EVALUATION OF THE ASSOCIATION OF TANZANIA TOBACCO TRADERS' REFORESTATION PROGRAMME: THE CASE OF URAMBO DISTRICT

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN RURAL DEVELOPMENT OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

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ABSTRACT

The study was conducted in Urambo District. The objectives of the study were as follows: to examine role played by primary farmer co-operatives in implementing the reforestation programme; to determine the planting rate of trees among co-operative members; to assess the survival rate of planted trees; and to identify constraints faced by farmers in implementing the reforestation programme and their coping strategies. The study applied a cross-sectional research design. A variety of methods including personal observations questionnaires and focus group discussion were applied. Sample size for the study was 60 primary-farmer co-operative members, 20 members from each of the three primary-farmer co-operatives, selected purposively and systematically from the most affected division. Sample size represented 7% of total study population which is 862 co-operative members. Data were analyzed using SPSS, both descriptive statistics and inferential statistics were analyzed. Results from this study show a poor performance of reforestation programme. Furthermore, the results indicate that, the study had a low planting rate and a low survival rate of 39.6 %. This study recommends proper actions to be taken on several constraints that have been identified to course the lower rates. Furthermore, farmers should be separated from livestock keepers to avoid grazing on tree farms. On issues of fire outbreaks, there is a need to introduce strict by-laws, penalties and fines to those who deliberately burn the forests.

DECLARATION

I, MANGASINI ATANASI do hereby declare to the SENATE of Sokoine University of Agriculture that this dissertation is my own original work and has never been submitted nor concurrently being submitted for any degree award in any other University.

_____ _____

Mangasini Atanasi Date

(MA. Rural Development)

The above declaration is confirmed

_____ _____

Dr. D. L .Mwaseba Date

(Supervisor)

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DEDICATION

This dissertation is dedicated to:

My late parents, my father Mzee Athanas John Katundu, Zuliethy Wamweru Michael my mother, my late father in-law Mzee Michael Paul Kangozi and my brother Desderi Nkwangara Katundu who died in search for education.

May the Almighty God rest all of them in Eternal peace, amen.

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A study by Kajembe et al. (2003) on the evaluation of the Ugalla Community Conservation Project noted that the project had great relevance to the targeted community, it is sustainable and that it recorded a positive effectiveness. In another study, Chamshama et al. (1992) evaluated the performance of the taungya system at the north Kilimanjaro Forest Plantation as a case study in Tanzania. Survival percent was based on an initial stocking of 1680 stems per hectare (2.5 x2.5m spacing). The researchers concluded that; "Survival is significantly higher in compartments under the taungya system (p<0.05). The

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ABBREVIATIONS AND ACRONYMS

AOTTL	-	Alliance One Tobacco Tanzania Limited
ATTT	-	Association of Tanzania Tobacco Traders
BAT	-	British American Tobacco Company
CBC	-	Community Based Conservation
CIFOR	-	Center for International Forestry Research
CSD	-	Commission for Sustainable Development
DESA	-	United Nations Department of Economic and Social Affairs
DSI	-	Development Studies Institute
DRDA	-	District Rural Development Authority
DFO	-	Divisional Forest Office
EAWLS	-	East African Wildlife Society
ENGOs	-	Environmental Non-Government Organizations
FAO	-	Food and Agriculture Organization of the United Nations
FDC	-	Forest Development Corporation
FGD	-	Focus Group Discussion
HADO	-	Hifadhi Ardhi Dodoma (Dodoma Land Rehabilitation Programme)
HASHI	-	Hifadhi Ardhi Shinyanga (Shinyanga Land Rehabilitation Programme)
HSD	-	Honestly Significant Difference
ICA	-	International Co-operative Alliance
ICRAF	-	International Centre for Research in Agro-forest
IPF	-	Intergovernmental Panel on Forest

IRAD	-	Institute of Agricultural Research and Development in Cameroon
ITTA	-	International Tropical Timber Agreement
ITTO	-	International Tropical Timber Organization
IUCN	-	International Union for Conservation of Nature
JFM	-	Joint Forest Management
KEPA	-	*Kehitysyhteistyön palvelukeskus*
KFMP	-	Kenya Forestry Master Plan
LMAV	-	Lower Mississippi River Alluvial Valley
MCPFE	-	Ministerial Conference on the Protection of Forests in Europe
MINEF	-	Ministry of Environment and Forestry in Cameroon
MINAGRI	-	Ministry of Agriculture in Cameroon
MLNRT		Ministry of Lands, Natural Resources and Tourism in Tanzania
MTNRE	-	Ministry of Tourism, Natural Resources and Environment in Tanzania
MUCCoBS	-	Moshi University College of Co-operative and Business Studies
NGOs	-	Non-Governmental Organizations
NIDEP	-	Namalteng Integrated Development Programme in Ghana
ONADEF	-	National Office for Forest Development in Cameroon
PAME	-	Participatory Assessment, Monitoring and Evaluation
PFCs	-	Primary Farmer Co-operatives

SFM	-	Sustainable Forest Management
SPSS	-	Statistical Package for Social Sciences
SNAL	-	Sokoine National Agricultural Library
SUA	-	Sokoine University of Agriculture
TAT	-	Tobacco Authority of Tanzania
TEV	-	Total economic value of a Forest
TFAP	-	Tanzania Forest Action Plan
TLTC	-	Tanzania Leaf Tobacco Company
TTB	-	Tanzania Tobacco Board
VANLA	-	*Vereniging Agrarisch Natuur en Landschapsbeheer Achtkarspelen* (Environmental Co-operative based in Netherlands)
VEL	-	*Vereniging Eastermar's Lânsdouwe* (Environmental Co-operative based in Netherlands)
UDC	-	Urambo District Council
UN	-	United Nations Organization
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environment Programme
UNFPA	-	United Nations Fund for Population Activities
UNFCCC	-	United Nations Framework Convention on Climate Change
UNCED	-	United Nations Conference on Environment and Development
URT	-	United Republic of Tanzania
VGP	-	Volunteer Ghana Programme
WWF	-	World Wildlife Fund

WWIS	-	World Weather Information Services
WRI	-	World Resource Institute
WRM	-	World Rainforest Movement

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Tobacco-related deforestation is a serious problem all over the world. It is especially acute in tropical countries, and more specifically in developing world, amounting to 1.7% of global net loss of forest cover or 4.6% of total national deforestation (FAO, 1999). Environmental criticality exist or is emerging in 35 countries with an estimated serious, high, and medium degree of tobacco-related deforestation, mainly in Southern Africa, Middle East, South and East Asia, South America, and Caribbean (op.cit.).

Tanzania, like many other African countries, has been experiencing rapid rates of deforestation. However, estimates of the magnitude and rate have varied widely. For example, the Ministry of Tourism, Natural Resources and Environment, estimates that; Tanzania has been losing between 300 000 and 400 000 ha of forest per annum (MTNRE, 1989). The FAO and World Bank estimates give an average annual rate of 130 000 ha or 0.3% (WRI, 1990; World Bank, 1992). Ahlback (1988), on the other hand, believes that the annual rate of deforestation has already exceeded 700 000 ha per annum. Expansion of agriculture, especially the massive clearance of land for cultivation of cash crops such as cotton and tobacco to boost export earnings, has been mentioned as one of the leading causes of deforestation in Tanzania (FAO, 2003a). Indeed agriculture alone seems to account for an annual deforestation rate of about 300 000 to 400 000 ha of forest and bushland (Mnzava, 1988). The regions

most affected are Coast, Mbeya, Dodoma, Singida, Shinyanga, Tabora, Kigoma and Tanga.

The expansion of agriculture has often taken the form of shifting cultivation. This has had a marked impact in the tobacco growing areas of Tabora, Urambo, Iringa, Chunya and Songea Districts (Misana and Nyaki, 1993). In Tabora Region, tobacco caused the decimation of at least 240 000 hectares of woodland over a 20-year period since the early 1960s (Madeley, 1983). It is estimated that about 400 000 m^3 of fuelwood is consumed annually for curing the tobacco (MTNRE, 1994). This figure does not include the amount destroyed during clearing of the land for the crop. The increasing demand for fuel and the scarcity of alternative sources is a major factor. Today the need to reverse the situation is high on agenda.

Reforestation is not a new concept; its history goes as far back as 1800s when the first reforestation attempts were made in Europe. WWF in 2001 noted that, the first reforestation project in Haute-Province in France started in 1860 and ended in 1930 (WWF, 2001). From 1960 to 1980, African forestry services made major efforts at reforestation, with the help of outside financing. From 1961 to 1975, priority was given to industrial afforestation (61 per cent of the areas planted). From 1976 to 1980, a scaling back of industrial plantations, and therefore of large-scale plantations, was begun as a result of the frequently mixed results of massive plantations, the major drought and the development of more integrated and participatory approaches (DESA, 1999).

Reforestation in Tanzania can be traced back as far as 1970s when the Village Reforestation Programme was introduced (MLNRT, 1989b). It was initiated as a strategic approach for improving fuelwood supply in rural areas and reducing pressure on environmental degradation. It was meant to provide enough fuelwood to the rapidly growing population as well as maintaining a sound environmental condition for sustained agricultural production (Misana, 1999). This came after realizing that sources of fuelwood supply were being depleted faster than expected. Therefore, the need for tree growing to meet basic needs for fuelwood and poles, while at the same time saving the country from the threat of desertification, was seen as an urgent undertaking (MLNRT, 1989a). A national reforestation campaign was launched in 1980 through the mass media to solve the fuelwood crisis. Slogans such as "*Misitu ni Mali*" (Forests are wealth) and "*Usikate Miti Ovyo*" (Do not cut trees indiscriminately) were used in the campaigns (Misana, 1999).

The agricultural policy of 1983 also incorporated aspects of tree planting, with the aim of expanding the reforestation programme especially in tobacco growing areas. Thus by 1983, over 68 000 ha of woodlots had been established by villages, schools, government and NGOs (MLNRT, 1989b). This means an average reforestation of about 6500 ha/year, which is relatively low. By 1989, about 80 000 ha of scattered woodlots had been established (MLNRT; 1989a). Annual seedling distribution was 15 to 20 million over a ten-year period. At the end of 1989 about 560 nurseries were in operation and more than 10 000 schools had planted trees (*ibid*).

During 1980s the government of Tanzania initiated Soil Conservation Programmes in which reforestation was taken as a means to conserve land in areas that seemed to have been affected by deforestation and land degradation. The programmes were initiated in Dodoma and Shinyanga. HADO started as a reforestation and engineering project aiming to prevent further land degradation in Dodoma especially the Kondoa Irangi highlands (Misana, 1999). Overstocking was the major cause of land degradation and the enforcement of a 1988 bylaw of the Kondoa District Council removed all livestock from the Kondoa highlands. Next very important reforestation programme which also employed soil conservation technique was known as HASHI (Hifadhi Ardhi Shinyanga/ Shinyanga Land Management Programme). It was initiated as a follow up of a national conference held in Shinyanga in 1984 on, "environmental conservation through tree planting"(op.cit.). The aim was to encourage and involve the people in Shinyanga in environmental conservation measures to mitigate the adverse effects of land degradation and to improve the standard of living of the people. The programme capitalized on education, awareness raising and use of indigenous knowledge to achieve its targets. HASHI has a lot of lessons to learn from for any programme on land reclamation and conservation through working with the people.

1.2 ATTT supported project in Urambo

In the wake of declining natural forest resources the major source of firewood for curing tobacco in Tanzania, tobacco companies initiated a “Tree Planting Policy” in 2001 and implemented by ATTT on behalf of Tanzania Leaf Tobacco Company (TLTC) and DIMON. This programme was set to cover all tobacco producing

regions with severe deforestation including Tabora, Urambo, Kahama, Mpanda, Chunya and Manyoni (ATTT, 2006).

The main objective of the programme was to achieve long term sustainability for tobacco production in Tanzania by providing enough firewood for curing tobacco and promoting curing barns that have higher fuel efficiency (*ibid*). Other objectives include: to plant and grow as many trees as possible by individual members of primary farmer co-operatives; to improve natural woodland productivity through proper management and conservation of the existing natural forests, woodlands and trees; and to ensure efficient utilization of the available forest resources. This study seeks to assess the effectiveness of the ATTT supported reforestation programme.

1.3 Problem statement

During the 2001/2002 season, tobacco companies initiated a “tree planting policy” which was to be implemented by the Association of Tanzania Tobacco Traders (ATTT) on behalf of Tanzania Leaf Tobacco Company (TLTC) and DIMON currently known as “Alliance One”. Since then, ATTT has been involved in tree planting within all districts affected by tobacco-related deforestation countrywide including Urambo District.

However, since its establishment, very little is known about the effectiveness of this reforestation programme that is being supported by the Association of Tanzania Tobacco Traders in Urambo District. Hence, it is the intention of this study to evaluate the effectiveness of this reforestation programme in Urambo District.

1.4 Study objectives

1.4.1 Main objective

The main objective of the study was to evaluate the effectiveness of the ATTT supported reforestation programme in Urambo District.

1.4.2 Specific objectives

i) To examine role played by the primary farmer co-operatives in implementing the reforestation programme

ii) To determine the planting rate of trees among co-operative members per year

iii) To assess the survival rate of planted trees since the inception of the programme

iv) To identify constraints faced by farmers in implementing the reforestation programme and their coping strategies

1.5 Major research questions

The study intended to answer the following four major research questions:-

i) What is the role played by primary farmer co-operatives in implementing the reforestation programme?

ii) What is the planting rate of trees among co-operative members per year?

iii) What is the survival rate of planted trees since the inception of the programme?

iv) What are the constraints faced by farmers in implementing the reforestation programme? What are the plausible means to deal with the situation?

1.6 The conceptual framework for the study

Programme evaluation is a management tool. It is a time-bound exercise that attempts to assess systematically and objectively the relevance, performance and success of on-going and completed programmes and projects. Evaluation is undertaken selectively to answer specific questions to guide decision-makers and/or programme managers, and to provide information on whether underlying theories and assumptions used in programme development were valid, what worked and what did not work and why (UNFPA, 2004). Key approaches used in evaluating projects/programmes include, assessment of project relevance, efficiency, effectiveness, impact and sustainability. Each of these is defined below:

Project relevance concerns whether the rationale behind a project is in keeping with priorities of the local community and society in question (Kajembe *et al*., 2003). On the one hand project relevance is seen as a matter of the direction of the project in relation to its purpose. On the other hand, it means looking at the societal changes that may have taken place while the project has been in operation and asking to what degree this may alter the rationale for the project.

Efficiency of project is the measure of the outputs of the project, qualitative or quantitative in relation to the total inputs. In other words, it is a measure on how economically the various inputs of the project are converted into outputs (Ngasongwa, 1988).

Effectiveness of project is the extent to which the project objectives have been achieved or can be expected to be achieved (Ibid). Assessing effectiveness presupposes that the project objectives have been unambiguously and operationally defined with clear and appropriate outputs/indicators so as to make verification possible (Kajembe *et al*., 2003).

Project sustainability is an overall assessment of the extent to which the positive changes achieved as a result of project can be expected to last after the project has been terminated (Kajembe *et al*., 2003). In many cases this is a question of the relation between the necessary use of local resources and how recipients view the project. Sustainability is the final test of project success (Ibid).

In evaluating the reforestation programme in Urambo District the study aimed at assessing effectiveness of the project/programme. This was done based on the number of tree seedlings planted as compared to what was supplied and the number of trees that survived at the end of the rainy season compared to what was planted at the beginning or at the start of the rain season.

CHAPTER TWO

2.0 Literature review

In this Chapter the concepts of reforestation, approaches and techniques to reforestation are reviewed. The role played by the primary farmer co-operatives in implementing the reforestation programme is also reviewed. This is followed by constraints faced by farmers in implementing reforestation programmes.

2.1 Concepts of reforestation and afforestation

Afforestation and reforestation are being defined by the UNFCCC as direct human-induced conversion of non-forested land to forested land through planting, seeding, and/or human-induced promotion of natural seed sources (IUCN, 2004). Even though reforestation and afforestation may be used interchangeably they have different but close meaning. It is better for the purpose of this study to distinguish the terms so as to avoid any misunderstanding which may arise. On one hand reforestation is the process of restoring and recreating areas of woodlands or forest that once existed but were deforested or otherwise removed or destroyed at some point in the past. The resulting forest can provide both ecosystem and resource benefits (FAO, 2003b). Operational forestry definitions of reforestation often include the establishment of trees on land that has just been harvested. In some definitions, reforestation is the conversion of land use back to forest after a period of some other land use. “The planting of forests on land which previously, contained forests but which have been converted to some other use” (*Ibid*). On the other hand, afforestation is the process of converting open land into a forest by planting trees or

their seeds (*Ibid*). The term may also be applied to the legal conversion of land into the status of royal forest. For example, since the industrial revolution many countries have experienced centuries of deforestation, and governments and global organizations directly engage in programmes of *reafforestation* (the restocking of existing forests and woodlands which have been depleted, with native tree stock) and also in supporting private and semi-private enterprise in programmes of *afforestation* (the planting of renewable tree stocks for harvesting as lumber or firewood).

2.2 Reforestation approaches and techniques

Organizations both governmental and non-governmental, which have been involved in rural reforestation projects each of them has an approach to and philosophy of reforestation projects (App, 2004). Selection of these approaches and techniques is a matter of careful investigation. As observed by May (2004), “While there are many methods available, many are complicated and/or time-consuming. A selection must be made carefully”. It is not the intention of this study to give a detailed survey of these techniques and approaches; as such an endeavor would be a work unto itself. However, for the purpose of this study it would be better to present a general overview of some of these approaches.

2.2.1 Reforestation approaches

2.2.1.1 The project approach

Project approach, has been employed by the World Bank to facilitate various rural reforestation projects in developing countries. In the book “Planting Trees in the Developing World,’’ Steven Brechin (1997) describes the project approach of the

World Bank for reforestation projects as considering “a project sound when the expected total economic benefits derived from the project exceed the expected total costs and when the project is arranged in a manner fiscally prudent for both lender and borrower”. Brechin (op.cit.) goes on to criticize the World Bank’s projects, which were intended as rural development, as by-passing their intended beneficiaries. These projects, especially during the 1970s and 1980s, often became industrial forestry that benefited the government, urban populations and the rural rich.

2.2.1.2 Facilitation approach

A second approach to rural reforestation programmes may be called facilitation. In this approach, organizations host meetings and act as storehouses of information and knowledge. FAO Forestry has exemplified this function, by helping to coordinate efforts between governments and international and local forestry organizations (App, 2004). However, the success of this approach relies on the relationship of the groups involved (Brechin, 1997). Facilitating existing organizations may provide critical aid in reforestation projects and help them to succeed (App, 2004). However, it adds a layer of bureaucracy that may slow the project’s progress.

2.2.1.3 Community based conservation approach

Another approach for rural reforestation is Community Based Conservation, sometimes referred to as participatory approach (Murphree, 2004). Participatory methodologies include the development of training packages in rapid rural appraisal, the study of management tools for "participatory assessment, monitoring and

evaluation" (PAME) and the elaboration of training packages in gender analysis (Oltheten, 1999). The use of participatory methods and tools has become common practice in the field. This approach relies on the “vested interest, ownership, and sense of pride and belonging” that local communities have with their environment (Western, 1994; Murphree, 2004). Although this approach is usually associated with the protection of endangered ecosystems and species, a holistic view of CBC shows its value in both conserving existing trees, and planting new ones (App, 2004) included here as an alternative to the programs that outside organizations bring to rural villages. According to App (2004) the community forests found throughout West and Central Africa provide an example of locally managed reforestation projects.

2.2.1.4 Agro-forestry approach

A final approach to rural reforestation is agro-forestry, also known as the farm forestry approach (App, 2004). In his book “The Economics of Afforestation: A Case Study in Africa,” Dennis Anderson describes this approach as “the planting and maintenance or restoration of trees in farming areas--on farm boundaries, in villages and hamlets, near dwellings, in copses, in village woodlots, and in watersheds and shelterbelts” (Anderson,1987). This approach can help to increase soil fertility and prevent soil erosion, while providing income and resources to those who participate (ICRAF, 2004). Farm Forestry projects benefit reforestation efforts with higher potential planting rates (with the large number of farmers available) and less public expenditure (farmers working for their own benefit). Working for their benefit, the farmers need fewer inputs for their fields, can improve their soil, and feed their livestock.

Agro-forestry is promoted by many organizations throughout Africa, including the International Center for Research in Agro-forestry (ICRAF), headquartered in Nairobi, Kenya, which works towards “mitigating tropical deforestation, land depletion and rural poverty through improved agro-forestry systems” (ICRAF, 2004). While agro-forestry holds great potential for reforestation the experience from north Cameroon shows that, most people were unwilling to participate in agro-forestry interventions (App, 2004). Many researchers have attempted to identify the characteristics of both successful agro-forestry interventions and those of populations that embrace them. In a study in southwest Cameroon, Adesina *et al.* (2000) identified several constraints to the adoption of agro-forestry techniques including: Inappropriate property regime, high labor costs, long gestation between tree establishment and accrual of benefits, below ground competition between trees and the crops, and the shading effect of trees. Scherr (1995) outlines three popular hypotheses about agro-forestry adoption: Induced innovation, livelihood strategies, and risk management. Briefly, ‘induced innovation’ suggests that decreasing available land necessitates agricultural intensification and technical innovations (such as agro-forestry). ‘Livelihood strategies’ theorizes that variations in technology adoption can be explained by differing household objectives and available resources which change over the life of the household. ‘Risk management’ explains adoption as farmers being reluctant to try innovations that are risky (due to their being unfamiliar) and therefore recommends incorporating them gradually and with modifications that reduce the risk of their use (Scherr, 1995).

Other researchers have found that the ability of general theories to explain agro-forestry adoption is decreased by their failure to take into account the specific factors of a particular site, and the complexity of both social and ecological systems (App, 2004). In this regard, adoption needs to be examined through the complex system of interactions between social, economic, and environmental factors with historic events and trends in particular locations (Belsky, 1993; Walters *et al.*, 1999). For example in the *Sahel*, ICRAF found that people were unwilling to plant trees since they thought it would be assuming the role played by God, although this mode of thought is said to be changing (ICRAF, 2000). Finally, agro-forestry can be explained in economic terms, or its ability to "put money in farmer's pockets." Although it has the goals of "providing food security, enhancing soil fertility, conserving soil and water, as well as increasing fodder and fuelwood production" it must be economically beneficial in the medium-term to be sustainable. "Profitability is a necessary but not sufficient condition of sustainability" for the adoption of agro-forestry systems (Sanchez, 1995).

2.2.2 Reforestation techniques

There are two common reforestation techniques namely; natural and artificial methods/techniques. In the case of Urambo, it applied both natural and artificial methods.

2.2.2.1 Natural reforestation technique

Also known as natural regeneration methods they include root suckering, stump sprouting or natural seeding. Reforestation sometimes occurs naturally if the area is left alone without human intervention. In many temperate zones such as the eastern

United States, reforestation occurs naturally and fairly quickly as the native hardwood forests are so resilient that they quickly re-establish themselves, given the opportunity to do so (FAO, 2003b).

2.2.2.2 Artificial reforestation technique

Artificial reforestation technique, also called artificial regeneration methods, they include; aerial and ground seeding, machine planting and hand planting (FAO, 2003b). In various arid, tropical, or sensitive areas, Urambo District being one of them, forests cannot re-establish themselves without assistance due to a variety of environmental factors. One of these factors is that, once forest cover is destroyed in arid zones, the land quickly dries out and becomes inhospitable to new tree growth. Other critical factors include overgrazing by livestock, especially animals such as goats, and over-harvesting of forest resources. Together these may lead to desertification and the loss of topsoil. In some tropical areas, the removal of forest cover may result in a duricrust or duripan that effectively seal off the soil to water penetration and root growth (FAO, 2003b; Brown & Schreckenberg, 2001). Also, in many areas, reforestation is impossible above all because the land is in use by people (*Ibid*).

2.3 Benefits of reforestation

There are two basic types of benefits from reforestation projects: those that go to the society at large, and those that go to the individual. However, May (2004) warned that, “Measuring the success (benefits) of forest restoration (reforestation) projects is not easy, even when clear project goals have been set and a detailed management

plan is in place (Holl and Howarth, 2000; Reay and Norton, 1999 as cited in May, 2004).

2.3.1 Societal reforestation benefits

The first societal benefit to be gained from reforestation is the preservation of the land, including restoration and protection of watersheds and wildlife habitat, as well as general holistic environmental values (App, 2004). Reforestation can help to counterbalance the deforestation in the region, and pass on an environment as rich as the current one to the next generation. This benefit not only helps the present society as a whole, but future generations as well (ibid). Similarly, another societal concern is the protection of the productivity of the land, and the fight against desertification. While this may be considered an individual benefit, given the uncertain land tenure and the long-term nature of natural processes, it should be considered more of a societal benefit. According to the UN, desertification poses its greatest threat in Africa, two-thirds of which is either desert or arid-land. Since the idea was first popularized, desertification has been linked with deforestation (App, 2004; Geist 1997). While the 1973 drought in the African Sahel focused international attention on desertification, the causal link between deforestation and drought has been difficult to prove in the region (Basset & Crummey, 2003 as cited by App, 2004). The social benefits of protecting the land, by preventing erosion and improving the soil help the long-term productivity of the land. This long-term effect works to ensure that the population can continue to feed itself and to continue to have farming as a viable mode of generating revenue (FAO/UNEP, 1982)

2.3.2 Individual reforestation benefits

While the degree to which benefits are accrued by individuals depends, in part, on the ownership of the trees, reforestation can hold many benefits for the individual, as long as the people in the area have access to trees (App, 2004). The rural people of sub-Saharan Africa depend on the forests for a myriad of well-documented uses, including those of subsistence, economic, social and cultural values (Olson 1999 cited in App, 2004). In his 1999 dissertation, Stephen Olson conducted many polls and interviews of the people in and around Guidar, a city in the north province of Cameroon, on land tenure and trees. He found that “all groups listed small timber, fuelwood, fruit and medicine most frequently for uses of trees.” Furthermore, he found that wild trees were generally used for “fuelwood, shade, fruit, poles, medicine, ornamental purposes and amenity” (Bromley, 1994). Olson also found that trees play an important role in Guidar society, and recommended that these roles should be taken into account by management groups for land use plans. For example, the Baobab (*Adansonia digitata*) was considered by many to be sacred as it represented the spirits of the ancestors, and would not be cut down.

The benefits of trees for shade, fruit and construction materials were well known. Indeed, with the local market selling both fruit and wood, these items had a recognized and standard economic value. However, the benefits of fodder and soil fertility were less recognized (App, 2004). Although fodder was understood as a benefit in Touroua, most people kept only a few animals that wandered freely to graze for their food. While the improvement of soil fertility is a benefit for the individual farmer, due to several factors it is generally unconvincing to most people

in the area. Firstly, the benefits to be gained from the improvement of soil fertility take years to be realized (Timberlake, 1991). Secondly, once realized these benefits are difficult to measure and need to take into account the area lost to crops by the planting of the trees. Finally, due to insecure land tenure, farmers in Touroua feared that, if the soil is improved too much local chiefs will confiscate the land for their personal use (App, 2004).

2.4 The Role of co-operatives in reforestation

The International Co-operative Alliance (ICA) defines a co-operative as an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. Co-operatives are set up to meet a broader purpose than just the economic needs of members (Philip, 2003). ICA has also defined a set of co-operative values, namely: co-operatives are based on the values of self-help, self-responsibility, democracy, equality, equity, and solidarity. In the tradition of their founders, co-operative members believe in the ethical values of honesty, openness, social responsibility, and caring for others (Dwived, (1996).

Primary farmer co-operatives have a great role to play in implementing reforestation programmes in the world. Gill (1997) pointed out that co-operatives play a key role in achieving a viable plantation forestry industry in Australia; cooperatives are also involved nearly in every activity of reforestation starting from nurseries, tree planting to timber harvesting. Advantages of co-operative action in tree planting according to the research are that, by forming co-operative's tree growers can secure fair prices for

their timber due to increased bargaining power, smooth supply of inputs, advice and information to members, expertise, labour, easy access to land and capital (Fisher,1995; Dwived, 1996).

The research by Wiskerke *et al.* (2003) indicates that, the role and position of rural areas are changing with the primary-producer co-operatives taking a greater role in tree planting. It is easy for the cooperatives to foster reforestation and environmental conservation because, they are characterized by new institutional relations between state agencies and the agricultural community (Wiskerke, *et al.*, 2003).

In another study by Stuiver *et al*. (2003), it was observed that the VEL and VANLA environmental Co-operatives present a clear example of the role of primary-producer co-operatives in environmental conservation and specifically in reforestation programmes in the Netherlands. According to this study, "VEL and VANLA are among the first environmental co-operatives in the Netherlands. An environmental co-operative is a regional co-operation of mostly agricultural entrepreneurs (Stuiver *et al.*, 2003) who aim at collective efforts of landscape management, in the process of managing the environment the individuals benefit from easy access to farm inputs (such as medicine and fertilizers) as they are provided by the cooperatives.

A research by Roep *et al*. (2003) indicates that, "more sustainable farming practices are constructed by interactions between different groups of actors within a specific social and material or ecological setting. Farmers with their co-operatives and researchers with their projects play a central role in VEL and VANLA, members of

the cooperatives benefit from the research findings, extension workers and advisors" (Roep *et al.*, 2003).

A report by Center for International Forestry Research (CIFOR) in Indonesian shows that, cooperatives have been active for many years in attempts to improve smallholder tree planting. Initially, they provided extension, access to land, improved planting materials and limited credit to individual households, while at the same time establishing modern marketing bodies (CIFOR, 1998).

Veerakumaran *et al*. (2007) examined the role of cooperatives in managing natural resources in Ethiopia. The study showed that, management of natural resources of land, water, forests, fish etc., of a nation is an important factor affecting the level and pace of its development. There are many forms of natural resources management but the cooperative mode of natural resources management seems to be the best of all. This is so because, with proper rules and regulations, it can better meet the goals of efficiency, sustainability, equity and resource users' satisfaction and is politically and socially more acceptable in most societies and nations than any other alternatives. Cooperatives are considered as an institutional intervention to increase agricultural production and productivity. The major functions according to the study are: provision of credit, provision of inputs, facilitating sale of produces, operating a consumer store, optimum utilization of natural resources like sand and stone, education and inculcation of thrift and savings habit among members (Veerakumaran *et al*., 2007). Furthermore the study points out that, forest cooperatives are for the collection and marketing of minor forest products/non-timber forest products such as

fodder, honey, wax, medicinal plants, wild fruits, tree bark, resin, gum, roots, and seeds. Tree growers' cooperatives are for reforestation of dry lands by planting fruits and fodder trees with limited water use.

2.5 Evaluation of reforestation programmes/projects

A study by Beavis (1993) on "Evaluation of reforestation projects in tribal India" demonstrates that, in the opinion of many of those interviewed, attributes of hierarchy, scale, and feedback loops generally do hinder the potential for sustainability in term of the reforestation project success (Beavis, 1993). The findings also suggested that, their absence improves the potential for sustainability or project success. Furthermore the study pointed out that, as people struggle for survival, they are tempted to make decisions for their short-tem benefit at the expense of their long-term well-being, and are less likely or able to give either time or resources (land) to efforts that only promise benefits over the long term like reforestation. For example, it was problematic that Joint Forest Management (JFM) was being implemented by the Forest Department, as people consequently lacked faith that they would receive benefits from it and therefore showed a lack of commitment and effort to make it work. Also, the study showed that the public lacked sense of project ownership as pointed by the researcher that; the critical issue here is the absence of responsibility or ownership that follows from excluding people from decision-making (*ibid*).

A research by App (2004) on "Rural Reforestation in Touroua, Northern Cameroon" showed that, many trees planted by the schools in the area survived. With two-thirds of the trees alive at the end of 2002, the school project was a success (App, 2004).

The reason is the efforts of many school children and teachers, the school had an established nursery of about 300 polypots. However, the results revealed that in most places the trees didn't survive. As App pointed out that, The Outdoor Festival Mosque project was by almost any standard unsuccessful. By the end of 2002, with no surviving trees, there was no evidence that there was ever a project in the area (*ibid*).

In another study by King and Keeland (1999) it was estimated that, about 2.8 million ha of an estimated original 10 million ha of bottomland hardwood forests still exist in the Lower Mississippi River Alluvial Valley (LMAV) of the United States. The U.S. Forest Service and state agencies initiated reforestation efforts in the late 1980s to improve wildlife habitat. Again the research noted that, Oaks were the most commonly planted species and bare-root seedlings were the most commonly used planting stock. Reforestation in the LMAV is based upon principles of landscape ecology; however, local problems such as herbivory, drought, and flooding often limit success (King and Keeland, 1999). Broad-scale hydrologic restoration is needed to fully restore the structural and functional attributes of these systems, but because of drastic and widespread hydrologic alterations and socioeconomic constraints, this goal is generally not realistic (*ibid)*. Local hydrologic restoration and creation of specific habitat features needed by some wildlife and fish species warrant attention. More extensive analyses of plantings are needed to evaluate functional success.

A research by Middleton (2003) in U.S. outlined the following; changes in farming practice provide an opportunity to restore once extensive forested wetlands on agricultural land. In some parts of the world, however, it has proved difficult to

restore the full complement of plant species through natural regeneration (Middleton, 2003). Similarly, the restoration of forested wetlands by replanting has often resulted in ecosystems of low diversity. Better methods of restoring these important ecosystems are now required and bald cypress swamps provide an opportunity to investigate alternative approaches to the restoration of forested wetlands (Middleton, 2003). The study examined the composition of seed banks of farmed fields to determine their value in restoring swamps in the south-eastern United States. It was further recognized that, woody species including trees, shrubs, and vines were poorly represented in seed banks of both farmed and intact sites (51 and 9 sites, respectively). Missing dominants in the seed banks included tree species with short-lived seeds such as *Taxodium distichum* and Nyssa *aquatica*. *Cephalanthus occidentalis* constituted the most abundantly dispersed seed of all woody species (*ibid*).

Herbaceous species were well represented in the seed banks of both farmed and intact swamps (species richness of 207 from 173 species, respectively) suggesting that herbaceous species may live longer than woody species in seed banks. Few of the herbaceous species decreased in seed density in seed banks with time under cultivation, although seed density was lower at sites that had not been farmed. Species that relied on vegetative organs for dispersal were absent in the seed banks of farmed sites including *Heteranthera dubia*, *Hottonia inflata*, *Lemna minor*, Lemna *trisulca* and *Wolffia columbiana*. These species may require active reintroduction during restoration (*ibid*). The study concluded that, synthesis and applications that is, both restoration ecologists and managers of nature conservation areas need to be

cognizant of seed bank and dispersal characteristics of species to effectively restore and manage forested wetlands. In the case of bald cypress swamps, critical components of the vegetation are not maintained in seed banks, which may make these floodplain wetlands difficult to restore via natural decolonization. Ultimately, the successful restoration of abandoned farm fields to forested wetlands may depend on the re-engineering of flood pulsing across landscapes to reconnect dispersal pathways (Middleton, 2003).

A research by Gardiner *et al.* (2004) concerned with an afforestation system for restoring bottomland hardwood forests in the southeastern United States concluded that, bottomland hardwood forests of the southeastern United States have declined in extent since European settlement. Forest restoration activities over the past decade, however, have driven recent changes in land use through an intensified afforestation effort on former agricultural land. This intense afforestation effort, particularly in the Lower Mississippi Alluvial Valley, has generated a demand for alternative afforestation systems that accommodate various landowner objectives through restoration of sustainable forests (*ibid*). The study results suggested that, an afforestation system involving rapid establishment of forest cover with a quick-growing plantation species, followed by understory enrichment with species of later succession, may provide an alternative method of forest restoration on bottomland hardwood sites and perhaps other sites degraded by agriculture throughout temperate regions.

A study by Kajembe *et al.* (2003) on the evaluation of the Ugalla Community Conservation Project noted that the project had great relevance to the targeted community, it is sustainable and that it recorded a positive effectiveness. In another study, Chamshama *et al.* (1992) evaluated the performance of the taungya system at the north Kilimanjaro Forest Plantation as a case study in Tanzania. Survival percent was based on an initial stocking of 1680 stems per hectare (2.5 x2.5m spacing). The researchers concluded that; "Survival is significantly higher in compartments under the taungya system ($p<0.05$). The lower survival in later years is caused by damage of trees by the peasant farmers in their deliberate efforts to reduce competition between trees and food crops. Also it is caused by sabotage of trees in order to maintain the use of the plots".

Another study by Moshi *et al*. (2000) noted that, tree seedlings of both indigenous and exotic species were planted in the Uluguru mountains biodiversity conservation project (UMBCP) area. All seedlings were distributed to schools and villages of Kinole and Tegetero Wards free of charge for planting. According to the physical survey made in June 2000 by the project staff who were stationed at Kinole the survival rate of the distributed (seedlings) was very promising. Survival rate suggest that the project has achieved positive effectiveness. The highest survival rate at Kalundwa village was 99 % while the lowest survival rate of about 92% was observed at Kinole P/School.

2.6 Constraints on reforestation

The need to increase forest cover is widely recognized, but there are a number of factors commonly limiting the extent to which reforestation actually occurs. Among these factors, “distance from roads” is the most important predictor. Since the activity is carried out by man, and planting materials have to be transported to the planting sites, it is understandable that priority is given to easily accessible areas (Phong, 2004). Major constraints therefore include: Site attributes, land tenure, funding, markets, silviculture, administrative control and animal grazing. These constraints are described below.

2.6.1 Site attributes

Many sites available for reforestation are poor, with the better land usually being used for agriculture. Sites available for reforestation often have poor soils (shallow, low nutrients, high acidity), long dry seasons or steep terrain (FAO, 2005). These marginal site conditions may be the factors that accelerated the rate of degradation at the site in the first place. Many of these problems may be expensive to correct. Some difficult sites may need a sequential reforestation programme. For example, in Malaysia, the sites are first reforested with tolerant exotic species. Such methodologies are still underdeveloped (op.cit.).

2.6.2 Land tenure

Land tenure and access rights are crucial issues. Land users or managers are unlikely to be interested in reforestation using trees that require long rotations unless they (or their families) will benefit (FAO, 2005). This usually necessitates that they be given long-duration land leases with rights to own, harvest and sell their tree crops. Full

land tenure is even more preferable. Attempts to reforest land subject to conflicting land-ownership claims are unlikely to be successful because of deliberate vandalism by disadvantaged parties (Timberlake, 1991).

2.6.3 Funding

Reforestation is usually expensive. This is particularly true for degraded areas where current methods are simply too expensive for rehabilitation to be carried out. Rehabilitation of sites that are difficult to reach and steep areas can be especially costly (FAO, 2005). Reforestation can also be unattractive because of the long growth periods required before any harvesting and financial return is possible. This means high returns are needed when harvesting does take place to overcome the costs that have accrued over these periods (*ibid*). Tree crops are further subjected to considerable risk (like, fires, droughts, disease and changing markets). Forest owners, besides having to pay for the cost of replanting, rarely receive any financial return for the ecological services their reforestation efforts might provide to the community. That is, there is a mismatch between public benefit and private cost.

One mechanism for dealing with these constraints is through joint ventures between land owners and an industrial partner involving a sharing of financial costs and risks, as well as the returns. Other forms of assistance to facilitate reforestation might include direct subsidies, low interest loans, micro-credit or tax concessions (Enters *et al*., 2004). Payments for carbon sequestration or other ecological services such as clean water may be another possibility. The types of financial assistance available will vary with both local and national circumstances. Care should always be taken to

ensure that incentive payments can be administered efficiently and that they achieve their intended objectives. Cases have occurred, for example, where payments made to encourage reforestation have prompted further clearing of nearby intact forest to provide land to reforest using the subsidies (FAO, 2005).

2.6.4 Markets

Markets may not be a problem for growers where an existing industry such as a paper mill or ply mill is already established. In fact, such industries often act as stimuli to tree growing. Of course, the disadvantage of such single-market situations is the risk involved for the growers who are dependent on the price offered, and who may have no alternative if the particular industry fails (FAO, 2005). In other situations, the absence of an established local market can be a major disincentive because it is difficult for many potential growers to understand the conditions and prices that might be obtained at markets considerable distance away. In a landscape with few remaining areas of natural forest and without a continued supply of high-value timber species, local sawmills often shift to utilize large, old fruit trees present in home gardens. In these circumstances, it is difficult to predict the value of other high-value tree species that might potentially be grown, especially if these are only episodically produced and only small volumes are available at any particular time. In such cases, the range of options often narrows to a few well-known species such as eucalyptus that are seen as "safe bets". There is also the dampening effect of liberalizing imports which can drive down the price of domestic wood and discourage reforestation (such as that happened in parts of India) (ibid).

2.6.5 Silviculture

Limited silvicultural knowledge is a common impediment to successful reforestation and most foresters currently rely on a handful of well-known species for plantation development. Across the African region, surprisingly little is now known of the identity, ecology, silvicultural or site requirements of many indigenous species, although a large number of these species were once harvested from the natural forests. The identity of species acceptable to timber users is well established and their relative value is reflected by their market prices. In most countries, this testing has been limited and little is known of the site requirements or of the attributes of these species (FAO, 2005).

2.6.6 Administrative control

Reforestation can also be severely constrained by administrative requirements. These include the need for harvesting permits, cutting restrictions, transport permits, checkpoints, export controls, excessive taxation, marketing permits and burdensome documentation and paperwork requirements. Reforestation entirely administered by centrally regulated government agencies runs the risk of being unable to respond to local initiatives and local needs (FAO, 2005). At the same time, reforestation managed by local agencies lacking the background knowledge of previous reforestation programmes elsewhere in the country may be doomed to "re-inventing the wheel” (ibid). A balance needs to be found between the use of well-founded silvicultural prescriptions based on extensive experience, and the rigid application of administrative rules that may be less relevant in certain field situations. The other

side of this coin is that strong and coordinated government promotion of reforestation can produce impressive outcomes under certain circumstances (*ibid*).

2.6.7 Animal grazing

A study by App in 2004 observed that, livestock presents the greatest threat to many reforestation projects (eating and trampling trees) and necessitates construction of protections. The study also observed some other constraints in relation to implementation of the reforestation programme, these are: Planting trees on the farm takes planting space away from crops, and the trees use valuable water, while blocking needed sunlight. Furthermore, labor is taken away from the crops to be spent on the trees at the critical beginning of the cropping season (App, 2004). Misalignment of costs and benefits, those who bear the costs are not those who reap the benefits. Land/tree tenure insecure tenure acts as a disincentive to long-term land investments, limited resources critical time for projects conflicts with farm activities, and resources (water, wood and labour) are used elsewhere; lack of rule compliance /enforcement; infraction of rules regarding livestock and vandalism go unheeded and unpunished, thereby encouraging the behavior, hot and dry climate with unreliable rains makes tree survival difficult (*ibid*). The problem of people paying little attention to public works was also observed in the area in the words of the researcher. App (2004) noted that, most people were engaged with work on their farms during the period of the research and could not spare the time for a public project.

CHAPTER THREE

3.0 METHODOLOGY

This chapter focuses on the description of the study area, research design, sampling procedure, data collection and analysis techniques.

3.1 Description of the study area

3.1.1 Location

The study was conducted in Urambo District which is one of the six districts of Tabora region. Other districts are Tabora, Uyui, Nzega, Igunga and Sikonge. Urambo District is bordered by Uyui district to the East, Mpanda to the South, Kibondo and Kasulu Districts to the West and Kahama to the North. The district lies between 31^0 24^1 and 32^0 47^1 Longitudes East and 5^0 30^1 and 6^0 20^1 Latitudes South. It covers an area of 25 995 square kilometers with a population of 369 329 of whom 340 348 live in rural areas which is about 92.2% of the total population (URT, 2002). Urambo was selected for the study because it is the major producer of tobacco and is severely affected by tobacco-related deforestation out of all the districts involved in ATTT supported reforestation project countrywide.

This study was carried out in four Wards located in Kaliua division. These wards are Ugunga consisting of Limbura A & B, Tuombemungu, and Ugunga Villages; Kazaroho consisting of Igwisi, Imalamihayo, Usimba and Kazaroho Villages, Igagala consisting of Kamsekwa, Imalampaka and Mtakuja Villages and Kaliua consisting of Ulindwanoni, Kasungu, Kaliua West and Kaliua East Villages.

3.1.2 Topography

Urambo District is found at an altitude of 1000m to 2000m above mean sea level and is generally characterized by a flat land with small hills and scarce undulating land scapes. There are two main rivers. These are Ugalla and Sagalla (URT, 2004).

3.1.3 Climate

Urambo has average temperature ranging from 18^0C in winter to 29^0 C in summer with a mean annual temperature of 23.5^0 C and a mean precipitation ranging from 142mm in January to 206mm in December. Rainfall in the western areas is bimodal and higher (1,000-2000 mm per year) (URT, 2004) and the rainy days range from 13 days in January to 17 days in December. The total annual precipitation stands at 1010mm with June and July being dry months. The rainy season starts in November and ends in May (WWIS, 2006).

3.1.4 Natural forest

The district has a total of 25 995 km^2 of natural forests out of which 9 840 km^2 are reserved for the Central and Local Government purposes. The remaining 5 684 km^2 are left for public uses (UDC, 2006). The forests are characterized by dense forest of miombo type and shrubs. These forests are used as sources of timber, charcoal, fuelwood, medicines and building materials.

3.1.5 Soil characteristics

The study area is located within zone five of the agro-ecological systems of Tanzania which consists of Southern, South-Western and Western Highlands. The area is characterized with soils of low to moderate fertility. The main soil types include the *ferralic cambiso* and *fluvic histosols*. Others are *hapic ferrasols*, *umbric nitisols* and *dystric calcisols* (URT, 2004)

3.1.6 Economic activities

Agriculture is the dominant economic activity in the study area. Other economic activities include: livestock keeping, lumbering, beekeeping and fishing. Both food and cash crops are grown in the area. Besides tobacco which is the main cash crop, sunflower, groundnuts and simsim are also grown. Food crops produced are rice, maize, beans, peas, banana, cassava and potatoes. Farm implements used in agriculture are generally limited to hand tools such as hoes, panga, sickle, and axe.

3.1.7 Social services

There are a considerable number of social services in the study area ranging from education, health, water supply, electricity, transport and telecommunication. The major means of transport are roads and railways. Roads are largely unpaved and there is only one main road which is all weather. It runs from Urambo to Nguruka and it is part of Tabora-Kaliua-Kigoma road. With respect to railway transport, there are two lines of railways namely the Tabora-Urambo-Kaliua-Kigoma route and the Tabora-Urambo-Kaliua-Mpanda route. Regarding education, a number of primary and secondary schools have been built most of which are government owned. Nearly

every village has a primary school and in each ward there is one secondary school or is under construction. With respect to health services, at a district level there is a district hospital and nearly every ward has a health centre. While currently the district is covered by the national electric grid, there is no portable water supply system as most of the households get water from wells which is of poor quality. Telecommunication is advancing with an introduction of a wire-less technology in the area by the Celtel Company.

3.2 Research design

This study employed a cross-sectional design, where data was collected at a single point in time using survey methods. The reason for choosing this design is that, it is flexible and economic (Babbie, 1990).

3.3 Sampling procedure

3.3.1 Study population and sample size

The study population consisted of all primary farmer co-operative society members dealing with tobacco production in Urambo District. The sample size for the study was 60 primary-farmer co-operative members, 20 members from each of the three primary-farmer co-operatives. This sample size was considered to be optimum. According to Kothari (2000) an optimum sample is one which fulfils the requirements of efficiency, representativeness, reliability and flexibility.

3.3.2 Sampling techniques

Both purposive and systematic sampling techniques were applied. First the division was selected purposively. This technique of sampling is very convenient and it is relatively inexpensive (Kothari, 2004). Then three primary farmer co-operatives which consisted many members from this division were also picked purposively. Purposive or judgmental sampling can be adopted when a known characteristics of the universe is to be studied intensively (Bernard, 1994). A total of 20 primary-farmer co-operative members in each of the three primary farmer co-operatives were selected using the systematic sampling technique. First a list of all members from each primary farmer co-operative was obtained from the primary farmer co-operative officials. Then, the first member of the 20 members was picked randomly and the remaining 19 members were picked systematically from the list based on a sampling interval. A total of 60 members out of 862 (i. e 20 out of 320 from Usaguzi; 20 out of 302 from Chimbuko and 20 out of 240 from Igwisi) were selected for the study representing about 7% of the total population. Literatures show that, in order for the sample to be representative it should at least constitute 5% of the total population (Boyd *et al.*, 1981 cited in Mitinje, 2004).

3.4 Data collection

This section presents the various methods used during data collection. These include questionnaire, focus group discussions (FGDs), direct observation and review of various secondary sources.

3.4.1 Primary data collection

Primary data were obtained using structured questionnaire with both closed and open- ended questions, focus group discussions (FGDs) and direct observation. The importance of FGD is shown clearly by Wolff *et al*. (1993) who observed that it is a complementary data collection method, which facilitates the presence of interaction between respondents and researcher's questions.

3.4.1 Questionnaire survey

In preparing the questionnaire the researcher followed the essentials of a good questionnaire i.e. questionnaire was kept short and simple, questions were organized in a logical sequence moving from relatively easy to more difficult questions. Technical terms, vague expressions and those affecting sentiments of the respondents were avoided. The important consideration here, as put by Young (1966: 198), .is that, "the questionnaire covers the subject and that the techniques used are those which will meet the demands of the study." Questionnaires were administered to the respondents between the months of September and December 2006 to 60 systematically selected co-operative members.

3.4.2 Direct observation

The researcher had a chance to visit primary co-operative societies' nurseries at Kasungu, Imalampaka and Urambo to observe the seedling raising activity. The researcher observed natural tree farms in Kasungu, Imalampaka and Mtakuja belonging to Usaguzi and Chimbuko primary co-operatives respectively. Besides, the seedling nurseries at Fundikira along Urambo-Ulyankuru road consisting of about

300 000 seedlings belonging to ATTT-Urambo were observed. The main advantage of this method is that subjective bias is eliminated if observation is done accurately; secondly, the information obtained using this method relates to what is currently happening, it is not complicated by either the past behaviour or future intensions or attitudes. Again observational procedures are quite useful in helping the investigator locate and obtain evidence for goals of which the individual is not aware but which nevertheless guide his behavior (Phillips, 1968).

3.4 3 Focus group discussion (FGD)

FGDs are commonly conducted among a small, non-representative sample of participants who share one or more characteristics that are of interest to the researcher. The characteristics participants share may be demographic (e.g. age, ethnicity, gender), situational (e.g. employment status, health status), behavioral (e.g. substance abusers), or any other combination of these. As O'Brien (1993) cited in Kessy (2001) pointed out, focus group samples are often small and non-representative, allowing for in depth descriptions of phenomena but not for generalizations to a large population.

Two focus group discussions were conducted at different time and space one with co-operative members and another with primary co-operative officials. The maximum number of discussants per focus group discussion was 15. Participants were selected purposively based on age, experience in tobacco growing and membership to one of the selected primary co-operatives. Also mixed groups of both men and women attended the FGDs. In both cases a checklist of questions (Appendix

1) was used to obtain information about effectiveness of the reforestation programme in Urambo. They also covered other issues including the participants' knowledge about the reforestation programme, aim of initiating the programme, participants' role in the implementation of the programme, constraints they face in the implementation of it; and strategies they adopt to solve these constraints and participants' assessment regarding the effectiveness of this programme.

3.4.2 Secondary data collection

Secondary data were obtained by reviewing various secondary sources, that is publications and reports obtained from local authorities (village, ward, divisional and district officials), and cooperative officials (primary-farmer co-operative officers and ATTT officers especially at Urambo). Furthermore, the Moshi University College of Co-operative and Business Studies' Library, University of Dar-es-salaam Main Library and Sokoine National Agricultural Library (SNAL) together with the internet were used as sources of secondary data.

3.5 Data analysis

Quantitative data from the respondents were verified, compiled, coded and summarized before analysis using Statistical Package for Social Sciences (SPSS). More specifically, descriptive statistics such as frequency and percentage distribution of responses, graphs and tables were used for data presentation. When quantitative data analysis and qualitative data analysis are integrated, they can complement each other, and they can provide a more complete picture than if each were used separately (Babbie, 1990; Kessy, 2001).

Inferential analysis of the quantitative data was done using ANOVA because this technique is useful when there are more than two uniform samples to be compared (Kothari, 2004). Analysis of Variance (ANOVA) was carried out to compare more than two means (more complex group comparisons). Furthermore, ANOVA was applied to determine the performance of the three primary farmer cooperatives namely Chimbuko, Usaguzi and Igwisi, to establish whether their performances differ significantly. ANOVA can be considered a generalization of the t-test for dependent samples and it offers various features that increase the overall sensitivity of the analysis. The technique is of great significance in all the research studies concerning phenomena which are capable of quantitative measurements for "testing the differences between different groups of data for homogeneity and, when the design is more complex, ANOVA offers numerous advantages that *t*-tests cannot provide even if you run a series of *t*- tests comparing various cells of the design (Alreck and Settle, 1985). Post-hoc comparisons were then made using Turkey's Honestly Significant Difference (HSD) test. This technique was used to test for the equality of the several sample means, usually more than two.

With respect to qualitative data analysis, this was done based on themes of the discussions extracted from the notes taken. The process proved to be complicated, difficult and time consuming.

3.6 Limitations of the study

This study did not evaluate project efficiency and project sustainability because of lack of data as related to programme activities and the fact that the programme objectives were not clear and specific.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This Chapter presents the key findings of the study. In particular the Chapter presents findings on the following main aspects: Socio-economic characteristics of the respondents, tobacco processing and the problem of fuelwood, tobacco farmers' participation in reforestation, the role of cooperatives in reforestation, effectiveness of the reforestation programme, constraints on the implementation of reforestation programme and their coping strategies.

4.1 Socio-economic characteristics of respondents

This study examined the following socio-economic characteristics of respondents: age, sex, size of the household as well as education level.

4.1.1 Age of respondents

Table 1 presents the distribution of respondents by age. The range of age of respondents is 43 years and the mean age is 42 years. The results show that the majority (28.3%) of the respondents were in the age category of 31-37 years, followed by the age category of 54 years and above (23.2%), 46 -53 years (18.4%), 38 -45 years (15.1%) and the age category of 23 -30 year (15%). This implies that a large number of people are within the productive age. These results are comparable with other similar findings by Njuki (2001) and Nduwamungu (2001).

Generally, the authors observed that the majority of respondents lay within the active and old ages and therefore are likely to provide relatively more accurate (current historical) data.

Table 1 Distribution of respondents by age (N=60)

Age category in years	Frequency	Percentage (%)
23 – 30	9	15.0
31 – 37	17	28.3
38 - 45	10	15.1
46 – 53	11	18.4
54+	13	23.2
Total	**60**	**100.0**

4.1.2 Sex of respondents

The results shows that, 91.7% of all respondents were males and only 8.3% were females. These results reflect the fact that most members of the co-operative societies within tobacco growers are men. The results also reflect the nature of activities involved in tobacco production which require a lot of physical work which include cutting trees using axe and carrying them on shoulders. As a result women find it difficult to participate in this type of activity.

4.1.3 Size of the household

Table 2 shows that 50.8% of the respondents belonged to household with 6 – 10 members followed by 28.8% respondents with 11- 15 members and 10.2% in each category, that of 1-5 persons per household and the one with 16-20 persons per household. The average household size in Urambo is 9.6 persons per household. While nationwide household size is decreasing from 5.2 persons per household in 1988 to 4.9 persons per household in 2002 (URT, 2003), the average household size of 9.6 persons per household recorded in Urambo is above national average as well

as Tabora region's average household size of 5.9 persons recorded in 2002 (ibid). A large number of people per household in Urambo may be either due to higher birth rates or due to the increasing tendency of tobacco farmers to hire laborers from other places in and outside the district. Also, the reasons why people prefer many children is possibly the fact that in small holder farms, the family is the main source of labour for agricultural production as also noted by Njuki, (2001), Epaphra, (2001), Kingazi, (2002) and Maenda, (1999).

Table 2: Distribution of respondents by household size (N=60)

Household size	Frequency	Percentage (%)
1 – 5	6	10.2
6 – 10	30	50.8
11 – 15	17	28.8
16 – 20	**6**	10.2
Total	**60**	**100.0**

4.1.4 Education level of respondents

Table 3 presents the distribution of respondents by education level. The table shows that 78.3% of the respondents had primary education, while 5%, 5% 5% 5% and 1.7% had secondary education, technical education (vocational training), adult education, no formal education and other type of education (like *madrasa)* respectively. Generally, the study shows that the majority of the respondents had primary education. These results could be due to the implementation of the Universal Primary Education (UPE) of 1970s which provided educational opportunity to all school going children all over the country.

Table 3: Distribution of respondents according to the level of education (N=60)

Education level	Frequency	Percentage (%)
Primary	47	78.3
Secondary	3	5.0
Vocational training	3	5.0
Adult	3	5.0
No formal education	3	5.0
Others	1	1.7
Total	**60**	**100.0**

4.2 Tobacco processing and the problem of fuelwood

Farmers in Urambo grow fire-cured tobacco. They cure tobacco in barns using fuelwood. Therefore fuelwood is one of the most important inputs in tobacco production. This study shows that all respondents (100%) in the study area depend on natural forests as the main source of energy for tobacco curing. Furthermore Figure 1 shows that the majority (67.2%) of respondents indicated that they faced the problem of fuelwood shortage. Only 32.8% of them said they did not face this problem. Misana (1999), on the other hand, observed that scarcity of fuelwood caused by deforestation has also been a major problem to the majority of people, who, poor as they are cannot afford to use alternative sources of energy.

Figure 1: Extent of fuelwood problem

4.3 Ways of mitigating fuelwood problems

The study shows that 61.7% of all farmers who responded to the question “how do you solve the fuelwood problem” said, they hired a village tractor and hired laborers and used animal power for fuelwood collection. On the other hand, 33.3% of the respondents indicated that they established new barns which consume fewer fuelwood while 5% relocated their farms near sources of fuelwood. The use of a tractor helps a farmer to collect more fuelwood far from home in short time and saves labour. Despite its usefulness as a tool to solve scarcity of fuelwood and other forestry products, it is interesting to note that not a single respondent mentioned

reforestation as a means to redress the fuelwood problem. These results indicate that farmers don't perceive reforestation as a means of solving the problem of fuelwood, which could have affected the performance of the reforestation programme in Urambo.

4.4 Farmers' participation in reforestation programme

The study shows that 94.9% of all respondents participated in the reforestation programme. Over 50% participated in planting seedlings and 47.4% participated in managing the tree farms (Table 4). Farmers who did not participate in reforestation programme, who accounted for 5.1% of the sample, attributed this to lack of information. The study also revealed that 25% of farmers in the study area do not see the importance of planting trees arguing that trees were readily available in the forest. Hence, if this attitude is not changed, it is difficult for the reforestation project to perform effectively.

Table 4: How Farmers participate in reforestation programme (N=60)

Activity	Frequency	Percentage (%)
Collecting seedlings from PFCs	1	0.9
Planting seedlings	30	50.9
Managing tree farm	28	47.4
To raise seedlings	1	0.9
Total	**116**	**100.0**

4.5 Reasons for participating in the reforestation programme

Table 5 below presents the possible reasons why farmers participated in reforestation programme. Results show that majority of the respondents (52.6%) participated in the programme in order to get fertilizers. On the other hand, 21.1%, 8.8%, 7%, 7%, and 3.5% of farmers participated as a result of forces of PFCs, environmental

education, to get shading, to combat deforestation and to solve scarcity of fuelwood respectively. Generally, these results indicate that, majority of the farmers hardly perceived the importance of planting trees for environmental management.

Table 5: Reasons for participating in the reforestation programme (N=60)

Reason	Frequency	Percentage (%)
To combat deforestation	4	7.0
To solve scarcity of fuelwood	2	3.5
To get fertilizers	32	52.6
Force of PFCs	13	21.1
Shading	4	7.0
Environmental education	5	8.8
Total	**60**	**100.0**

4.6 The role of primary-farmer co-operatives in reforestation

Reforestation programme in Urambo District is done by individual farmers who are members of primary co-operatives also known as associations. ATTT supports reforestation through primary farmer co-operatives. Therefore primary co-operatives provide the link between farmers and the ATTT. The study shows that, primary farmer cooperatives in Urambo perform several functions to promote reforestation. The most prominent ones include rising of tree seedlings, supplying inputs, provision of technical know-how, running a demonstration farm, supervisory duty, provision of education to members and awareness creation.

In terms of raising tree seedlings, the primary farmer co-operatives own and manage tree seedling nurseries. Two out of the three primary farmer co-operatives that the researcher visited had their own seedlings nurseries. For example, Usaguzi had two nurseries at Tuombemungu and at Kasungu while Chimbuko had one tree nursery at Mtakuja. During this season Usaguzi had raised 41 860 tree seedlings in the two

nurseries to be supplied to farmers free of charge. While Chimbuko had managed to raise about 32 230 tree seedlings to distribute to farmers during the rainy season, Igwisi primary co-operative was in the process of establishing a tree nursery.

Regarding the supply of inputs, all farmers get inputs such as watering cans, seeds/seedlings, and fertilizers from their primary co-operatives. This started earlier before the reforestation programme began. As with tobacco production, all inputs are supplied by tobacco buyers through primary farmer co-operatives on credit basis. But inputs used in reforestation such as seeds, seedlings, and tubes are freely supplied to farmers. When asked to name the sources of seedlings, majority (79.7%) of the respondents said they got seedlings from their respective primary farmer co-operatives (Table 6). Besides, the table also shows that only 1.4% said they got their tree seedlings from private suppliers while 18.8% said they obtained their seedlings from their nurseries. This shows that majority of the farmers got seedlings from primary farmer co-operatives.

Fertilizer was supplied using the policy of “one sack of fertilizer to nine tree seedlings”. Every farmer in need of fertilizer had to comply with this policy. The policy was initiated in the cropping season of 2004/05 when the ATTT realized that, most farmers were not fully participating in the programme. The policy was set to make sure that farmers plant more trees. But the reverse was true, that, most of tree seedlings farmers took were not planted at the end of the rainy season. These results reveal the failure of “one sack of fertilizer to nine tree seedlings policy.” This policy, which as earlier indicated, was introduced in 2004/05 after discovering that many

members were not participating fully in the reforestation programme. Majority responded but again tree seedlings were not planted. Many farmers said they did so because fertilizers are normally given on loan basis so planting tobacco early would guarantee loan repayment hence majority started to plant tobacco instead of trees which do not pay back so early.

Table 6: Sources of tree seedlings planted by farmers (N=60)

Source of Seedlings	Frequency	Percentage (%)
PFCs	55	79.7
Private suppliers	1	1.4
Own seed farm	13	18.8
Total	**60**	**100.0**

Regarding technical know-how, ATTT provides technical know-how to the farmers through primary farmer cooperatives in the form of extension services. In fact, every village in Urambo is supposed to be served by at least one leaf technician and an agro-forest officer employed by ATTT. But some villages like Igwisi do not get the services of the technician. This is because roads are impassable during the rainy season which limits the frequency of visits by ATTT experts. In addition, ATTT has supplied agro-forest officers with motor bikes but the problem is that, they are few in number and as a result the whole district is being managed by a single officer.

Furthermore, primary co-operatives in Urambo manage a demonstration plot. It was assumed by the ATTT that farmers will learn from their respective associations if the association performs well in their demonstration plots in line with Mnyenyelwa (2005) observation that "…establishment of demonstration plots of agro-forestry practices will motivate farmers to adopt the practice…"

Also, primary farmer co-operatives perform day to day management and implementation of the reforestation activities. Associated with this activity is that of carrying out internal evaluation here known as survival counts. The major aim of making survival counts is to ensure that those trees which die are being replaced. Due to lack of qualified technicians survival counts is done when the agro-forest officer is available, and sometimes during the dry season. For example, survival count in the cropping year 2005/06 was done at the end of the rainy season in May 2006 (Appendix 11). This made it difficult to replace trees that didn't survive.

The primary farmer co-operatives, in addition to their activities, send their members for short course in order to increase their knowledge and improve their performance. During an FGD it was discovered that some primary associations had sent their members for short courses. For example, Usaguzi sent five farmers for short course training at Tumbi. This was made possible by two factors, namely willingness of members to go for training and availability of resources. On the other hand, Chimbuko and Igwisi co-operative societies didn't manage to send their members for short courses and this might be the possible explanation for their poor performance.

Lastly primary societies perform the duty of awareness creation using various means including conducting meetings, seminars and workshops. Indeed, when respondents were asked to name sources of knowledge of reforestation they mentioned ATTT in collaboration with their respective primary farmer cooperatives as the main source of their knowledge.

4.7 Effectiveness of the reforestation programme

As earlier indicated, in this study, effectiveness was assessed based on the number of tree seedlings planted as compared to what was supplied and the number of trees that survived at the end of the rainy season compared to what was planted at the beginning of the rainy season.

4.7.1 Assessment of the number of tree Seedlings planted

Table 7 below shows that, 28.6% of all respondents planted 41-66 tree seedlings per year. Others (25%) planted 93-118 tree seedlings, while 12.5% of them planted 15–40 tree seedlings per year. Furthermore, the results show that 1.8% of all respondents planted 119-144 tree seedlings and 7.1% planted 145-170 tree seedlings per year, and only (21.4%) of them planted more than 170 tree seedlings per year. At a spacing of 2.5 x 2.5m it was observed that, many farmers plant less than 1 hectare annually. Even the primary societies themselves planted less than 2 hectares. For example, Usaguzi planted 3 acres which is equivalent to 1 hectare, while Chimbuko planted 1.5 acres and Igwisi planted 1 acre annually. Generally, farmers in these three primary co-operatives planted 6480 trees within 3.3 hectares in 2006/07 cropping year. These results show that most of the respondents planted few tree seedlings. At this rate of tree planting it is difficult to meet the annual target of planting 2 701 000 tree seedlings (Appendix III). Similar findings were reported by Misana (1999) who observed that “tree planting in Kahama District has been rather low. On the average, about 69 hectares were being planted with trees annually”. Overall, the researcher noted that, reforestation rate is lower than the deforestation rate. Indeed, despite the

establishment of woodlots at community level, the survival rate of the planted trees was very low, averaging between 40 and 50%.

Table 7: Average number of tree seedlings planted per year (N=60)

Tree seedlings	Frequency	Percentage (%)
15–40	7	12.5
41-66	17	28.6
67-92	2	3.6
93-118	15	25.0
119-144	1	1.8
145-170	5	7.1
170 and above	13	21.4
Total	**60**	**100.0**

4.7.2 Tree survival assessment

Table 8 presents data on survival counts by PFCs. Generally, the overall survival count is 39.6 % of all tree seedlings planted in the study area. Regarding the performance of each primary farmer co-operative in reforestation, the results indicate that Chimbuko planted 2905 tree seedlings and about 1172 (40.3%) survived. On the other hand, Usaguzi planted 1099 while only 457 (41.6%) survived and Igwisi planted 2476 tree seedlings whereas 934 (37.7%) survived. Respondents were asked to comment on the performance of the ongoing reforestation programme in their area. According to the study most of them (81.6%) said the reforestation performed poorly while 13.3% said the programme had performed well and 5% said the programme performed very poorly. Similar findings have been reported by App (2004) and Senkondo (2000) based on a study on reforestation in Cameroon and Babati respectively, Based on these studies many reforestation projects didn’t perform well as less than 50% of trees planted didn’t survive.

It is difficult to establish whether the reforestation project in Urambo was effective or not as objectives of the project were unclear and didn't set specific criterion regarding survival rate. Based upon the field data, the definition for project effectiveness and comparison with other projects such as the "Uluguru Mountains Biodiversity Conservation Project (UMBCP); tree planting in the Uluguru, 2000" and the "Participatory Evaluation Report for the Ugalla Community Conservation Project (PERUCCP)," which together suggest that, the project is considered to be effective if the survival rates are more than 50%. This study suggests that the reforestation project in Urambo was not as effective as expected.

Table 8 Survival count

PFC	Tree Planted	Tree Survived	Survival Rate (%)
Chimbuko	2905	1172	40.3
Usaguzi	1099	457	41.6
Igwisi	2476	934	37.7
Total	**6480**	**2563**	**39.6**

4.7.3 Performance of the reforestation programme in three PFCs

One way ANOVA was done at 0.05 significance level to establish whether there was significant difference in terms of performance of the reforestation programme implemented in the three primary farmer co-operatives (PFCs) namely Chimbuko, Usaguzi and Igwisi. In terms of tree seedlings planted an F value of 6.939 was obtained which was highly statistically significant at p= 0.003 and 56 degree of freedom. The ANOVA for surviving trees was also statistically significant at a probability level of p=0.021 and 4.135 degree of freedom with an F value of 56 (Table 9). Results show that, there were differences in performance between PFCs regarding tree planting and survival rates. In terms of tree seedlings planted,

Chimbuko performed better than others while based on tree survival rates Usaguzi achieved the best performance compared to the other two.

Table 9: ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Trees planted	Between Groups	89558.569	2	44779.284	6.365	**0.003**
	Within Groups	379918.694	54	7035.531		
	Total	469477.263	56			
Trees survived	Between Groups	12890.405	2	6445.202	4.135	**0.021**
	Within Groups	84179.525	54	1558.880		
	Total	**97069.930**	**56**			

To establish the source behind the significant difference between groups, post-hoc comparisons were made using Turkey's HSD test at 0.05 level of significance (Table 10). A Turkey's HSD test shows that there are statistically significant differences in trees planted as well as trees that survived between Chimbuko and Usaguzi as well as between Igwisi and Usaguzi. Results show that the sources of difference as being between the groups and specifically between Chimbuko and Usaguzi and Igwisi and Usaguzi. There was a highly statistically significant difference between Chimbuko and Usaguzi at p=0.004 while concerning trees that survived the test yielded a result of p=0.023 implying statistically significant difference. In terms of trees planted the Turkey's HSD test revealed significant differences at p=0.023 between Igwisi and Usaguzi while concerning trees that survived the test showed that results were no statistically significant at p=0.091. The test also showed that there were not statistically significant differences in the number of trees that survived and trees planted between Chimbuko and Igwisi with p=0.860 and p=0.843 respectively.

Generally, within groups Turkey's HSD test presented no statistically significant differences in all cases. This implies that differences are only observed between rather than within the primary farmer cooperatives. For example, comparison between groups shows that, Usaguzi recorded the best results with survival rate of 41.6% while Igwisi recorded relatively poor results with a survival rate of 37.7%. Possible reasons behind the best performance of Usaguzi were the establishment of a demonstration plot and the fact that Usaguzi officials had sent five members for short course training at Tumbi.

Table 10: Turkey HSD

Dependent Variable	Primary cooperative	Primary cooperative	Mean Difference (I-J)	Std. Error	Sig.level
Trees planted	Chimbuko	Usaguzi	90.250 *	26.871	0.004
		Igwisi	15.194	27.25	0.843
	Usaguzi	Chimbuko	-90.250 *	26.871	0.004
		Igwisi	-75.056 *	27.589	0.023
	Igwisi	Chimbuko	-15.194	27.251	0.843
		Usaguzi	75.056 *	27.589	0.023
Trees survived	Chimbuko	Usaguzi	34.547 *	12.649	0.023
		Igwisi	6.711	12.828	0.860
	Usaguzi	Chimbuko	-34.547 *	12.649	0.023
		Igwisi	-27.836	12.986	0.091
	Igwisi	Chimbuko	-6.711	12.828	0.860
		Usaguzi	27.836	12.986	0.091

* The mean difference is statistically significant at the .05 level.

4.8 Constraints facing farmers in implementing reforestation programme and their coping strategies

Table 11 below summarizes the constraints facing farmers in implementing reforestation programme and their coping strategies. The results indicate that (28%) of all respondents face the problem of cattle grazing. While fire outbreaks seem to be a problem to only 21% of the respondents. The other respondents (21.5%) indicated that, poor supply of implements was a problem followed by pests and disease (20%) and shortage of rains (9.5%). However, 4.5% of the respondents reported poor knowledge of the soil as being one of the main problems affecting the development of the reforestation programme. These results supports Senkondo (2000) who pointed out that, grazing animals in the fields and fire incidents discourages farmers to plant trees at distant plots. Mnyenyelwa (2005), on the other hand, reported that in most cases grazed livestock can escape the pastoralists and go into crop farms eating both plants and trees.

Due to land pressure, there are considerable frictions between agro-forestry and pastoralist. There are many reasons as to why people burn the forests. Basing on the findings of this study, pastoralists are to be blamed for causing most of fire incidences in the study area. Pastoralists burn forests so that they can regenerate and produce new pastures and to kill pests such as ticks. Farmers also burn the forests to clear land for agricultural cultivation, smokers burn forests when they throw away burning cigarettes. In other cases villagers burn forests in their attempt to scare dangerous wild animals, and honey harvesters burn forests when they want to kill harmful bees.

The study indicates that many respondents mentioned weeding as the effective means they have been using to control bush fires. To avoid land use conflicts between farmers and pastoralists respondents said, the village governments have been making efforts to separate farmers and livestock keepers. Other respondents said in order to avoid grazing animals farmers normally build fences. But this activity is possible only if trees are fewer in number and provided it is not during the farming season. On the other hand some respondents named planting trees on lowland as a better means of ensuring tree survival, because those planted on lowlands survived than those planted on highlands. Other respondents practice watering during the dry seasons. Other measures include: Drilling wells, planting on time and growing few trees that can be easily managed.

Table: 11 Constraints farmers face in implementing reforestation programme and their coping strategies.

Constraints	Percentage (%)	Coping strategies
Poor rainfall	9.5	Planting trees on low lands, plant on time, watering during dry seasons and drilling wells.
Fire outbreak	21.0	Weeding around borders
Cattle grazing	28.0	Build fences and to separate farmers and livestock keepers
Pests and disease	20.0	Use pesticide supplied for tobacco
Poor supply of inputs (pesticide and watering cans)	21.5	Use the inputs meant for tobacco
Total	**100.0**	

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

This Chapter presents the conclusion and recommendations to improve reforestation programme in Urambo.

5.1 Conclusion

Based on planting and survival rates recorded by the programme, this study concludes that, the reforestation programme in Urambo district was ineffective compared to other reforestation programmes implemented in the country.

5.2 Recommendations

Based on conclusion this study recommends the following to improve reforestation programme in Urambo district.

There is a need for ATTT to employ more field extension workers in order to train and help farmers to establish their own tree nurseries according to their needs. Training for farmers is needed especially in the areas related to attitude change in order to develop the sense of ownership. Education is also needed in the areas of proper management of the tree seedlings and trees planted.

Concerning planting rates, there is a need to review the “one sack of fertilizer to nine tree seedlings policy”. The success of the reforestation programme could be measured based on survival rates and tree seedlings planted and not on the number of tree seedlings given to farmers as is currently done.

Regarding the survival rate of trees, proper policies should be set to avoid several constraints that have been identified to cause the lower survival rates in Urambo district. These policies should cover issues like, land use planning, fire outbreaks, and timely tree planting. Attention should also be given to planting indigenous species which can resist or adapt to the problems.

Furthermore, Proper selection of tree species for different sites and purpose should be encouraged. For example trees with high catchment values should be planted at water sources while those that are evergreen all the year should be planted around homestead for shade and boundary marking.

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APPENDICES

Appendix I: An interview Schedule for Evaluation of the Association of Tanzania Tobacco Traders Supported Reforestation Programme in Urambo District.

Respondent's number…….

Name of Primary-farmer co-operative……

Division …….. Ward …… Village ……...

A: Background information

1. Year registered as a member……
2. Sex of the respondent Male……Female……(Tick one)
3. Age of the respondent (in years)……
4. Education level of the respondent (Tick one)
   a) Primary school
   b) Secondary school
   c) No formal
   d) Others (specify) ……...

5. Household size ……

B: Tobacco production

6. Do you expect to have members who don't grow tobacco? (Tick one)
   a) Yes
   b) No

7. What is the main source of fuelwood for tobacco curing? (Tick one)
    a. Natural forest
    b. Farm trees
    c. Forest reserve
    d. Others (Specify) ……
8. How many years have you been growing Tobacco? ……
9. Do you face the problem of fuelwood?
    a. Yes
    b. No
10. If yes how do you solve the problem?

    a) …….

    b) ...……

    c) ……

C: Reforestation programme

11. Are you aware of the reforestation programme? (Tick one)
    a. Yes
    b. No
12. If yes when did you know about this reforestation programme? ……...
13. Who first initiated this reforestation programme? ……
14. Do you participate in the on going reforestation programme? (Tick one).
    a. Yes
    b. No

15. If yes how do you participate in programme?

    a. …….

    b. ……

    c. …….

16. If no why? ……..

17. Have you ever planted trees?

    a. Yes

    b. No

18. If yes when did you start planting trees? ……

19. Why did you start planting trees at that time? ……

20. How many trees have you plated this season (2006/07)? ……

21. How many of those planted trees are still surviving? ……

22. What is the source of seedlings?

    a) Primary-farmer co-operative……...

    b) Private Suppliers …….

    c) Own Seed farm ……

    d) Others (specify) ……

23. If a) above how many seedlings do you receive annually? ……

24. How many of those in number 20 above were planted? ……

25. What is the average number of trees do you plant every year? ……

D: Constraints in the implementation of the programme

26. How do you rate the ongoing reforestation programme?

a) ……

b) ……

c) ……

27. What are the constraints you have been facing in implementing this reforestation programme?

a) ……

b) ……

c) ……

d) ……

28. How have you been dealing with these problems?

a) ……

b) ……

c) ……

d) ……

29. What other methods do you recommend to deal with these problems?

a) ……

b) ……

c) ……

Checklist for FGD with primary-farmer co-operative officials

1. Tell me about this reforestation programme?

2. What was the aim of initiating this reforestation programme?

3. What is your role in the implementation of this reforestation programme?

4. What constraints do you face in the implementation of this reforestation programme?

5. What strategies do you use in solving these constraints?

6. What is your assessment about this programme?

7. For how long have you been involved in this programme?

Thank you

Checklist for FGD with cop-operative members.

1. What do you know about reforestation programme?

2. Can you remember when this programme started in your area?

3. Who first initiated this reforestation programme?

4. How long have you been involved in this reforestation programme?

5. How do you rate the ongoing reforestation programme?

6. What are the constraints you have been facing in implementing this reforestation programme?

7. How have you been dealing with these problems?

8. What other methods do you recommend to deal with these Problems?

Thank you

APPENDIX II

FROM: REFFORESTATION CO-ORDINATOR
ATTT - URAMBO.

DATE: 8/5/2006

TREE PLANTING AND SURVIVAL FOR THE CROP YEAR 2005/06 - URAMBO REGION

S/N	Company	primary society	Seedlings		Surviving seedlings						TOTAL	Survival
			Issued	Planted	A. Crassicarpa	A. Polyacantha	Senna	A. Lebback	Eucalyptus	Others		
	TLTC											
1		Nsanjo	66,200	59,000	7,980	2,600	3,900	5,300	15,000	20	34,800	
2		musisi	18,500	16,000	2,340	80	60	120	6,500	-	9,100	
3		kalemela	5,900	5,000	250	650	150	200	1,600	-	2,850	
4		kamgomoli	8,800	8,000	950	-	500	650	2,000	-	4,100	
5		Mtakuja	6,000	5,000	750	20	150	300	1,200	-	2,420	
6		mirambo	17,750	16,000	2,400	180	-	400	6,600	-	9,580	
7		Mwenge	16,400	15,000	2,000	300	1,300	1,800	1,600	400	7,400	
8		kazimoto	21,400	20,000	4,800	1,100	500	1,600	3,610	-	11,610	
9		igunguli	10,800	10,000	1,200	300	250	950	1,800	-	4,500	
10		Itundu	24,500	23,000	3,015	750	800	1,765	5,900	-	12,230	
11		Isundauduki	5,000	4,500	470	-	-	580	750	-	1,800	
12		igembesavillo	6,300	5,500	1,110	-	-	180	820	-	2,110	
13		Sipungu	5,000	4,200	250	-	120	170	1,910	-	2,450	
14		Katunguru	28,600	25,500	1,230	850	320	650	10,000	-	13,050	
15		Mkombozi	5,000	3,700	515	7	18	20	1,400	-	1,960	
16		Kalembela	8,000	6,500	910	-	150	450	890	-	2,400	
17		Chapajembe	15,000	13,500	1,090	170	320	-	5,470	-	7,050	
18		Kigodi	11,500	10,000	820	340	250	1,870	1,700	-	4,980	
19		Uyela	5,000	4,000	1,030	210	-	-	680	-	1,920	
20		Limbula	22,000	20,000	4,100	-	2,000	2,500	3,000	-	11,600	
21		Usaguzi	22,000	20,000	2,500	-	1,715	2,335	4,000	1,100	11,650	
22		Utulivu	26,000	24,000	4,900	-	2,300	2,350	4,000	580	14,130	
23		Isoga	32,000	30,000	3,500	-	4,800	3,500	5,000	-	16,800	
24		mlinda	22,350	20,350	2,500	-	2,500	2,000	3,500	675	11,175	
25		Balatogwa	12,000	10,500	200	-	820	280	1,500	-	2,800	
26		Mpandamloka	16,000	14,000	1,350	-	900	1,350	2,700	900	7,200	
27		Kaliua rural	5,000	4,000	2,970	-	870	2,980	5,500	730	1,300	
28		Nguvukazi	32,000	29,000	3,300	-	4,400	2,750	3,850	1,100	15,400	
29		Juhudi	20,000	18,000	1,500	-	1,840	2,300	1,200	-	6,840	
30		Mbohora	18,300	16,500	2,220	-	3,350	2,180	1,600	-	9,350	
31		Matendo	19,300	17,300	3,600	-	1,720	1,800	2,000	-	9,120	
32		Malagarasi	16,000	14,500	800	-	4,500	1,300	-	-	6,600	
33		Mganza	19,970	18,000	1,800	-	2,820	1,760	2,100	-	8,480	
34		Nyamagoma	24,000	22,000	2,000	-	2,080	1,000	5,000	-	10,080	
35		Shaluma	20,000	17,800	700	-	3,990	1,200	1,000	-	6,890	
36		Luganjo	20,100	18,500	1,100	-	4,000	1,000	2,000	-	8,100	
		SUBTOTAL	632,670	568,850	72,150	7,557	53,393	49,590	117,380	5,505	305,575	

S/N	Company	primary society	Seedlings		Surviving seedlings						TOTAL	Surviv
			Issued	Planted	A. Crassicarpa	A. Polyacantha	Senna	A. Lebback	Eucalyptus	Others		
	AOTTL											
1		Imalamakoye	35,400	33,000	4,520	650	1,800	2,100	7,650	40	16,760	
2		Maendeleo	27,400	24,000	2,000	600	1,500	1,800	6,900	-	12,800	
3		Kasela	25,100	22,500	2,300	-	1,000	1,400	7,500	-	12,200	
4		Upendo	29,300	26,700	1,170	400	1,300	1,130	10,200	-	14,200	
5		Nyota	42,784	39,500	2,900	1,420	2,000	1,150	14,800	30	22,300	
6		Ally Abeid	8,000	6,500	570	-	-	-	3,500	-	4,070	
7		Juhudi	15,400	13,800	1,300	-	540	1,360	2,700	-	5,900	
8		Usimba	61,000	56,500	2,700	-	10,000	5,400	10,000	900	29,000	
9		Ifuta	23,500	20,158	1,100	80	950	1,720	6,800	-	10,650	
10		Nsenda	16,000	14,000	1,190	-	740	1,260	5,400	-	8,590	
11		Kawisunge	45,100	41,500	4,900	1,200	3,800	3,250	15,000	-	28,150	
12		Kapilula	10,500	9,000	1,040	-	-	60	2,400	-	3,500	
13		Ussya	10,000	9,000	800	120	640	240	2,000	-	3,800	
14		Mabundulu	5,000	4,500	1,050	-	-	150	1,700	-	2,900	
15		Kiloleni	9,000	8,000	1,040	-	1,110	-	2,700	-	4,850	
16		Mkinduwazagamba	5,000	4,500	1,030	-	620	-	350	-	2,000	
17		Mpigwa	16,000	13,500	1,650	150	1,200	500	4,000	-	7,500	
18		Kondagimoyo	20,400	18,000	2,800	250	560	640	5,400	-	9,650	
19		Katuma	51,000	46,000	5,100	-	-	60	2,400	-	7,560	
20		Usindi	50,000	46,000	3,200	-	7,250	6,630	8,000	-	25,080	
21		Mwamko	32,000	29,000	1,020	-	3,060	5,100	5,610	1,020	15,810	
22		Chimbuko	56,000	51,000	6,500	-	10,600	2,950	10,000	1,780	31,830	
23		Wako	48,000	44,500	1,650	-	5,500	4,950	11,000	2,200	25,300	
24		Igwisi	55,000	50,000	5,250	-	7,250	5,000	6,250	1,250	25,000	
25		Mapinduzi	20,000	17,900	2,400	-	2,000	3,000	2,000	550	9,950	
26		Kaviciri	20,000	17,330	900	-	6,110	1,300	-	-	8,310	
27		Karatuma	20,000	18,000	1,600	-	60	2,020	2,800	-	6,480	
28		Muurigano	16,000	14,100	-	-	6,110	1,300	-	-	7,410	
29		Tumaini	22,000	19,000	2,000	-	650	1,250	6,000	-	9,900	
30		Kachambi	16,000	14,000	800	-	2,200	1,400	-	-	4,400	
		SUBTOTAL	810,884	731,488	64,480	4,870	78,550	57,120	163,060	7,770	375,850	
		GRANDTOTAL	1,443,554	1,300,338	136,630	12,427	131,943	106,710	280,440	13,275	681,425	

RRC, URAMBO

APPENDIX III

TO: AGROFORESTRY OFFICER,
ATTT, TABORA

DATE: 23.10.06

REFORESTATION PROGRESS AT Ps IN URAMBO

S/N	COMPANY	PRIMARY SOCIETY	TARGET SEEDLINGS	POTTED TUBES	SOWN TUBES
1	TLTC	NSANJO	91,000	25,000	25,000
2		MUSISI	20,000	3,000	3,000
3		KALEMELA	18,000	22,000	22,000
4		KAMGOMOLI	18,000	10,000	10,000
5		MTAKUJA	30,000	3,000	3,000
6		MIRAMBO	45,000	30,000	30,000
7		MWENGE	32,000	-	-
8		KAZIMOTO	22,000	17,000	17,000
9		IGUNGULI	30,000	27,000	27,000
10		ITUNDU	13,000	5,800	5,800
11		ISUNDAUDUKI	45,000	25,000	25,000
12		IGEMBESAVILLO	18,000	-	-
13		SIPUNGU	54,000	10,000	10,000
14		KATUNGURU	12,000	3,000	3,000
15		KALEMBELA	45,000	-	-
16		CHAPAJEMBE	27,000	-	-
17		KIGODI	54,000	10,000	10,000
18		UYELA	12,000	-	-
19		LIMBULA	29,000	15,000	15,000
20		USAGUZI	41,000	25,000	25,000
21		UTULIVU	12,000	12,000	12,000
22		ISOGA	40,000	27,000	27,000
23		MLINDA	29,000	-	-
24		BALATOGWA	14,000	-	-
25		MPANDAMLOKA	10,000	-	-
26		KALIUA RURAL	2,000	1,000	1,000
27		NGUVUKAZI	26,000	-	-
28		JUHUDI	13,000	-	-
29		MBOHORA	54,000	10,000	10,000
30		MATENDO	67,000	40,000	40,000
31		MALAGARASI	8,000	8,000	8,000
32		MGANZA	34,000	17,600	17,600
33		NYAMAGOMA	36,000	35,600	35,600
34		SHALUMA	25,000	30,000	30,000
35		LUGANJO	57,000	20,000	20,000
		SUBTOTAL	**1,083,000**	**432,000**	**432,000**

S/N	COMPANY	PRIMARY SOCIETY	TARGET SEEDLINGS	POTTED TUBES	SOWN TUBES
1	AOTTL	IMALAMAKOYE	36,000	15,000	15,000
2		MAENDELEO	10,000	14,000	14,000
3		KASELA	29,000	25,000	25,000
4		UPENDO	6,000	-	-
5		NYOTA	9,000	5,000	5,000
6		ALLY ABEID	1,000	1,000	1,000
7		JUHUDI	63,000	20,000	20,000
8		USIMBA	27,000	-	-
9		IFUTA	20,000	5,000	5,000
10		NSENDA	32,000	15,000	15,000
11		KAWISUNGE	36,000	15,000	15,000
12		USSYA	25,000	11,100	11,000
13		MABUNDULU	25,000	-	-
14		KILOLENI	91,000	10,000	10,000
15		MKINDUWAZAGAMBA	20,000	-	-
16		MPIGWA	36,000	10,000	10,000
17		KONDAGIMOYO	20,000	-	-
18		KATUMA	27,000	10,000	10,000
19		USINDI	29,000	15,000	15,000
20		MWAMKO	14,000	11,000	11,000
21		CHIMBUKO	50,000	20,000	20,000
22		WAKO	29,000	5,000	5,000
23		IGWISI	29,000	-	-
24		MAPINDUZI	50,000	-	-
25		KAVIGIRI	23,000	15,000	15,000
26		KARATUMA	30,000	5,000	5,000
27		MUUNGANO	12,000	10,000	10,000
28		TUMAINI	18,000	15,000	15,000
29		KACHAMBI	21,000	20,000	20,000
		SUBTOTAL	**818,000**	**272,100**	**272,000**
		GRAND TOTAL	**1,901,000**	**704,100**	**704,000**

NB Blank spaces potray primary societies which have opted their seedlings to be raised by individual farmers

Targeted seedlings = 200 seedlings per 1000Kgs of tobacco produced

REFORESTATION PROGRESS AT PRIVATE NURSERIES IN URAMBO

S/n	Area	Nursery owner	Nursery name	Target seedlings	Potted & sown tubes
1	NGURUKA	KORNAL SIMON	Maboha	21,000	21,000
2		HAMISI KASIGAYE	Mwangaza	20,000	20,000
3		DIGNA MICHEAL	Chako ni Chako	30,000	30,000
4		GERALD .A. AMANI	Nguruka	50,000	50,000
5		KISSY DISMAS	Kachambi	7,000	7,000
6		WILLIUM FUNGAMEZA	Malagarasi	7,000	7,000
7		LAURENT BILANTANYE	Kitakata	14,000	14,000
	Subtotal			***149,000***	**149,000**
8	KALIUA	ANZURUNI HUSSEIN	Lumbe	18,000	18,000
9		MARY HANGA DAVID	M.D	30,000	30,000
10		SADICK ISMAIL	Kikumumi	100,000	100,000
11		LEONARD MSANZYA	Mazingira endelevu	60,000	60,000
12		DOTO NYILINYA	Achawacheke	5,000	5,000
13		JACOB PETRO MGUNGA	Juakali	23,000	23,000
14		SELEMANI KATABAYA LUMENDE	Sehemu	8,500	8,500
	Subtotal			***244,500***	**244,500**
15	USSOKE	RAMADHANI SAID MIHAYO	ussoke	30,000	30,000
16		HASSAN MOHAMMED MPATE	Nsogolo	10,000	10,000
17		MASOUD KASISA	Izimbili	19,000	19,000
18		ALLY HUSSEIN MAYENGO	Kalembela	18,000	18,000
19		HAMISI MASOUD	Katunguru	4,000	4,000
20		IHUKA BAI IHUKA	King'wa	18,000	18,000
21		ABDALLAH HATIBU MAGOHE	Milambo	55,000	55,000
22		WILSON VALIANGA MIGEZO	Mlimani	7,000	7,000
23		HAMIDU MUSSA USANTU	Isongwa	10,000	10,000
	Subtotal			***171,000***	**171,000**
24	URAMBO S.	MALENGO GROUP	Malengo	4,500	4,500
25		MBARUKU MAZIKU MALALE	Mwenge	14,000	14,000
26		JUMA. HASSAN KALLANDA	Ijanija	20,000	20,000
27		JASHUM GROUP	Jashum	12,000	12,000
28		GRACE ARON DOSHA	Grace	15,000	15,000
29		SAMWEL RICHARD MPAPI	Muungano	7,000	7,000
30		NASSIBU JUMANNE	Vumilia	4,000	4,000
	Subtotal			***76,500***	**76,500**
31	URAMBO N.	ERICK MALELA	Maendeleo	12,000	12,000
32		ROBERT MABILLA	Wacha wacheke	10,000	10,000
33		STEPHEN MADEBE MAKULU	Jionee	19,000	19,000
34		VALERIAN DICSON MDANYA	Farm Fundikira	88,000	88,000
35		KESSY RAMADHANI PETER	Lekangeme	20,000	20,000
36		MARCO KULWA FRANSIS	Mzibira	10,000	10,000
	Subtotal			***159,000***	***159,000***
	Grand total			***800,000***	***800,000***