

**THE OPEN UNIVERSITY OF TANZANIA**

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**SOUTHERN NEW HAMPSHIRE UNIVERSITY**

**MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT**

**(2005)**

**EVALUATION OF FARMER KNOWLEDGE ON CASSAVA  
BROWN STREAK DISEASE (CBSD) IN THE ROMAN CATHOLIC  
CHURCH DIOCESE OF TUNDURU-MASASI IN SOUTH EASTERN  
TANZANIA**

**HALIMA MALIKI KWIKEGA**

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DISEASE (CBSD) IN THE ROMAN CATHOLIC CHURCH DIOCESE OF  
TUNDURU-MASASI IN SOUTH EASTERN TANZANIA**

**BY**

**HALIMA M. KWIKWEGA**

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

**2005.**

### **CERTIFICATION**

I ..... Certify that I have thoroughly read this project report and found it to be in an acceptable form for submission.

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**Dedication**

Dedicated to my dear daughter, Hadija Hamza who has suffered a lot for being left alone with sometimes-unknown people, missing me for most of the time during this course.

**Declaration**

I declare that, this paper is my own work, and it has not been submitted for the similar degree in any other university.

## List of abbreviations

CBSD	Cassava Brown Streak Disease
CMD	Cassava Mosaic Virus Disease
CBO	Community based Organization
OFM	Organization Development, Food Security and production for Market
PADEP	Participatory Agricultural Development and Empowerment Project
NARI	Naliendele Agricultural Research Institute
FRG	Farmer Research Group
MATI	Ministry of Agricultural Training Institute
VTC	Village Training Centre
VODP	Village Oriented Development Project
RIPs	Rural Integrated programmes
TASAF	Tanzania social Action Fund
SIDO	Small Scale Industry Development Organization
IITA	International Institute for Tropical Agriculture
TDV	Tanzania Development Vision
URT	United Republic of Tanzania
ASDS	Agricultural Sector Development Strategy
PRSP	Poverty Reduction Strategy Paper
GDP	Gross Development Product
LGRP	Local Government Reform Programme
LGA	Local Government Authority
ALP	Agricultural and Livestock Policy
NAFCO	National Agricultural and Food Corporation
DADP	District Agricultural Development Programme
PO-	President's Office- Regional Administration and Local Government
RALG	
NGO	Non Governmental Organization
URT	United Republic of Tanzania

## **Acknowledgement:**

I would like to acknowledge the Ministry of Agriculture for giving me permission and funding my studies for the Masters degree in Southern New Hampshire University at the Open University of Tanzania.

I would also like to acknowledge the support given by NRI (Cassava brown streak disease project) in the Southern zone which enabled me study and work for my project comfortably.

I am especially grateful to my Zonal Director of Research and Development for his kindness, wisdom, encouragement and support in my ability to complete this work and my studies in general; without him, it would have been difficult for me to pursue this course.

I would like to acknowledge the cooperation given by the Roman Catholic Church Diocese of TUNDURU-Masasi: The Vicar General – Father Patrick Mkapa and the Development Director – Father J. Livigha in Masasi district for accepting my request to work in this organization for the whole period of my studies. Special thanks, goes to the Project leader of OFM, Mr. Steven Mwanache for his assistance and tireless efforts which made it possible for me to come up with this project.

I am also grateful to my supervisors: Dr. Geoffrey Mkamilo and Felician Mutasa for their skilful assistance and efforts which made it possible for me to work on this paper; and my instructor, Mr. Michel Adjibodou.

I am also very grateful to my mom, Late farther (unfortunately it was not possible for him to see the fruits of my studies) and my sisters for their moral and financial support to my life during my studies.

Finally I would like to thank all who had commented or participated in one way or another in the success of this paper.



**ABSTRACT:**

Based on needs assessment, education was chosen as the most important farmer's need in this project (OFM) because farmers were lacking new or improved agricultural technologies in cassava production. Improved cassava production techniques, it may help farmers in OFM areas and the whole community in the Zone lead to food security, poverty reduction and improved livelihood in general because cassava is the main food and cash crop. The evaluation of farmer's knowledge on cassava brown streak disease in OFM was conducted in July 2004 in cassava producing areas of Lindi and Mtwara regions in the southern zone. This study was intended to establish the current farmer's knowledge concerning Cassava Brown Streak Disease (CBSD) and its control strategies so that the author will be able to identify the gaps and how can they be covered. It was found that, the majority (98%) of respondents was aware of CBSD and was able to recognize the disease's symptoms. In general about 80% of respondents reported to use some control strategies i.e. about 90% of respondents in project areas and 68% in non project areas whereas in Namikunda and Maugura (OFM) villages was 47%. This shows that, much effort is needed for more dissemination of technologies in the OFM and the southern zone as a whole. Therefore, this report will become helpful in measuring the benefits of the training intervention later on.

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## **CHAPTER 1**

### **1.0 Background information of the Roman Catholic Church Diocese of TUNDURU-Masasi.**

The Roman Catholic Church diocese of TUNDURU - Masasi is a registered Non Governmental Organization (NGO). It started in 1988. It uses the constitution of the Roman Catholic Church. Organization development, Food security and production for market (OFM), is one of the projects in this NGO. Other projects are Vocational Education and Training Authority (VETA) and Women in Development (WID). The WID project was very much concentrated in Tunduru district than in Masasi district. With regard to my field of experience, I was attached to OFM project. My daily contact person was OFM project leader.

The OFM with offices at the Diocese sub-headquarters in Masasi town covered 6 wards, through Village Training Centers (VTC), which are located in one village of the ward and cater for the ward. OFM emerged from Village Oriented Development Programme (VODP), which was a project that propagated a development policy that aimed particularly at the young village community. It was funded by the Austrian Donor formerly Institute for Internationale Zusammenarbeit (IIZ) which late in 2000 merged with other co-financiers to form an organization called HORIZONT 3000.

In 1999 VODP changed to Rural Development Organization for Food Security and

Marketing (RD-OFM). It aimed at bringing about a higher and sustainable productivity of small farms in order to achieve food security and to be able to market surplus products by considering two core measures:

- (1) The introduction of methods of an organic oriented farming system - using animal traction while preserving soil fertility.
- (2) Promoting self-reliant rural grassroots organizations that would take up and spread

The innovative measures.

OFM project involves four main areas, which are: sustainable agriculture, goat component, cashew component and organization.

#### **Organizational structure of the NGO:**

The Diocese of Tunduru works in partnership with Horizont 3000. All the project activities under VETA, WID and OFM are coordinated with the Development office or CARITAS. The VTC serves as a core from where the farmers are attracted and the project activities are carried out and linked. A Village Steering Committee (VSC), associated with each center, coordinates the project implementation and the activities organized for and by three groups of farmers, namely the members of the VTC-association, the farmers participating at the Best Farm Competition (BFC) and members of the Women Group (WG). Annex I shows the VTC's and the members of the farmer groups.

Steering Committees run the groups; whereby additional committees, namely a Goat Rearing Committee (GRC) and a Cashew Growing Committee (CGC) coordinate the different activities supporting goat rearing, respective cashew growing in the 3 groups of

farmers. The Instructors' Committee deals with practical implementation of training and is linked with the VTC-association since the instructors are members of the VTC-association.

All groups and committees are informal institutions. The Village Steering Committee (VSC) of the 3 groups (VTC-association, BFC and WG) consists of a chairperson, an assistant chairperson, a secretary, an assistant secretary and a cashier, since each group is supposed to raise its own funds from the activities implemented and keep it in the safe at the VTC building. The GRC, CGC and instructors' committee are advisory committees with chairperson, secretary and some members. Each committee meets once per month as well as the VSC, where all-important matters are brought together.

Chairperson and secretary from each of the 3 group steering committees, OFM project staff, village leaders (chairman & secretary), a controller and 2 elders, form the VSC (13 members), which has final implementing power. VSC elects the chairman and secretary for instructors' committee and for the goat rearing committee and the VTC and VSC elects the members of the cashew management committee. Main tasks of the VSC are:

Approve monthly training and reporting schedule, group's annual planning and budget, new members, and control group's funds, stock, use of subsidies, etc. Besides, the VSC is monitoring the work of instructors and presenting reports to the OFM office and other organizations.

The VTCs are looked at as tools for OFM project development while NARI and MATI



are there for technical support in Agriculture in the Southern zone of Tanzania which when utilized fully may help to improve farmers' food security and livelihood in general.

**Ownership:**

The owner is the Bishop of the Roman Catholic Diocese of TUNDURU-Masasi in collaboration with the Austrian NGO cluster Horizont 3000 executed in Masasi district, Mtwara region.

**Geographical coverage:**

Women In Development (WID) is very much concentrated in Tunduru district while OFM is working in Masasi district, Mtwara region, Tanzania. Masasi district consists of 34 wards, out of which OFM started working in 6 wards in two divisions through Village Training Centers. The VTCs were placed in Maugura, Namikunda, Nanjota, Namatumbusi, Mtakuja and Mikuva. Via each VTC, OFM assists farmers who are members of the VTC association; farmers who are participating in the Best Farmer Competition; and women who join the Women Group. Currently OFM is operating in 8 wards. The three new wards are Lulindi, Nandete and Mnavira. The name of villages and number of members of different farmer groups are as shown in table 3. The total number of members is about 332 farmers where as, out of this number 89 are females i.e. 27%. The average age of the members is 40 years. About 93% of the members are married with the average family size of 3. Table 2 shows that, the project was a bit gender sensitive in its planning although women representation is not very satisfactory because the number of women is very low compared to men.

Therefore, in order for me to work in this NGO, I had to apply formally by writing a letter (Annex V) to the Vicar general. In my expression, I requested a permission to provide a free consultancy for the whole of my project life (18 months). In so doing I was accepted and attached to OFM project according to my work experience. The OFM project leader was assigned to be my contact person. This was a person who was responsible with many community development activities basically agricultural and livestock development activities as well as other off-farm activities like carpentry. His responsibility was to provide requested support to me.

### **1.1 Mission statement:**

To ensure food security and raise farmers' income by organizing marketing strategies and strengthening as well as building up grass-root organizations

### **1.2 Objectives of the organization:**

The overall objective was to improve the livelihood security for rural communities of Masasi through their village training centers and particularly members of farmers groups in the targeted wards and divisions.

### **1.3 Programmes and activities**

#### **1.3.1 Programmes**

The main components of OFM involved were:

##### **1.3.1.1 Sustainable agriculture:**

OFM also involved non-members around the village training centers in the Best Farm Competition. These non-members were trained in the methods of sustainable-agriculture, household management, food storage, seed bank and other agricultural-related skills.

About 300 people have participated in the Best Farm Competitions. In the competition the winners (first winners) were getting a heifer, the second and third winners were getting a she goat each, and hoes to all participants. The improvement of cashew crop aimed at raising farmers' income to prevent them from selling their farm produce which was their food supply to fend for their necessary requirements like school fees, medical expenses, and uniforms for their children, etc. The methods of sustainable agriculture that involves:

- Oxenization
- Ox-cart making
- Compost Manure Making
- The use of Sun Hemp
- Application of Contour skill

#### **1.3.1.2 Goat component**

- introducing a 'borrow a goat, pay a goat' system within the same groups

#### **1.3.1.3 Cashew component:**

Targeted were small-scale farmers who were already organized in active former groups for the aim of improving their cashew production. The intervention aimed at increasing the cashew production of the group members, apart from technical farming, training participants in marketing strategies and farm economics was emphasized. Small scale processing of cashew was not proposed since marketing of processed cashew nuts in the villages was not considered viable.

#### **1.3.1.4 Organization:**

The organization aimed at strengthening the groups. The VTC-association was to be further strengthened, in order to ensure their sustainability. Their experience was to be

exploited for training and monitoring the newly supported groups. Trained VTC-instructors assisted in supervising the farmer groups, especially on cashew activities. The members of the farmer groups were trained on field and at institutes, in farming, marketing and group building issues. It started with emphasis on empowerment of farmers for self-reliance by giving more training on group organization, leadership, farm economics and marketing.

### **1.3.2 Activities:**

These activities include: Group organization – strengthening farmer groups in farming economics and marketing strategies, cashew management and goat rearing activities, and field days. OFM promotes sustainable agriculture practices, mainly via the VTC-association, the Best Farmer Competition and the Women Groups. Farmers are trained on better and alternative agricultural techniques, they receive tools and inputs either subsidized or as a grant and through competitions farmers are encouraged to apply the skills. OFM is working in Masasi district, Mtwara region. Masasi district consists of 34 wards, out of which OFM works in 6 wards through Village Training Centers. Via each VTC, OFM assists farmers who are member of the 'VTC association'; farmers who are participating in the best farmer competition; and women who join the Women Group.

Activities aim at improving agriculture husbandry and marketing of both food crops and cash crops (cashew), increasing livestock keeping (ox-mechanization and goats), developing technical skills and strengthening the organization building. In each center, each of the 3 groups has a steering committee for the daily management and additionally

3 committees take care of the most important activities, namely the goat rearing committee, the cashew management committee and the instructors' committee. The overall coordination of each cluster happens through the Village Steering Committee.

**Products/services:**

The farmers groups are trained in self-reliance and management related trainings for capacity building and group dynamics like farm economics and marketing.

**1.4 Assignment:**

Based on needs assessment (Annex II) done in OFM, education was chosen as the most important need of the project. Education is required in order to identify a disease at its early stages in order to control it. Training is important in order to improve farmers' skills, knowledge and attitude on CBSD symptoms and its control strategies for increased cassava production and market.

Based on the farmers' needs assessment conducted in January 2004 it was agreed to start with farmer evaluation on CBSD knowledge assessment in order to know what farmers know about the most important cassava disease and its control strategies. This was considered to be helpful in measuring the benefits of the intervention (training) later on. Crop diseases were the major farmer's problem in cassava production.

Therefore, my assignment was about "Evaluation of farmer knowledge on Cassava Brown Streak Disease (CBSD) and its control strategies in the Organization Development, Food security and production for Market (OFM) project. The evaluation

has enabled the researcher identify the knowledge gaps. In so doing, some interventions were also identified in order to cover the gaps. In the OFM project, nothing has been done so far concerning the training on how to identify and control the disease except radio news broadcasted by NARI – Naliendele through Radio Tanzania Dar-es-Salaam (6 times i.e. 2 times per program) and Radio Lindi (once per programme). Therefore, a total of 3 programmes were broadcasted through Radio for creating awareness in CBSD and its control strategies. These programmes were those concerning: 1. Causes of the disease (CBSD), 2. Disease symptoms and 3. CBSD control strategies.

In order to have effective disease control strategies there is a need to educate farmers on how to identify the disease symptoms of both CBSD and CMD (Katinila, 1997) so that uprooting practice as one of the control strategies can easily be done at early stages of the disease development in the fields. Most farmers in OFM areas were still confusing between the two diseases (CBSD and CMD). Some disease control strategies have been identified to reduce the negative effects of diseases. These include the use of disease free planting material, field sanitation, uprooting and varietal resistance (Hillocks and Jennings, 2003:230-231; Katinila and Kwikwega, 2001:1).

#### **1.4.1 Problem statement:**

Cassava Brown Streak Disease is a major biotic production constraint of cassava in SE Tanzania (J.P Legg and M.D. Raya 1998:17; R.J. Hillocks et. al 2001:389 R.J. Hillocks and D.L. Jennings 2003:225; N.A. Katinila 1997:1; R.J. Hillocks et. al 2001:389; Katinila and Kwikwega 2001:1). If CBSD is not well controlled it can cause a crop loss of

between 20% and 80%, which is rendered unsuitable for human consumption. This disease can reach up to 70% in some fields (Katinila and Kwikwega 2001:1). Previous researches on CBSD were carried out in South Eastern Tanzania. Experiments have shown that CBSD can reduce root weight and renders unfit for consumption and marketing (Hillocks et.al 2001:389; Katinila and Kwikwega 2001:1). Furthermore, Socio-economic studies were conducted in South Eastern Tanzania (Katinila 1997; N Katinila and Kwikwega 2001, Mkamilo et.al 1998). From these studies it was found that the majority of farmers (about 85%) were aware of the disease, but little information is available on farmer's knowledge on CBSD and its control strategies.

#### **1.4.2 Objectives:**

The objective of this research was to assess farmer knowledge and control of CBSD in farmer groups that are working with the Roman Catholic Church Diocese of TUNDURU-Masasi for improved food security and income to rural communities.

#### **1.4.3 Specific Objectives:**

1. To assess farmers' knowledge on cassava brown streak disease symptoms and its control strategies.
2. To understand the effect of CBSD on food security and economy.

#### **1.4.4 Expected output:**

- Farmer's knowledge level on CBSD will be understood
- Knowledge gaps will be identified for intervention
- The effect of CBSD to food security and economy will be Known.

## CHAPTER 2

### 2.0 LITERATURE REVIEW

#### 2.1 Theoretical literature review

##### 2.1.1 Importance of cassava:

Cassava (*manihot esculenta*) is one of the most important tropical root crops in developing countries. It is an important source of carbohydrate in many parts of the low and mid-altitude tropics. The crop is widely grown in the tropical regions of Africa, Asia and Latin America. Cassava production has increased greatly in Africa during the second half of the 20<sup>th</sup> Century (Hillocks and Jennings, 2003:225). The wide adoption of cassava in much of sub-Saharan Africa has been due to its suitability to traditional farming and food systems and the socio-economic circumstances of farming communities. The crop is of particular value as a food security crop because of its tolerance to drought, poor soils and easy of propagation through stem cuttings (Legg and Raya, 1998:17; Katinila and Kwikwega, 2001:1; Hillocks *et.al.* 1996:285; 2001:389; Hillocks and Jennings 2003:225).

Tanzania is the third largest producer of cassava in Africa and the estimated cultivated area in 1993 was 657,000 ha giving an estimated production of 6,833,000 tones. The crop is most widely grown in the Northwest, particularly around Lake Victoria and along the coastal plain, especially to the South in Mtwara and Lindi regions. Other important areas of cassava cultivation are the Indian Ocean Islands of Zanzibar and Pemba and along the shores of Lakes Tanganyika (Legg and Raya, 1998:17).



Cassava is the major crop in South Eastern Tanzania. It is grown as a food crop and is the most important staple. It is also an important cash crop in the region. Cassava is particularly important in South Masasi and West Makonde plateau where 93% and 96% of households respectively grow cassava. Socio-economic studies conducted in the zone indicated that cassava occupies the first place as a food crop and second place after cashew as a cash crop (Katinila, 1997; Mkamilo *et.al.* 1998:1).

Presently, fresh tuber yield of cassava under farmers' conditions ranges from 5 – 12 tones per hectare whereas attainable yield under research condition is about 20 tones per hectare. The main yield reducing factor was identified to be associated with high viral disease infestations particularly Cassava Brown Streak Disease (Legg and Raya, 1998:17; Katinila and Kwikwega, 2001:1; Hillocks *et.al.* 2001:389; Hillocks; Raya and Thresh, 1996:285; Hillocks and Jennings 2003:225). Cassava Mosaic Disease (CMD) occurs in all cassava growing areas of Tanzania.

#### **2.1.2 Cassava brown streak disease Distribution:**

Cassava brown streak disease (CBSD) is a viral disease which has been recorded to be endemic in all East African coastal cassava growing areas, but restricted to the low and medium altitudes below 1000 m a.s.l. (Hillocks *et.al.* 1996; Legg and Hillocks, 2002). The disease is rarely found above 1000 m a.s.l. although symptoms may be expressed at altitudes above this if infected cuttings are taken from the coast. The explanation for such a restricted pattern of distribution is unknown at present but is likely to be due to either,

or both, the distribution of the vector and the distribution of alternative hosts in the natural vegetation. At some locations particularly in the Southern zone of the country, the incidence of CBSD exceeded 20%. Further studies (surveys) in Tanzania have confirmed that the disease is endemic along the entire coast with local differences in incidence due to altitude, varying sensitivity of cultivars and sources of planting material (Hillocks *et.al.* 2001: 389-390; Hillocks and Jennings 2003:225 Katinila, 1997:1,7; Katinila and Kwikwega 2001:1).

### **2.1.3 CBSD Spread:**

The spread of the disease is mainly through infected planting materials (Hillocks *et.al* 1999, Legg and Raya, 1998). The vector has been identified to be spread through whitefly (*Bemisia*) species (Personal discussion with Hillocks 2004). Results from field experiments on disease spread show that the main period for spread in Tanzania is April and May in crops planted in January and February. Further spread ceases with the onset of the dry season. This may be because the plants are no longer attractive to the vector or the vector disappears in the dry season. According to Legg and Hillocks 2002: whitefly populations on cassava fields decline almost to zero in the dry season. In the Southern Zone, after several seasons with low whitefly numbers, between February and March 2004 saw high numbers of whiteflies on cassava, resulting to a rapid spread of both CBSD and CMD. Also by May, cassava green mite (CGM) damage to the upper leaves of the cassava crop in Tanzania has usually increased to the point where they become unattractive to whitefly.

#### **2.1.4 Losses due to CBSD:**

CBSD if cannot be well controlled may cause crop loss because between 20% to 80% is rendered unsuitable for consumption depending on variety and time of infection (Katinila and Kwikwega 2001:1). Cassava brown streak disease decreases root weight and patches of root necrosis, which make roots unmarketable, although the unaffected parts might still have been suitable for consumption. The disease therefore has two effects, one on total root yield and one on root quality, which affects marketability (Hillocks *et.al.* 2001:389).

CBSD can decrease root weight in most sensitive cultivars by up to 70% (Hillocks *et. al.*, 2001:149). The length of time between the appearance of foliar symptoms and the development of root necrosis is a varietal characteristic. In the most susceptible cultivars, root necrosis may appear within 6 months of planting cuttings derived from symptomatic mother plants. Some varieties are tolerant to CBSD, which may show foliar symptoms, but the development of root necrosis may be delayed allowing the full yield potential to be realized (Hillocks *et.al.* 2001:389).

According to Legg and Raya (1998:18), CMD symptom recognition caused no problems, although the loss of lower leaves resulting from drought stress sometimes made distinction between cutting and whitefly-borne CMD difficult, probably resulting in a slight under estimation of the latter. CBSD symptoms are extremely variable according to cassava genotype and season, and more difficult to identify than those of CMD since they are less conspicuous and generally confined to lower leaves. During dry season, CBSD

symptoms are most apparent compared to the rainy season. Similarly for some varieties symptoms are restricted to the roots. Both CBSD and CMD produce symptoms of foliar chlorosis, which may be hard to distinguish from each other when the plant is infected by both viruses and possibly also affected by cassava green mite.

#### **2.1.5 The power of knowledge:**

Power refers to ability of doing. Power is often conceived as the ability to exert control over others through the use of strength, authority, or expertise to obtain an outcome on one's own terms. Knowledge refers to know-how about an object. Knowledge itself is so wide but people tend to concentrate on some aspects only. Never on earth you may find somebody knowing everything. Knowledge is held, controlled and generated by different people in a society. Knowledge can be categorized into two:

1. Rural peoples knowledge (RPK) or informal knowledge.
2. Scientific knowledge (formal knowledge)

That is why it has been emphasized to actively involve local people in the diagnostic analysis of priority problems, and in planning and implementation of specific projects. There are three aspects which affect generation when talking about knowledge. These are: culture, economics and politics, and their relation in time. According to Kincaid (1988), it is believed that knowledge is everywhere but there are situations where things might change.

There are encouraging signs that development research and development practice are moving closer together in ways which do empower poor people to control their own

development; or to empower the poor and powerless people to increase the control they can exert over their own lives, Edwards, 1993; Scoones & Thompson, 1994).

According to Edwards, 1993 it was insisted that, the fundamental kind of rational learning is learning how to live, how to see, to experience, to participate in and create what is of value in existence. Therefore the use of indigenous knowledge in the research process was emphasized because you cannot understand real-life problems of other people unless they tell you. People also should benefit from the use of their information. In this way people will be actively involved in their development process. The purposes of any research to be relevant are:

1. To promote the development of poor powerless people around the world.
2. Research must involve its subjects in some way and at some stage in constructing both processes and outputs.

Research is the origin of knowledge. Therefore, it is highly encouraged and emphasized to use indigenous knowledge in the process of research. Indigenous knowledge should be valued because if people are involved from problem identification, planning, implementation and evaluation process, whatever intervention you will tell them they will be ready to accept it because they have participated. In this way it will be sustainable and they will feel that it is theirs or may feel more the sense of ownership. By doing so, the ability of the poor and powerless people will increase in controlling their own lives.

If needs are to be met on a sustainable basis the Earth's natural resources base must be conserved and enhanced (World Commission on Environment and Development, 1987, p. 57). Therefore, sustainable development as a goal rejects policies and practices that support current living standards by depleting the produce base, including natural resources, and that leaves future generations with poorer prospects and greater risks than our own. (Repetto, 1986, p. 15).

## **2.2 Empirical literature review**

Cassava Brown Streak Disease is a major biotic production constraint of cassava in SE Tanzania (J.P Legg and M.D. Raya 1998:17; R.J. Hillocks et. al 2001:389 R.J. Hillocks and D.L. Jennings 2003:225; N.A. Katinila 1997:1; R.J. Hillocks et. al 2001:389; Katinila and Kwikwega 2001:1).

Previous research activities and promotion of developed technologies were done concerning cassava brown streak disease. Previous researches on CBSD were carried out in South Eastern Tanzania. These activities were based on the causes and effects of cassava brown streak disease on yield and quality of cassava, biology and management of Cassava Brown Streak Disease, A review of present knowledge and research needs.

The key findings of the previous research or promotion were as follows:

CBSD is present at high incidences in cassava fields along the coast of E. Africa from Southern Kenya to the Zambezi river in Mozambique. In some areas it is the primary

biotic constraint to production and marketing of cassava (Hillocks *et.al.* 2001; Thresh and Hillocks, 2003;). CBSD was shown to be a major threat to food security in coastal eastern and southern Africa, affecting a population of around 20 million people.

The international community realized the impact of CBSD on food security along the eastern seaboard of Africa. Experiments have shown that CBSD can reduce root weight and renders unfit for consumption and marketing (Hillocks *et.al* 2001:389; Katinila and Kwikwega 2001:1). Furthermore, Socio-economic studies were conducted in South Eastern Tanzania (Katinila 1997; N Katinila and Kwikwega 2001, Mkamilo *et.al* 1998). From these studies it was found that the majority of farmers (about 85%) were aware of the disease, but little information is available on farmer's knowledge on CBSD and its control strategies.

The most susceptible cultivars suffer up to 70% yield loss due to CBSD, but even where there is no actual loss of root weight, the crop can be completely spoiled by root necrosis (Hillocks *et.al.* 2001; Katinila and Kwikwega 2001).

Farmers report that roots with even a small amount of infection do not dry well and give an inferior flour. Even a small lesion on a root will render a crop unsaleable (NRI and Save The Children, 2004 and Hillocks *et.al.* 2001).

Research at NRI and SRI Tanzania, has shown that Cassava Brown Streak Virus is transmitted by whiteflies. (Thresh and Hillocks, 2003; Hillocks *et.al.* 2002; NRI and Save

The Children, 2004 and Muruthi *et.al.* 2004). Field studies on transmission and spread of CBSD suggested that periods of rapid spread coincided with periods of high whitefly populations.

Among the many varieties grown in farmers fields were a few with tolerance to CBSD root necrosis (NRI and Save The Children, 2004). In the second project the control measures were developed and a programme of on-farm research initiated in 8 villages in Tanzania. Virus-free stock was selected of several CBSD-tolerant local varieties and the extent of CBSD in Malawi was established. If CBSD is not well controlled it can cause a crop loss of between 20% and 80%, which is rendered unsuitable for human consumption. This disease can reach up to 70% in some fields (Katinila and Kwikwega 2001:1).

Initial on-farm research into roguing and selection of planting material was abandoned because of farmers' hostility to roguing and annual shortage of planting material. The project then focused exclusively on dissemination of CBSD-tolerant varieties accompanied by an information campaign to raise farmers' awareness of CBSD symptoms and availability of tolerant varieties. In the Southern Zone of Tanzania, on-farm validation of the tolerant varieties was completed in six target villages and the emphasis with the farmers groups shifted to community multiplication. In the community multiplication phase of the project, secondary schools have also been used, and the plots form the focus for inclusion of cassava production and utilization in the school



curriculum. Teachers from six schools received training at Naliendele. In addition, the CBSD-tolerant varieties have been distributed to a further two villages in Ruangwa district at the request of the District Extension Officer. In all these villages the varieties have been multiplied and distributed.

Tolerant cultivars have now been identified in Tanzania and Mozambique. Some of these have been multiplied and distributed to and by farmers (NRI and Save The Children, 2004). On-farm evaluation of the CBSD-tolerant varieties in Tanzania, has shown that there is high approval among farmers for some of them. A cultivar like Kiroba, has proved very popular with farmers who market their cassava because of its early maturity and sweetness. An improved variety, Naliendele 34 has yielded well and also has good culinary characters. The variety release committee as a CBSD-tolerant variety has approved Naliendele 34. These varieties will provide a temporary solution to CBSD until the IITA programme comes up with more resistant material. Their main draw-back is susceptibility to CMDs.

The variety distribution programme has been supported by a communication strategy that has involved an information leaflet, information posters and radio broadcasts. Extension officers in the Southern Zone of Tanzania have received training in all aspects of cassava production, crop protection and post-harvest utilization.

[vii] A number of different media have been used to disseminate knowledge on CBSD and its management – poster in 3 languages for Tanzania, Mozambique and Malawi. A leaflet and radio broadcasts in Tanzania (NRI and Save The Children, 2004).

CBSD project, as an intervention to the problem was introduced to some villages in different districts of Mtwara and Lindi regions. One of these project activities was based on promotion and dissemination of different technologies through the use of tolerant varieties identified at an earlier phase of the project. This is being done through community multiplication, starting from cuttings provided by the project from virus-free stocks on stations. This was concentrated to CBSD project areas, selected primary and secondary schools.

The project has used a number of media to disseminate knowledge e.g. radio broadcasting, poster campaigns and information leaflets on knowledge of CBSD (disease symptoms and control strategies) among farming communities. A series of radio broadcasts were aimed at farmers, while a leaflet and a poster in Kiswahili was directed at both farmers and extensionist. About 4000 leaflets were produced and 50 copies of the poster were distributed. Training of teachers and inclusion of cassava production and processing technology into school curriculum was done. Furthermore, Socio-economic studies were conducted in South Eastern Tanzania (Katinila 1997; Katinila and Kwikwega 2001, Mkamilo *et.al* 1998), but little information is available on farmer's knowledge on CBSD and its control strategies.

## **2.3 Policy review**

### **2.3.1 The Agricultural Sector Vision**

As a component of the TDV 2025, the Government and stakeholders in agriculture envisage an agricultural sector that by the year 2025 is modernized, commercial, highly productive and profitable, utilizes natural resources in an overall sustainable manner and acts as an effective basic for inter- sectoral linkages.

Achieving these long- term goals will require the existing subsistence- dominated agricultural sector to be transformed progressively into commercially profitable production systems. However, the Agricultural Sector Development Strategy (ASDS) represented a time slice of only 5 years (2002 – 2007). The primary objective of the ASDS is therefore to create an enabling and conducive environment for improving the productivity and profitability of the sector. This will serve as the basic for improved farm incomes and rural poverty reduction in the long term, whilst contributing to the medium term (2003.5) and long-term (2010) goals of the Poverty Reduction Strategy Paper (PRSP).

### **2.3.2 Sector Growth Targets**

The PRSP recognizes the agricultural sector as one of the priority poverty reduction sectors because of its dominant role in the economy and the high incidence of poverty in rural areas. A high rate of sustained, broad -- based growth in the sector is critical to achieving the poverty reduction targets set out in the PRSP. These are:

- Reduction of the proportion of the population below the basic poverty line from 48 percent in year 2000 to 42 percent in 2003 and 24 percent by the year 2010.
- Reducing the proportion of rural population below the basic poverty from 57 percent to 49.5 percent by the year 2010.
- Reducing the proportion of the food poor from 227 percent to 23.5 percent by the year 2003 and 14 percent by the year 2010.

These are subject to revision, as more up to-date information becomes available from the surveys being conducted as part of the poverty monitoring master plan.

### **2.3.3 Why Agriculture is Critical to Poverty Reduction**

According to the latest (1991/92) Household Budget Survey in Tanzania, the majority of the poor is found in rural areas. Where agriculture is the mainstay of livelihood agriculture as defined in this report, has such a dominant role in the economy that it is the most critical of the sectors that have been identified as the priority poverty reduction sectors in the PRSP in the long run. Commercializing smallholder agriculture and accelerating its growth rate are critical in pulling the majority of the rural poor out of abject poverty. The ASDS lays the foundation stones for this long run objective but also proposes interventions with a more immediate impact in rural poverty alleviation through diversified and increased production and productivity and smallholder agriculture.

The PRSP Progress Report 2000/01 set growth targets for the agricultural sectors for the coming five years of:

- Increasing real annual agricultural, GDP growth from 3.6. Percent to 5 per cent by the year 2003 and to 6 per cent by the year 2005.
- Increasing real annual growth rate of the livestock component from 2.7 per cent to 5 per cent by the year 2005.
- Increasing real annual growth rate of the export crops from 6.8 pr cent to 9 percent by the year 2005.

However, these targets were set before a full analysis of the constraints facing the agricultural sector has been completed. Two constraints in particular create problems of achieving marked increases in agricultural productivity in the short run. The first is the predominance of hand- hoe technology and a relative shortage of agricultural labour in the rural areas. It will take time to change a significant proportion of farming systems and / or introduce mechanization on a sufficiently large scale to raise labor productivity significantly. The second constraint is the combination of the on going LGFP, the transfer of responsibilities from central government to LGAs, and the current capacity shortages in LGAs to manage and implement these effectively. In time these moves will significantly improve the support services available to farmers, but it is likely to be towards sector given the unpredictability of world prices for export commodities.

In the light of these considerations, a more realistic target for the overall agricultural sector was to achieve an average annual range of growth of 5 percent p.a. over the 3 years period 2005/ 07. If this is broad- based and accompanied by increased off- farm rural

employment opportunities, it will make a significant impact in the poverty reduction targets by the end of the decade.

#### **2.3.4 Mission of the Agricultural Sector Ministries**

The mission of the agricultural sector Ministries, within their mandates, will be to facilitate the growth and development of the agricultural sector to meet these medium and long-term targets. This will enable the sector to contribute fully to insuring food security and poverty reduction through increased volumes of competitive crop and livestock products, increased incomes especially as smallholder farmers and increased national income and export.

This will involve the Government in implementing the necessary institutional, legal, and administrative and policy changes as well as planning long-term investment programmes that will facilitate further transformation. These interventions are intended both to improve the well being of smallholder farmers and to facilitate the increased participation of larger private sector businesses in agriculture. Subsistence and small- scale farmers are mainly concerned with raising the productivity of their scarce resources, typically labour and capital, whilst the rate of return on capital is of main concern to commercial farmers and the private sector.

#### **2.3.5 Policy framework from agricultural Development**

The policy environment is key to agricultural development at two levels. First a favorable and stable macroeconomic environment (primary the inflation rate, interest rate and exchange rate) is a precondition to profitable private investment in general and in

agriculture in particular. Second, sector specific policies have an important bearing on agriculture's terms of trade with other sectors of the economy and also on its productivity and profitability. The ASDS proposes changes in the existing agricultural policy to permit private agribusiness to expand investments in primary production directly or through partnerships with smallholders, input distribution, produce marketing, and agro-processing. These policy changes will demonstrate Government's sustained political commitment to economic liberalization in the agricultural sector and remove uncertainties deterring the private agribusiness sector from spearheading the longer-term development of agriculture.

### **2.3.6 Agricultural Policies**

The agricultural sector is guided by two main policies. The agriculture and livestock policy of 1997 seeks to ensure that the direction and pattern of development in the agricultural sector meets social objectives and outputs. The policy emphasizes the importance of competitive markets, with the Government providing priority public goods and services and the conservation of the environment as a rational basis for agricultural development.

The cooperative Development Policy of 1997 evolved on the basis of experiences in implementing the Cooperative Development Act of 1991. It marks a change from cooperatives being state-controlled institutions to becoming autonomous and member-controlled private organizations. The policy provides the framework for the restructured co-operatives to operate on an independent, voluntary and economically viable basis and

to develop into centers for providing and disseminating agricultural inputs, implements technologies and information. This will empower farmers to enhance their bargaining position in the market. Ministries of Cooperatives and Marketing is currently facilitating consultative meetings among cooperative stakeholders to review the 1997 policy and the Cooperative Act of 1991 to make them meet the needs of stakeholders even more effectively

### **2.3.7 Agriculture Related Policies**

Several other policies have a bearing in the development of agriculture. The overall aim of the *National land Policy* is promote and ensure a secure land tenure system, encourage the optimal use for land resources, and facilitate broad-based socio economic development without endangering the ecological balance of the environment.

One of the water policy objectives is to establish a multi sector platform and framework for participatory agreements on the allocation of water use in a coordinated and rational manner. This will eventually ensure that the interests and rights of various water users, particularly the requirement of catchments, crops and livestock, are taken into account during the process of allocating water.

The National Micro- Finance policy forms the long-term basis for developing an efficient and effective micro- financial system and provides a framework for empowering farmers and livestock keepers through access to credit.



The Gender Policy of 2000 aims to mainstream gender issues in all aspects of policy planning, resource allocation and implementation. Special attention is directed towards ensuring that women have access to land, other productive resources, training and labour saving technologies. Nevertheless, it will be important under ASDS to formulation of special programmes to enhance women's access to technology, training and credit.

The Government has also enacted a National Environment policy, which lays the foundation for coordinated, multi-sectoral action in this field.

### **2.3.8 Objectives of the Agricultural and livestock Policy (ALP) of 1997**

The ALP of 1997 has the following as its major objectives:

- Assure food security for the nation, including improvement of national standards of nutrition
- Improve standards of living in rural areas
- Increase foreign exchange earnings
- Produce and supply raw materials and expand the role of sector as a market for industrial outputs
- Develop and introduce new technologies for land and labour productivity
- Promote integrated and sustainable use and management of natural resources (environmental sustainability)
- Develop human resources
- Provide support services
- Promote access of women and youth to land, credit, education and information.

### **2.3.9 Implications of Major Reforms for the ASDS**

The ASDS will be implemented within the context of several other major Government reform programmes, including the Macroeconomic Reform Programmes, the LGRP and the PSRP.

Adjustment and Structural Reform Programmes began in 1986 with the aim of stabilizing and putting the economy on a sustainable growth path. They have helped to correct the macroeconomic imbalances and poor performance that characterized the Tanzania economy during the 1980s and first half of the 1990s.

The reform programmes have consequently addressed issues relating to monetary policies (devaluation, interest rate, money supply), fiscal policies (public expenditure taxes, subsidies, fiscal discipline) and trade policies liberalization of markets privatization and divestiture of state enterprises). The current reform programmes are deepening the initial reforms made in these areas. The economy is now experiencing positive growth again. In short a more favorable environment for private investment and economic growth has been put in place and this will need to be sustained.

The impact of the structural reforms on agriculture has been profound. The removal of subsidies has had a large impact on input prices and borrowing interest rates, which increased to market determined levels. The liberalization of agricultural marketing led to

an increase in product price in the short run, but these later stabilized when they reached market-determined levels. As a consequence of trade liberalization and subsidy removal, the cooperatives ceased to be the sole buyers of crops and suppliers of inputs.

Despite some initial and short run negative effects of the reforms on agricultural development, The Government has significantly improved the policy environment for private investment and sustainable agricultural growth in the long term. Crop marketing has been largely liberalized and private traders and farmers' organizations compete to provide marketing services to farmers. Crop marketing subsidies, except those relating to the grain operations of the Food Security Department in MAFS, have been eliminated. Input distribution has also been liberalized as has agricultural export and import trade. Several loss-making agricultural Parastatal, including NFC and NAFCO, are in the process of being privatized or liquidated. The ASDS will make use of this favorable policy environment to reinforce the reform programmes long-term effects on agricultural growth and rural poverty reduction.

These reforms will be particularly critical to the implementation of the ASDS actions concerning the delivery of support services to smallholder farmers, rural infrastructure development and farmers access to financial services using participatory approaches, LGAs and the local communities will gradually assume responsibility for formulating the proposed DADPs implementing ASDS actions, using guidelines to be developed by the

lead ministries, assisted by the Planning Commission (SC) and PO-RALG. The changes to the Tanzania Civil Service include:

- Making public personnel better resource managers and more accountable through training.
- Improving transparency and accountability through performance monitoring and evaluation.
- Improving service delivery under severe budget constraints.
- Restoring ethics and professionalism in the public service.
- Improving structures, systems, work environment, compensation packages and behavioral attitudes and cultures.

The Agricultural and Livestock Research Policy of Tanzania (URT, 1983,1997) also emphasizes that: “There is a great scope for raising agricultural production through the application of both scientific and technical knowledge to local conditions and crops, especially if modern knowledge is married effectively with the accumulated experiences of the peasant farmers”. Various development practitioners are encouraging a similar approach (Mkamilo, 2004:6; Ponna Wignaraja (2001) Yingyi Qian (2001).

#### **2.3.9.1 Poverty eradication strategies in Tanzania**

The strategies might focus on improving or eradication of all the factors, which cause poverty in Tanzania, following the millennium Development Goals.

A growing economy involves elimination of:

- Poverty
- Inequality and
- Unemployment

The Millennium Development Goals (MDGS) were formulated whereby targets and indicators were formulated to monitor poverty.

The MDGS are:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote Gender equality and empowerment for women
4. Recheck child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other tropical diseases
7. Ensure environmental sustainability
8. Develop a Global partnership for development.

The targeted are:

By 2025 the proportion people living on less than 1 USD a day and those who suffer from hunger should be reduced by half.

According to Pearce *et.al.* (1997) gave in implication of development that is to bring a change that is desirable. What constitutes development depends on what social goals are being advocated by the development agency, government analyst or adviser. We take development to be a sector of desirable social objectives. We take development to be a sector of desirable social objectives, it is a list of attributes, which seeds to achieve or maximize. The elements of this sector include:

- Increase in real income per capital
- Improvements in health and nutritional status
- Educational achievements
- Access to resources
- A 'fairer' distribution of income
- Increase in basic freedoms.

Sustainable development is then a situation in which the development sector does not decrease over time; i.e. as saying that the rate of change of development over time is generally positive over some selected time horizon [ $(dD/dt)$  is positive]. If needs are to be met on a sustainable basis the Earth's natural resources base must be conserved and enhanced (World Commission on Environment and Development, 1987, p. 57).

Therefore, sustainable development is a development strategy that manages all assets, natural resources and human, resources, as well as financial and physical assets, for increasing long-term wealth and well-being. Sustainable development as a goal rejects policies and practices that support current living standards by depleting the produce base,

including natural resources, and that leaves future generations with poorer prospects and greater risks than our own. (Repetto, 1986, p.15).

The social policy will target to the poor people. It is, therefore, very important that we establish the methodological procedures for the identification of the poor class before we can identify the socio-cultural factors in the process of alleviation of poverty (Omari, 1994).

These methods involve:

1. Identification institutions and the policies they administer.
2. Posing question that determine whether or not there are services and policies that care for the sick, disabled, elderly and dependents.

Other steps apart from the two above are as follows:

- Examining the strength and weaknesses of specific policies
- Examining the extent to which the state meets people's needs
- Analyzing the extent, which it contributes to social equality.

Steps to be taken in the process of formulating poverty eradication policy:

In order for the policy to be effective, it should be formulated under participatory basis;

That is to ensure that policies are properly implemented, planning and formulation should involve as many people as possible especially those who will be affected by the policy.

A policy is used to address a problem in a certain community. Social policies are used as control mechanics. Therefore, policies are made in order to bring about social harmony and peace within a community and organization.

The communities have to contribute on how or cause of action to solve problems.

Therefore, in case someone doesn't adhere to the regulations something must be done to her/him. It is to a certain extent to which the needs are met or to help individuals and groups achieve certain objectives, which affect their lives and situations, in a sustainable basis for increasing long-term wealth and well being.

Therefore, social policy is an integral part of public policy and that, social policies contributes towards social community development. Unless we know who are the poor and which criteria we use to identify them; any policy directed to the poor for the purpose of changing them will not succeed development. Certain social policies evolve depending on the historical and economic background of the countries concerned.

Policy areas are linked. This shows that, social policy should not be analyzed or discussed in isolation. Also other policies may not be seen as social or welfare policy but may lead to a greater contribution to social and economic development.

This research was in line with the Agriculture and Livestock Policy of 1997, which seeks to ensure that the direction and pattern of development in the agricultural sector meets



social objectives and outputs. The policy emphasizes the importance of competitive markets, with the Government providing priority public goods and services and the conservation of the environment as a rational basis for agricultural development. In order to achieve farmers goals of food security, increased income and sustainable development, there is a need of abiding to the participatory approaches which will ensure community involvement in all development processes i.e. from problem identification, planning, implementation, monitoring and evaluation. It is through this way when farmers will have sense of responsibility by having things in mind that, all the development processes are theirs. Therefore, it is my feeling that, this study will contribute towards increased food production hence improved food security and income by selling the surplus.

## **CHAPTER 3**

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Research design:**

The target villages were the cassava producing ones in Masasi Lindi and Mtwara rural districts. Villages were purposively selected jointly by the researcher, the project leader and the district extension officers basing also on geographical distribution and village accessibility. Eight villages were involved in the survey. In so doing, we were doing a comparison between two sides i.e. project area and OFM area. These villages were: Ziwani and Mtiniko in Mtwara rural district, Chisegu in Masasi district and Mtua in Lindi district. These are villages, which have been participating in Cassava On-Farm trials through Farmer Research Groups (FRGs) in collaboration with Naliendele Agricultural Research station and extension offices. These FRGs were established to facilitate research trials on control of CBSD and multiplication of disease free planting materials. Other 4 villages were those, which were not under FRG. Maugura and Namikunda were under the organization (OFM) which I was working with in Masasi district, Mnyambe – Newala district and Kineng'ene of Lindi urban district (Figure1).

#### **3.2 Research Approach and strategy**

For education to take place properly and in order to measure the benefits of interventions, which will later be implemented, we saw the need of farmer evaluation to see what was their status of their knowledge, especially of the most constraining factor in cassava production which, was Cassava Brown Streak Disease. To attend the above, a survey was

conducted in some villages of Lindi and Mtwara regions. A survey to evaluate farmer knowledge was conducted in Maugura and Namikunda villages, which are under the OFM in order to know their status of CBSD knowledge in comparison to villages, which were under CBSD project. This was a big survey from which I was involved, but for the purpose of this paper what is going to be reported here will focus on the two villages under OFM compared to CBSD project areas (Control).

Informal visits to these villages were made in May 2004, where village leaders were met and introduced on the need for conducting a survey to their villages.

### **3.3 Sampling techniques:**

Random sampling was done to select farmers in control villages (FRGs) where a sample of 10 farmers was taken for interviews from each village. A purposive sampling was done in villages under OFM where a sample of 9 farmers in Maugura and 11 farmers in Namikunda was taken for interviews from each village.

A total sample of 80 households (80 farmers) were interviewed in 4 villages which have been participating in CBSD project (On-Farm Research trials) through Farmer Research Group (FRGs), other 4 villages were those villages which were not involved in on-farm agricultural research i.e. non FRGs where two of them were under OFM. The FRGs were used as control groups.

### **3.4 Data collection methods:**

#### **3.4.1 Primary data collection**

Primary data collection was done by using a questionnaire (Annex vi), which was administered to farmers through individual interviews whereby a household survey was done. Table I shows the number of respondents in each village. A household survey was conducted by a team of one researcher and technicians, extension workers of respective villages, through interviews by using a semi-structured questionnaire. This was done in June 2004. A total of 10 days were required for a survey whereby 8 days were for the actual survey, which was approximately one day per village. Two days were used for traveling and gapping. Each enumerator interviewed at least 2 farmers per day.

Data collected included: Farmer characteristics like sex age years lived in the village, main occupation, marital status, education, experience in cassava production and household size. Other information included: Land allocation for different crops, institutional support (access to agriculture extension service and credit facilities), crop yields, quantity sold, price, market, distance to the market and time of selling. Also, it included data on development activities, farmer crop (cassava) management practices, knowledge on cassava brown streak disease and its control strategies. Different sources of information were determined. Other types of data were: type of cassava grown, and reasons for growing it was determined.

### **3.4.2 Secondary data collection**

Secondary data collection was done through literature review. This was done using different reports from the CBO, different offices and village councils e.g. resource maps, seasonal calendar of work and web sites. Secondary data review was done in order to know the importance of CBSD, spread and distribution of the disease, estimates of crop losses due to CBSD and the effect of the disease on food security, what has been done so far and policy review.

## **3.5 Data analysis methods:**

### **3.5.1 Primary data analysis**

Since primary data collected was qualitative and quantitative, the qualitative data were analyzed manually while quantitative data were entered into an SPSS computer program. The data was also coded and entered to the computer under excel environment. Descriptive analysis and proportions were used to summarize primary data. Data analysis involved descriptive statistics such as frequencies, cross-tabulations and comparison of means.

### **3.5.2 Secondary data analysis**

Secondary data gathered during literature review were analyzed manually and used to determine the design and methodology of the study. Secondary data was analyzed through using different reports from different offices and village councils.

Table 1: The distribution of respondents in district and villages.

S/NO	DISTRICTS	VILLAGES	RESPONDENTS				
			Males	Percent	Female	Percent	Total
1	Mtwara Rural	Mtiniko	6	60	4	40	10
		Ziwani	8	80	2	20	10
2	Newala	Mnyambe	5	50	5	50	10
3	Masasi	Maugura*	4	44.5	5	55.5	9
		Namikunda*	7	63.6	4	36.4	11
		Chisegu	7	70	3	30	10
4	Lindi	Mtua	10	100	0	0	10
		Kineng'ene	7	70	3	30	10
Total			54		26		80
Mean				67.3		32.7	10

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Females: 32.5%

Males: 67.5%

\* Villages under OFM

## **CHAPTER 4**

### **4.0 FINDINGS**

The author was involved in a big survey where eight villages were involved. For the purpose of this paper, many findings and recommendations will mainly focus on two villages under OFM (Maugura and Namikunda) in the NGO, which are the targets of this paper in comparison to project areas.

#### **4.1 General characteristics of respondents**

##### **4.1.1 Gender distribution:**

This survey involved 80 respondents. About 54 out of 80 farmers (66.5%) who were interviewed were men and 26 of them (32.5%) were women (Table 3). About 84% of farmers were married and 16% were not. Reasons for being single were that, about 31% of farmers said it was because of migration while 23% said it was due to divorce. Other reasons included deaths. In Maugura and Namikunda, 9 and 11 farmers respectively participated in the survey where 9 out of 20 farmers (45%) of them were women. This shows that in OFM areas there was a good representation of women in the study. Also about 44% of women respondents were heads of households.

##### **4.1.2 Age distribution:**

###### **1.1 Age distribution and experience in Cassava production:**

The age distribution interviews contained people of different age groups. They ranged from 19 to 75 years old. The majority (31%) were those under the range of 36 – 45 years old, followed by 21% and 18% of interviews lying between 46 – 55 and 56 – 65 years old

respectively. Others were 15 – 25, 26 – 35, 66 – 75 of about 11%, 10% and 9% respectively. The mean of the age of respondents was about 46 years old (Table 3). This shows that, this is an important crop because the majority of the active labor in the household was putting more emphasis on the crop. Also this may suggest that old people were not fully represented among cassava growers. The average age of respondents in Maugura and Namikunda was 41 years old. While that in FRG was 47 years old.

#### **4.1.3 Household size and labour force**

The mean household was 6 people. About 51% of farmers have 4 – 6 people/household, followed by 22% with 1 – 3 people/household and 15% with 7 – 9 people/household. Others (12%) had people ranging from 10 – 19 per household. The mean labour force and the standard deviation were as shown in Table 3. About 63% of farmers had 1 labour force, which implies that, if you compare it with the mean household size, there is a higher dependence rate, which may contribute to reasons for increasing poverty in the surveyed villages. It was assumed that size of the household correlates with the labour force, but this has been shown that it was not normally the case.



Table 2: Household characteristics of the study area

Characteristics	Mean	Standard deviation
1. Age distribution (years)	46	13.69
2. Education (years of schooling)	6	2.6
3. Years lived in the village	29	15.10
4. Experience in cassava production (years)	15	11.46
5. Household size	6	3.35
- Male adults	1.40	0.89
- Female adults	1.58	1.19
- Children (12 - 17 years old)	1.24	1.38
- Children (under 12 years)	1.51	1.41
6. Active labour		
- Male adults	1.29	0.75
- Female adults	1.48	1.11
- Children (12 - 17 years old)	0.91	1.22
7. Total farm area (Acres)	8	6.14
8. Farm plots (number of plots)	3	1.60
9. Land under cropping (acres)	7	6.18
10. Land area allocated to cashew	3.58	3.63
11. Land area allocated for cassava	2.21	1.88
12. Land area allocated for maize	1.15	1.31
13. Land area allocated for sorghum	0.65	1.14
14. Land area allocated for rice	0.58	0.82
15. Land area allocated for pigeon pea	0.48	0.86
16. Land area allocated for sesame	0.34	0.20
17. Land area allocated for groundnuts	0.26	0.53

#### 4.1.4 Experience of farmers in Cassava production:

Above 20% of farmers have an experience in Cassava production between 1 – 5 years. This was followed by the group of farmers of about 19%, 17%, 14% and 9%, with the experience of 16 - 20, 6 – 10, 26 – 30 and 11 – 15 years respectively. The mean of years of experience in Cassava production is 15; while the mean of the numbers of years people lived in the village is 29 years. About 29% of farmers have lived in the village for 31 – 40 years followed by 25% who have lived in the village for 21 – 30 years, 16% lived for 11 – 20 years and 11% lived for 1 – 10 years in their villages. The rest (19%) have lived

between 41 – 70 years in the study areas. This shows that farmers have experience in cassava production.

#### 4.1.5 Education levels:

The mean years of schooling were 6 years. The standard deviation was 2.6 years (Table 2). About 60% of farmers completed standard 7, followed by 15% who completed standard 4, whereby 5% reached standard 8 and 4% were standard 3. Only 2% had gone up to secondary school while 13% of respondents had no education. It was shown that the literacy rate was high to the respondents in the study area. In OFM areas, the mean of the years of schooling was 7 years, which shows that most of the respondents completed primary school education.

Table 3: Education levels in Maugura and Namikunda

Education level	Namikunda		Maugura		Mean (%)
	Frequency	Percent	Frequency	Percent	
Standard 7	9	82	7	78	80
Standard 4	2	18	0	0	9
Below Standard 4	0	0	0	0	0
No education	0	0	2	22	11
Total	11	100	9	100	100

From Table 3, it shows that, the majority of respondents in OFM areas had primary school education whereby 22 % had no education and all of them were women. That is, 2

women out of 9 had no education. This shows that more women were disadvantaged in their levels of education. The implications of the above findings is that, low levels of education require additional measures for effective dissemination of knowledge and technological inputs to CBSD and its control strategies.

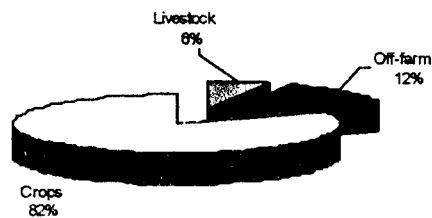
#### **4.1.6 Occupation:**

Farmers in the study areas were involved in different types of economic activities, which included agricultural production, Livestock keeping, and off farm activities.

About 80% of farmers depend on agriculture as their source of income by selling crops. The most important crops in the household for contribution of income were: cashew, cassava, maize, sorghum, rice, pigeon peas, groundnuts and sesame. Figure 1 shows that, crops in general contributed about 82% of the total household income. Cassava was ranked as the second most important crop after cashew in the household by contributing more income compared to other crops. Cassava contributed about 21% of the total income from crops, while cashew contributed about 34%. Cassava contributes about 17% of the total household income.

Other development activities also fell under general agricultural activities e.g. animal power utilization, cashew production techniques, improved cassava production techniques (Research), Seed multiplication and cassava post harvest processing techniques projects. These were mentioned by 68% of respondents.

Other sources of income came from livestock selling mainly Chicken (6%) and off farm activities e.g. Carpentry and Masonry and selling out labour. About 55% of respondents were involved in off-farm activities.



**Figure 1: Income contributed from different sources**

#### **4.1.7 Farm areas**

The total farm area was estimated to be about 8 acres per household (Table 3). Out of this, the land area under cropping was on average of 7 acres per household, which was about 90% of the total area. The average number of farm plots was 3 for each household. About 48% of respondents had 3 – 4 plots, 41% had 1 – 2 acres while 11% of them had 5

– 12 plots. The majority (45%) of respondents had a total farm area ranging from 5 – 10 acres followed by 38% who had 1 – 5 acres. The minority (17%) of farmers had farm sizes ranging from 10.1 to 35 acres. Cassava occupied about 22% of the land allocated for different crops.

#### **4.1.8 Food security and coping strategies to food shortage periods:**

CBSD is one of the factors, which lead to low cassava production. Other factors include drought, pest and market problems. CBSD and drought for example may lead to shortage of cassava planting materials. As a result, for the last season 2003/2004, some farmers couldn't plant cassava due to lack of planting materials and hunger which, was caused by serious drought. This situation forced some farmers to plant any planting material because selection of disease free planting material was difficult.

During December – February, more than 80% farmers were suffering from hunger. Therefore, in order to get something to feed their families, they had to sell their labour by doing fieldwork to others in exchange; they received food (dried cassava chips), or money, which at the end was enabling them to purchase their food.

The implication of this was also shown in the needs assessment that, farmers did not participate fully in producing their food because most of their valuable time was spent looking for food. This was said to be the critical time for weeding. Therefore, they ended up not weeding their crops, which later led to low crop production.

From discussions with farmers, they suggested that, in order for them to participate fully in food production, they asked for food support during this critical period of the season. This will make them stay at home weeding their fields instead of going far away looking for food by selling out their labour. It is through this way farmers felt that, they may be a bit sure of harvesting enough food for their families under conducive conditions like weather. At the end of the day farmers will be helped to break their food shortage cycle, which appears to be a repeated phenomenon.

## **4.2 Institutional support**

### **4.2.1 Access to agricultural extension service:**

In general, about 48% of respondents had access to agriculture extension services. This rate is very low compared to the importance of agriculture to rural livelihood and the farmer's problems. The frequency of access to extension services differed for individuals. About 19% said have met extension agents twice, 8% once, 8% five times, 5% and 4% met 4 and 3 times respectively. About 52% of respondents have access to extension service.

Type of skills, which were trained to farmers, was as shown in Table 4. Other skills included control on storage pests, horticulture, health and childcare, carpentry, tailoring, economics and record keeping.

Table 4: Type of skills, which are trained to farmers by extension workers

Skills acquired	Frequency	Percent
General agricultural knowledge	16	20
Knowledge on cashew pest and disease control	14	18
Research on cassava production (pest and disease control)	13	16
Cashew improvement	12	15
Knowledge on cassava processing	7	9
Animal power utilization and livestock keeping	6	8
General crop management and intercropping	6	8
Proper spacing for maize and use of fertilizer	5	6
Others	8	10

About 52% of respondents had no access to extension services. The reasons for this were mentioned that, about 15% of farmers said had never seen, or there is no extension worker and 9% said that extension workers did not pay some visits to farmers to the fact that or 4% said have never requested for an extension agent to visit them.

Table 5: Reasons for not accessing extension services.

Reasons	Frequency	Percentage
Never seen or no extension agent	12	15
Extension agent does not visit villagers	7	9
Do not know what the extension work is doing	9	11
It is expensive to call for extension service	4	5
Never requested for extension agent	3	4

Table 5 shows some of the reasons as to why farmers do not have access to extension services. The major reason was lack of extension workers. These were the reasons also for low production in their fields.

#### 4.2.2 Access to credit facilities

Results show that 15% of respondents have access to credit facilities. The sources of credits mentioned were community development office and SIDO. This is a small proportion. Although farmers may be aware of the credit facility and they are in need of a loan but they lack facilitation to access it. Therefore it was found that the majority (85%) of respondents have no access to credit facilities. Table 6 shows some of the reasons mentioned by farmers for not receiving credits was the bureaucratic procedure. Farmers felt that, there were unnecessary delays, which are caused by poor leadership. Sometimes farmers do not request for credit because they are afraid of the failure to paying back the credit. They feel that, it is even better to get a loan from fellow farmers than any other sources of credit. Other farmers did not know as to why they did not get credit even after requesting for it. They just saw other colleagues getting while they did not.

Table 6: Reason for not receiving credits. N = 80

Reason	Frequency	Percentage
Bureaucratic procedures	19	24
Unaware	16	20
Lack of acquired collaterals	7	9
Farmer groups are not well organized	7	9
Poor leadership/ governance of district councils	5	6
Never requested	8	10
Do not know the reason as to why	8	5
Others	30	41



### **4.3 Management of cassava brown streak disease**

#### **4.3.1 CBSD awareness:**

In general, it was found that about 98% of respondents were aware and had a problem of CBSD. This generally shows that most farmers were aware of CBSD disease while 78% are aware of Cassava Mosaic Disease. The awareness in Maugura and Namikunda village was 80%.

#### **4.3.2 Identification of disease symptoms:**

About 4% and 12% of respondents were able to identify one and two symptoms respectively. For those who were able to identify only one symptom was only root necrosis, which was so obvious to them when roots were harvested. For two disease symptoms, those were mostly mentioning to be root necrosis and stem die back. Stem and leaf symptoms were also still confusing especially for respondents from non-project areas and CBOs where CMD and CBSD leaf symptoms were problematic. About 78% and 4% were able to recognize all four and three important disease symptoms (root necrosis, Yellowing of leaves, stem die back and stem lesions) respectively.

In general about 86% of respondents were able to recognize the root symptoms, 66% of farmers were able to recognize leaf symptoms. These were the ones who could recognize the disease at early stages hence able to control the disease by uprooting because, this practice is very important at early stages of plant establishment, i.e. within a month or two after planting. About 52% and 56% were able to recognize stem die back and stem lesions respectively. In FRG areas the knowledge on disease symptom was higher

compared to OFM-project areas (Table 6). Identification of stem lesions, leaf symptoms and stem die back was still a problem to farmers in OFM areas. For example about 45% of respondents in OFM area were able to recognize leaf symptoms at early stages of plant growth compared to 91% of respondents in FRGt areas. This shows that, in FRG areas, farmers can be able to practice disease control measures at early stages e.g. uprooting.

Table 7: Disease identification in project and OFM areas N = 43

Symptoms	FRG area n = 23		OFM area n = 20	
	Frequency	Percent	Frequency	Percent
Root necrosis	22	96	14	70
Yellowing of leaves	21	91	9	45
Stem die back	19	83	4	20
Stem lesion	20	87	7	25
Did not know	0	0	6	30

From Table 7 shows that in all villages farmers were aware of CBSD and even more familiar with it.

Table 8: Number of symptoms identified by farmers in OFM areas N = 20

Number of Symptoms	Maugura n = 9		Namikunda n = 11	
	Frequency	Percent	Frequency	Percent
1 symptom	2	22	2	18
2 symptoms	2	22	1	9
3 symptom	3	33	3	27
4 symptom	1	11	0	0
Did not know	1	11	5	45

Table 8 Shows that, about 33% and 27% of farmers in Maugura and Namikunda villages respectively were able to identify 3 CBSD symptoms while 11% and 45% in Maugura and Namikunda villages respectively did not know how to identify disease symptoms.

#### **4.3.3 Management of CBSD by farmers**

It has been known that CBSD is a problem to cassava producers for a long time. Farmers reported that they have been doing different practices in trying to combat the problem. Control strategies practiced by farmers included dipping cassava cuttings into kerosene oil before planting, destroying plant residues after harvesting and cutting the upper part of the plants and allow them to establish new shoots, shifting cultivation and frequent changing of varieties or planting materials.

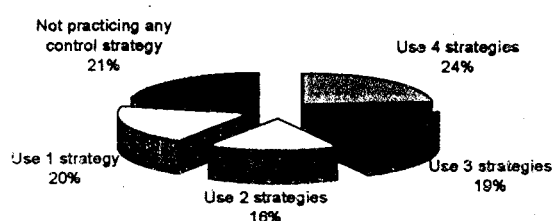
The extension and research institution in the zone have over time exerted considerable effort in sensitizing farmers on the advantages of utilizing CBSD control measures. Five villages in the study area revealed that there were some promising results that were heading towards adopting of these control measures.

#### **4.3.4 Knowledge on the use of control strategies in OFM**

There are about four recommended CBSD control strategies from research work by Naliendele Agricultural Research Institute. These practices are:

1. Use of disease free planting materials
2. Uprooting diseased plants
3. Use of tolerant varieties
4. Burning

It was found that, about 44% used tolerant varieties, 54% were uprooting diseased plants, 70% were using disease free planting materials and 36% were burning diseased plants. About 21% of respondents were not practicing any control strategy. At least most farmers (80%) were trying to control the disease (Figure 2).



**Figure 2: General farmer knowledge assessment on control strategies**

**Key:**

4 strategies = Disease free planting material, uprooting, use of tolerant varieties and burning

3 strategies = Disease free planting material, uprooting and use of tolerant varieties

2 strategies = Disease free planting material and uprooting

1 strategies = Disease free planting material

About 24% of respondents were using all the control strategies followed by 20%, 19% and 16% who were using at least one control strategy, three and two strategies respectively.

#### 4.3.5 Use of control strategies in FRG and OFM areas

It was found in this study that, about 90% of the respondents in project areas have been practicing some CBSD control strategies (Figure 3) while about 45% was reported to practice CBSD control strategies in OFM areas.

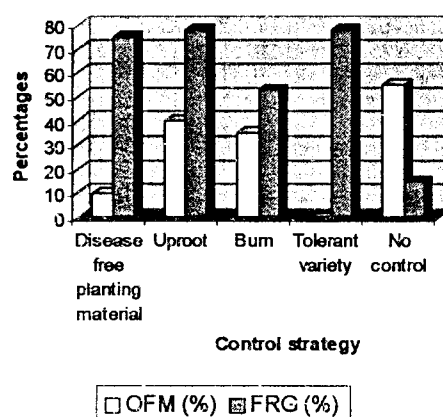


Figure 3: Use of CBSD control strategies in project and OFM areas

Table 9: Control strategies as practiced in Maugura and Namikunda.

Control Strategy	Namikunda		Maugura	
	Frequency	Percent	Frequency	Percent
Disease free	0	0	2	22
Uproot	3	27	5	56
Burn	3	27	4	44
Tolerant	0	0	0	0
No control strategy	8	73	3	33

Table 9 shows that, in OFM areas, no one was using tolerant tested varieties as a CBSD control strategy, while, uprooting and burning was mostly practiced in Maugura than in Namikunda. From my observation, the reason behind this could be that, farmers in Maugura are more active and serious in their group activities compared to Namikunda farmer group.

#### 4.3.6 Uprooting diseased plants:

Uprooting was practiced by 54% of the respondents in the study area. In FRG areas, about 83% of respondents was practicing this control strategy while 42% of respondents in OFM areas was practicing uprooting as a control measure for CBSD.

It was felt that, most of the respondents especially in OFM areas, these practices were mentioned by chance because in my experience, for some practices like uprooting diseased plants was found to be difficult to be implemented by farmers even in the project areas at early stages of the project because they felt that it was a loss of plants. This practice has been well and successfully practiced where schools were used for multiplication of disease free planting material than in farmer multiplication plots. Uprooting is very important especially at the early stages of plant growth (within a month

or two months after planting). At this stage it needs to be done on daily basis in the multiplication blocks if possible to ensure cleanliness of planting materials.

Sometimes plants not showing symptoms may carry the virus. As a result, some plants may sprout with symptoms, although cuttings were taken from plants without visible symptoms. In this case, if the numbers of plants with symptoms are few, pull them out at an early stage and replace with cuttings from other plants with no symptoms.

#### **4.3.7 Tolerant varieties:**

In general, about 57% of the respondents reported to use tolerant varieties as one of the control measures for CBSD. In FRG areas, it was reported that, 78% was using tolerant variety while in OFM areas; none of the respondents was using improved tolerant varieties. The improved varieties were Naliendele 90/034, Kigoma red, Kitumbua, Namikonga, Kalulu, Kiroba and Nachinyaya. Table 10 show that the most commonly grown improved varieties were Kigoma red followed by Kitumbua, Namikonga and Naliendele 90/034 by (46%), 42% and 40% respectively.

In FRG areas, 80% of respondents of Mtua village and 100% respondents of Chisegu, Mtiniko (100%) and Ziwani (100%) villages were growing Kigoma red. About 40% of Mtua respondents, 83% of the respondents from Ziwani and Chisegu (83%); and 100% of the respondents from Mtiniko village were growing Naliendele 90/34. These farmers were given the planting materials by NARI. Generally, in FRG areas, about 78% of the respondents were growing improved varieties.

Mreteta and Musa Saidi were tolerant local varieties and are selected for planting in farmers' fields (Annex III). Musa Saidi was a local variety grown in Mtiniko and Ziwani villages, while Mreteta was also a tolerant local variety commonly grown in Chisegu, Maugura and Namikunda. About 100% of the respondents in Chisegu, 80 % in Maugura, 100 % in Namikunda were growing Mreteta and about 100% of respondents in Mtiniko were growing cassava variety called Musa Saidi.

Table 10: Percentage of farmers growing tolerant and tested varieties N = 50

Varieties	Frequency	Percent
Naliendele.90/034	20	40
Kigoma red	29	58
Kitumbua	23	46
Namikonga	21	42
Kalulu	15	30
Nachinyaya	18	36

From Table 10, it was shown that, Kigoma red was most preferred where 58% of respondents were growing it, followed by Kitumbua (46%), Namikonga (42%) and Naliendele 90/034 (40%). Kalulu was the least liked in the list.

#### **4.3.8 Selection of disease free planting materials:**

About 70% of the respondents reported to select disease free planting materials. This was also a normal farmers practice when selecting planting materials. It became difficult sometimes to do the selection when there was a shortage of planting materials like the past two seasons for Masasi was dry. Therefore, a farmer planted whatever came in front of him/her. In this situation, it was noted that practicing this important strategy for controlling diseased plants becomes impossible under this kind of a situation. Otherwise each farmer



would prefer to plant disease free planting materials when diseases and pests will be identified. Therefore, in FRG areas 90% of the respondents were selecting disease free planting materials while in OFM areas, 50% of respondents were selecting disease free planting materials.

The criteria for selection were: sweetness, cookability and fiber content. Other criteria included yield potential, maturity, drought resistance, plant vigor and tolerance to pests and diseases (CBSD and CMD).

Therefore, even those who did not mention that they used tolerant varieties or select disease free planting materials as one of the control measure for CBSD, in practice they do because they normally choose healthier plants which means they choose what has tolerated the most adverse conditions which are biotic (e.g. pests and diseases) and other factors e.g. drought and Floods. Material selection is normally done at harvest. The responsibility for selection of planting materials was reported to be men's activity.

Experience also shows that, most farmers do select tolerant varieties and disease free planting materials, other than the tested ones from research. For example in Mtiniko village, a variety called Albert, was the most commonly grown variety by all farmers in the previous years due to its high yielding characteristic and earliness in maturity. Almost all farmers have abandoned growing this variety due to the fact that, it is highly affected by CBSD in such a way that, sometimes 100% of the field may be infected. The same

applies to Chisegu or Maugura village where the most commonly grown variety was a local type called Mreteta whereby about 100% of Chisegu respondents were growing it while 70% of Maugura respondents also were growing this variety due to its tolerant nature to pests and diseases especially CBSD. Therefore, from this experience, farmers are doing trial and error in selecting and using tolerant varieties although were not the improved varieties. Annex III shows some of the common cassava varieties grown in the study area.

Generally the most important source of planting materials was from farmers previous crop, which was mentioned by 61% of respondents followed by neighbors (33%) and 21% mentioned Naliendele Agricultural Research Institute (NARI).

#### **Yield:**

Results from this study also showed that, there was a difference in cassava yield to farmers who were using improved varieties and those who were not using local types. The mean yield of cassava to farmers who used tolerant varieties was 781kg per household while those who were not using tolerant varieties was 665kg.

#### **4.3.9 Burning:**

About 36%% were burning the diseased plants. In my observation, burning was not associated with CBSD control but rather as a land preparation method where, all plant debris have to be burnt. In FRG areas this was practiced by 55% and 18% in OFM areas.

## Source of knowledge

Table 11: Source of knowledge to farmers (N= 80)

Source	Frequency	Percentage
NARI	40	50.00
Extension	24	30.00
Leaflet	35	43.75
Poster	23	28.80
Radio	24	30.00
Farmers	6	7.50
VTC/OF M	14	17.50
Own experience	10	12.50
Other	3	3.8

Table 11 shows that the most important source as mentioned by 50% of farmers were NARI followed by leaflets, Extension service radio and VTC / OFM which were mentioned by 44%, 30%, and 17.5% respectively. NARI had access to the CBSD Project areas where training, leaflets, posters and radio broadcasting services were provided to farmers. The VTC/OFM are operating in the two villages (Maugura and Namikunda) of the study area. About 13.5% of farmers were using their own farming experience. Others reported that, elders experiences were very helpful in advising farmers based on their tradition and believes e.g. planting time or what should be planted first e.g. from farmers experience, it was reported that Bambaranuts should not be planted first otherwise it will not rain leading to drought hence low yield for all crops. Other sources included: seed fairs, farmers' field days, neighbors, village government leaders and newspapers.

The use of radio would have been a very good source of information for mass dissemination of technologies. Radio broadcasting was used in August – October year

2003 for technology dissemination of CBSD control strategies but, the results were not very much promising since most of the farmers said that, they could not hear the news because most of them did not own radios. Therefore, farmers preferred some training sessions in villages or conducting educative meetings to villagers rather than using radios.

#### **4.2 Recommendations:**

Generally it was learnt that, majority of farmers can identify root symptoms, leaf symptoms at early stages and on stems in FRG areas and OFM areas. Cassava brown streak if not well controlled may lead to serious food loss between 20% and 80% or low quality of cassava products hence low price.

Also majority of farmers (80%) reported to use some control strategies to cassava brown streak disease, which are: uprooting, selecting disease free planting materials, use of tolerant varieties and burning. In OFM areas, none of respondents aware of tolerant and tested varieties to CBSD from Agricultural research Institute, Naliendele. In Maugura and Namikunda, farmers were not growing any of the tested varieties. Farmers normally used their local tolerant varieties. The yield of cassava to the people who were using tolerant and tested varieties was high (781kg per household) compared to those who were not using those varieties (665kg per household).

Therefore, these results show that there is still a need of putting more effort to sensitize farmers on the use of developed cassava brown streak disease control strategies through

training programmes in order to improve the crop productivity and income to farm families in Maugura and Namikunda as well as the whole of the Southern Eastern zone of Tanzania.

It was also identified that, farmers are still getting low prices for cassava. Therefore more effort is needed to improve the value of cassava i.e. either through improved cassava processing techniques in order to add value by using labour saving technologies for producing good quality cassava products e.g. chips/grated materials, cassava flour, or through the introduction of alternative uses of cassava to farmers rather than relying on *ugali*. This diversification of the uses will capture different consumer preferences hence more market. Together with processing, there is a need of conducting a research on the economics of cassava production in order to get the clear answers to the production costs and actual yield per area (Acre/hectare) in the zone.

There is a need of putting more emphasis in other crops also, like pigeon pea and sorghum, which seemed to be profitable to farmers in order to improve the production level and income per household.

Farmers copying strategies to food shortage brings a continuous vicious circle where food insecurity is predominantly inescapable thing. Therefore proper preservation and storage techniques of all food crops should be emphasized to enable availability and accessibility of food in an affordable price.

## **CHAPTER 5**

### **5.0 IMPLEMENTATION**

#### **5.1 Course overview**

After doing an evaluation of OFM organization, it was identified that, some gaps on education where farmers were lacking new or improved technologies in cassava production. NARI have recommended some cassava brown streak disease control strategies. Therefore, this evaluation will cover the gaps by conducting trainings to the farming communities in order to disseminate CBSD management strategies. Together with the training on CBSD, it would be good if farmers will also be taught on the proper methods on cassava post – harvest-processing techniques, financial management and book keeping. This will be targeted to women who are the main food processors in the household. CBSD is a major constraint to the expansion of cassava processing in several ways:

1. Loss of varieties with good qualities for processing
2. Patches of root necrosis may need to be removed from the roots before grating
3. Root necrosis impairs the drying process and gives a poor-quality flour (it is said that even small areas of necrosis can adversely affect the whole root in this respect)
4. Roots affected by CBSD cannot be sold to processors hence loss of income.

This training is aimed at reaching more farmers in parts where the project has been less active to date. Therefore, in order to cover the above, the training manual is developed which, will consist of course outline, course content as well as some guidelines on how to conduct the course. The outline of the course will be as follows:

## **PART I:**

### **5.2 CBSD training outline - THEORY**

#### **5.2.1 General introduction**

- Objective of the course: “Technology dissemination to farmers”
- Importance of Cassava in the southern Zone and its uses.

#### **5.2.2 Draw backs / production constraints in cassava production**

Diseases

(1) CBSD (2)CMD

The major drawback in the use of cassava is: -

Cyanogenic compounds (need proper post – harvest processing) and pests like: mealy bugs, green mites, white flies and storage pests.

#### **5.2.3 Cassava production general:**

Ecology, cassava field management practices, pests and diseases.

#### **5.2.4 Cassava brown streak disease.**

- (i) Distribution
- (ii) Losses due to CBSD
- (iii) How can the disease be recognized?

- (a) On the leaves
- (b) On the roots
- (c) On stems.
- (iv) What causes the disease?
- (v) Where does the infection come from? (Spread)
- (vi) How can CBSD be controlled? This includes important technologies on CBSD management strategies i.e. Use of disease free planting materials, uprooting, Use of tolerant varieties and burning.

NB: Posters and leaflets will be used and distributed to farmers, choirs and radio broadcasting, planting material will be distributed. This theory part is expected to take about 12 – 18 hours (approximately 3 days).

### **5.2.5 Practicals on CBSD management strategies**

Field practical to participants to show them how the disease looks like in the field, and the practice on the control strategies. The practical is expected to take about 2 days.

## **PART II**

### **5.3 Cassava post-harvest processing techniques**

#### **5.3.1 Introduction**

##### **1. Cassava processing**

- Understand the need for processing



- Know cassava types and their associated products.

2. Objective of post – harvest processing
3. Importance of cassava post - harvest processing.
4. Expected out put/outcome

### **5.3.2 Different ways to process cassava.**

1. Factors influencing removal of cyanogens / Critical steps in cassava processing
2. Constrains of Traditional cassava flour.

(i) Time factor and (ii) Quality

3. Cassava flour production by using labor saving technologies.

- We are trying to promote 2 improved methods

(1) Chipping technology

(2) Grating technology

- Understand features of processing equipment.
  - How to use/operate the processing machines.
4. Understand simple procedures for cleaning the equipment after use.
  5. Storage of Dried cassava i.e. handling of products processed by the machines.
  6. Comparison between Traditional cassava chips drying and improved cassava chips drying.
  7. Processing in large scale.
  8. Hygiene.
  9. Sources and costs of machines.

Source: Intermech Engineering Ltd Morogoro.

**Costs:**

Motorized grater	=	780,000/=
Motorized chipper	=	650,000/=
A press	=	250,000/=

**10. Gari making**

- What is it? Its importance
- Steps for making gari and its storage

**5.3.3 Cassava utilization**

1. For human consumption
2. For livestock feed
3. For utilization in industries

**5.3.4 Cassava product development**

- How to prepare different types of recipe from Cassava flour e.g. cakes, biscuits and chinchins
- Requirement / ingredients for different types of products.
- Understand how to make correct measurements of the needed ingredients
- Understand the procedure for preparing different products

Cassava processing in general is expected to take about 7 – 10 days.

#### **5.4 Training programme for cbds to farmer groups in the Roman Catholic Church Diocese of TUNDURU - Masasi**

##### **Introduction:**

The adoption and implementation of the Structural Adjustment and Economic Recovery Reforms have led to the shift from the central controls of economy to liberalized market economy. This has in turn lead to the needs and demands for skills and skilled labour.

The training for farmers among others arose from the study, which was conducted concerning needs assessment for the NGO in year 2003. The course programme is designed to address farmer's problems on CBSD in the NGO and the Southern zone in general. The course is practical oriented and aspects of cassava post harvest handling techniques, financial management and book keeping have been incorporated to enable farmers to work more independently with minimum supervision and to undertake profitable and sustainable agricultural production.

##### **[i] The training for CBSD management:**

Time (Hours):	Theory	18.5
	<u>Practical</u>	<u>31.5</u>
	<u><b>Total</b></u>	<u><b>50</b></u>

##### **Aim:**

To teach farmers improved crop production techniques so that they can use the knowledge and skills in cassava production.

##### **The objective of this course:**

To raise or grow cassava crop using modern husbandry practices.

In this course, farmers will be shown CBSD symptoms and management of the disease through different ways like uprooting, use of disease free planting materials and tolerant varieties to CBSD. Farmers will get a theory part of it and more of practical skills will be acquired from the fields.

### **[ii] Improved cassava processing and utilization**

**Aim:** To train farmers on improved cassava processing and utilization technologies

**Objectives:**

- To train farmers on preparation of new products from cassava
- To introduce to farmers improved cassava processing equipment
- To train farmers on safe and hygienic cassava processing techniques

The training will be conducted through demonstrations on the use of the improved cassava processing machines and preparations of different cassava products.

The training on CBSD control strategies will enable farmers to know how to identify disease symptoms and take appropriate control measures. CBSD is also known to be a post-harvest issue in the sense that it reduces the crop quality. Infected roots if processed may give a farmer a poor quality product. Therefore, farmers need to identify infected roots so that they can be isolated from being processed for better quality product.

Improved cassava post-harvest processing techniques, will help farmers add value to cassava products which will be of high quality and fetch higher prices compared to traditionally processed cassava.

## **5.5 Course evaluation**

**Purpose:** To evaluate the training

**Time:** 45 minutes

The participants will need to evaluate the training itself, what they have learnt by identifying the strengths and weaknesses, which will lead to suggestions for improvement in later programmes. This will be done at the end of the course despite the fact that, everyday during the course there should be some sort of evaluations taking place to improve the course content or procedures and methods used in conducting the training.

In designing the evaluation at the end of the course, one may adopt the format as follows:

- Which Topics were most useful?
- Which other training aspects of the training were most useful?
- Which topics were least useful?
- Other comments and observations

Due to the explanations above the expected duration for the training will be about a month (30 days) which includes 20 and 10 days for actual training and traveling as well as other logistics respectively. Two people will be facilitating the training programme. In order to carry out this programme effectively. There should be some requirements.

Table 11: List of budget items

<b>Budget items</b>	<b>Estimated cost</b>
Materials	30,446,350
Transport	1,550,000
Food and beverages	1,478,400
Services	90,000
Per diem	1,300,000
Other	3,000,000
<b>Total</b>	<b>37,864,750</b>

A detailed list of equipment can be seen in Annex VII

A time line of activities is also shown in Annex VIII.

## **5.6 Monitoring and evaluation (M&E)**

Planning, monitoring and evaluation of development projects are frequently treated as separate activities and carried out with little or no input from the project participants.

Projects are planned by outsiders, taken to the village where they are implemented, and after some time outsiders evaluate the project again. This top-down approach to development has main shortcomings:

- Projects may not be appropriate to the needs of the community since were not involved in planning,
- Community members may not fully understand the purpose of the project and not feel ownership or responsibility since they were not involved in designing it , and

- Evaluation and monitoring of project activities are often wasteful of time and other resources because they are not treated as an integral part of the project implementation process.

Participatory appraisal offers a wide range of techniques, which facilitate involvement of the community in all aspects of the project design, implementation, monitoring and evaluation. This ensures that the community is empowered and takes a stronger interest and larger role in their development activities.

It has been noted from the beginning that the training need came from farmers themselves. Therefore farmers were actively involved in the project cycle which started from problem identification and planning. It is expected to be the same in implementation, monitoring and evaluation. Monitoring is the routine collection, analysis and use of information about the progress of the project or activity while evaluation is the periodic assessment of the extent to which the objectives of an activity or project have been accomplished. This shows that the different elements of the project cycle are seen as integral parts of the whole process and not as isolated activities done by different people. Seeing M&E as an integrated support to those involved requires:

- Creating M&E processes that lead to clear and regular learning for all those involved in the programme operations.
- Understand the links between M&E and management functions (esp (especially decision making)).

- Using existing processes of learning, communication and decision making amongst stakeholders as the basis for programme oriented M&E.
- Putting in place the necessary conditions and capacities for M&E to be carried out. These capacities include:
  - Human capacity for M&E
  - Incentives for carrying out M&E
  - Organization/programme structures
  - Information management systems and
  - Financial resources

The key parts of the M&E system include:

1. Designing and setting up the M&E system
2. Gathering and managing information
3. Reflecting critically to improve actions
4. Communicating and reporting results

Monitoring will be a continuous process in this programme where progress reports will be written. Final evaluation of the programme will be done 5 years after the training has been conducted to farmers. This will be planned to take about three to four weeks from preparation for data collection to report writing and presentation.



Data gathering will be done through different PRA tools like Review of secondary sources, direct observations, and focused group discussions, construction of diagrams, innovation assessment and use of semi-structured interviews (Annex IX)

Therefore the M&E system is an integrated system for reflection and communication that supports project/programme implementation, so more than the more formal and data – oriented side of M&E. The tasks of designing and implementing information gathering and reflective learning processes help to generate insights that help to improve operations and strategic directions.

## **5.7 How to use this manual**

The course material in this training manual consists of the course outline and the training programme. It is important to be clear about the following points regarding adaptation of the material, preparing yourself for each session and the actual conduct of the session:

### **5.7.1 Adapting the material**

You should first read through the complete set of session guides and decide what parts of it are appropriate for the particular group whom you are to train. It is possible, though unlikely, that the complete course can be run as outlined in the guidelines, without any modifications except for the obvious changes to names and currency. It is more likely that:

- only certain sessions or parts of sessions can be used
- modifications will have to be made to the sessions which will be used

- some entirely different sessions will have to be included, to cover topics which have been omitted from this guide.

Think of locally familiar examples to illustrate the points made during the session, and make a note of them in the margin of the session guide. Do not treat this manual as a book which should be respected and taken as the source of everything you need; it is a resource, to use or not to use as you think fit, and you should 'make it your own' by writing in it, adding to it and, eventually, discarding it because you might have developed your own personal manual/material which is fully appropriate for the group with whom you are working.

### **5.7.2 Preparing for the sessions**

#### **Equipment**

The only equipment you really need is a blackboard. The handouts, suitably modified, should be typed and duplicated before the course begins, and this can be done by a local printer or typing service if you do not have suitable facilities at your institution.

The sessions where small group preparation is suggested should be used not only to teach the topics which they cover but also as an opportunity to develop participants' self-confidence and ability to make effective presentations. Elaborate educational equipment such as a video recorder is useful, but by no means essential, and it can form a barrier between the participants and the instructor. A well managed participative learning session held under a tree without even the benefit of tables and chairs can be a great deal more effective than a poorly-managed session using all sorts of equipment!

### **5.7.3 Conducting the sessions**

At the beginning of each session you should have a clear idea of the conclusions to which you wish to lead participants, but you must also be ready to follow a quite different line if this appears appropriate. At the end of the session, participants should feel that they themselves have produced whatever conclusions they have reached. You, the trainer, will have done your job well if your own contribution has been tactfully to steer the participants, while they feel that they are in fact in charge.

Ensure that every participant understands what is being said; some women learn without making any personal contributions, while others tend to dominate the sessions, without themselves learning anything. It is your task to moderate the proceedings, so that everyone gets an opportunity to contribute, and those who do not understand, and are too shy to admit it, are identified and assisted as needed.

When dividing the group into smaller subgroups, be sure that everyone has a chance to learn and to contribute her views. When participants are working in groups, it is particularly important to ensure that any figure work is not done by one member who already has the necessary skills, while the others learn nothing.

Some trainers believe that participative sessions such as these are far easier for them than traditional lectures, because most of the ideas are elicited from the participants rather than being stated by the trainer. They are wrong; sessions such as these require more rather

than less preparation if they are to be effective. The trainer must have the confidence to admit that she/he, too, can and must learn, with the participants, rather than pretending that she knows everything and they must only learn from her.

#### **5.7.4 Duration of the sessions**

Each session guide gives the estimated duration of the session, based on our experience. When you prepare a session you should split it into its different steps and activities, estimate the time for each of these steps, allow enough time for questions, discussions, group work and report-back. Take the total of your estimates as being the time for each session, rather than relying on the times given in the manual.

The actual timetable must, of course, be designed to be convenient for the participants who are attending the course. Every trainer must put together a timetable herself which fits the material she proposes to use, and, more important, fits into the time that the group have available.

#### **5.7.5 Handouts**

Summary handouts are included after most session guides. These should be suitably changed where necessary, reproduced and distributed to participants at the *end* of the session to which they refer.

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