

**In Tanzania the major output was the woodlot management guidelines that were distributed to many farmers as well as to government institutions.**

## **i. Economic analysis of the action**

- a. Investment cost
  - 50,365 US Dollars
- b. Economic opportunities emerging from the action

Before this study, however, there was little information on the total forest area covered under individual ownership. Also the contribution of individual woodlots to the income of smallholder and poverty alleviation as a whole and how the benefits are distributed to all stakeholders involved in the industry were not known. It was therefore not clear how much woodlot management is contributing to climate change adaptation. Much as the communities were harvesting and getting income from their woodlots, their management practices including marketing strategies were far from being sound. This study therefore assessed management practices of smallholder woodlots and marketing of timber in order to document best woodlots management practices which could be used to improve forest management and livelihoods of local communities in Makete District.

## **ii. Implementation guide for economic investment in the action.**

- a. Benefits of the action.

Trees contribute highly to the economy of individuals and to the District at large. Previously the income of people in Makete district depended on agricultural products such as maize, wheat, rice, Irish potatoes and pyrethrum, but later due to climate variability and changes the crops production declined tremendously. This resulted in threatening food security and the wellbeing of rural people of Makete.

- b. Direct beneficiaries in economic terms of the action.

There are two categories of direct beneficiaries that include:

- The farmers who acknowledge the dependence on woodlots as their major source of income. The annual income from woodlots ranges from TAS 100, 000 to 2,000,000 depending on the size of land holding. The annual income is lower than expected because according to the field investigation one tree can give a net earning of TAS 27,840. Considering that in one hectare there can be 1,000 trees, the net earnings would be TAS 27,840,000. This can be realized through improved management especially spacing, pruning and thinning.
- The District Council realizes annual revenue of about TAS 200 million in form of tax revenue from timber and fire wood coming from the woodlots.

**Trees contribute highly to the economy of individuals and to the District at large.**

### **Short-term benefits and constraint.**

- Cash income to the people of Makete from sale of trees.
- Provision of firewood for cooking from tree pruning and thinning.
- Constraint of low market prices compared to the prices in big towns.

### **Long-term benefits and constraints and constraint.**

The project was implemented by the staff from: Sokoine University of Agriculture, Tanzania Forest Research Institute and Makete District Council. This mix of staff provided good linkage between research institutions and the local governments' staff who are responsible for assisting the farmers on their day to day management of woodlots. The District's staff also has direct linkage to their respective sectoral ministries in the central government system. In this respect the District staff provided feedback on woodlots management to the Ministry of Natural Resources and Tourism on which the forestry sector is anchored.

The methodology used in executing the project activities was participatory in nature where by farmers' own experience in managing their woodlots and technical experience of the researchers were sourced. This provided a direct link between the researchers, district forest staff and the farmers.

#### **iii. Cross-cutting benefits or offsite implications of the action.**

- Baseline information on the extent of woodlots in Makete district and their contribution to climate change generated. A report on baseline information on woodlot management in Makete district has been prepared. This information is useful for the identification of existing practices and local knowledge with the aim of improving the practices and integrating them with the scientific knowledge.
- Baseline information on the existing marketing channels for timber in Makete district generated. A report containing the baseline information on woodlot management in Makete district was prepared.
- A guideline contains recommendations on more profitable market options for timber was prepared. At least 25% of tree growers are expected to follow the guidelines. Due to the nature of the project, verification of this indicator is however a post project activity.
- Baseline information on the contribution of smallholder woodlots to household income and poverty alleviation in Makete district generated. A report containing baseline information on the contribution of smallholder woodlots to household income and poverty alleviation in Makete district was prepared. This information is useful to researchers, tree growers, District Council, Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism, for planning purposes whereby smallholder woodlots are recognized as significant contributors to the economy of the households, districts and nation at large.

**The methodology used in executing the project activities was participatory in nature where by farmers' own experience in managing their woodlots and technical experience of the researchers were sourced.**

**Local knowledge, scientific knowledge, gender and tenurial arrangement considered on the proposed best woodlots management and marketing practices.**

- A guideline on sound woodlots management to enhance productivity as a climate change adaptation strategy was prepared. The guideline also contains recommendations on more profitable market options for timber. It is expected that, at least 25% of tree growers will follow the guidelines. Due to the nature of the project, verification of the indicator is a post project activity. However, the active participation of various stakeholders indicates the acceptability of the technologies. This guideline is a useful tool for the tree growers, District Council, Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism.
- Baseline information on other income generating activities as adaptation strategies to climate change was documented. The activities are: agriculture (of adaptive crops), livestock keeping, beekeeping, small businesses, fisheries, making local brew and milling machine. This information which is useful for planning for the alternative income generating activities for the households, districts and nation at large is contained in a progress report. Tree growers, District Council, Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism were the main clients.
- Local knowledge, scientific knowledge, gender and tenurial arrangement considered on the proposed best woodlots management and marketing practices. The process of developing the guidelines containing best practices on woodlot management and marketing was participatory and considered local knowledge, scientific knowledge, gender and tenurial arrangement. This information is useful for the tree growers for the improvement of woodlots management and income generation. In fact some of the proposed best practices were taken from among the tree growers.

**iv. Others**

- Soil erosion control because of canopy cover by the trees and reduced surface runoff.
- Soil amendments through organic matter build up from the leaf fall.
- Nutrient re-cycling from deep horizons to top soil.
- Carbon sequestration leading to reduction in carbon dioxide concentration in the atmosphere.

**v. Protective mechanism of the adaptation actions and the investment portfolios.**

It was also recommended that farmers form credit associations e.g. *Mang'otoTree Growers Association* from which they can borrow money while keeping their immature woodlots as collaterals and repay when they sell mature timber. This will reduce the loss caused by selling immature timber. The district authorities support this recommendation and promised to facilitate.

**vi. Contribution in greening the local economy.**

- Tree planting has positive impact on beautification of the landscape

## **vii. Supporting resilient national development.**

- Tree planting is within the national development agenda. Tree planting programme in most part of the country has been advocated for decades but there has been slow adoption to these activities in most parts of the country. To the contrary, people in Makete district have responded positively to tree planting due to unfavorable climatic conditions and poor soils that contributed to poor agricultural crop production.

## **viii. New action for economic awareness, sensitization and policy formulation**

- Publication of manual of best practices in forest trees management.
- Training of farmers on woodland management.
- Integration of research extension, beneficiaries and government institutions in finding a solution to increased productivity of forest trees.
- The best practices were documented in a publication in the form of Guidelines for Woodlots Management in Makete District (Malimbwi et al., 2010). These Guidelines are a result of combined farmers' own experience in managing their woodlots and technical backing of researchers and forestry staff in the district. The guidelines which are both in English and Swahili provide basic steps for proper woodlot management. The project produced 100 copies in Kiswahili and 100 copies in English. The Kiswahili copies and some English copies were distributed to tree growers in the study villages through Makete District Council. The District council photocopied 50 copies more which were distributed in the whole District. Each ward and village government office was given a copy. Fifteen (15) Wards and 90 villages out of 97 of Makete district were covered.
- The district council management also instructed the Ward and Village government officers to organize village meetings for creating awareness on the application of the guidelines.
- The phase one project recommended that more studies on adaptation to climate change and variability are vital in order to provide information necessary for planning for adaptation and mitigation measures in Tanzania.
- As the guidelines are already distributed in Makete District and farmers have started applying them, a follow up study on rate of adoption of recommended management practices as a post project activity is vital.

**The best practices were documented in a publication in the form of Guidelines for Woodlots Management in Makete District (Malimbwi et al., 2010)**

**The overall objective of this project was the rehabilitation of earth dams in the Savannah region to reduce the region's vulnerability to the adverse effects of climate change by providing water for the communities to boost their cereal and vegetable production.**

### **2.2.2 TOGO PROJECT:**

Rehabilitation of water reservoirs in the savannah region for the benefit of women and youth groups.

#### **Objectives of the project:**

The overall objective of this project was the rehabilitation of earth dams in the Savannah region to reduce the region's vulnerability to the adverse effects of climate change by providing water for the communities to boost their cereal and vegetable production.

Specific objectives were to:

- Raise awareness of local communities, in particular women and young people in the region on the negative impacts of climate change.
- Improve water management through training and demonstration.
- Promote tree planting for environmental conservation and protection.
- Increase production of cereals and vegetables.
- Diversify sources of recipient's income to combat the rural-urban migration.
- Develop an investment plan for the rehabilitation of water reservoirs in the Savannah and Kara regions of Togo.
- Submit both the investment plan and the project proposal to implement the plan to the Ministry of Water Resources.

#### **The main project outputs are:**

- Good understand by the communities the impacts of climate change and how they can be involved in the implementation of adaptation to climate change measures.
- Two water reservoirs rehabilitated.
- Women and youths trained in water utilization for irrigation for crop diversification and improved income.
- An investment plan for the rehabilitation of the water reservoirs in Savanna and Kara developed.
- A project proposal for the implementation of the investment plan developed and submitted to the Ministry of Water Resources.

#### **i. Economic analysis of the action.**

a. Investment cost  
100,000 US Dollars

b. Economic opportunities emerging from the action:

- A number of farmer groups and local councilors sensitized on the implementation of the project.
- More water reservoirs likely to be rehabilitated in other areas of the country.
- More people to be trained on water management for agricultural production.
  - Increased yield of agricultural produce.
  - Greater awareness of dam rehabilitation created.

## ii. Implementation guide for economic investment in the action.

### a. Benefits of the action

- Increased availability of water for farming and other domestic uses
- Improvement of food security guarantee for the population.
- Crop diversification to spread the risk of crop failure.
- Capacity building of women and youth in water management practices.

### b. Beneficiaries in economic terms of the action.

#### Short-term benefits and constraints:

- Increased volume of water stored for production.
- Increased crop yields. For example yield of tomatoes under rain-fed conditions is 19 tons per hectare while the yield under irrigation is 30 tons per hectare. This is below average production and can be improved through management and seed selection. The average production can be between 45 and 50 tons per hectare.
- 94,000 m<sup>3</sup> of water harvested and stored in the two rehabilitated dams in Togo is enough to irrigate 30 hectares of vegetables. Some vegetables like tomatoes can be planted at least two times in one year. Considering the yield of 30 tons per hectare, farmers are likely to harvest at least 1,800 tons of tomatoes per year with harvested water in the dams.

#### Long-term benefits and constraints.

- Reduced land degradation through runoff water harvesting and storage.
- There will be increased ground water recharge due to seepage from the dams. The rise in water table will enhance vegetation establishment. More vegetation will lead to increased carbon sequestration.
- The Department of Water Resources has adequate knowledge and skills to develop the project proposal for implementation of the investment plan for rehabilitation of water reservoirs.
- The Ministry of Water Resources and the Department of Village Water Supply have tools to approach development partners for collaboration in rehabilitating water reservoirs in the Kara and Savannah Regions of Togo.

## iii. Cross-cutting benefits or offsite implications of the action:

- The capacity of a number of women and youth groups has been built during project implementation that will lead to increase in agricultural production.
- More training to build local capacity on irrigation water management and crop husbandry.

**There will be increased ground water recharge due to seepage from the dams.**

**Training of beneficiaries on operation and maintenance of the water facilities to continue for sustainability.**

**iv. Protective mechanism of the adaptation actions and the investment portfolios:**

- The investment plan communicated to the government and the local authority for funding to do more projects on reservoir rehabilitation.

**v. Others:**

- a. Contribution in greening the local economy
  - Increased vegetation cover.
  - Beautification of the landscape.
  - More food production during the dry period because of available water for irrigation.
- b. Supporting resilient national development
  - Crop diversification.
  - Improved food security for the population.
  - Saving on food imports.

**vi. New action for economic awareness, sensitization and policy formulation.**

- The beneficiaries have adapted the project and willing to take charge of operations and maintenance.
- The people are well informed about water harvesting and management.
- Rehabilitation of water reservoirs likely to be expanded to other areas in the country.
- Training of beneficiaries on operation and maintenance of the water facilities to continue for sustainability.

**1.1.3 MOZAMBIQUE PROJECT:**

Introduction of new adaptation techniques to climate change related top soil erosion in xai-xai city.

Objectives of the project:

The overall objective of the project is to increase the adaptive capacity of the communities in the municipality of Xai-Xai to mitigate the pluvial erosion across the city in order to contribute to a sustainable environment and the communities' welfare.

The specific objectives of the project were to:

- Introduce alternative techniques to combat top soil erosion due to erratic rainfall.
- Sensitize coastal communities in the XaiXai region to adapt alternative techniques of erosion control.
- Include new techniques of soil erosion control in municipal management plans.
- Create a technical and institutional capacity within the municipality and communities

through the adoption of participatory models.

- Up scaling the technology for wider coverage in the region.

Project outputs:

- Simple Guide on how to produce retaining wall systems and agro forestry techniques that can counteract soil erosion.
- 75 members of municipal staff and community members trained on alternative techniques.
- Construction of 5 demonstration plots of retaining wall systems in various parts of the city.
- Green areas through planting of eucalyptus, fruit species, and some other vegetal species.
- One municipal plan updated to include new techniques.

### **i. Economic analysis of the action**

- a. Investment cost

US Dollars 48,500

- b. Economic opportunities emerging from the action

- Commercial production of the hollow blocks
- Commercial production grass and tree seedlings

### **ii. Implementation guide for economic investment in the action.**

- a. Benefits of the action

- Section of road protected from damage from erosion.
- Vegetation planted that improves the environment as well as carbon sequestration.

- b. Direct beneficiaries in economic terms of the action

Short-term benefits and constraints

- Ease of transportation due to road protection against damage.
- With the implementation of the project within the communities, the level of awareness about the climate change problems has been increased and people are willing to take actions to mitigate the adverse effects of climate change.

Long-term benefits and constraints.

- Soil improvement from vegetation grown in the area.

**The project results have called attention of the elected Mayor and councilors who will include the issues related to climate change in their programmed activities and budget.**

### **iii. Cross-cutting benefits or offsite implications of the action**

- The challenges that the institution faced during the implementation of the project have brought the need to establish a team of technicians to be directly involved with the future implementation works. This group of technicians is now able to carry on the actions and work with the community members.

### **iv. Protective mechanism of the adaptation actions and the investment portfolios.**

- The project results have called attention of the elected Mayor and councilors who will include the issues related to climate change in their programmed activities and budget.
- The present project has shown that with the community engagement the municipality can carry on actions to reduce the impacts of climate change with the use of new adaptive techniques.
- The youth commitment to the project is so encouraging that the municipality believes that the project is going to take place for a long period of time.

### **v. Contribution in greening the local economy**

- The project wishes to spread the adaptive capacity of the communities to mitigate the pluvial erosion across the city in order to contribute to a sustainable environment and the communities' welfare.
- The project wants to make sure that all people in the community can be able to implement the technique all around the city building on the foundation laid during the project implementation.

### **vi. Supporting resilient national development**

- The project has brought to the municipality the need for the institution to look to this experience as a lesson to be learned and maintained since it deals with a very strong problem that affects all the citizens.

### **vii. New action for economic awareness, sensitization and policy formulation.**

- The municipality technicians have made all their effort to make the project come out with good results through the training of community and the youth.

## 1.1.4 SEYCHELLES PROJECT.

Demonstrating Adaptation to Climate Change in Schools – Roof water harvesting.

Objectives:

The main objective of the project was to increase water availability to schools.

The specific objectives were to:

- Harvest rainwater to meet the needs of selected schools and to reduce the cost of their water bills.
- Educate the school children on the impact of climate change on our water sources and methods used for adaptation.
- Raise awareness among the general public on climate change impacts on the Seychelles, and rain harvesting as a means of adaptation to water problems due to climate change.
- Share the schools' experience on water harvesting with other organizations.

### **i. Economic analysis of the action**

- a. Investment cost

USD 50,000

- b. Economic opportunities emerging from the action:

- There has been a great demand for the project to be carried out in other schools.
- Already through some generous donations from private businesses, two other schools have started the project.

### **ii. Implementation guide for economic investment in the action.**

- a. Benefits of the action.

- Saving on monthly water bills.
- Beautification of school compound.
- Modification of micro-climate.

- b. Direct beneficiaries in economic terms of the action.

- Direct beneficiaries are school children and school teachers.

Short-term benefits and constraints.

- Increased amount of water available to school children.

Long-term benefits or constraints.

- Savings from water bill used in other development activities

### **iii. Cross-cutting benefits or offsite implications of the action.**

**Raise awareness among the general public on climate change impacts on the Seychelles, and rain harvesting as a means of adaptation to water problems due to climate change.**

- The pilot school has participated in several local exhibitions to sensitize the public on climate change adaptation and rainwater harvesting.
- There has been a great demand for the project to be carried out in other schools. Already through some generous donations from private businesses, two other schools have started the project.

### **iii. Protective mechanism of the adaptation actions and the investment portfolios.**

- The school environmental representatives and the Environmental Education Unit will bring forward a formal proposal to the government on the need to include rainwater harvesting in the building codes of the country, starting with government buildings. First the Ministry of Education (MoE) management will be sensitized to see how the programme could be included in the schools building codes.

### **iv. Contribution in greening the local economy**

- Water harvested at the schools is also being used for school gardens during the dry season when there is water restriction from the conventional water supply.

### **v. Supporting resilient national development**

- Once the project has been implemented in several schools, the Environmental Education Unit, together with the schools involved can finally submit a formal request to the Ministry of Education and other concerned ministries, such as environment and national development, for rainwater harvesting systems to be included in building codes.
- The project has significant up-scaling and replication potential. A nationwide proposal would be able to attract donor interest.

### **vi. New action for economic awareness, sensitization and policy formulation.**

- The pilot school participated in several local exhibitions to sensitize the public on climate change adaptation and rainwater harvesting.
- The project and school featured in local newspapers and television programmes contributing to sensitization of the public.
- The Environmental Education Unit organized workshops for teachers on climate change and water and together with the Water Division in Public Utility cooperation, organized public speaking and poster competitions for schools and was given good publicity by the local media.

# GUIDELINE FOR ECONOMIC INVESTMENT IN THE ACTION

### 3.1 Introduction:

Looking across the global economy, it becomes apparent that there are emerging business opportunities in the climate change arena. Companies and investors are quickly realizing that climate change is not merely a social, political or moral issue. It is an economic and business issue as well, translating into a wave of investment and innovation. Climate change strategies seek to invest in industries, companies groups of people and even individuals that are involved in both the mitigation of, and the adaptation to, climate change. Mitigation involves intervention by humans to reduce the sources of greenhouse gases or enhance their sinks, while adaptation involves Adjustments in practices, processes or structures to take account of changing climatic conditions.

CC DARE projects have been addressing both issues of mitigation and adaptation. The projects have had significant impact within a short period of three years. Some of the projects have been pilot studies, demonstrations, trainings for capacity building or policy developments in different countries in the sub-Saharan Africa. The work that has been initiated has the potential of up-scaling to cover larger areas and more beneficiaries. It is hoped that both public and private sector will be motivated by the positive results obtained in CC DARE projects and increase financial investments in climate change actions.

Under the Climate Change Convention and Kyoto Protocol, various financing instruments have been developed for climate change adaptation and mitigation measures that include projects on forest management, afforestation and deforestation. The evolving policy discussions within UNFCCC has established a financing mechanism include among others:

#### 3.1.1 UN REDD programme.

This is a United Nations sponsored programme that stands for “Reducing Emissions from Deforestation and Degradation.” A REDD mechanism would seek to provide incentives for developing countries to undertake actions that lead to reduction in GHGs concentration in the atmosphere. A REDD mechanism could provide compensation to governments, communities, companies or individuals if they have taken actions to reduce emissions from forest loss below an established reference level. The sustainable management of forests then becomes a smart economic decision, as well as a smart decision for the environment. The Tanzania project on management of woodlots can fit well in the REDD programme if the communities can be educated on how it works and the requirements. REDD could provide political and financial support to indigenous peoples if governments decide that local forestry practices contribute to storing carbon. In many cases at present time, forest areas are often worth more harvested than left standing. At its core, REDD aims to change the incentive structures in favor of protecting forests. for Reducing Emissions from Deforestation and Degradation (REDD) have created high expectations for its role as a financing tool for sustainable forest management and forest conservation.

Although funding towards REDD will likely take many different forms, one option that is often discussed is to link REDD to carbon markets in developed countries.

### **3.1.2 Carbon credit:**

Although funding towards REDD will likely take many different forms, one option that is often discussed is to link REDD to carbon markets in developed countries. Companies could then meet their emission reduction commitments by channeling funding to REDD in forest-rich countries. Carbon markets would generate significant funding for REDD at a scale rarely seen before. A key feature of these markets is emissions trading, which allow companies to buy or sell “credits” that collectively bind all participating companies to an overall emissions limit. So far the biggest emissions market is for carbon dioxide.

## **3.2 Summary Guidelines on economic investments in the actions implemented in the four countries:**

### **3.2.1 TANZANIA PROJECT:**

The people to be assisted in forming credit associations e.g. *Mang'otoTree Growers Association* from which they can borrow money while keeping their immature woodlots as collaterals and repay when they sell mature timber. This will reduce the loss caused by selling immature timber. The district authorities support this recommendation and promised to facilitate. The association can also be educated on how they access the carbon trade market for their action.

### **3.2.2 TOGO PROJECT:**

The Department of Water Resources has adequate knowledge and skills to develop project proposal for implementation of the investment plan for rehabilitation of water reservoirs. The Ministry of Water Resources and the Department of Village Water Supply have tools to approach development partners for collaboration in rehabilitating water reservoirs in the Kara and Savannah Regions of Togo. The investment plan communicated to the government and the local authority for funding to do more projects on reservoir rehabilitation.

### **3.2.3. MOZAMBIQUE PROJECT:**

With the implementation of the project within the communities, the level of awareness about the climate change problems has been increased and people are willing to take actions in mitigating adverse effects of climate change. The project results have called attention of the elected Mayor and councilors who will include the issues related to climate change in their programmed activities and budget. The present project has shown that with the community engagement the municipality can carry on actions to reduce the impacts of climate change with the use of new adaptive techniques. The youth commitment to the project is so encouraging that the municipality believes that the project is going to take place for a long period of time.

### **3.2.4 SEYCHELLES PROJECT:**

Once the project has been implemented in several schools, the Environmental Education Unit, together with the schools involved can finally submit a formal request to the Ministry of Education and other concerned ministries, such as environment and national development, for rainwater harvesting systems to be included in building codes. The project has significant up-scaling and replication potential. A nationwide proposal would be able to attract donor interest.

*There has been a great demand for the project to be carried out in other schools. Already Economic analysis, guidelines on investment and relevance Of CC-DARE projects implemented in Tanzania, Togo, Mozambique And Seychelles*

through some generous donations from private businesses, two other schools have started the project.

## CHAPTER 4

# RELEVANCE OF THE CC DARE PROJECT WORK WITH CURRENT DEBATES AND DEVELOPMENT ON THE ECONOMICS COST OF CLIMATE CHANGE ADAPTATION

### 4.1 Introduction:

Changing climate and weather patterns are likely to have severe impacts on food production, food security, land degradation, water and sanitation and increased frequency and magnitude of climate driven disasters that can hit any part of the world. Africa in general is considered to be the most vulnerable regions of the world to climate change. Mitigation measures have been discussed in several international conventions and conferences with the main focus on reducing greenhouse gas (GHG) emissions. Kyoto protocol is a legally binding agreement under which industrialized countries are supposed to reduce their collective emissions of greenhouse gases by a minimum of 5.2 % by 2012 compared to the year 1990. The protocol was developed under the United Nations Framework Convention on Climate Change (UNFCCC). The agreement was negotiated by many countries in December 1997 and came to force with Russia's ratification in 2005. It took such long time because it required at least 55 parties to ratify the agreement and that the total emission of those parties to be at least 55 % of the global production of greenhouse gases.

Kyoto protocol recommended initiation of programmes to assist developing countries in adapting to adverse effects of climate change. The objective was to facilitate the development and deployment of techniques that can help increase resilience to the impacts of climate change. A funding programme was established to finance adaptation projects and programmes in developing countries that are parties to Kyoto protocol. By the end of the commitment period of the Kyoto protocol in 2012, a new international framework needs to have been negotiated and ratified. There have been other conventions and conferences that have also addressed the concerns raised in the Kyoto protocol. Judging from the UN climate talks held in Bangkok this month of April 2011, it is unlikely that commitments to cut greenhouse gas emission will come to fruition any time soon. The meeting was marred by disagreements between poor and rich countries, with the former indicating impatience at the slow pace of negotiations. The impatience among the poor countries is quite understandable, with the increasing impact of climate change such as storms, drought and crop failure.

Poor nations are demanding that developed countries agree to a legally binding greenhouse gas reduction commitment under an updated protocol. They want the speeding up of an earlier deal reached in December 2010, which included a green climate fund to aid poor nations and to limit a rise in average world temperature to less than two degrees Celsius. Some rich nations seem to have turned against such an agreement because of imbalance in the countries' commitments. For example, China is the greatest polluter but it is grouped as a developing country and has no

**Kyoto protocol recommended initiation of programmes to assist developing countries in adapting to adverse effects of climate change.**

**CC DARE aims to become a practical example of UN cooperation on a critical development issue and provide direct evidence of UN reform under the One UN banner.**

commitment to cut down GHGs emission. United States is the second world's biggest polluter after China but has never signed the Kyoto protocol.

The Climate Change and Development-Adapting by Reducing Vulnerability (CC DARE) is a joint initiative of UNEP and UNDP, funded by the Danish Ministry of Foreign Affairs. CC DARE aims to become a practical example of UN cooperation on a critical development issue and provide direct evidence of UN reform under the One UN banner. The CC DARE programme provides demand-driven technical and financial support to sub-Saharan African countries that is targeted, flexible and rapid. The support is made available to improve the ability of sub-Saharan African countries to remove barriers and create opportunities for integrating climate change adaptation into national development plans and decision-making frameworks. The programme is designed to complement and strengthen ongoing and planned nationally based climate change adaptation and risk management in sub-Saharan Africa. The emphasis is on short-term (3-6 months) initiatives and products that contribute towards addressing key gaps for national climate change adaptation. The programme addresses issues raised at international conventions on climate change such as Kyoto protocol, Bali conference and the recently held talks in Bangkok (April 2011). Using this approach, the CC DARE programmes in sub-Saharan Africa have demonstrated how targeted countries can address climate change challenges using local resources and capacity, and provide lessons learnt from demonstrated actions.

This report gives evidence of the relevance of CC DARE project work in four countries; Tanzania, Togo, Seychelles and Mozambique on the current debates and development on the economics cost of climate change adaptation.

## **4.2 TANZANIA PROJECT:**

The Tanzania project has been on forestation through woodlot management for economic empowerment of people in Makete district. There are three climate issues addressed by the project.

### **4.2.1 Carbon sequestration**

Carbon sequestration is the process of removing carbon dioxide from the atmosphere and depositing it in a reservoir. The process involves long-term storage of carbon dioxide to other forms of carbon to either mitigate or defer global warming. Carbon dioxide is the leading greenhouse gas with the highest concentration in the atmosphere (430 ppm). In addition to reducing the GHGs emission by the industrial nations, growing vegetation reduce the concentration in the atmosphere through photosynthesis. Trees and forests help alleviate these changes by removing carbon dioxide from the atmosphere and converting it during photosynthesis to carbon, which they then "store" in the form of wood and vegetation, a process referred to as "carbon sequestration." Trees are generally about 20 percent carbon by weight and, in addition to the trees themselves, the overall biomass of forests also acts as a "carbon sink." For instance, the organic matter in forest soils, such as the humus produced by the decomposition of dead plant material also acts as a carbon store.

Afforestation is one way of increasing carbon capture and storage, hence reducing the carbon dioxide concentration in the atmosphere. Forests are one of the greatest environmental challenges and opportunities facing the world in the 21st century. As forests are well known for

*Economic analysis, guidelines on investment and relevance Of CC-DARE projects implemented in Tanzania, Togo, Mozambique And Seychelles*

their ability to absorb carbon dioxide, they also release CO<sub>2</sub> into the air when they are destroyed. This helps explain why Indonesia, a developing country with high rates of deforestation, now has one of the highest emission rates in the world from deforestation and forest degradation.

The main objective of the Tanzania project was to develop guidelines on forest management to sustain the action while at the same time increase the income of the people in Makete district. From the report it is observed that forest tree production is the main economic activity in the district. It has also been recorded that there some farmers sell immature trees before the recommended age of 15 years because of financial needs. In order for the forests to make substantial contribution to carbon sequestration, there has to be continuous stand of forest cover. The management guidelines gives very comprehensive management procedures including timing of cutting down of trees for sale and replanting to replace the harvested trees. There has to be a balance between harvesting and replacement to avoid deforestation and forest degradation. The guidelines manual seem to have been received positively by individual farmers and government institutions. It is hoped that another phase of CC DARE project will make more farmers and institutions to adopt the recommendations in the manual and make woodlots management more profitable and at the same time mitigate the negative impacts of climate change.

#### **4.2.2 Rehabilitation of degraded land:**

In Makete district woodlots have been established in degraded land where most of the top soil has been eroded. The remaining sub-soil is not suitable for conventional food crops growing. Such land may be regarded as wasteland of no economic importance. Trees planted in such lands transform the landscape and improves the soil structure and fertility for more vegetation establishment. The land value is increased and brings economic returns to the residents in addition to climate change mitigation.

#### **4.2.3 Soil erosion control:**

Woodlots in Makete district are also planted in good land but with high risk of soil erosion. Planting of trees in sloping areas that are not suitable for annual crops cultivation reduces the rate of soil erosion and conserves the environment. Conserved soil also acts as carbon sink when decomposing vegetation is converted to humus and organic carbon and forms an integral part of carbon sequestration.

#### **4.3 TOGO PROJECT:**

The project in Togo involved runoff water harvesting by rehabilitation of water reservoirs in the savannah region for agricultural production to benefit women and youth groups. Water scarcity is one of the critical impacts of climate change. The key objectives were to alleviate poverty and hunger through increased cereal and vegetable production and planting of trees for environmental conservation and protection.

Runoff water harvesting in the dams will reduce land degradation though soil erosion caused by excess accumulation of surface runoff during the rains. Water stored in the dams will also raise the ground water table through seepage. This will cause vegetation re-growth which is important in mitigating climate change.

The success of CC DARE project in rehabilitation of two dams will motivate the government

**The main objective of the Tanzania project was to develop guidelines on forest management to sustain the action while at the same time increase the income of the people in Makete district.**

**The projects in Tanzania and Mozambique did not have direct financial gain but there was heavy investment in training and capacity building.**

and other institutions to finance more rehabilitation as well as construction of new dams to increase water availability for multiple uses. The action has caused increased incomes to the beneficiaries from sale of produce as well as more people employed in irrigating the fields. When trees and other vegetation will be established due to water availability, this will slow down the hydrologic cycle and allow water time to seep into aquifers instead of running straight to the oceans to evaporate back to the atmosphere.

#### **4.4 MOZAMBIQUE PROJECT:**

The project involved control of soil erosion caused by erratic rainfall and flooding which one of the impacts of climate change. The target area is the municipality of Xai-Xai city and the surrounding environment. The damage to infrastructure within the city especially road network causes inconvenience and economic loss of business opportunities.

Soil erosion removes the top soil which supports vegetation as well as acting as carbon sink. The remaining sub-soil has poor characteristics and will not support vegetation growth. Soil erosion control and re-vegetation will sequester more carbon from the atmosphere. There will be positive economic impact through enhanced transportation by the road protection action.

#### **4.5 SEYCHELLES PROJECT:**

The project involved roof water harvesting in schools for washing and gardening within the school compounds. Inadequate water for school children and high water bills were the two main issues addressed by the CC DARE project. The demonstrations in the selected schools attracted the attention of many players both in the private and public sector. Tree planting and gardening around the schools improves the environment and micro-climate. Additional water will increase vegetation establishment round the schools that will enhance the process of carbon sequestration.

### **CONCLUSION**

The reports from country projects indicate positive economic returns on the investment. Some projects showed direct cash income after completion of the intervention. This was demonstrated in Togo and Seychelles projects. The projects in Tanzania and Mozambique did not have direct financial gain but there was heavy investment in training and capacity building. The up-scaling of the projects will have a significant impact on microclimate modification, carbon sequestration, beautification of landscape and soil amelioration. The projects yielded positive and quantifiable results within a short time. A second phase of the project will have greater impact since the implementers have a platform of experience to build on. Any problems that may have delayed implementation of the first phase can be sorted out quickly.

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*Appendix 1. Financial allocation and utilization for Tanzania project*

S/N	Item/Activity	Unit	Quantity	Unit Cost (USD)	Amount
1	Subsistence allowances				
1.1	Training assistant researchers on data collection tools and handling of collected data.	Researchers Assistant researchers	4 x 3 days 3 x 3 days	80 40	960 360
1.2	Pre-testing questionnaire and collection of preliminary data in the field	Researchers Assistant researchers	4 x 3 days 3 x 3 days	80 40	960 360
1.3	Data collection in the field	Researchers Assistant researchers	4 x 75 days 3 x 75 days	80 40	24,000 9,000
1.5	Farmer visits and workshops for giving feedback of research findings to communities	Researchers Assistant researchers	4 x 5 days 3 x 5 days	80 40	1,600 600
	<b>SUB TOTAL</b>				<b>37,840</b>
2	Transport				
2.1	Hiring vehicle for transport to and within study sites	One car	55.5 km x 90 days	0.75	3,750
	<b>SUB TOTAL</b>				<b>3,750</b>
3	Labour				
3.1	Data coding entry and analysis	Persons	2 x 10 days	20	400
3.3	Secretarial charges e.g. typing and photocopying	Pages	800	0.5	400
3.4	Report binding	Copies	5	5	25
	<b>SUB TOTAL</b>				<b>825</b>
4	Materials and supplies				
4.1	Printing white paper	Reams	6	5	30
4.2	Cartridge	Pieces	2	150	300
4.5	Flash disk	Pieces	2	50	100
	<b>SUB TOTAL</b>				<b>430</b>
5	Farmer visit & Workshop costs				
5.1	Refreshments: Like soft drinks and tea for farmer participating in the visits and workshops.	Farmers	120	5	600
5.2	Hiring transport for farmer visits	120 farmers			120
	<b>SUB TOTAL</b>				<b>720</b>
6	Communication and postage				200
	<b>SUB TOTAL</b>				<b>200</b>
7	Production of guideline				6,600

The action has caused increased incomes to the beneficiaries from sale of produce as well as more people employed in irrigating the fields.

The up-scaling of the projects will have a significant impact on microclimate modification, carbon sequestration, beautification of landscape and soil amelioration.

7.1	Preparation and production of draft guidelines	Days	15	80	1200
7.2	Meetings with policy makes and stakeholder to discuss guidelines	Number of meetings	1		2200
7.3	Compilation and production of final guidelines	Days	15	80	1200
7.4	Printing of guidelines	Copies	200	10	2000
	<b>SUB TOTAL</b>				<b>6,600</b>
	<b>GRAND TOTAL</b>				<b>50,365</b>

*Appendix 2. Financial allocation and utilization for Togo project.*

Designation	Unit	Quantity	Coût (US\$)	Amount
Human resources				
Coordination of Project (5% of the cost project)	Fixed price			5 000
Consultants	U	2	1 500	<b>3 000</b>
Administrative staff of support	U	3	200	<b>6 00</b>
<b>Travel</b>	U	5	1200	<b>6 000</b>
<b>Meetings and Workshops</b>	U	<b>6</b>	<b>1 000</b>	<b>6 000</b>
<b>Office equipments &amp; Supplies</b>	Fixed price		500	500
<b>Suivi&amp;Evaluation (Interne)</b>	Fixed price		2 500	2 500
<b>Development of the TDR and the invitations to tender and recruitment of the company</b>	Fixed price		2 000	2 000
IEC on the adaptation to the DC and the project	Fixed price		1 000	1 000
<b>Realization of work of rehabilitation water reserves</b>	U	2	29 000	58 000
Development off the Investment Plan and Project Proposal			10 900	10 900
<b>Control and monitored work</b>	Fixed price		1 500	1 500
Support with the profit groupings	Fixed price		3 000	3 000
Follow-up and external evaluation (CC-DARE) of the project	-		-	-
Technical Assistance from CC-DARE one rehabilitation works	-		-	-
<b>TOTAL</b>				<b>100 000</b>

*Appendix 3. Crop yield data for Togo project*

**RENDEMENTS DES CULTURES MARAICHÈRES REGION DES SAVANES**

<b>Rendement de culture maraichère sans irrigation</b>	<b>Type de culture</b>	<b>Année</b>	<b>Quantité/ hectare</b>	<b>Observations</b>
	Tomate	2004	30 tonnes/ha	Depuis l'année 2004, il n'est plus pratiqué de culture sans irrigation
<b>Culture avec irrigation</b>	Tomate	2004	29 tonnes/ha	Cette régression de la production est due à la surexploitation et la dégradation progressive des sols
		2010	19 tonnes/ha	
	Oignon	2004	18 tonnes/ha	
		2010	12 tonnes/ha	
Piment	2004	-	Résultat non disponible dû au fait que cette année la production n'a pas été évaluée	
<b>Prix des maraichers</b>			<b>Montant (CFA)</b>	<b>Kilogramme</b>
	Tomate	2010	21 000 Frs à 4 000 Frs	un (01) panier de 80 kg
		2011	50 000 Frs à 2 000 Frs	un (01) panier de 80 kg
	Oignon	2010	6 000 Frs à 23 000 Frs	un (01) cuvette de 50 kg NB : Ici le prix est presque constant en raison de la demande du produit
	Piment	2009-2010	22 000 Frs à 12 000 Frs	un (01) sac de 40 bols

**A second phase of the project will have greater impact since the implementers have a platform of experience to build on.**

*Appendix 4. Financial allocation and utilization for Mozambique project*

The reports from country projects indicate positive economic returns on the investment.

Item	Unit	Quantity	Unit cost (US\$)	Amount
<b>Human resources</b>				
Labor for block production (4 months)	person	20	\$ 260	\$ 5200.00
Labor for planting, (3 months)	person	40	\$ 210	\$ 8,400.00
Labor for stock establishment (2 months)	person	10	\$ 150	\$ 1500.00
Project coordination how many months (6 months)	person	1	\$ 3000.00	\$ 3000.00
Consultants: <i>to assist on retaining wall systems and agro forestry techniques (2 month);</i>	person	2	\$ 1750.00	\$ 3500.00
Administrative/support staff how (6 months)	person	2	\$ 1000.00	\$ 2000.00
<b>Travel</b>				
Travel for project coordinator & team members	---	---	-----	\$ 1000.00
Tour for community leaders to denudes sites and to the demonstration plots	---	---	-----	\$ 500.00
<b>Meetings &amp; Workshops (specify)</b>				
Inception workshop		1	\$ 2.000.00	\$ 2000.00
Training workshop		5	\$ 1500.00	\$ 7500.00
<b>Office materials &amp; supplies</b>	---	---	-----	\$ 2000.00
<b>Monitoring &amp; Evaluation (specify)</b>			-----	\$ 1000.00
<b>Communication</b>				
Project flyer, leaflets, brochures, etc.			-----	\$ 2000.00
Production of retention blocks and acquisition of plants			-----	\$ 8.900.00
<b>TOTAL</b>				<b>\$ 48.500.00</b>

*Appendix 5: Output of Mozambique project*

S/No	Activity	Output
1	Blocks made	74.800
2	People trained	123
3	Road protected (km)	1,1
4	Seedlings raised	26.300

*Appendix 6. Financial allocation and utilization for Seychelles project*

Item	Unit	Quantity	Unit cost (US\$)	Amount (US\$)
<b>Human resources:</b>				
Project coordination, Ms. Jeannette Larue		Lump sum	5000	5,000
Consultants Water Engineer – Mr Franky Dupres  Environment Educator – Ms Jeanette Larue. Expenditures covered under the coordinator budget		Lump sum	5000	5,000
<b>Monitoring &amp; Evaluation</b>				
Visits to schools on Mahe and two other islands to assist and monitor how work is being done				1,500
<b>Travel</b>				
Transport and food allowance for students and teachers participating in exhibitions		Lump sum		1,500
Meetings & Workshops: Transport and food allowance for teachers involved		Lump sum		3,000
<b>Office and exhibition materials &amp; supplies, brochures and leaflets</b>		Lump sum		5,000
<b>Equipment and Installation</b>				
Purchase and installation of rainwater harvesting systems for a total of 8 schools (6 on Mahe and 1 on two other islands)	Schools	8		29,000
<b>TOTAL</b>				<b>50000</b>





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