

**SOUTHERN NEW HAMPSHIRE UNIVERSITY
&
THE OPEN UNIVERSITY OF TANZANIA**

**MASTER OF SCIENCE IN
COMMUNITY ECONOMIC DEVELOPMENT (2007)**

**CATCHMENT AFFORESTATION PROJECT
FOR PROTECTION OF CHERECHE RAINWATER DAM
IN
CHERECHÉ VILLAGE IN
TARIME DISTRICT,
TANZANIA**

LEONARD MOSSES MASALE

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**SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR
THE MASTER OF SCIENCE IN COMMUNITY ECONOMIC
DEVELOPMENT IN THE SOUTHERN NEW HAMPSHIRE UNIVERSITY
AT THE OPEN UNIVERSITY OF TANZANIA**

LEONARD MOSSES MASALE

SUPERVISOR'S CERTIFICATION

I certify that I have read this project paper and I am satisfied that it can be submitted to the OUT/SNHU senate in partial fulfilment of the requirements for the award of Degree of Science in Community Economic Development (MSC CED)

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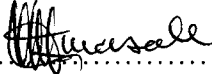
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DECLARATION

I **Leonard Mosses Masale** do hereby declare to the Senate of the Southern New Hampshire University/The Open University of Tanzania that, this Project is my own original work and has not been submitted for a similar degree in any other University.

Leonard Mosses Masale

.....

Signature

Date:30/8/07.....

DEDICATION

This work is dedicated to my parents - my late Father Mr Mosses Hosea Shikoni, my Mother Mrs Beatrice Mosses Shikoni (*Mamchau*) who brought me up and showed me the value of education. It is also dedicated to all Community Development Practitioners, who work day and night to support marginalized and voiceless people to overcome both income and non income poverty and suffering.

ACKNOWLEDGEMENTS

I am taking this opportunity to acknowledge Tarime District Council through its Council Executive Director Mr. George Samuel Kagomba for kindly providing me financial assistance to pursue this project. My gratitude also goes to Chereche CBO Chairperson Mr Zakaria Ezekiel Ooro and the members of the CBO by their support and willingness to work with me throughout the project activities and finally taking over the project.

Special thanks go to Hon. Isidore Leka Shirima, the Mara Regional Commissioner and Hon. Paschal Mabiti who promoted the project through launching of tree planting and advised the project to cover the whole village of Chereche and the whole district at large.

I extend special thanks to the following extension officers – Mr Joseph Amo Sagday. Mr Hashimu Jumanne Barongo, Mr Raymond P. Mushi of SSC-VI Agroforestry, Mr Elijah Sere, Mr Julius Dioniz, Mr Charles Lukoyoyo, and a primary School teacher Mr Deogratius Lurota Nyangibo, who assisted me in supervising the project and administer the questionnaires.

I thank also Mr Lusewa, a researcher at Lake Zone Agricultural Research Development Institute, in Mwanza Region, Tanzania who perused the questionnaire and forwarded useful suggestions for improvement.

I am mostly indebted to my course instructors Mr Michel Adjibodou and Mr Felician Mutasa who guided me throughout the course from project formulation up to implementation phase.

Special thanks also go to my supervisor Mr H. Mtenga who had earlier taught me practical participatory methodology in Land and Water Management Program at the then Cooperative College Moshi, Tanzania.

Chereche village government and the village general assembly are hereby acknowledged in enacting the catchment conservation by-law and allowing the project to spill over to non project areas.

Mrs Godfreda Andrew Uissomasale, my wife is also indebted for constantly encouraging me throughout to this level.

ABBREVIATIONS

1. CBO	Community Based Organization
2. CAN	Community Needs Assessment
3. FGD	Focus Group Discussion
4. IFAD	International Food and Agriculture development of the United Nations
5. LOGFRAME	Logical Framework Approach
6. MARAFIP	Mara Region Farmers Initiative Program
7. MDG	Millennium Development Goals
8. MoA	Ministry of Agriculture
9. MIS	Management Information System
10. NGO	Non Governmental Organization
11. UNDP	United Nations Development Program
12. VEO	Village Executive Officer
13. WEO	Ward Executive Officer
14. SACCOS	Savings and Credit Cooperative Society Organization

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ABSTRACT

This project was undertaken to enable increase in income of 150 CBO members in 41 households in Chereche village while sustaining the existence of Chereche rainwater dam in Tarime District, Mara Region, Tanzania.

The project goal was to establish a multipurpose tree belt along the upper edges of the dam catchment area that would decrease the impact of soil erosion and the dam siltation.

Enough water in the dam will sustain paddy production and thus household food and financial income security.

Project activities on the catchment area that would contribute towards increase in income were sales of tree produce and products, and tree seedlings. Resultant activities were fish sales from the conserved dam, and increased livestock production through use of planted or conserved fodder and pasture.

A survey was done to study the situation of tree planting activities by members. The findings were that middle aged and old male headed households grew more trees per year in their farms due to cultural traditions, and were ready to implement extension services offered by extension officers. Young generation preferred quick money activities like petty business and fishing than farming activities. However, they planted trees forcefully in the project area as a condition to retain their paddy farms.

This project contributed to the members' food and financial security, institutional strengthening to both the CBO and village government and triggered the spirit of environment protection to the whole village.

EXECUTIVE SUMMARY

This afforestation project consisted of institutional strengthening of both the Chereche CBO and the Chereche Village Government in overseeing the continuation of the project and environmental protection in Chereche catchment area. It was through planting a tree strip width of 500m along the edge of the dam supplemented by natural vegetation growth. The beneficiaries of the project were 150 members of the CBO.

The members of the CBO were facing two major problems. The problems were degradation of the dam catchment area due to human activities, and paddy infested with pests and diseases

It was clear that without controlling degradation, the dam would be silted up and irrigation activities would cease to exist and the catchment area would be severely eroded. Major reasons for degradation were due to excessive and unsustainable human activities. Some households kept a lot of livestock which caused overgrazing in some areas and destroyed plants. Scarcity of woodlots caused household members to cut trees for firewood in the catchment area accelerating the degradation process. Some villagers cut trees for charcoal-making for sale while farmers owning farms in the catchment tilled the land across contours thus accelerating soil erosion

Desired conditions are that afforestation would enrich the village soils and improve land productivity. This would contribute to improved financial income and food and

environment would be conserved. Reduced soil erosion would also make the dam water clear, clean and potable for domestic use.

The project goal was to establish a multipurpose tree belt along the edges of Chereche dam catchment area for decreasing the impact of soil erosion and hence the siltation of the dam.

The project objectives were:

- To organize Chereche CBO and village Government institutions in having enactable constitution and catchment protection by-law by the end of June 2006.
- To reduce land degradation through establishment of a 500m wide strip of multipurpose tree cover by CBO members by the end of March 2007.

By March 2007, the CBO constitution had been approved by CBO general meeting, and the catchment protection by-law was in place. The 500m conserved strip had been planted with trees. The whole catchment had been quarantined to allow natural vegetation growth cover and tree seedling nurseries had been established.

The project activities had been extended by the village government to the whole village. The tasks remaining were planning for sustainable use of the forest products at maturity stage and registration of the CBO. It can be concluded that a supportive institutional environment is critical for success of community programs.

General recommendations for the CBO and the village government were that bare land belonging to schools and institutions should be converted into forest plantations.

Communal land should be subdivided as tree plots for individual village community members and ownership assured through protection by village by-law. Forest products should be promoted as an income generation activity. Environmental protection laws, by-laws and policies should be translated into Kiswahili and be made available to village community members.

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CHAPTER ONE: COMMUNITY NEEDS ASSESSMENT

A community needs assessment (CNA) is a way of gathering information about a community's opinions, needs, challenges, and assets used to determine which project(s) will meet the real needs of the community.

The following are some community needs assessment tools:

- Interviews – Collect information from community members who are in a position to know community needs. These people might be community leaders, professionals, or other individuals who have affiliations with particular organizations or agencies.
- Public forum – Bring a wide range of community members together at public meetings to gather information via group discussions.
- Focus group – Obtain opinions and ideas from a small, targeted group of community members.
- Survey – Use a formal survey or questionnaire to collect information from a wide range of community members.
- Secondary data analysis – Review and analyze data that has already been collected regarding community issues and needs.
- Asset mapping – Gather information about existing community assets and resources.

Some factors that might influence the type of assessment selected include time, cost, target audience, and available manpower. Ideally a community needs assessment should include a combination of tools.

This chapter shows the methods used in conducting C N A in order to understand the community's needs and problems before identifying the major problem the community is able to address.

1.1 Community Profile

Chereche is one of the villages in Nyathorogo ward, Luo-Imbo Division, Rorya political constitution, in Tarime district, Tanzania. It has an area of about 10,000 ha with agricultural potential area of 5,300 ha. The households were concentrated in 290 ha.

The village Population was 3,188 (1,712 females, 1,476 males) in 580 households and in 7 sub villages (2002 census data).

The Village receives marginal rainfall of less than 900mm per annum limiting crop production. There is bimodal rainfall pattern with short rains (*Vuli*) around October to December and long rains (*Masika*) in late February to May. The mean temperature was about 25 centigrade. The village has a river known as Mori crossing at its Western boundary to Lake Victoria. A strip of un-invaded forest is along the river.

Survey done by Barricks Gold Mine of Canada had indicated presence of gold in Chereche deep soils. Gold extraction would in future attract businesses to the village.

However, the village had a problem of land degradation which resulted into low land productivity. There was no cash crop farming and most households were poor in terms of basic human needs.

Appraisals done through the support of IFAD funded Farmers' Initiative Program showed that, as most households were located in the Eastern part of the village, it was difficult for

them to have access to water for everyday use and for farming activities. Villagers showed the necessity of harvesting rain water. The donor agreed to fund rain water harvesting program with a condition of establishing a CBO which would sustain the harvested rain water in a dam and at the same time use the dam water for paddy and other crops production.

The source of water for irrigating the paddy farms was rainfall in the catchment area of Rorya hills draining an area of 412 ha. This rainwater was stored in the constructed multipurpose dam which had a capacity of 800,000 M³ of water when full. The water was used to irrigate paddy farms of about 80 ha. It was clear that paddy production would be sustainable if and only if there was enough rain water in the dam. The dam would be in existence as long as soil erosion in the dam catchment was controlled.

1.3 Conducting Community Needs Assessment

Community needs assessment (CNA) was conducted to identify the existing situation within the Chereche community in order to decide the needs the project would address.

Information was gathered in order to understand:

- i. Socio-cultural issues contributing to existing situation
- ii. The actual extent of the problem and its consequences.
- iii. Why the village community seem to be less concerned with environmental degradation problems.
- iv. The approaches the community members themselves will develop on how to alleviate the situation.

- v. The entry point to develop a Community Economic Development Project with Chereche Rorya Farmers Organization.

The assessment involved getting information and data using the following research methods and tools:

- (i) Physical observation while conducting transect walk
- (ii) Focus Group Discussions (FGDs) guide using structured discussions
- (iii) Quantitative method whereby structured interview using a questionnaire was applied
- (iv) Secondary data sources by reviewing relevant records and reports
- (v) Coffing-Hutchinson needs analysis methodology in prioritizing the needs

The tools employed were mainly for collection of information important for decision making. The information obtained was also needed by the Village Council and the Chereche CBO for their future interventions. This approach was selected based on the nature of the study objectives, design and resources needed both financial and material so as to produce precise, quantitative findings as well as qualitative descriptive information. Using the experience gained from the CED course a qualitative and quantitative study was conducted and other sources of data and information were utilized to identify community needs as shown below.

1.3.1 Physical observation

The observation group consisted of three persons which included the SNHU student. The group took notes throughout the exercise. They went across the village observing the

fields, what people were doing at home, ethnic grouping, the local evening markets, village shops, and water resources. The group also assessed development activities that included the way the people lived and behaved, infrastructure development and environment management.

The researcher being an employee of Tarime District Council for the period of 2001 to 2005 was able to observe the environmental and social changes which have occurred for the period which included:

- Excessive cutting of trees for charcoal and house construction.
- Disappearance of Rorya hill slope beauty due to cutting trees for settlement and agricultural production purposes.
- Changes in the community's social behavior pattern accelerated by inadequate availability of water and fuel for domestic consumption.

1.3.2 Focus Group Discussions (FGDs) guide

Focus Group discussion tool was applied to understand people's knowledge attitudes, and feelings towards afforestation issue. Discussions were done with village government officers, extension officers, some retired civil servants, and four randomly selected groups of adult and young males and adult and young females. These were interviewed using a FGD guide carrying twelve questions. The interviews were carried out using FGD moderators who were oriented and instructed to follow rules of carrying out this type of research method.

The moderators using the guide collected information related to the awareness of the group on extent, causes and consequences of deforestation; type of measures taken and

their adequacy in addressing the problem; feelings attitudes and practices of the respondents about tree planting and recommended measures to address the situation.

1.3.3 Structured Interview Using a Questionnaire

A primary C N A questionnaire was developed with 32 questions. This was administered after being scrutinized by a researcher from Ukiriguru Agricultural Research Institute in Mwanza Tanzania. All threatening questions were removed or modified before administration.

The questionnaire was used to extract the awareness on environmental problem that is deforestation, extent, causes and consequences of deforestation in the village; Measures being taken to address the problem and personal opinions to alleviate the problem.

The questionnaires helped in collecting the general information about the interviewee such as place of resident, sex, age, level of education and response. They also assisted in discovering the level of awareness and type of attitude of the interviewee on afforestation as to whether deforestation is an issue as well as assessing the causes, extent and consequences of deforestation. Other questions were directed to extract information on practices such as whether the interviewee had planted trees and protected them or not and reason for doing or not doing so.

The last section had two questions which were about recommendations by the interviewee on steps needed for improvement of tree planting activities in Chereche Village.

A total of 127 randomly selected interviewees were interviewed. These 127 respondents were 54 females and 73 males.

However, a secondary questionnaire was used solely for CBO members eight months after the commencement of the project.

In using the questionnaire, the research questions were the following:

- What constraints hinder tree planting and management in the catchment area?
- What is institutional role in promoting tree-planting practice in Chereche village?
- What is the role of extension services in tree planting practice?
- How does land ownership affect tree-planting practice?
- What is the effect of education and income in tree planting practice?

1.3.4 Secondary Data Sources

Reviewing records and reports was another methodology used to identify the community needs. Documents reviewed consisted of census data and CBO monthly reports which were quite useful in the CNA. Reports used included the village annual reports and the District Agriculture and Livestock Development Department annual reports.

Project report by the then MARAFIP project was detailed and quite useful for the C N A.

1.3.5 Coffing-Hutchinson Needs Analysis Methodology

After identifying all the needs, a Coffing-Hutchinson needs analysis methodology was used. Each participant had to go through the master list carefully and placed a tick or check mark against each need one considered important for the village. The participants then went over checked items in the list and five most important items were circled.

A checked item was equal to one point while a circled item was equal to ten points.

All these methods were used as a triangulation in order to identify the main problem. Causal – effect analysis was done to identify the main cause of the problem and the effect of the problem to the environment and the community. Moreover, Strengths, weaknesses, opportunities, and challenges to address the problem were analyzed.

Below are the results from the information gathered during the general community needs assessment.

1.4. Psychometrics characteristics

Psychometrics enables researcher to determine how good the survey is. It provides survey researchers with a way to quantify the precision of the measurement of qualitative concepts such as program beneficiary satisfaction. In this case, filled questionnaires were studied and each response was coded. Skipped items on responding or by mistake were coded as missing data to be decided on how to treat them in the analysis. Ten respondents were re-interviewed to observe reliability of the data.

1.4.1 Scales

A scale is a set of numerical values assigned to subjects, objects, or behaviors for the purpose of quantifying the measuring qualities. Scales were used to measure attitudes, values, and interests. They measure the degree to which an individual possesses the characteristic of interest (Saunders, 2003). Therefore, scale was used as a measuring instrument and to indicate the systematized numerals of the measuring instrument

Scales used were attitude scales. The score of the items were summed and averaged to give an individual's attitude score. Some were numeric rating scale. Scales with three to five points were used in the satisfaction measures.

The content included opinion variables – how the respondent feels, think, or believe is true or false; behavioral variables – concrete experience in tree planting practice within the village and attribute variables – the respondent's characteristics, that is things a respondent possesses. These include age, gender, marital status, education, occupation, including income.

Questions were combined into scales by ranking and choosing with ranking from the most preferable item to least preferable. Closed question were pre – coded on the questionnaire to facilitate analysis. Some questions were rated using Likert-type scale (Saunders, 2003) in which respondent was asked how strongly she/he agree or disagree with a given statement.

1.4.2 Reliability

Reliability is a statistical measure of the reproducibility or stability of data collected by the survey instrument. This is to minimize random errors which are unpredictable errors occurring in all research. The other error to be minimized is measurement error which refers to how well or poorly a particular instrument performs in a given population.

When information is reliable it means that one can expect to obtain the same information every time or in other words when measurements are repeated the new results are consistent with the first scores for the assessment tool on the same similar individuals.

The reliability of the questionnaire was on consistency of the responses to the administered questions. The responses should not keep changing (Saunders, 2003). The type of reliability used was test re-test, which measures the stability of responses over

time using the same group of respondents. This required administration of survey to a sample at two different and appropriate points in time.

The questionnaire was administered twice to pre-tested respondents. Consistency of responses was assessed by correlating the responses to each question in the questionnaire with those of initial pre-tested questions in the questionnaire.

The pre-testing enabled us to get some idea of the questionnaire's face validity – that is, if the questionnaire made sense in application. We checked the questionnaires to ensure that there was no problem in understanding the questions and that they followed all instructions correctly. On spot questionnaire administration resulted in a high response rate of 55 out of 60 expected respondents. High response rate gives reliable results.

1.4.3 Adequacy of reliability

Extensive pilot testing and analysis of the results ensured reliability and validity. The questions were re-worded to meet the understanding of respondents. Then the questions were translated into Kiswahili in order to be understood by the respondents. Precision and accuracy of the information gathered by the questionnaire was by making sure that definitions used were grounded in fact and experience. On testing the questionnaire, it was found that some questions needed to be defined in order to be useful for data collection. Right terminology was assessed. Some questions were adopted from the former C N A questionnaires and some were developed to fit the existing CBO situation.

For reliability, the clarity of the questions and general format of the survey was pre-tested. The questionnaires were filled at one point in time in order to get high responses.

The CBO members knew how to read and write. Any term used was elaborated in order to get accurate responses. Respondents did not prefer confidentiality therefore they were allowed whoever wanted to write his/her name to feel free. The on-spot filling of questionnaires reduced the cost of the survey and covered most respondents. The use of close-ended questions makes more reliable responses. They are also easy to use, score, and code for analysis using statistical computer software.

1.4.4 Validity

Information is said to be valid, when it is presented or used in the way for which it was intended. Validity is concerned with whether the findings are really about what they appear to be about (Saunders, 2003). In addition to determine reliability, validity of items, scales, and whole survey instruments was done – that is how well they measure what they are intended to measure. Face validity was also used by extensionists doing causal review how good group items appear.

Content validity also refers to the accuracy with which questions represented the characteristics they were supposed to survey and to the accuracy of the information or its freedom of error. Therefore the type of validity used was content validity.

An Agro-forester was used to peruse the questionnaire and reviewed how good its series of items appeared. Comments on the representativeness and suitability of the questions were taken into consideration.

To ensure validity and reliability, the first draft of the questionnaire was pre-tested to 10 CBO members and corrections were done prior to final administration. This was to re-assure that the respondents would have no problems in answering the questions, no

problems in recording the data and to obtain some assessment of the questions' validity and reliability. Preliminary analysis was done using the pilot test data. This was also to measure the consistency of responses of the questions.

Pre-testing of the questionnaire was done to assure that all topics were included and that sufficient varieties in responses were available. If there were differences, the survey would pick up those differences. Sampling techniques used and response rate was explained. A copy of survey questionnaire was perused. Respondents were chosen similar to the ones who would eventually complete the survey.

1.4.5 Questionnaire Administration

Administering of questionnaire was done after completing its design, pilot testing and making amendments. The survey administrators had secondary school education level and knew the local language while an assistant had experience in conducting interviews.

The survey administrators were selected to monitor respondent when on-spot filling the questionnaires. There was three extension staff within the village including two primary school teachers. Each monitored about 10 respondents. The survey administrators were couched what to do, and were monitored. They themselves filled the questionnaires and we discussed the results and what they could expect when on spot monitoring during the filling of the questionnaires. Then they went for pre-testing the questionnaire to a group of ten respondents.

After conducting all the processes, below is the information which was compiled.

1.5 Village Information

1.5.1 Leadership pattern

There was a 25 member Village Council of which at least 25% were women and seven were sub village (*Vitongoji*) chairpersons. A Kitongoji Chairpersons was elected by a Kitongoji general assembly. There was also an elected Village chairperson by the village general assembly who was also the chairperson of the village council. The office tenure of the village council is five years giving way to new elections. This one was elected in 2004.

The secretary of the village council was an employed Village Executive Officer (VEO).

A village general assembly was convened once per three months while the village council met once per month and the Vitongoji general assembly was convened once every month. The council had three permanent committees which reported its matters to the Village Council.

1.5.2 Farming system and labor

In Chereche village the family provided the source of household labor. Women supplied most of the labor for subsistence farming while men herded cattle. School children supplied labor after school hours mainly for farming activities, livestock keeping and domestic activities. Traditionally there was no division of labor along gender lines. Men did most land preparation in comparison to women. Planting and weeding were done by

both genders. Property ownership was dominated by men while female commonly owned small stocks such as chicken.

The farming system in the village was traditionally based on availability of large communal areas which supplied free grazing land, firewood and building materials.

Most trees had been cut to give place for livestock grazing and food crop farming.

There was strong ties between families and livestock especially cattle which were exchanged for food and paying dowry for women during marriage. About 37% of respondents owned land sizes of about one hectare while 22% had two to four hectares located near homesteads.

1.5.3 Crop production

About one third of the arable land was under cultivation with diverse agricultural production. The main food crops grown were sorghum, maize, cassava, finger millet and sweet potatoes as shown in Table 1 below. Farmers grew no cash crops and in general the village community had no income security. Before introduction of irrigated paddy farming it was only cassava and sweet potatoes which assured food security and meager income when sold in the market.

Land for agricultural production was not fully exploited due to poor husbandry practices and unavailability of farm inputs. As a result farm yield per unit area was generally low.

The table below shows crop productivity in Chereche village.

Table 1. Area cultivated and average crops produced in Chereche village in 2004

Type	Short rains (ha)	Long rains (ha)	Average annual Production (kg)
Cassava	285	123	2,000
Sorghum	54	150	1,000
Maize	64	166.4	1,800
Paddy	16	40	6,125
Vegetable	4.8	3.2	975
Finger millet	-	20.4	300
Sweet potatoes	33	28.2	1,750
Beans	18	43.2	750
Groundnuts	-	3	750

Source: Agriculture and Livestock department Annual Report, 2004

1.5.4 Livestock production

Traditionally, farmers were livestock keepers with a big herd of livestock per household symbolizing household social status. Cattle breeds kept were Tanzania shorthorn zebu. Other livestock kept were goats and sheep. Few kept donkeys. Poultry were kept by women and children. Livestock data is shown in Table 2 below.

Manure was seldom used in the farms and was piled in front of cattle kraal (*Boma*). A huge pile of manure indicated the status of the herd size owned by the household.

Problems facing livestock production were tick borne diseases, and lack of extension services. It was noted that there was no dipping services although there was an old rehabilitated dip tank. Farmers could not contribute cash to run the cattle dip jointly.

Livestock marketing was controlled by private entrepreneurs and middlemen who usually gave low prices. This was due to lack of livestock auction markets nearby (*mnada*), poor roads and transportation facilities. The majority of livestock keepers had to walk long

distances to sell their livestock in neighboring Randa livestock market which one had to cross river Mori when its waters were low during the dry season.

Nutrition for livestock was poor in terms of quantity and quality of animal feeds especially

during the dry season and also contributed to low productivity of the livestock. Water for livestock was abundant during rainy season in seasonal ponds otherwise animals had to be trekked to Mori River in the west side of the village.

Table 2. Livestock data in Chereche village in 2004.

Type	Total number	Average production (milk) (lts/day)	Average production (meat) (kg)	Eggs/Clutch	Farmers Keeping each Type of Livestock
Cattle	3,633	2	120	-	416
Goats	1,396	-	12	-	502
Sheep	1,237	-	15	-	340
Donkeys	11	-	-	-	4
Chicken	3,088	-	2	12	670
Ducks	44	-	3	10	8
Pigs	-	-	-	-	-

Source: Agriculture and Livestock department Annual Report, 2004

Although the villagers kept more goats, they preferred sheep meat to goat meat.

1.5.5 Food security and eating habits

About 77% of respondents showed that there was always food shortage, pronounced during April to June and October to December. Main shortages experienced were mainly maize, sorghum and cassava. The causes of food shortages were bad weather, poor soils and lack of farm inputs. Other factors were poor storage facilities and pests.

Late in 2005, the village was hit by drought and the Central Government had to send emergency food aid to the village. The food was given free as no villager was able to buy maize at the lowest price offered which was Tshs 50/= per kilogram. During drought seasons most households (72%) were compelled to buy food to meet household requirements. It was found that most households (87%) could afford to take three meals per day during post harvest season.

Breakfast was usually cooked maize flour soft porridge (*uji*), with boiled sweet potatoes. At least one person could drink a litter of soft porridge. At lunch it was common for more than six people to share one big plate of cooked food. Lunch and dinner were mainly stiff porridge (*ugali*) with beans and or fish popularly known locally as *Kamongo* or *Kambale mamba* in Kiswahili. Its scientific name is *Protopterus aethiopicus* while its common English name is Lungfish. The main staples were cassava, maize, sorghum, and sweet potatoes. Average household needs were 8 to 10 bags of 70 kg of each staple per year. Shortfalls of staples were between 4 and 6 bags of the major staples per annum. Sales of staples in order to earn cash for household needs reduced the stored amount. This was due to absence of alternative opportunities and cash crops.

1.5.6 Environmental degradation

The crop and livestock production system like many agro-pastoralists parts of the country was stressful due to high land degradation rates contributed by human activities, animal population pressure and current global warming conditions. This affected the available natural resources.

The over-exploitation of trees for fuel and building purposes without reforestation resulted to soil erosion. Other causes of soil erosion were poor farming practices and

overstocking which resulted to poor soil fertility and reduced land productivity. Figure 3 at the end of this chapter is showing the deforested part of the village.

1.5.7 Livelihood

Crop and livestock production was shown to be the major providers for household economy by 79% of respondents. Fishing, petty businesses, and charcoal making had minor contribution to household economy. Main source of income was crop sales followed by sales of livestock. Money was spent on purchase of meat, sugar, cooking oil, dried staples, fish, school fees, hiring labor, clothing, and health services. Lack of capital limited their ability to acquire farm inputs that could contribute to increased land productivity.

Most villagers owned thatched roofed huts that were inhabited by four to six persons per hut. A typical Luo hut is seen in figure 4 at the end of the chapter. Some men are married to more than one wife and cared less for the children. Uncared children wore dirty and rugged clothes and wore no shoes. Men preferred to wear neckties although their clothes were not as tidy as one could expect for necktie wearers. Due to scarcity of water, it was common to see naked men, old and young bathing in rivers or rain water pools not caring any passersby.

Nobody owned a vehicle in the village hence villagers had to walk long distances of about 20 kilometers to the nearest tarmac road to board vehicles. Few people owned bicycles which were used for transporting people from the village to the tarmac road at a fee of Tshs 1,500/=.

Almost each other day there was an evening dance where youngsters met. A boy using a bicycle and a megaphone would go across nearby villages to announce the evening dance. Promiscuity was always practiced in such dances. Cases of AIDS victims had been reported in the village but it was still common to inherit a widow of the dead husband by relatives and brothers. Malaria was an upcoming disease as a result of the irrigation scheme which favored multiplication of mosquitoes.

1.5.8 Family and social structures relevant to the situation

Most of the village households were composed of extended families. Households formed units of about 10 families which raised livestock together sharing common labor.

Socially, elders were decision makers. However, villagers respected the village Council.

Decisions were made through meetings convened either by clan elders or village Council.

After decisions were made each member was obliged to implement. There were local penalties imposed to members who did not attend meetings or did not implement decisions.

What was noticed during needs assessment was the way the people in the community related to each other. They respected each other regarding their kinship. Those who were of **Kurya** clans were hard working while those of **Luo** clans were less hard working. This difference forced those from *Luo* clan to work, although it was not so in other Luo inhabited villages. Women were hard working followed by middle-aged men and lastly by young men. Youth preferred petty cash business.

The clan leaders were very powerful. Some of them were traditional healers; the household head (usually men) controlled household resources including all men, women, and children within the household. Men with more than 50 heads of cattle were respected in the village and advice was sought from them. In any elections, they influenced the nomination of any person to be elected to any leadership post.

Information was gathered in meetings, public announcements, and through letters.

It was also commonly transmitted in meetings and house to house by elders.

There was weekly crop and livestock evening markets known locally as *Chiro (a Luo name for a local evening market)*. These markets were well attended by villagers. During market days nobody worked in the farms, so it was an area where one could disseminate information.

1.5.9 Village infrastructures and services

There were several infrastructures in the village with different ownership. Table 3 below is showing some of the recorded infrastructures.

Table 3. Social Infrastructures existing in Chereche village in 2004

Type	Total	Ownership
Dispensaries	1	District Council
Primary schools	1	District Council
Retail shops	5	Individual (private)
Cattle dips	1	Village Council
Animal crushes	1	Village Council
Seasonal Charco dams	2	Village Council
Feeder road	4	Village Council
Multipurpose Irrigation Dam	1	CBO – Rorya Chereche Farmers Organization
Primary court	1	Central Government

Source: Chereche Rorya Farmers' Organization. 2005 Quarterly report

There was local minor market at the centre of the village and an active market at Ochuna centre, 15km from Chereche village centre. A 15 km feeder road was connecting the village to Ochuna centre in the east of the village. Some individuals owned milling machines and Lorries. Mobile phone communication firms available by then were Celtel and Vodacom.

In a neighboring village there was an extension worker from SCC VI-Agro- forestry project (SCC VI-AFP). This was a Swedish funded project in Mara Region.

The extension worker could contribute forestry education to the CBO members at request.

The village community could also benefit extension services from the department of Natural Resources through its forestry and fisheries staff.

1.5.10 Chereche Rorya Farmers Organization

After the results of the C N A it was decided to work with the existing Chereche CBO which was mandated to take care of the rainwater dam and paddy production. Chereche Rorya Farmers Organization is a community based organization which was formed as a result of IFAD's financial support of Mara Region Farmers Initiative Program (MARAFIP) in 1996.

1.5.11 The CBO mission statement

The CBO mission statement is to establish a multipurpose, self sustaining and environmental friendly harvested rain water irrigation scheme for economic growth and poverty reduction of the organization members.

1.5.12 The goal of the CBO

The goal is to reduce food and income poverty of members at risk of unreliable rainfall pattern.

1.5.13 The irrigation infrastructure

The farm land allocated to the CBO by the village government was 80 ha and could be increased as more villagers joined the CBO. Every member was entitled to 0.40 Ha of land for paddy production. The farm had a 400m long irrigation canals.

On the catchment area the CBO was allowed to own a strip width of 500m along the edges of the dam. The CBO had yet to construct an office and a store. Several initiatives have been taken to support improvement of paddy production by the CBO members'

Tarime District Council had contributed some research funds to Zonal Agricultural Research Fund (ZARF) in the lake Zone of Tanzania in order to undertake paddy diseases research and develop a resistant variety of paddy. This research was an on-farm trial done together with the CBO members. Some paddy varieties were identified to be disease resistant, consumer suitable, and highly productive. The Ministry of Agriculture and Food Security had funded some CBO members to go for a study visit to lower Moshi

Irrigation Scheme, in Kilimanjaro Region, Tanzania. They studied the organizational structure of paddy farmers, paddy management and irrigation infrastructure management. At the same time, the Ministry sponsored one crops extension officer and a primary school teacher to Ethiopia to study catchment conservation practices. These were to train villagers on catchment protection in the lowlands of Tarime district. The two officers were transferred to the village to assist the CBO and the village government in training CBO members on tree nursery management and tree planting and management. As livestock Manure was freely available in the village it could be utilized for nursery management and tree growing as a natural fertilizer.

The CBO was managing the rain fed paddy irrigation project in Chereche village. Paddy farm layout for farming plots commenced in 2002, with a first paddy harvest in 2004 and a second harvest in 2005. The IFAD financial support was phased out in December, 2003.

Water source was from the multipurpose dam that was constructed by the IFAD funded project.

Cost sharing approach was adopted in meeting the construction costs as follows:

- The CBO contributed Tshs 3,000,000/=
- Ministry of Agriculture Tshs. 6,000,000/=
- IFAD – 115,000,000/=
- Tarime District Council Tshs 3,000,000/=

Chereche Rorya Farmers organization was managing the project under guarantee of Chereche Village Council. Tarime district Council was supporting the paddy project.

through provision of Agriculture extension service. The CBO was bound to report its activities to both the village Council and the district council. The land used by the CBO was allocated by the Village Government.

The source of fund for running the CBO was obtained mainly from the paddy farm.

To sustain the organization activities, the CBO adopted the following strategy - when members harvested paddy, each contributed 70 kg, of paddy to the CBO. Therefore, more than 3,000 kg of paddy was contributed per season. The CBO management sold the paddy for funding its activities.

Other sources of fund were - membership shares and registration fees of Tshs 10,500/=; and fines imposed to livestock owners letting livestock graze within the paddy farm. The amounts charged per animal were as follows: cattle – Tshs 5,000/=, pig – Tshs 1,000/=, Donkey Tshs 5,000/=, Goat – Tshs 200/=, Sheep – Tshs 200/=, Calve Tshs 200/=.

A person doing laundering in the dam, or swimming in the dam was fined Tshs 1,000/=.

1.5.14 The Needs to be addressed

The community needs assessment revealed that facilitation of local development by building local organizational and institutional capacity would enable village community to lay a central role in their own development process. The majority of households in Chereche depended on subsistence farming with large part of their labor allocated to food production. The village soils were poor in fertility resulting in low land productivity. Marketing was one of major constraints in the village. Farm inputs scarcity, poor infrastructures, poor feeder roads and degradation of the village environment were

constraints to sustained production. Livestock were not fully utilized in the farming system for provision of draught power and manure.

Through analysis, needs which were identified for addressing land degradation and thus sustain economic activities around the dam including the catchment area were identified and accepted. The needs assessed centred on fuel-wood, and timber, clean and safe water, increased food security and financial income. This could be achieved through soil conservation in the dam catchment area.

In summary the community needs which were finally agreed were:

- Continued water supply for irrigation, domestic and livestock use
- Basic demands for fuel-wood, timber and feeds for livestock
- Food and income security
- Strong institutions that would cater for the development of villagers

To alleviate the poverty situation, the village community wanted to address these needs.

It was expected that an afforestation project would meet most of these needs above.

1.6 The Graphical content of the project area

Using SPSS analysis, some of the results are shown in the tables below.

Table 4 Gender of Respondent * Monthly Cash Income Cross Tabulation Count

		Monthly Cash Income (in Tshs)				Total
		less than 20,000	21,000- 40,000	41,000- 60,000	above 60,000	
Gender of respondent	Male	25	2	3	3	33
	Female	19	3	0	0	22
Total		44	5	3	3	55

Source: SPSS analysis of survey data in Chereche village, 2006.

Table 5 Gender of Respondent * Landownership Cross Tabulation Count

		Landownership			Total
		Private	Communal	No answer	
Gender of respondent	Male	27	5	1	33
	Female	19	3	0	22
Total		46	8	1	55

Source: SPSS analysis of survey data in Chereche village, 2006.

During C N A photos were taken by the SNHU student to expose the reader with the image of the project area.

Below are some photos which show the Chereche dam and its surroundings as discussed above. At the background and towards the right side of the picture in figure 1, is part of the catchment area. The catchment had no trees before the start of the afforestation project. The second photo (figure 2), shows the flat land used for paddy farming. An irrigation canal can be seen cutting across the middle of the picture from left to the right. Figure 3 shows the bare catchment area towards the Rorya hills in the background. This was an area of intervention by the afforestation project.

CHAPTER TWO: PROBLEM IDENTIFICATION

A problem statement provides focus and direction for a project. It looks beyond symptoms to clearly define the problem and state specific areas of change. The C N A conducted helps to determine major needs and problems.

This chapter defines specific areas for targeted change focusing and directing the afforestation project. Major focus of the study was to understand the knowledge, attitude and practice gaps in relation to afforestation in the project area and get recommendations from the CBO members on what measures should be taken to alleviate land degradation in the catchment area. Secondary sources of information were also used to get the real situation of the problem. The problem identification helped greatly the CBO to identify relevant stakeholders and set goal, objectives and targets to be reached in reducing land degradation in the dam catchment area.

2.1 Problem statement

When conducting the C N A a cause – effect relationship was done to find the main problem the village community was facing. It was found that land degradation was the main problem in the village catchment area including the dam edges and the village farmland. The causes of the problem were human activities on the catchment and household farms that included farming, tree cutting for timber, fuel-wood, charcoal, and livestock grazing. Other causes were inadequate extension and research services and farmers lacking proper agronomical knowledge.

Tree planting in the catchment area and farms would be adopted for reducing land degradation and at the same time address some of the community needs. The dam catered the needs for the livelihood to the whole village community and it was necessary to support the CBO in the protection of the dam. The community and the CBO were aware that, if nothing was done, the dam would silt up and irrigation activities would cease to exist denying them expected food and income security.

Table 1 in chapter one, shows that in 2004, the project area produced about 6.1 tons of paddy through planting only 40 ha of paddy out of the potential 80 ha. Therefore the project was a potential source of food and income security. The CBO had no control of the catchment area so it needed support from the village Council to ensure other villagers conserved the rest of the catchment as they were also using the dam water for domestic and livestock use. At the same time they will use forest products for their basic needs and fodder and grass would be available for their livestock. The project had intended to solve the problem through protection of the eroded dam catchment.

2.2 The target community

Tree planting activity was targeted to the whole community but the SNIU student and the CBO concentrated on the strip around the dam. Therefore, the main target community was the CBO members although the project activities were extended to the rest of the catchment area at the request of the village council.

The members participated fully in the project in order to meet their needs. Every member of the CBO was allocated a plot between measured and demarcated contours to establish own multipurpose trees plot and grew sisal hedge along the contours. Other activities would in future be hanging modern beehives for honey production and tree nursery establishment. The village government also allocated tree plots to other village community members outside the 500m strip in order to support the project. The participation of the community in non-project area would reduce pressure on the project area on basic needs of the community. The project established tree nurseries which would provide tree seedlings for the community.

2.3 Stakeholders

On implementation of the project there were other major players in the project. These stakeholders are shown in Table 4 below.

Table 6: Major players with a stake in the afforestation project

S/N	Stakeholder	Stakeholder roles/concern	Expectation
	Chereche Rorya Farmers Organization members	<ul style="list-style-type: none"> • Maintenance of Chereche Dam • Paddy production • Organizing members activities • Implementation of afforestation project 	Sustainable paddy production, Availability of water in the dam, and sustainable income generation.
2	Chereche Village Council	<ul style="list-style-type: none"> • Supervision of village projects • Maintenance of law and order • Implementation of land and environment laws and by laws • Enactment of village by laws 	Sustainable village projects, food and income security, Peace and harmony
3	Obolo Primary school	<ul style="list-style-type: none"> • Tree nurseries establishment using the dam water • Provision of training facilities to 	Availability of tree seedling, Woodlot at school farm, income from sale of tree produce and

		the CBO	trained young generation on environment protection
4	SCC – VI Agro-forestry Project	<ul style="list-style-type: none"> • On farm tree planting • Land and water management practice 	Increased farm land fertility and productivity
5	Ministry of Agriculture and Food Security	<ul style="list-style-type: none"> • Rain water harvesting technology • Paddy production extension services • Irrigation technology • Savings and Credit fund formation 	Success in improved crop production in arid and semi arid lands trials Financial security to members
6	Tarime District Council	<ul style="list-style-type: none"> • Strengthening of village institutions • Coordination of village extension services • Environmental protection and support of village by law formulation 	Strong village institutions, increased income and food security, Peace and harmony in the village
7	Livestock Keepers	<ul style="list-style-type: none"> • Concerned with availability fodder, pasture and water for livestock 	Access to dam water, enough fodder and pasture in the dam catchment area.

All stakeholders were concerned with environmental conservation and poverty alleviation of community. They expected to improve the welfare of the people through combating income and non-income poverty.

2.4 The Project goal

A project goal briefly describes what it is expected the project setting to be like after the project has completed its intervention. It is a solution to the problems which were described earlier.

The target community was facing shortage of forest produce including fodder and pasture for their livestock. The community also needed clean and safe water for domestic use and for paddy production. In addition fish could be grown in the dam water for easy access of protein and for sale. The project goals would focus on this situation. The livelihood of the

community depends on availability of water in the village. This dam was the only guaranteed source of domestic and irrigation water in the village by the time of the project. Therefore, both the community and the village government supported the project. To verify that the project was progressing towards achieving the goals the needs of the CBO members were monitored. These needs were:

- Continued water supply for paddy irrigation,
- Basic demands for fuel-wood, timber and other forest produce
- Implementable CBO constitution
- Income generating activities
- By-law for protecting the Chereche village catchment area.
- Strong Village institution that would cater for the development of village community

Therefore, the **project goal** was to reduce land degradation through established multipurpose tree forest along the edges of Chereche dam catchment area. This would decrease siltation of the dam through soil erosion. When this goal is achieved the community would get sustainable forest produce, increased income and reduced soil erosion.

2.4 Project objectives

Project objectives are a series of specific achievements designed to address the stated problems and attain the stated goal. It is an endpoint that describes what will exist at the end of the project.

From the community needs assessment, problem statement and the project overall goal, project objectives were developed. Hence the project objectives were:

- To organize Chereche CBO and village Government institutions in having enactable constitution and catchment protection by-law by the end of June 2006.
- To reduce land degradation through establishment of a 500m wide strip of multipurpose tree cover by CBO members by the end of March 2007.

These project objectives were the set of steps that must be achieved to accomplish the goal. The steps or project components were as follows:

- To reorganize and strengthen the CBO and its constitution
- To enact the catchment protection by law
- Establishment of tree nurseries
- To plant multipurpose trees and quarantine the catchment area for natural vegetation re-growth
- To harvest tree produce sustainably

The resources that were essential to fulfill the project prerequisites were among others the support given by Tarime District Council in provision of extension staff and funds to support the project officer in initiating the project. The project was presented to Chereche village council which agreed to support and expands project activities to the whole catchment area. After adoption of the project, the CBO reviewed its constitution, and the village community was aware of the need to conserve the catchment. Other stakeholders mentioned previously agreed to support the project and the community efforts at large.

At last, a new comer, the Tanzania Home Economics Association (TAHEA) agreed to take over the project after its first 12 months of implementation.

2.5 Host Organizations

On implementation of the project, other major actors were consulted and agreed to facilitate specific components of the project. The host organizations are shown in Table 5 below indicating what they were supporting and their participation.

The role of the project advisor (the then SNHU student) was to coordinate the project activities and present the endorsed catchment by law to the District Council for approval. Other responsibilities were coordinating, supervision and monitoring of afforestation project activities undertaken by the Government Staff attached to the project. The role also included advising the CBO Secretary on matters pertaining to the afforestation project and paddy production and collaborating with institutions which deal with environment conservation in order to support the afforestation project

Table 7. Host organizations of the project by 2005/2006

S/ N	Host Organization	Components facilitated	What the organization was doing	Participation of Organization
	Chereche Rorya Farmers Organization	<ul style="list-style-type: none"> • CBO management strengthening • Tree nurseries establishment, • Forest management 	Paddy production Dam management	Enacting of CBO constitution Management of the afforestation project Regulation of forest produce harvesting in a sustainable manner
	Chereche Village Council	<ul style="list-style-type: none"> • Institutional strengthening • Project monitoring Law and order 	Governance, Village Projects supervision, Formulating bylaws, execution of law and order	Supervision of the CBO projects Formulating catchment bylaw, Implementing execution of laws and order
	Ministry of Agriculture and food Security	<ul style="list-style-type: none"> • Extension services • Irrigation technology • Rain water harvesting technology 	Extension services support Funding of Farming projects	Backstopping of Extension services Project staff training Training on land use planning, Rainwater harvesting structures construction
	SCC - VI-Agro-forestry project funded by SIDA (of Sweden)	<ul style="list-style-type: none"> • Agro forestry component 	Training of farmers on agroforestry practice, Support on Farm tree seedlings production	Training CBO attendants on tree nursery establishment
	Tanzania Home Economics Association (TAHEA)	<ul style="list-style-type: none"> • Environmental protection component 	Support community land and water management programs	Financial support for activities of reducing dam embankment erosion
	Obolo Primary School	<ul style="list-style-type: none"> • Training component 	Training of pupils on tree nursery establishment, tree planting and management	Supply of tree seedlings to farmers on cash basis Training site for CBO members
	SNHU student	<ul style="list-style-type: none"> • Promoting the political support for the project • Institutional strengthening 	Project supervisory role,	Facilitation the review of the CBO constitution, village council enactment of catchment protection by law, coordination of project resources availability.

CHAPTER THREE: LITERATURE REVIEW

Afforestation and reforestation both refer to the establishment of trees on non-forested land. Reforestation refers to the establishment of forest on land that had recent tree cover; whereas afforestation refers to land that has not been a forest for a long period of time.

According to the Kyoto Protocol, a **forest** is considered as a **minimum area of land of 0.05-1 hectares with tree crown cover of more than 10-30%.**

Afforestation and reforestation require that forests be established through planting, seeding and/or the human-induced promotion of natural seed sources. Ultimately this process converts non-forest land into forests. This means that it is not always required to plant trees, but it is enough to promote the regeneration of trees.

In this project, Afforestation and reforestation have the same meaning and can therefore refer to them just as **afforestation**

This chapter gives an overview of afforestation concepts adopted by several practitioners and factors that influence communities to adopt tree planting practice. It also shows successful practices in Tanzania and East Africa in general and policies that provide framework in cases such as this project. Adoption in this case is defined as the degree of use of a new technology in long run until when the farmer has full information about a new technology (Collinson and Tollens, 1994).

Afforestation projects have beneficial contribution to rural communities due to that afforestation has capacity to produce wood and other tree products. They also have benefits in terms of soil fertility. Forest protection and reforestation will have both socio-

economic benefits and environmental benefits. These forestry options will increase rural incomes, increase equity of income, and increase the availability of biomass. Forests serve many environmental functions aside from carbon mitigation. Natural forests with various stages of stand development, including old-growth forests with snags and fallen logs, provide diverse habitats necessary for biodiversity (Harris, 1984; Franklin and Spies, 1991).

Preserving forests conserves water resources and prevents flooding. By reducing runoff, forests control erosion and salinity. Consequently, maintaining forest cover can reduce siltation of rivers, protecting fisheries and investment in hydroelectric power facilities.

Forest protection may, however, have negative social effects, such as displacement of local populations, reduced income, and reduced flow of subsistence products from forests.

There are hopes for the absorption of carbon dioxide by afforestation as a means of mitigating global warming. Forests absorb carbon dioxide, and even after trees are cut they will store carbon for decades if used as building materials. Using wood as biomass energy allows a reduction in the use of oil and other fossil fuels. Afforestation and subsequent uses of wood make it possible to slow the pace of global warming.

There exist the following worries for the failure of social forestry projects:

- Lack of land tenure security.
- Lack of control over forest resources.
- Lack of secure or reliable markets and suitable pricing policies.

- Lack of appropriate technologies.
- Long rotation periods
- Competition with other land uses for land, labor and capital.
- Weak local institutional capacity.

It is important to address these worries when designing an afforestation project.

3.1 The Theoretical Literature

Trees and shrubs, or rather woody biomass, do play an important role in the farming systems in developing countries. They provide the necessary wood and wood by-products to the farms to build houses and fences, to supply wood fuel and charcoal and to produce fodder for the animals. The woody biomass is also important to protect the soil against erosion and environmental degradation.

Contrary to the food and present cash crops on the farms the woody biomass does not have a clear production cycle. Optimum production rotation periods under farm conditions can be developed, but agreement has to be reached about what the farm conditions are. It will be very important to know to what extent the farmers are planting trees to earn cash or whether they are planting trees at subsistence level. However, Mercer and Miller (1998) argued that agroforestry projects failed due to failure to incorporate socio-economic issues in development projects.

The existing planting pattern and end-uses of the trees are very much locally based, and in order to develop this production capacity, local habits and practices have to be taken into consideration. Woodlots are considered to be production cycles which last for 4 to 8

years or even longer. Trees in cropland have a more or less permanent character but do need regular pruning, while trees in hedges grow fast and are often cut back every one or two years. Only woodlots have a clear cash function.

Trees have a multipurpose function. Not only is wood produced but also the fodder and soil improvement capacities of species should be recognised. Within forestry, species have often been selected on their wood production characteristics only, but under farm conditions the rotation aspects and the multipurpose value of the species become important as well. Farmers are very well able to raise their own seedlings, but seed is often the bottleneck. If new species are introduced the seed-producing characteristics of the species should be taken into consideration to multiply the new species quickly and on a large scale. Also the coppicing abilities of trees are important as a renewed establishment can be avoided (Berry 1995).

Mersman and Taube (1999) addressed situation in afforestation due to population pressure more and more land has been deforested and unsuitable land (hilltops, steep slopes, etc.) has been taken under cultivation. Heritage customs lead to high land fragmentation and further aggravate the situation. One of activities to rescue the situation was **catchment afforestation** and range rehabilitation that provided trees planted to strengthen the effect of soil erosion control and to produce firewood, timber and fruits.

Farmers have the opportunity to express expectations and problems, while the extension staff learn that extension means participation of people, who know a lot about their environment and who know best how new ideas can be integrated into existing land-use

systems. Like these, all other extension instruments -field days, group meetings, seminars, special campaigns- are based on the principle of information exchange.

Hedge (1993) in "Markets for tree products needed" following an experience in India, advised that, to popularize tree planting among farmers, support services such as supply of good quality seedlings, skill-oriented training, technical advice and marketing play a critical role. However, whereas fruit and timber species were sold at cost price, fodder and fuel wood species had to be sold at a subsidized price. This way of supplying seedlings has three major advantages

- farmers, after spending on seedlings, try their best to establish the plants;
- establishing a forestry nursery can be an economic activity for a large number of rural families;
- easy access to seedlings is a source of motivation for planting more trees.

Tree planting by farmers is a recent activity. Quite often they lack sufficient knowledge about selecting suitable tree species, seed handling and silvicultural operations. Taube (1999), stressed that short-duration training at village level can help in providing expertise and avoiding failures. Visits to field demonstration sites and plantations successfully developed by small farmers nearby can motivate farmers to take part in afforestation programs.

Existing market outlets may simply serve as a source of inspiration to tree growers. However, such outlets are limited in capacity. If they are not expanded further or alternative markets are not developed, farmers may face a glut when their produce is harvested from new plantations.

Proper and environmental sensitive agriculture practices can halt to the decline of vegetation through the introduction of multipurpose leguminous trees such as for example *Leucaena leucocephala*, *Gliricidia sepium* and *Calliandra calothyrsus* into the normal farming system. The introduction of these tree species into the normal cropping system also seeks to improve soil fertility without resorting to chemical fertilizers, which are usually very costly and may not be available all the time, to prevent soil erosion, to get fodder for animals all the year round, to overcome the problem of fuel wood shortages, and to get stakes for yam poles and also sticks for fencing and housing. It is also hoped that with the introduction of this new technology, farmers may sustain their yields for a longer time without necessarily having to use high cost external inputs like artificial fertilizers and chemical pesticides.

Brunding and Anderson (2005) promoted **Farmer Scholars** to train fellow farmers in agroforestry practice. These are farmer participants initially trained by virtue of the fact that they are the agents through whom the new technology is to be transferred to the other farmers in the various communities. Their initial responsibilities after their training include setting up demonstrations on any of the technologies taught, in their own farms with the inputs (mainly seeds of multipurpose trees) taught to harvest from local trees, recruitment of fellow farmers from each of their communities to be trained in agroforestry. In their SCC Vi – AFP activities the authors promoted sub village communities to develop participatory development plans for sustainable land use.

In general, technology performance evaluation in afforestation includes the assessment of three different aspects of the technologies. These are the quantity and quality of products

from technology components and of trade-offs resulting from the combined production of crops, trees and/or livestock, the quality of service functions of the technology (their effectiveness and efficiency). Such service functions may include soil fertility improvement, soil erosion control, and provision of shade, aesthetic functions, marking of boundaries, fencing, improvement of microclimate, windbreaks, weed suppression, or live staking for climbing plants, Socio economic costs and benefits of the technology (input/output relations, opportunity costs, risk, tenure effects, division of labour, etc).

The three aspects of technology performance need to be evaluated from the point of view of biological, as well as socio-economic sustainability. Evaluation of the latter emphasizes the perspective of the farmer, taking into account their own assessment of technology performance in relation to other alternatives available to them. The management aspect in afforestation is important in reducing erosion.

Steinberg (1998), in Tree planting for soil conservation, the need for a holistic and flexible approach, gave an example of Niger, a landlocked Sahelian country. This country has undergone severe environmental degradation during the last twenty years. Demographic pressures, without substantial changes in traditional agricultural practices, have resulted in widespread erosion of the soil's fertility. The growth of extensive rainfed farming in order to feed the growing population has brought marginal land, traditionally used for pastures, into cultivation. Fallow time has been reduced, or sometimes eliminated. The reduction of vegetation cover had left the land exposed to wind and water

erosion, as fields have been cleared of trees, shrubs and grasses for cultivation, wood for fuel and construction and fodder.

Steinberg suggested that some of the conservation and restoration activities, in addition to tree planting, that may be appropriate include the construction of contour berms and micro-catchments and the protection of natural regeneration. The restoration of the soil in the upper reaches of a watershed is equal in effect to conserving water, as fast flowing water is the of soil erosion. On gentle slopes, water can be slowed and infiltration encouraged with contour berms, shallow rock or earth walls that follow the contour of the slope. The steeper slopes require a measure more resistant to the force of the water. Here, micro-catchments, V or crescent shaped trenches that catch water and hold until it infiltrates are necessary. Trees planted behind the contour berms or in the micro-catchments benefit from the retained water and show good survival.

3.2 The Empirical literature

Several sources had been revisited in order to get an insight of similar projects.

From the University of Dar es Salaam, Geography Departmental Library, a paper on Tree-planting: mobilizing the people of Tanzania by Annersten, (1989) was perused. The author discussed the techniques of motivating and mobilizing the people of Tanzania for village afforestation program, that is, the planting of trees as a soil conservation measure.

A book by Antapa (1989) was studied on Soil conservation in the SADCC region that covered an analysis of approaches to soil conservation (Rural Development Studies paper No. 26). This examined approaches being undertaken in the conservation of soil in the SADCC countries. The author discussed policies in play and purposes a coordinated approach among member states for soil conservation.

Mndeme, 1987 in Soil Conservation in Tanzania – the HADO Project, Dodoma District, discussed on the Dodoma region soil conservation project (HADO). The project operated in the three districts of Kondoa, Dodoma and Mpwapwa with headquarters at Kondoa Township. It started in 1973 and since then most of its activities had been concentrated to the Kondoa Eroded Area which was one of the most eroded areas within Dodoma Region.

Mugasha et al (1988), covered soil conservation in Kondoa, Tanzania. The authors evaluated some of the effects of a soil conservation project (Hifadhi Ardhi Dodoma – HADO) inaugurated in 1974 in a semi-arid area of Tanzania which had been repeatedly cleared of vegetation (especially the *Brachystegia* woodland communities) for the control of tsetse flies and the provision of land for agriculture. The project covered 125 600 ha, of which 10 000 had been reclaimed by March 1983. Aims of the project were: to ensure self-sufficiency in wood requirements; to encourage communal tree growing schemes, beekeeping, and the establishment of shelterbelts, shade avenues and fruit trees; and to conserve soil and water and reclaim depleted land – partly by modifications of traditional agricultural systems. The organization and planning of the project was described in detail.

At macro level, the project seemed to have regulated water flow as shown by both increase in discharge at Ntomoko and by the absence of floods in low-lying villages. Increases in both plant and animal biomass had also been recorded. On a micro level, there were contradictions emanating from the *Rangi* people, such as the practice of terracing, tree-planting (including the use of multipurpose trees and agro-silvicultural

practices) and selective cutting of trees alongside shifting cultivation (which had too short a fallow period), and use of fire. This suggests that, where popular participation forms the basis of the conservation process, rapid changes in attitudes and conservation practices should not be expected. The need for inter-sectoral co-operation was implied. Short-interval periodic evaluations were advocated as a means of project monitoring.

3.2.1 Similar afforestation projects

There had been several approaches in afforestation practice. Some approaches dealt with individual farmers while some used village governments that forced village communities to plant trees in own farms and open spaces. In places with man-made dams like Chereche the beneficiary organization approach is used to conserve the dam while letting the village government and the community learn from the organization. The project is seen as a pilot for others to learn. The members then practice in the project area and their own farms.

Study done by VI-Agro forestry project in West Pokot District of the Rift Valley province of Kenya , Trans Nzoia in Kitale, Kenya, Masaka in Uganda, Mara and Mwanza Regions in Tanzania and Kigali in Rwanda, showed that community empowerment in afforestation, was always a success.

Participatory Rural Appraisal (PRA) has been used by the project as a tool modified into Participatory Development Program (PDP) which involved the community initiatives to a greater extent. Visioning was used when involving the participatory community

perspective in the PRA process. This process enabled the project to establish green belts in their areas of operation. These resulted into:

- Increased and diversified food supply
- Improved nutritional status
- Increased on-farm tree cover for firewood and wood products
- Increased and diversified production of marketable forestry products

VI-Agroforestry succeeded in developing farmers tree nurseries in own farms and including farmer groups tree nurseries. Similarly lessons can be drawn from SECAP project in Usambara Mountains. SECAP Communal approach in afforestation of Usambara Mountain used Participation and extension.

SECAP used village approach towards erosion control and sustainable land use. The project recommended that, besides supplying farmers with a wide choice of tree species as planting material and skill-oriented training, markets needed to be developed for tree products to promote participation of farmers in afforestation programs.

Establishment of forestry nursery created easy access to seedlings and was a source of motivation for planting more trees.

On visiting afforestation project at Kalemela Village in Magu district-Mwanza, Tanzania, one will note an approach of preventing deforestation by quarantining areas. That is areas were left for natural vegetation re-growth. No farming activities were allowed in quarantined areas. The natural vegetation had improved. The area was strictly legislated by the village government.

Other areas using the same approach were land and water management program in Mbulu and Babati districts in Manyara region, Karatu District and Arumeru districts in Arusha Region. Natural vegetation growth approach had been used successfully by projects such as HADO (Hifadhi Ardhi Dodoma) and HASHI (Hifadhi Ardhi Shinyanga literary meaning – Conserve the Land) within the two regions of Dodoma and Shinyanga regions respectively. The Kondoa project was still performing well by the time of this study.

Since 1983 a small Swedish NGO, Byskosinamligen (BSI), had supported tree-planting in Karatu, Tanzania. The local counterpart was another NGO, Tanzanian Association of Foresters (TAF). In 1986 a baseline study was conducted in the villages of Bashay, Gongali and Gyekrum Arusha. A follow-up study was conducted in these three villages and a fourth programme village, Tloma, in 1993. Earlier, the Karatu area was used as grazing area by the pastoral *Maasai*. The *Iraqw*, a tribe consisting of agro pastoralists, expanded into the Karatu area from the south. The *Iraqws* were mainly farmers but livestock had an important role in most aspects of daily life. When the practical part of the program started in 1986, two of the goals were to improve the fuel situation and the situation for women. The project covered development of nurseries and tree-planting, and popular participation, education and information, nurseries and soil conservation.

Tanui (2002), studied catchment protection on the slopes of Mt Kenya. He commented that it was evident that in order for land care technologies to be readily adopted, there was need to have what he termed as carrier technologies which need not necessarily be conservation related but which would address pertinent issues or constraints considered

to be of high priority. An example of this would be fruit production technologies geared towards income generation and which blend well with nursery production and ultimate soil and water conservation. Farmers involved in rainwater harvesting readily accepted soil and water conservation technologies. The farmers who were keeping dairy animals under zero-grazing conditions were very eager to acquire fodder and practice soil conservation and fertility improvement. Policy gaps and mismatches also played a significant role in environmental degradation. In the Mt. Kenya region, charcoal making was practiced widely amongst the farming community. The study revealed that the charcoal making was mostly done to generate quick cash to solve pressing and urgent needs such as paying for school fees in times when other farm incomes were insufficient.

Programs that dealt with similar afforestation activities included:

- Dodoma Region Soil Conservation Project (Hifadhi ardhi Dodoma, HADO 1973)
- Shinyanga Region Soil Conservation and Afforestation Project (Hifadhi ardhi Shinyanga, HASHI 1986)
- Environmental Conservation in Iringa (Hifadhi Mazingira Iringa HIMA 1990)
- Land Management Programme for Environmental Conservation (LAMP in Babati District, 1991).
- Dodoma Village Afforestation Project (DOVAP 1991)
- Handeni Integrated Agroforestry Project (HIAP 1992)

3.2.2 Lessons learnt

Through the experiences gained from similar projects, the following lessons were learnt and incorporated in the Chereche afforestation project:

- Motivating and mobilizing the village communities is necessary for village afforestation program, that is, the planting of trees as a soil conservation measure
- An afforestation project must ensure self-sufficiency in wood requirements, encourage communal tree growing schemes, beekeeping, and the establishment of shelterbelts, shade avenues and fruit trees; and to conserve soil and water and reclaim depleted land – partly by modifications of traditional agricultural systems.
- Approaches in afforestation project must incorporate individual farmers, village governments to ensure that village communities plant trees in own farms and open spaces. In places with man-made dams like Chereche community organization approach is used to conserve the dam while letting the village government and the community learn from the organization. The members then practice in the project area and their own farms.
- Community empowerment in afforestation was always a success and participatory methodologies and extension are necessary in community projects.
- An afforestation project must have a component of farmers tree nurseries in own farms and including farmer groups tree nurseries.
- Besides supplying farmers with a wide choice of tree species as planting material and skill-oriented training, markets are needed to be developed for tree products to promote participation of farmers in afforestation programs.
- Establishment of forestry nursery creates easy access to seedlings and a source of motivation for planting more trees.

- Prevention of deforestation by quarantining areas that is areas left for natural vegetation re-growth improves natural vegetation. Such areas should be strictly legislated by the village government.
- Other carrier technologies which need not necessarily be conservation related but which would address pertinent issues or constraints should be considered to be of high priority. An example of this would be fruit production technologies geared towards income generation and which blend well with nursery production and ultimate soil and water conservation. Farmers keeping dairy animals under zero-grazing conditions may be eager to acquire fodder and practice soil conservation and fertility improvement. Another example is fish management in the dam and beekeeping.

3.3 Policy Review

3.3.1 National Development objectives

The National development objectives are thoroughly examined in the Tanzania development vision 2025. The economy is envisioned to have been transformed from a low productivity agricultural economy to a semi – industrialized one led by modernized and highly productive agricultural activities, which are effectively integrated and buttressed by supportive industrial and service activities in the rural and urban areas.

Deliberate efforts are made to empower the people and catalyze their democratic and popular participation. It is also envisaged that fast growth will be pursued while effectively reversing current adverse trends in the loss and degradation of environmental resources (such as forests, fisheries, fresh water, climate, soils, biodiversity) and in the accumulation of hazardous substances.

3.3.2 Tanzania National Environment Policy

The policy defines a general environment framework and some of the overall objectives are the following:

- To ensure sustainable and equitable use of resources for meeting the basic needs of the present and future generations without degrading the environment or risking health or safety;
- To prevent and control degradation of land, water, vegetation and air which constitutes our life supporting systems;
- To conserve and enhance our natural and man-made heritage, including the biological diversity of the unique ecosystems of Tanzania;
- To improve the condition and productivity of degraded areas including rural and urban settlements in order that all Tanzanians may live in safe, healthy, productive and aesthetically pleasing surroundings;
- To raise public awareness and understanding of the essential linkage between environment and development and to promote individual and community participation in environmental action;

The Policy states that there is a clear **cause-effect relationship** between poverty and environmental degradation. Environmental degradation leads to wide spread poverty and poverty is a habitual cause of the degradation of the environment. Satisfaction of basic needs is therefore an environmental concern and has relevance to the environmental policy. The policy further states that investment in development is vital for environmental

protection because the environment is the first victim of acute poverty, urban overcrowding, overgrazing, shrinkage of arable land and desiccation.

3.3.3 Tanzania National Forest Policy

The Policy outlines the goal and objectives of forestry sector. The overall goal is to enhance the contribution of the forestry sector to the sustainable and the conservation and management of natural resources for the benefit of present and future generations. The objectives based on the overall goal are as follows:

- Ensured sustainable supply of forest products and services by maintaining sufficient forest area under effective management;
- Increased employment and foreign exchange earnings through sustainable forest based industrial development and trade;
- Ensured ecosystem stability through conservation of forest biodiversity, water catchments and soil fertility; and
- Enhanced national capacity to manage and develop the forest sector in collaboration with other stakeholders.

The policy also describes the roles of some key stakeholders in which the NGO are described to have main responsibilities in the areas of; awareness raising and extension services, capacity building, training and technical assistance, financing of forestry and environmental activities and to promote gender roles and women's empowerment

3.3.4 The National Strategy for Growth and reduction of Poverty (NSGRP)

This is Tanzania's organizing framework for putting the focus on poverty reduction high on the country's development agenda. This aspires on the Tanzania's Development

Vision (Vision 2025) for high and shared growth, high quality livelihood, peace, stability and unity, good governance, high quality education and international competitiveness. It is also committed to the Millennium Development Goals (MDGs) as internationally agreed targets for reducing poverty, hunger, diseases, illiteracy, **environmental degradation** and discrimination against women by 2015.

On environment, NSGRP stress that, it is degraded by weather extremes (e.g. flooding, drought), stresses from gradual degrading of forest, soils, fisheries and pastures. This leads to health effects and loss of confidence in future well-being. The strategy calls forth on development of programs for increasing **local control** and earnings by establishing **locally managed natural resources**.

Sustainable land management is meant for improved land management and adoption of **water conservation technologies**, and implementation of national plans to halt desertification and land degradation and **restore degraded lands**. One of intervention packages is to adopt water conservation and water harvesting technologies, adopt **strict laws and penalties** to those involved in illegal harvesting of natural resources, and promote continuous **campaign for planting trees**.

The Tanzania's' Cabinet through the country's Vice President has ordered each district to grow 1,500,000 trees per year commencing in 2006. Competition on environmental conservation should start from individual household's farms, sub-village, village, ward,

division, and district levels. Through this competition annual winners will be awarded prizes.

In conclusion, the afforestation project was in line with both national regional and international policies on environmental conservation and the Kyoto protocol.

CHAPTER FOUR: PROJECT IMPLEMENTATION

The project target group was the CBO members who decided to conserve a strip of land around the upper edge of the water dam. This was important as an early measure in conserving the dam water and sustained paddy production. Trainings and meetings were conducted to create awareness of the methods for successful implementation of afforestation activities.

Through meetings it was noted that not only the CBO members should be involved but also the village council, and the village community. It was also important to strengthen the village institutions for sustainability of afforestation activities.

4.1 Products and Outputs

Among the activities requested by the CBO was reviewing of their constitution and strengthening the CBO into a legal entity. The output expected was a legal document which could be reliable in the court of law. The constitution had been revised and approved by the CBO general meeting to become a **legally operating organization**. However, for the organization to operate it has to apply for registration. It has done so by paying Tshs 150,000/= for registration in Mwanza Registration office.

In collaboration with the Community Development Department and Chereche Village Council, Chereche Catchment Protection by-law was formulated, delivered to the Village Assembly for discussion and approval. Tarime District Council had reinforced the village bylaw to be circulated to all courts of law within the district.

Other outputs were:

- 100 members with planted multipurpose trees plots

- Two viable tree seedlings nurseries near the dam and at the village primary school.
- Four Trained nursery/forestry attendants. Topics covered were – Soil erosion control methods, Seedbed management, harvesting of forestry seeds and nurseries and forestry management.
- Sub-village community members tree plots in the catchment area beyond the CBO project area.

By December 2006, out of the total of 2,050 tree seedlings planted at the project area, 1,881 trees survived which was 91% of the total. The sub-village communities grew 2,850 tree seedlings of which 2,537 survived (89%). The causes of non-survival were recorded as poor planting methods, re-rooting of plants in order to grow in ones' own farm, destruction by livestock and water lodging.

4.2 Project planning

It was planned to continue with establishment of trees nurseries to supply tree seedlings for sale to the wider community members. On institutional strengthening, the CBO was to adopt the new organizational structure and use the bylaw in protecting the planted trees.

In February, 2007 the CBO members and village government members were trained on afforestation practice. A meeting was conducted to brainstorm the methods of nursery and forestry Management. Training was in phases before the start of long rains in February, 2007. The phases were two as shown below.

Phase I –Local environment friendly plant species suitable to the village, planting methods and tree Management. Duration: two hours per session in February 2007.

Phase II: This was to take place in September 2007, tree seed collection and establishment of a tree seedlings nursery - one day per week each for 3 hours. One District Forestry Officer would provide back-stopping services.

A revolving fund would be established to support tree seedlings production for within and out of village boundaries

The project planning schedule providing the detailed activities, timing and responsibilities was prepared and is being appropriately followed (appendix 5).

Other activities implemented were:

- Contours were designed and measured by Extension staff in collaboration with the CBO members and grown with sisal plants to identify them.
- Members dug plant holes in their plots, put manure and planted tree seedlings for the seasonal rains.
- The Council distributed 4,900 tree seedlings to the CBO members and other community members.
- The members developed a work calendar and identified responsibilities of each stakeholder.

4.3 Staffing Pattern

Through reorganization of the CBO staffing pattern was done as seen in appendix 4.

Staff placement was mainly in the finance, technical and extension sections. The CBO was advised to recruit a professional accountant to control financial expenditure. The

hierarchy of activities, the job description and supervisory roles of staff was made clear to each staff. Most staff used was paid salaries by government or their organizations.

4.4 Budget

A budget is a financial plan providing donors, project implementers, and managers with financial information on how much it will cost to carry out a particular project (CEDPA 1994, PP 82)

The afforestation project was implemented in Chereche Village and most of the implementers lived within the village. It was their day to day activity.

The Project Supervisor lived in Tarime Town about 40 km from the project area so he incurred some costs. The Government staff and NGOs staff costs were met by their employers as the project part and parcel of their extension services.

As each member owned a paddy plot he/she used the same equipments used in the paddy plot in the afforestation project. The district council provided 4,900 tree seedlings as a support to the project. (See appendix 6 for the budget). Since the tree plots were owned by the CBO members, they were using own labour and resources to implement the project. The condition was that any member with a farm plot was obliged to have a tree plot as a means of protecting the dam.

4.4 Project Implementation

Implementation of the project started through awareness creation to the district executive director, the ward management, Chereche village government and the CBO members. Then C N A was conducted while creating awareness to both the CBO members and the

village community. Training on tree planting and nursery establishment was conducted. Participatory monitoring and evaluation was done while reports were submitted monthly.

4.5.1 Project Implementation Report

The project implementation focused on resources, time frame and responsible person to enhance the success of the project. The project addressed two specific objectives that contributed to its overall goal. The planning process had been done at all levels of project design; that is from the communities; stakeholders and project staff. Up to January 2007, the Organization was in the process of restructuring to adopt the new constitution. What had remained was to maintain the established forest to maturity.

The project was scheduled for a period of November, 2005 to March, 2007. During this period different activities implemented included the ones shown in the table below.

Table: 8 Afforestation Project Activities Implemented during the period November, 2005 to January, 2007

Project Goal: To establish a multipurpose tree belt along the edges of Chereche dam catchment area and to decrease the impact of soil erosion in the siltation of the dam.

Project Objective	Activities	Duration	Resources Used	Unmet Resources
To organize Chereche CBO and village Government institutions in having enactable constitution and catchment protection by-law by the end of June 2006.	Reviewing the CBO constitution	November, 2005 to Jan 2006	Stationeries	All met
	Endorsing the CBO constitution	March, 2006	Stationeries	All met
	Formulating the catchment project by -law	November, 2005 to Dec 2005	Stationeries	All met
	Tabling to District Council catchment protection by – law for approval	April, 2006	Stationeries	All met
To reduce land degradation	Creating awareness of the	November, 2005 to January	Stationeries, Fuel	All met

through establishment of a 500m wide strip of multipurpose tree cover by CBO members by the end of March 2007.	afforestation project to Stakeholders	2006		
	Marking contours in the catchment	November, 2005 to December 2005	Contour measuring equipments, pegs, sisal plants, hand hoes	All met
	Training of CBO members and village government on planting of trees	January, 2006 to February, 2006	Stationeries, Fuel	All met
	Digging planting holes and putting manure	January, 2006 to February, 2006	Hand hoes, Manure	All met
	Procuring of tree seedlings	February, 2006	Fuel, funds Allowances, Tree seedlings	All met
	Planting of tree seedlings	February, 2006 to March 2006	Hand hoes,	All met
	Management of planted trees	March, 2006 to March, 2007	Hand hoes for weeding	All met
	Tree nursery establishment	September, 2006 to February, 2007	Tree seeds, Forest soil, Rakes, Watering cans, other nursery equipments	All met
	Monitoring Implementation of Project	November, 2005 to February, 2007	Stationeries Fuel	All met

By January 2007, most of the resources for implementation of the project were already met.

4.5.2 Project Implementation Gantt chart

Gantt Chart is used for scheduling activities as time is usually a common denominator in most elements of projects. The progress could easily be assessed by viewing each element's status with respect to time. Work packages are listed on the left hand and time listed along the bottom. The starting and completion times of jobs are indicated by the

beginning and ending of each bar. Task analysis was completed resulting into the table below (see also appendix 6).

Table 9 Task analysis table for constructing the Gantt Chart for afforestation project in Chereche village in 2005 - 2007

	Task	Starts	Length (days)	Ends
1.	Creating awareness of the afforestation project to Stakeholders	15 Nov. 2005	14	29 Nov. 2005
2.	Marking contours in the catchment	20 Nov 2005	10	30 Nov 2005
3.	Contouring and sisal planting	1 Dec 2005	30	30 Dec 2005
4.	Reviewing the CBO constitution	20 Nov 2005	25	15 Dec 2005
5.	Formulating the catchment project by -law	20 Nov 2005	25	15 Dec 2005
6.	Endorsement of new constitution by CBO general assembly	15 Jan 2006	1	15 Jan 2006
7.	New CBO Constitution	20 March 2006	0	
8.	Endorsement of Catchment bylaw by village general assembly	29 Dec 2005	1	29 Dec 2005
9.	Approval of catchment protection by – law by District Council	7 April 2006	1	7 April 2006
10.	New Catchment bylaw	8 April 2006	0	
11.	Training of CBO members and village government on planting of trees	15 Jan 2006	3	17 Jan 2006
12.	Digging planting holes and putting manure	20 Jan 2006	30	19 Feb 2006
13.	Procuring of tree seedlings	15 Feb 2006	6	20 Feb 2006
14.	Planting of tree seedlings	20 Feb 2006	20	9 March 2006
15.	Management of planted trees	20 Feb 2006	365	20 Feb 2007
16.	Tree nursery establishment	1 Sept 2006	170	20 Feb 2007
17.	Monitoring Implementation of Project	20 Nov 2005	435	20 Feb 2007

CHAPTER FIVE: MONITORING, EVALUATION, AND SUSTAINABILITY

All stakeholders who use, manage or conserve biodiversity will need to assess it in some way. Village communities have different objectives and ways of doing this, from policy makers and government departments who are responsible for commitments to the conservation of environment. Improved understanding of each other's approaches to evaluating project activities can have benefits for rural communities, governments and intermediary organizations.

Participatory monitoring and evaluation of project involves different stakeholders working together to assess steps undertaken by the project staff, which can help policy makers to support local people in managing the environment, or local people to contribute to national environment monitoring processes.

Participatory assessment, monitoring and evaluation of project activities involve participants in observing, measuring or assessing the project life or its components. It is often understood to mean assessment by rural communities, but can also involve other stakeholders, such as students, or policy makers. This can help to understand each other's perspectives better. Participatory monitoring and evaluation is often used as a single phrase (PM&E) but in the biodiversity context, it may be useful to distinguish between monitoring, which requires agreement between stakeholders to measure according to scientific or other standards; and evaluation, which is value-laden and stakeholder-differentiated.

Through implementation of the afforestation project it was necessary for the CBO members to monitor what their project could achieve in future. In a participatory manner, monitoring indicators were developed towards the planned targets. The following were the leading questions – what to monitor, who was to collect data, who was to use the data, how the information was to be used, and what decisions were to be made from the collected data (see also table 12).

5.1 Monitoring

Monitoring is the process of routinely gathering information on all aspects of the project (CEDPA 1994, pp 52)

Monitoring provides information needed to:

- Analyze current situation
- Identify problems and find solutions
- Discover trends and patterns
- Keep project activities on schedule
- Measure progress towards objectives and formulate/revise future goals and objectives
- Make decisions about human, financial, and material resources

5.2 Monitoring methodology

Project monitoring started as part of implementation plan of the project where community situational analysis was undertaken and the community designed ways of solving their problems as regard to catchment degradation. Monitoring process involved five stakeholders of the project who had different roles to play to form the monitoring team.

These were the project coordinator (the then SNHU student), Agricultural extensionists, the CBO management, the village council members and the training coordinator. The role of the CBO was to assess the request made from its members' needs assessments and monitor financial expenditure during the implementation of the project. The training coordinator was the main player in the monitoring process. He was responsible for day-to-day monitoring of project activities.

The aim of project monitoring is to know whether the various activities are undertaken as specified in the project plan, whether materials and other inputs are reaching the specific places in due time, whether the unexpected issues or problems are occurring, whether the outcomes match pre-determined targets, and if not, why and to decide what corrective action to be taken.

The following monitoring methods and tools are being used:

(i) Training on Participatory Monitoring and Evaluation (PM&E)

Training is done to impart skills to members on the methods for monitoring and evaluation of the afforestation project.

A first training was conducted to enable CBO members in managing monitoring and evaluation methods. The training introduced the key concepts, approach, and basic questions related to PM&E. The focus was very much on working toward a shared understanding of the meaning of participation, monitoring, and evaluation. This training was conducted to the monitoring team that allowed it to start exchanging ideas,

experiences, and interests. The training also generated a draft PM&E plan for the team, focusing on the specific project components.

A second training which was conducted focused on the PM&E fieldwork. It carried out so far within the context of the project at large. The team presented its research and PM&E work, highlighting what they had learned so far. This proved to be very valuable. It was followed by exercises identifying and discussing gaps linked to the six key PM&E questions: why? for whom? what? who? when? how?

Here the focus was on achieving a better sociological understanding of participation as a process. The most important of the identified gaps were debated and suggestions were made for additional research work. The following were taken into consideration:

- Resources had to be devoted to monitoring and evaluation, including stakeholder's time and financial inputs.
- Working with intended users, important monitoring and evaluation issues and questions had to be defined, and, based on these, the design was prepared and data were collected.
- Key stakeholders and primary users had to be involved throughout the process.
- The monitoring and evaluation process and findings should provide (new) knowledge and understanding.
- Intended users must interpret results, generate and adopt recommendations, and use the monitoring and evaluation results.
- The project improves and (new) decisions have to be made.

The trainees attendance was good, and the training evaluation shows that the subjects were understood. This training enabled trainees to use the other monitoring methods narrated below.

However with regard to the impact of this training, the evaluation will have to be conducted later.

(ii) Physical observation

This tool is used through personal observation of the planted trees for assessment of tree planting attitudes and practices among the residents in the project operational area.

This tool was used through personal observation of the planted trees for assessment of tree planting attitudes and practices among the residents in the project operational area. The researcher, the CBO program trainer, the irrigation extensionists and the CBO environmental committee members transected through the project area observing the growth conditions of the planted trees. Notes were taken and reports were written for presentation to the CBO leadership and General assembly. Copies were sent to the Village Council and the District Executive Director.

Most tree seedlings had survived but some were water logged and stunted. Some were not. Some trees were affected by a type of fungus which was yet to be identified.

Some stunted trees were outgrown by grass while some were cut by grazing animals. In general by the time of observation members were satisfied with tree growth performance.

(iii) Focus Group Discussions (FDG) Guide

Focus Group discussion tool is applied to understand member's knowledge attitudes, and feelings towards tree management issue.

Study sessions conducted using FGDs revealed that there has been an increase in number of people selling tree seedlings. This showed that tree seedlings were scarce and attracted tree seedlings sellers from within and outside the village to meet the demand.

Most seedling sellers were young people and school children. Some school children sold seedlings which were provided by their tree nursery teacher as part of school income generating activity. It was also revealed that some villagers had grown tree seedlings in their own farms and some people were coming from other villages to buy seedlings for sale elsewhere.

It was also revealed that, the Presidential order for all districts to grow 1,500,000 trees annually had created a high demand for tree seedlings.

(iv) Individual Interview

This is held to randomly selected members on their own tree plots. A questionnaire was used that needed the respondent to describe conditions for good tree growth, measuring and observation of the stages of tree growth.

This was held to randomly selected members on their own tree plots. A guided questionnaire was used for twelve members selected randomly.

They were asked to describe conditions for good tree growth, measuring and observation of the stages of tree growth that included height and girth and the common pests and diseases affecting trees.

The respondents showed that tree growth was affected by drought, destruction by livestock, some affected by tree pests and diseases, poor management by tree owners and some villagers uprooted some trees for growth in own farms.

Some responded that poor weeding and water logged situations affected tree growth.

It seemed that the village council was still hesitant in applying the village bylaw on catchment protection for those leaving livestock to wander in the project area..

(iv) Monitoring charts

Monitoring charts are developed and filled by individual members and a cumulative form is used for filling information from monitoring charts.

Monitoring chart was developed and filled weekly during the first three months and monthly thereafter. Report filled included tree length in centimeters, signs of disease and pests, plant health status, destruction of plants including reasons. Management of the grown trees was also recorded including watering and weeding.

Tree survival rates were calculated monthly.

The charts showed that trees survival rate was decreasing from 2050 trees counted in February 2006 to 1881 by December 2006. (See also general results below).

General results

There were also monthly CBO general meetings to discuss monitoring reports. They discussed successes and failures, the causes and the way forward. The training coordinator then wrote the final report which was forwarded to the village council, district executive director, and copied the report to the Ministry of Agriculture.

The monitoring process was built on existing skills and relied on participants' contributions in a learning-by-doing, semi-structured process and a longer-term commitment based on the belief that a one-off event does not work in participatory monitoring and evaluation.

Below is a table which the members developed showing the status of tree planting in the project area in two months of February 2006 and December 2006.

Status of tree planting in the project area

S/N	DESCRIPTION	FEB. 2006	DEC. 2006
1.	Number of trainings conducted	3	6
2.	Number of trained nursery attendants	0	4
3.	Monthly CBO general meetings to discuss monthly project report	3	10
4.	Number of regular reports on afforestation	2	11
5.	Number of members planting trees correctly	97	102
6.	Number of tree nurseries	1	2
7	Number of trees surviving	2050	1881

5.3 Management Information System

Project Management Information System was designed to collect and provide feedback to CBO members and technical personnel as well as Village government and the district

council on project implementation to enable project stakeholders to plan, monitor and evaluate the operations and performance of the project.

Monitoring was done to keep the project implementation on schedule and information was gathered through field visits and monthly tree survival report. On field visits, the CBO members were recording survived trees and handing their observations to the training coordinator. The coordinator visited all plots and confirmed each CBO member report and compiled monthly reports. Anticipated problems were drought during January to February 2006 and water lodging during March long rains.

Plant survival recording in general was successful. The training coordinator monitored the following variables:

- Number of trainings conducted in afforestation techniques
- Number of trainings conducted in tree seedlings production
- Number of trained nursery attendants
- Number of CBO members planting trees correctly
- Number of planted trees surviving per CBO member by the end of December 2006,
- Number of tree seedlings ready for planting up to February 2007.

During the dry spell, January to February 2006, the activity for watering planted trees did not work since members were busy looking for food for their survival.

Table 12 below was used to track information and in writing monthly reports.

Table 10 Monitoring of Afforestation Project Operations

Na	Categories of information	What to monitor	What records to keep	Who collects data	Who uses data	How to use information	What decisions can be made
1	Work plan Activities	-Timing of activities -Availability of tree seedlings -Planting and management of trees	Monthly records on tree survival rate	-CPEO -CBO Secretary -TC	-CBO management -Project Supervisor	Ensure planted trees survive and a tree seedlings nursery is established	-Reschedule activities -Use of dam water in case of rainfall shortage
2	Costs and Expenditures	-Expenditure of Funds set for tree seedlings	-Receipts for procurements -Delivery note of seedlings	-TC -CBO Accountant -CPEO	-Council Treasurer -CBO Accountant	-Ensure funds are used to buy & transport tree seedlings	Determine need for further funding from other sources
3	Staff and Supervision	-Job performance of extension/Project staff	-Monthly activities report	-Village executive officer -Organizational Secretary -Project Supervisor	-District Executive Director -CBO Management -Project Supervisor	-Open Performance appraisal for promotion -Allowance for project attendants	-Promotion for Gov extension staff -Further training for project attendants
4	Commodities	-Tree seedlings -Nursery equipments	-Stock registers -Project attendant reports	-CBO accountant -CPEO -Project Supervisor Organizational Secretary	-District Executive Director -CBO Management -Project Supervisor	-Ensure availability of seedlings -Ensure good condition of equipments	-Extra seedling to order from outside the village or to sell outside
5	Results	-Number of trainings conducted in	-Survival rate of seedlings and	-Project attendants -CPEO	-District Executive	-Assess survival rate of tree	Revise project strategy and

		afforestation techniques -Number of trainings conducted in tree seedlings production -Number of trained nursery attendants -Number of CBO members planting trees correctly -Number of planted trees surviving per CBO member by the end of December 2006, -Number of tree seedlings ready for planting up to February 2007.	planted trees	-CBO Secretary -TC -Project Supervisor	Director -CBO Management -Project Supervisor	seedlings and planted trees	approach
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Table format adopted from CEDPA 1994 pp 59

Key:

CPEO – Crop Production Extension Officer

TC - Training Coordinator

DED – District Executive Director

Table 11 Afforestation activities Monitoring and Evaluation Plan

GOAL: - To establish a multipurpose tree belt along the edges of Chereche dam catchment area and to decrease the impact of soil erosion in the siltation of the dam

Objectives:

1. To organize Chereche CBO and village Government institutions in having enactable constitution and catchment protection by-law by the end of June 2006.
2. To reduce land degradation through establishment of a 500m wide strip of multipurpose tree cover by CBO members by the end of March 2007.

Main activities	Activities	Indicators	Data source	Methods/ Tools	Person responsible	Time frame
To assist Chereche CBO in reviewing its current organizational draft constitution	-Review draft constitution -Submit reviewed draft constitution to CBO assembly	-CBO Constitution document	-CBO assembly minutes -Constitution document	-Conduct discussions with involved parties -Binding of original copies	-CBO Secretary -Project Supervisor -TC	January – June 2006
To assist Chereche Village government in formulating a by-law for protecting Chereche dam Catchment area.	-Submit reviewed draft constitution to CBO assembly -Submit draft by-law in village assembly -Submit by-law in District Council meeting	-Legal catchment By - law	-Village assembly minutes -District council minutes -Catchments by-law	-Conduct meetings -Binding of copies	-Village Executive officer -DED -Project Supervisor -TC	January – June 2006
To coordinate planting of multipurpose trees, in between contours along the edges of Chereche dam.	-Training of CBO members -Preparing tree holes -Planting of trees -Procurement of tree seedlings -Establishing tree nursery	-No. of Trained members -No. of holes planted -No. of seedlings procured -No. of seedlings in nursery	Monthly reports Site data Training Report	-Site visit -perusing reports	-Village Executive officer -Project Supervisor -TC	-February 2006 -January 2006 -January 2006 -Sept 2006 – January 2007

5.4 Evaluation

Evaluation is for objectively assessing the impact and accomplishments of a project. It is a process of gathering and analyzing information to determine whether the project is carried out as planned and the extent to which the project is achieving its stated objectives through the activities.

Evaluation criteria of the project were based on its effectiveness, sustainability, relevance, impact, and efficiency and were done by the PM&E team.

5.4.1 Evaluation Methodology

Participatory self assessment and evaluation is used. This enables participants to critically assess their project and plan for future activities. Self assessment form is designed and members are clustered according to their activities such as CBO members who were not leaders in the organization, committee members, and the executive committee and the management staff.

In projects there are two kinds of evaluation which are:

- **Formative evaluation** – This happens throughout the project lifecycle and provides information to guide corrective action. It is designed to pilot the project as it progresses asking the questions – “What is happening?” and “How the project is proceeding?” (Nicholas, 2001 pp 414).

- **Summary (Summative) evaluation** – This occurs after the project is completed and focuses on the end product or result. It is designed to appraise the project after completion with the questions – “What happened?” and “What were the results?”

Tools used for formative evaluation were the following:

(i) Self assessment form

Self assessment form was designed for members to critically assess themselves and the project management in accomplishing the project objectives.

(ii) Reviewing implementation reports

This was done through analyzing the monthly implementation reports from the project area being prepared by the CBO. It also included reviewing biannual project management meeting reports which contained the progress and achievements of all project interventions.

(iii) Individual In-depth Interview

A questionnaire was used in this case to capture relevant information that was analyzed using computer software.

The methods and tools that will be used to conduct the summative evaluation are as follows:

- Structured interviews
- Focus Group Discussion
- Individual In-depth Interviews
- Physical Observation
- Review of CBO and village council reports to assess the changes that occur.

5.4.2 Formative Evaluation

Formative evaluation was conducted in March 2006 during the start of rains, June 2006, at the end of rains, and December, 2006 during the scarcity of rains.

This was done looking for guidance and recommendations designed to strengthen or improve the project, make it sustainable, or enhance performance and productivity.

Evaluation was done on the following:

- Community awareness and respect of the CBO constitution
- Community awareness and implementation of catchment protection by-law
- Income generated from tree seedling sales
- Members depending on own farm agroforestry woodlots
- Members with own tree nurseries and deriving income from the sale of seedlings
- Financial contribution of the afforestation project to the CBO
- Village community members with own woodlots
- Sub-village or hamlets community owning demarcated forest plots in the catchment area and deriving income from forest produce
- Cleanliness of the dam water as a result of controlled soil erosion

Results

Per capita meeting attendance rates averaged 2.4 times, above the overall average.

The main incentive for farmers to manage forest resources was found to be the fodder that was obtained from the conserved land.

Evaluating the project by the monitoring and evaluation team used four points which were: 4.0+: very good, 3.0+: Good, 2.0-: Poor, 1.0-: Very poor. The scores were thus, 4.5

for effectiveness, 2.5 for sustainability, 3.5 for efficiency, 2.5 for impact and 3.5 for relevance.

At the time of evaluation, the overall average of scores was 3.3. Hence this project was deemed to be delivering good results. For social development impact, the project was given a positive evaluation in terms of strengthening organizational capacity, empowering members and giving better access to government administration, including evaluation of future potential.

By December 2006, the tree survival rate was above 75% which was optimal for any afforestation project. The survival rate of about 91% for the CBO and 89% for the community planted trees showed the seriousness of the CBO in managing the project. It was found that the CBO members also planted trees in the non-project catchment areas and in their own farms. For the project to be sustainable, the members must succeed in nurturing both the trees and the fodder plants.

5.4.3 Summative Evaluation

This is a concrete, measurable community economic development outcome that is derived directly from the project and includes process objectives which are:

- Number of trained nursery attendants who are actively implementing their activities
- Number of CBO members planting trees correctly
- Number of planted trees surviving per CBO member
- Number of tree seedlings raised by the project nursery
- Number of other stakeholders deriving income from the afforestation program

- Number of households building modern houses
- Number of households able to pay school fees for children passing standard seven examinations
- Income generated by the forest produce to individual members

The survival rate of the planted trees will be used as an indicator for the sustainability of the resources, and the attendance rate at the CBO's general meetings and tree management would be used as an indicator for the sustainability of the project.

The attendance rate is the total attendance over the year divided by the number of members. The project will use an internal evaluation system to assess its progress and impact. The internal evaluation will be carried out using the CBO management assisted by district community development staff using self assessment charts, some of the monitoring tools and indicators.

External evaluation will be conducted using people outside the project area, preferably SCC VI agroforestry staff, TAHEA staff, district and regional forestry officials. The terms of reference will be provided.

The external stakeholder, Tanzania Home Economics Association (TAHEA), will be involved in conducting Summative evaluation as he had an interest to continue the conservation activities to the whole catchment.

The summative evaluation was expected to be done by July 2008.

5.5 Sustainability

This relates to how the project ensures its capacity to function regardless of changes in external funding sources. It is project continuity or capacity of a project to continue

functioning, supported by its own resources (human, material and financial) even when the external sources of funding have ended (CEDPA 1994 pp 90).

The categories for sustainability are institutional, financial and political sustainability.

5.5.1 Financial sustainability

The project had started to operate two tree seedling nurseries which were used as a source of income for the CBO through sale of tree seedlings. The project area was advantageous due to availability of dam water throughout the year for watering the tree seedlings. Once forest matures, the forest produce for sale will increase financial income for the CBO and its members. Other income generating activities included installation of small scale industry to add value in both forest produce (fruits, honey and wax) and increased paddy farm produce for higher income generation. Fish was grown in the dam in order to derive income and nutrition for the village community

Some funds from the paddy farm account had been used as **seed money** to support the afforestation program due to its importance in sustaining the dam water. The money was from the fund created by sales of paddy that was contributed by members to the CBO.

The CBO was planning to open a Savings and Credit Account which each member will contribute 35 kg paddy equivalent value market price. This will be half of 70kg of paddy that is contributed per member for 0.4 ha used for paddy production. The other 35 kg will be used to finance the CBO activities.

The CBO was also expecting to charge fees for harvesting of project forest produce

5.5.2 Institutional Sustainability

Legalizing the CBO constitution and Village catchment protection by-law ensured continuity of the project. The CBO trained four young members to become trainers of fellow members in extension services. Backstopping from Vi-Agroforestry Officers was assured and available and field days were conducted on the project to stimulate other village communities in initiating afforestation projects in their villages.

The SCC Vi-Agroforestry project supported this project on technical issues and training of the CBO members on afforestation projects,

By February 2007, TAHEA which is a Home Economics Project started to support of the Afforestation project through training of village community on catchment protection methods.

5.5.3 Political sustainability

Tarime district council had used the afforestation project as a pilot. The Catchment by law had been copied to all 156 villages in the district to encourage other villages to adopt own catchment protection by laws.

The village government had ensured all villagers plant trees in the remaining part of catchment. When the long rains started, the Regional Commissioner was invited to officiate tree planting ceremony at the project area. This was part of the National Tree Planting day and it was publicized by the media.

The Organization Secretary had been scheduled to attend Village Council meetings monthly to deliver progress report of the project.

However, both the Ministries of Agriculture and of Natural Resources were supporting the project and supported study visits for farmers from other districts to the project area.

The President of the United Republic of Tanzania had urged all political leaders in the country to support all afforestation activities in the country. Every district had been directed to plant at least 1,500,000 trees annually starting from year 2006. The project had already paved way in implementation of the directive.

5.5.4 Results

All the project objectives can be regarded as having been fully attained namely afforestation and institutional strengthening. The following was also reported:

Awareness on the importance of tree planting:

Awareness creation was successful as the project activities had spilled over to the rest of the village. School children were given tree seedlings which they planted in their family farms.

Political support

The district and regional government and political leaders have taken the afforestation project and bylaw in Chereche village as a pilot. The Political and Government leaders are also advocating tree planting during public meetings and Chereche project being mentioned as an example to be emulated.

The Tree Planting Practice

The CBO has reported an increased demand for tree seedlings by the village community and by farmers from nearby villages. The main purposes of the trees demanded are for shades, fruits, timber, and fuel wood.

The number of household planting trees has increased by 25% as compared to the period between February to December 2006.

The first objective was met before June 2006 due support given by the district council and the village council. For the second objective there was vegetation regrowth which trapped eroded soil and the dam water was cleaner than when the project started. This objective to be fully achieved will need three years as from March, 2007 to have sustainable harvesting of forest produce. However fodder was available for livestock use. Community forestry based on individual allocation of plots incorporated in the project is one effective method of breaking the cycle of poverty and environmental destruction, and as such it is necessary.

This community forestry project can be classified within the broad definition of a participatory development project. The afforestation work related to the project has effects with economic impact on the poor, through employment in tree planting, priority provision of wood and fuel, and reduced drought damage due to elevated water tables.

People can also reduce their expenditures by obtaining fodder and fuel from the plantation, and poverty pressure on adjacent areas is reduced. This project aimed to prevent land degradation, enrich the ecology, augment local supplies of essentials such as fuel and fodder, and improve socio-economic conditions by creating employment opportunities. With all data collection, it provides opportunities for feedback, analysis and action by forest users and relevant local organizations.

Participatory monitoring leads to ownership of new relevant knowledge, and is part of an empowering development process. Consequently, in afforestation related issues

particularly, participatory approaches can help with conflict management, institutional development, silvicultural management, and monitoring of sustainability. Also the reasons for their effectiveness, which are closely linked to the direct involvement of the beneficiaries. Results cannot simply be transferred between communities, but groups of resource users must be supported to develop solutions based on their own knowledge and experience.

Monitoring and reporting need to be readily verifiable, so that someone can: (a) review the data or documentation (e.g., procedures, methodologies, analyses, reports); (b) inspect measurement and analytical tools; and (c) repeat sampling and measurements.

6.2 Recommendations

Most farmers are not aware of the consequences of cutting trees in catchment areas, especially where there is a water body within the catchment. The mud coloured water is an indication of severe soil erosion from the catchment. However poverty force human to over utilize natural resources leading to environmental degradation.

Below are recommendations to others implementing similar projects.

- The system for afforestation work must be reformed to enable sustainable management of forest resources by CBOs. It is particularly important to get the planting density, lopping and thinning right, in order to make forest growth compatible with fodder production.
- In order to maintain high survival rates while raising the economic value of the forest, fruit and timber trees should be selected that are resistant to dryness and termite attack. Such trees should be environmental friendly and sufficing community needs.

- The main negative effect of the allocating individual tree plots under the catchment protection scheme is the possibility of some villagers being excluded. Community members who were not included during the allocation period for some reason are excluded from the fodder and pastures which they have traditionally used, and may suffer increased economic and social disparities between them and tree plot owning villagers.
- Instead of focussing on the numbers of trees or hectares planted the main issue for rural afforestation projects should be the number of farmers reached, trained and adopting during the project period regardless of age or gender. The target should be people.
- Catchment areas within villages which are public lands should be legislated by village governments and community members must be involved from the very beginning to understand and support the protection bylaw.
- Legislation for protection of efforts invested in the catchment and household farms must go hand in hand with tree planting. The legislation should also regulate the harvesting of forest/tree produce in the forest and household farms.
- Community lands should be demarcated and leased to NGOs, CBOs, CSOs, and hamlets for afforestation. Each hamlet member should be allocated a plot within the hamlet land and allowed to grow multipurpose trees and keep own beehives for honey production.
- There should not be allowed a free accessible land in the villages in order to avoid environmental degradation. Every body must depend on trees grown on own land and/or leased land.

- Environmental related policies, laws, by laws and strategies should be interpreted into National language and/or local language and made available to grass root organizations and community members.

Strategies found to be helpful was working both with CBOs in collaboration with the Village council and staff at district headquarters. To make such projects be sustainable it should be part of an ongoing project or activity to share the existing resources. They should also address a problem that is known to threaten their ongoing activities.

Political support is necessary for community projects and the projects should reflect implementation of National policies. The project shared existing resources of the paddy project.

For poor communities, projects should be clear of a near future progressive income generation as well as food security. Personal ownership of products derived from what is invested on land should be clear even before the project begins.

6.3 Future work

Further steps to be taken by this project are designing sustainable income generating activities from forest produce; Beekeeping, fruit processing, and fodder and pasture baling for livestock use. The Rorya hill top can used as an area for camping sites.

The following should be evaluated:

- project costs: capital & operating costs, opportunity costs, incremental costs

- cost-effectiveness: based on different indicators and perspectives
- macro-economic impacts: gross domestic product, jobs created or lost, effects on inflation or interest rates, implications for long-term development, other economic benefits or drawbacks, displacement of present uses
- equity impacts: differential impacts on income groups or future generations

Other areas of consideration are:

- The legal and customary land and resource use rights of local communities are recognized and honored.
- The concerns of local communities regarding all project operations are actively sought and fully taken into account in planning and implementing these operations.
- Whether the project is developmentally appropriate or provides positive secondary outputs, according to the following areas of analysis:
 - Long-term income opportunities for local populations
 - Employment rights
 - Appropriate technology transfer
 - Social development
 - Increasing public participation and capacity building
 - Maintaining and fostering local cultures
 - Gender equity
 - Tenure and land use rights
 - Human rights

- The mature forest may in future become site o birds that might become pests to the paddy farm. This must be put into consideration.