University of Dar es Salaam
Institute of Resource Assessment

Strengthening Local Agricultural Innovation Systems in Less Favoured and More Favoured Areas of Tanzania and Malawi to Adapt to the Challenges and Opportunities Arising from Climate Change and Variability

STAKEHOLDER CONSULTATION SURVEY REPORT
FOR NJOMBE AND MUFINDI DISTRICT IN IRINGA REGION

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Preface

In many sub-Saharan African countries, poverty and food insecurity are linked to low agricultural productivity which accelerating climate change (CC) threatens to make even worse. In Tanzania and Malawi, a key challenge for decision makers is to understand the context and strategies of farmers and other stakeholders in agriculture for adapting to CC, including increasingly variable climatic conditions. Diverse farming environments and complexities associated with the context of peoples' livelihoods varying over time and space suggest a need for localised innovation to enhance and sustain productivity. There is therefore a need to foster processes for two-way communication and engagement amongst these stakeholders and for supporting their information and other needs in order to strengthen farmers' and other stakeholders' capacities to adapt. It is in this line that consultations with key stakeholders was undertaken to understand the agricultural innovation system in the context of climate change and variability. This was done as a way to contribute to the project overall aim of strengthening the capacity of individuals, organizations and systems within the agricultural innovation systems in Tanzania and Malawi to adapt to the challenges and opportunities arising from climate change and variability (CC & V).

Acknowledgements

The stakeholder consultations in Njombe and Mufindi Districts were carried out with a team of two researchers (Dr. Emma Liwenga and Ms. Madaka Tumbo), from the Institute of Resource Assessment (IRA), University of

Dar es Salaam. The team worked in close collaboration with agricultural extension staff from District and Ward levels in the respective districts. The team highly appreciate the support provided from the DALDOs in Njombe and Mufindi Districts for organizing the consultations and taking part in this exercise.

The team also wish to take this opportunity to thank all the stakeholders in the study area for their time and enriching discussions. In the course of these consultations, all of the consulted stakeholders have developed keen interest in this study and willing to take part in initiatives involving climate change and variability. The survey involved consultations with 20 stakeholders from various domains in a range of agricultural innovation systems. Special thanks are extended to the consulted stakeholders in the following domains: the NGOs, Private sectors, public domain (especially with agricultural extension workers and village government), financial institutions and last but not least the community groups.

Summary

The overall objective was to understand the roles and activities in relation to agricultural innovation system. The consultations further aimed at understanding their current perceptions and practices regarding CC&V and adaptation; Identify patterns of interaction, including relationships; Examine enabling environments and Identify possible individuals and organizations to work with the project eg in NCG and/or as part of Learning Alliance. The report provides a synthesis of information obtained from consultations with various stakeholders in Njombe and Mufindi Districts; in the southern highlands of Tanzania.

The survey involved 20 stakeholders from various domains in a range of agricultural innovation systems. The consulted stakeholders lie in the following domains: the NGOs, Private sectors, public domain (especially with agricultural extension workers and village government), financial institutions and the community groups.

The survey was guided by a checklist, which was developed based on the Innovation System (IS) framework in combination with sustainable livelihood frameworks. This combination provided a conceptual frame and a learning alliance approach to guide our action research. The project builds on: Trans-disciplinary partnerships and initiatives in agriculture and natural resources; Tanzania's and Malawi's NAPAs (National Adaptation Programmes of Action), which prioritize agriculture; Farmers' livelihood strategies in relation to CC; and other agricultural stakeholders' (public & private) strategies.

The findings indicate that most of the stakeholders have some level of understanding with regard to issues related to climate change and variability and agree that this is a priority issues as far as their livelihoods are concerned. However, it was established that there was very little awareness with regard to the country's NAPA to guide the adaptation to changing climate in their respective areas. Nevertheless, to some extent there was some levels of interactions among various stakeholder with regard to sharing and understanding farmers situation. Among the strength of the agricultural; innovation system for adapting to CC & V include a variety of key institutions and a willing community. The CCAA project was also singled out as the key institution to facilitate these linkages and information sharing with regard to issues related to climate change and variability.

Acronyms and abbreviations

AGM	Annual general meetings
AMCOS	Agricultural Marketing Cooperative Society
ARD	Agriculture and Rural Development
CARITAS	
CC & V	Climate Change and Variability
DALDO	District Agricultural and Livestock Development Officer
INCOMET	
IRA	Institute of Resource Assessment
IS	Innovation System
MuCoBa	Mufindi Community Bank
NAPA	National Adaptation Program of Action
NCG	National Consultative Group
NGO	Non Governmental Organizations
SACCOS	Savings and Credit Co-Operatives
SHILDA	Southern highlands Livestock Development Association of Tanzania
TFA	Tanzania Farmers Association
WAEO	Ward Agricultural Extension Officer

1. INTRODUCTION

1.1 Background

Stakeholder consultations involved Njombe and Mufindi Districts including the selected villages, which are Nyombo and Mwitikilwa in each district respectively. The study area is situated in the Southern Highlands of Tanzania, whereby more than 90% of the people live in rural area and depending on agriculture and livestock keeping as their major economic activities. The villages lie in the highlands zone at an altitude of above 1,600 metres above sea level. The temperatures are often below 15°C with rainfall ranging between 1,000mm to 1,600mm per year for about 200 to 280 days in a year.

1.2 Aims

The objectives of the consultation survey were to:

- Identify key stakeholders, their roles and activities in relation to agricultural innovation system and CC &V;
- Understand key stakeholders' current perceptions and practices regarding CC&V and adaptation;
- Identify patterns of interaction, including relationships;
- Examine enabling environments (policies, infrastructure, informal institutions, and incentives);
- Identify possible individuals and organizations to work with the project eg in NCG and/or as part of Learning Alliance.

1.3 Approach

The survey was guided by a checklist, which was developed based on the Innovation System (IS) framework. An Innovation System (IS) is defined as a 'network of organizations, enterprises and individuals focused on bringing new products, new processes and new forms of organization into economic use, together with the institutions and policies that affect their behaviour and performance' (Agricultural and Rural Development -ARD World Bank 2006). A combination of a sustainable livelihoods framework and innovations systems thinking provide a conceptual frame and a learning alliance approach will guide our action research. The project builds on: Trans-disciplinary partnerships and initiatives in agriculture and natural resources; Tanzania's and Malawi's NAPAs (National Adaptation Programmes of Action), which prioritize agriculture; Farmers' livelihood strategies in relation to CC; and other agricultural stakeholders' (public & private) strategies.

The Innovation Systems concept, although originating from policy debate in more industrialized countries in the 1970s and 1980s, still provides useful insights into strengthening agricultural innovation capacity in developing countries. It is envisaged that the framework will be of benefit to our project because the emphasis of the approach is not only on professional scientists but the totality and interaction of actors involved in innovation.

The IS concept moves beyond the creation of knowledge and encompasses factors affecting demand for and use of knowledge in novel and useful ways (Arnold and Bell, 2001).

Although there is increasing interest in the IS concept as a means of understanding agricultural innovation in developing countries, approaches to applying the concept to interventions are still being explored. In the World Bank ARD (2006) study, an analytical framework for the IS concept was developed and included four main elements: 1) key actors and their roles 2) the actors' attitudes and practices 3) the effects and characteristics of patterns of interaction and 4) the enabling environment for innovation. The same study suggests an intervention framework comprising: 1) A typology of agricultural innovation environments which helps in the analysis of IS in a particular context 2) Diagnostic features for each stage of IS development 3) Principles for intervention and 4) Options for interventions. The consultations thus drew on elements of the IS concept and the World Bank ARD approach.

Consultations involved the following stakeholders in the following domains:

- NGOs - SHILDA (Njombe), CARITAS (Njombe) and INCOMET (Mufindi)
- Private Input suppliers – TFA (Njombe and Mufindi), AS Agriculture Chemicals (Njombe), Stephano Godfrey Store (Mufindi) and Mnyang'anda Agro Suppliers (Njombe)
- Public sector (Extension staff) at District and Ward level & village government in Nyombo and Mwitikilwa
- Financial Institutions (Njombe & Mufindi) and AMCOS in Nyombo village
- Community groups in Nyombo and Mwitikilwa village

2. FINDINGS

2.1 Range of stakeholders and grouping (see appendix 2 below) (Qs 2 and 3)

Table 2.1.1 Classification of stakeholders consulted by sector, location and prime role with respect to agricultural innovation and CC&V in Southern Highlands

Sector+	**Prime role++ *(be detailed)***	**Location+++**	**No. Consulted**
NGO	SHILDA (Njombe) – Improve livestock production through extension work & capacity building CARITAS (Njombe) – To improve livelihood through good agricultural practices. INCOMET (Mufindi)- To improve livelihood through agriculture, small scale business, vocational training.	Southern Highlands	3
Private Stockist / input supply	Tanzania Farmers Association - TFA (Njombe & Mufindi) AS Agriculture Chemicals (Njombe) Stephano Godfrey Store (Mufindi) Mnyang'anda Agro Suppliers (Njombe) (Role: Supply and sale of agricultural inputs)	Southern Highlands	5
Public (Extension)	Ward Agricultural Extension Officers (Ikuna Ward – Njombe & Ifwagi Ward – Mufindi) District Agricultural Extension Officers (Njombe & Mufindi) (Role: Educating farmers & livestock keepers; Linking farmers, researchers & extension workers)	Southern Highlands	4
Public (Village govt)	Nyombo & Mwitikilwa (Role: Organize & manage village development goals)	Southern Highlands	2
Financial Institutions	SACCOS (Nyombo – Njombe; Ifwagi – Mufindi) – Provide saving & credit services to local communities) AMCOS (Nyombo – Njombe) – Support cooperatives initiatives & Supply of agricultural inputs)	Southern Highlands	3
Community Groups	Nguvukazi Group (Nyombo, Njombe) Piggery Group (Mwitikilwa, Mufindi) Tree & Tea Nurseries (Mwitikilwa, Mufindi) (Promote livelihood activities & environmental conservation)	Southern Highlands	3

+ eg NGO, private, public

++ E.g. Not for profit Extension/ seed provision, Distributing/ retailing inputs, commercial input supply to intermediaries, extension, policy, regulation, funding, research

+++ E.g. S.Highlands, Central Zone, Dar es Salaam,

For the purposes of this report, the stakeholders consulted are grouped as follows:
See Appendix 2 for suggestions.

2.2 Aims, interests and activities of stakeholders (Qs 2 and 3)

Characterize the main stakeholder groups according to their overall aims, interests and activities. Emphasis on what the stakeholders in a group have in common whilst also explaining variability within the group. This could be done through 1-3 paragraphs on each stakeholder group

2.2.1 NGO

INCOMET 2001 is a non-governmental organisation based in Mufindi district. Its activities concentrates on capacitating farmers, women, micro entrepreneurs and youth through self initiated groups and demand-driven training in agriculture, livestock, business development and vocational education.

CARITAS -Njombe is the Catholic Agency for International Aid and Development. Their activity focuses on key areas in the long-term development philosophy and the goals of the Development Vision 2025 Tanzania. The main aim of this agency is to improve communities' livelihoods income generating activities such as beekeeping, livestock keeping and planting fruit trees. Apart from income generating activities CARITA provides education on good agricultural practices through the use of contour farming (*makinga maji*).

SHILDA stands for Southern highlands Livestock Development Association of Tanzania. It is a non-profit organization and it was registered on 23rd October 2002 as an association. The main aim of SHILDA is to Support livestock keepers and their informal and formal organizations; Provide and/or facilitate technical advice in the field of livestock production as well as processing and marketing of livestock products; Facilitate integration of livestock keepers' interests in the plans of local government authorities and policies at national level; Provide and/or facilitate advice in socio-economic fields related to rural livelihood, including farm household economics, gender and HIV/AIDS

2.2.2 PRIVATE STOCKIST

The main aim of this group is to sell and distribute agricultural inputs to farmers on business basis.
X
X
x

2.2.3 EXTENSION SERVICES

The main aim of this group is to improve the delivery of extension services to smallholder farmers for increasing their incomes and productivity, while also improving relevance, sustainability, and cost effectiveness. Main activities involve;

- Provide education to farmers and livestock keepers on good agricultural practices
- Linking farmers, researchers and other stakeholders in improving agricultural development and good land use/ soil conservation activities
- Providing extension services to various stakeholders within the district and outside the district through workshop, training and field work facilitations

2.2.4 VILLAGE GOVERNMENT

The main aim of village governments is to organise and manage village development goals. Main activities involve;

- Building classrooms and house for primary and secondary schools
- Provide environmental education and soil conservation to village members

2.2.5 FINANCIAL INSTITUTIONS (SACCOS, AMCOS)

Savings and Credit Co-Operatives (SACCOs) established by local communities with the aim of transforming the lives of rural communities in Nyombo and Mwitikilwa villages. The savings and credit scheme operates along principals that an applicant loan approval based upon an ability to save funds over the preceding months. The main activities of SACCOS are to provide loan, saving and crediting (*kuwekeza amana na hisa*).

AMCOS stands for Agricultural Marketing Cooperative Societies. Main activities involve distribution of agricultural inputs (fertilizers, seeds, pesticides) and to provide Marketing services for smallholder farmers.

2.2.6 COMMUNITY GROUPS

It is well known that the smallholder farmers who comprise the majority of the rural poor need effective production support and marketing services through diversification of socio-economic activities. Community groups (piggery, tree nursery, sunflower) have been the main channels for improving communities' livelihoods in Nyombo and Mwitikilwa villages. The main aim of these groups is to improve communities' livelihoods through diversified economic activities such as sunflower crop development, piggery, and tree and tea nursery planting.

2.3 Aims, interests and activities of stakeholders with respect to CC &V and agricultural innovation (Qs 4, 6, 7, 15, 20)

Characterize the main stakeholder groups according to their **specific** aims, interests and activities in relation to CC&V and agricultural innovation. Emphasis on what the stakeholders in a group have in common whilst also explaining variability within the group. This could be done through 1-3 paragraphs on each stakeholder group. This would include any experiences in climate change e.g. other projects they have been involved in.

Generally, stakeholders agreed to have experienced changes / variations in the climate within their areas of operations. Changes includes increase in temperature, changes in rain season, in the past short rains used to come between late October and mid November, in recent years short rains starts December and sometimes January. Also they used to have dry spells between January and February, but in recent year the dry spells is missing that is they have rain during this period which is very destructives to crops such as beans and maize.

2.3.1 NGOs

Experienced climate change and variability on their areas of operation. The more pronounced ones are changes in rain season, increase in temperature. They have been linking these changes with deforestation and bad agricultural practices. Therefore they put more emphasis on afforestation programmes, good agricultural practices (the use of organic manure), and decrease in number of livestock's. Moreover activities have been more on building capacity on different activities that help local communities to cope with impacts of extreme events (floods and droughts), and livelihood diversification activities (e.g. Promotion of hibiscus flower for tea making, and sunflower for commercial purposes. Promotion of drought resistant is also done by NGO.

The primary beneficiaries of NGO activities are the local communities in their areas of operation, input suppliers and district councils including the village government.

2.3.2 Private

There has been a decrease in rainfall, which is highly unpredictable, short rain start late in recent years. Short rains used to start late October-mid November but in recent years they start mid December and sometimes in January. Also there is a very big increase in temperature unlike in the past where it used to be very cold. Due to an increase in these events it has been hard for farmers to make decisions on when to cultivate and what kind of seeds to be planted for particular season. These lead to a decrease in profit in the business they do, since it mainly depends on farmers. Since they have little knowledge on the science of climate change and variability and its associated impacts on agriculture, it is hard to make adjustments on their activities and advise farmers. Main beneficiaries of their services are farmers.

2.3.3 Extension

Agreed to have experienced climatic changes in terms of changes in rain season, increase in rainfall intensity this leads to foot and mouth disease (FMD) for cattle, goat and sheep. Though they have little knowledge on the science of climate change and its linkage to agricultural productivity, they do provide on planting dates, and kind of crops to be grown based on past experiences. They also promote good agricultural practices and crop and livelihood activities diversification and environmental conservation. The main beneficiaries of their activities are farmers and input suppliers.

2.3.4 Village government

Experienced climate changes, especially an increase in temperature and changes in rain seasons. Also there is an increase in rain intensity and rain hours. This leads to stunted growth of crops especially maize (water logging/inundation). There is an increase in malaria cases and mosquitoes unlike in the past. Moreover intense rainfall leads to destruction of roads, bridges, and topsoils. Crop production costs go high. Runoff washes soil nutrients lead to low crop yield. The village is putting more emphasis on crop diversification and planting beans for soil nutrients replacement/restoration and sunflower cultivation for commercial purposes. Also they facilitate afforestation programmes for environmental conservation purposes, business and wind breaking. Moreover the village government help in supplying subsidised inputs to local communities, and promote the use of farmyard manure and early maturing and drought resistant crops. The main beneficiaries of their activities are local communities and the government of Tanzania.

2.3.5 Financial

Experienced a slight increase in temperature unlike previous years where it used to be cold and sometimes they experienced frost. This has been observed since 1998 onwards. Prolonged rainfall during January and February where they used to have dry spells. These rains have lead to destruction of crops such as beans and maize planted during short rains. Apart from prolonged rainfall, rain season are unpredictable in recent years. Sometimes they have experienced very intense rainfall in short time and leads to destruction of house, road and infrastructure.

Our activities depend on farmer's ability to save and obtain credit. Poor crop production makes hard for farmers to return credit. Also due to unpredictable rainfall, it is hard for farmers to make decision regarding whether or not to take credit for agricultural activities. This makes hard for AMCOS to order and distribute agricultural inputs on time. At first their activities focuses on saving and credit services, but due to recent climate changes especially changes in rain season, they have started to provide education on good agricultural practices and livelihood diversification activities. More emphasis is put on crops that cope with the current climatic situation though they are lacking knowledge on what kind of crops to be planted for a given climate. They also provide education on environmental conservation and marketing of their crops.

The main beneficiaries for financial institutions activities are local communities and public workers like teachers and nurses in areas of operation. Some of SACOSS members have been able to build good houses and pay schools fees.

2.3.6 Community groups

Prolonged rainfall has led to stunted rainfall and eventually crop failure. Also they have experienced changes in rain season and an increase in temperature. The main activities are agriculture, which mainly is rainfed, with increased variation in rain season and increased intense rainfall, leads to poor crop production and sometimes-total failure to produce depending on farmland one holds. Local communities have plans to diversify their activities that are moving from agricultural activities to small businesses and animal husbandry and tree planting for business purposes. The main beneficiaries of their activities are the community groups themselves. The main influence of these groups is to improve their income and to reduce income poverty.

2.4 Perceptions of the climate situation in the area the organisation operates (Qs 4, 5, 8, 9, 10)

Table 2.4.1 Perceptions of importance of CC and V issues by stakeholder group (Q5)

	Stakeholders groups					
	NGOs	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
V. Important	√	√		√		
Important			√		√	√
Slightly important						
Not important						
Total						

Table 2.4.2. Perceptions of CC and V by element and associated indicators of change by stakeholder group (Q4)

	Stakeholders groups					
Element of change	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Rainfall	Rain season is highly unpredictable in recent years.	There is a shift in rain season rainfall season is much shorter than in the past for example sinces its onset on November 2007, it still raining until now stops by mid May. This has been very destructive to crops such as maize, and beans	There are changes in rainfall in terms of total amount of precipitation received, its frequency of recurrence, and persistence of wet season	There has been persistence of wet season even during months of January and February where they used to have dry spells		There is changes in onset and duration of the rainy season, rain season used to start late October-15 November but now the season has shifted, short rains start in December and sometimes in January. They used to have dry spells in January and February.
Temperature				There is a slight increase in temperature, in the past they used to have frost		There is a slight increase in temperature, in the past they used to have frost
Diseases				Increase in malaria cases		Increase in malaria cases

Table 2.4.3. Perceptions of who is vulnerable to CC and V and why by stakeholder group (Q8)

	Stakeholders groups					
Vulnerable groups identified	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Women, Widows, poor	-Do not own land and livestock -Women are supposed to take of family matters (water, firewood, food) take care of children	Children are more vulnerable to diseases during extreme events	Farmers especially the ones depending on maize because too much rain is detrimental to the crops			
Small scale farmers	-They own small land for agricultural activities -Do not grow variety of crops that is they depend on single crop for their livelihoods		Farmers especially the ones depending on maize because too much rain is detrimental to the crops		Farmers especially the ones depending on maize because too much rain is detrimental to the crops	
Livestock keepers	Livestock are affected by diseases during heavy rainfall (foot and mouth disease		Livestock are affected by diseases during heavy rainfall (foot and mouth disease			Livestock are affected by diseases during heavy rainfall (foot and mouth disease

Table 2.4.4. Perceptions of how different groups are adapting to CC and V by stakeholder group (Q9)

	Stakeholders groups					
Groups identified	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
E.g. Women and children and the poor	-Small scale businesses like Selling vitumbua and bagia, and local brew -Selling weaving products to earn money for buying food	Depend on relief services from churches, government and NGOs	-Small scale businesses like Selling vitumbua and bagia, and local brew -Selling weaving products to earn money for buying food	Cultivate on vinyungu -Selling labour on large scale farmers -Temporary jobs on tea and timber companies -Sell horticultural products	-Engage on small scale business -Selling labour	- Depend on relief services from churches, government and NGOs -Small scale businesses like Selling vitumbua and bagia, and local brew -Selling weaving

						products to earn money for buying food -Livestock keeping (pig and local chicken)
Small Scale Farmers	-Cultivate on vinyungu -Sell labour on large scale farmers -Temporary jobs on tea and timber companies		-Cultivate on vinyungu -Sell labour on large scale farmers -Temporary jobs on tea and timber companies	-Cultivate on vinyungu -Sell labour on large scale farmers -Temporary jobs on tea and timber companies	-Cultivate on vinyungu -Sell labour on large scale farmers -Temporary jobs on tea and timber companies	-Cultivate on vinyungu -Sell labour on large scale farmers -Temporary jobs on tea and timber companies -Sell horticultural products -Animal husbandry (piggery)

Table 2.4.5. Perceptions of how other organizations/ stakeholders are making changes in response to CC and V by stakeholder group (Q10)

	Stakeholders groups					
Organizations/ stakeholders	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
District council	Facilitate farmers to plant early maturing crops		Facilitate farmers to plant early maturing crops			
Natural resources department	Facilitate environmental conservation measures					Environmental conservation and trees planting

2.5 Trends in agricultural innovation systems (various Qs)

[Text summarising interview findings]

An Innovation System (IS) may be defined as a 'network of organizations, enterprises and individuals focused on bringing new products, new processes and new forms of organization into economic use, together with the institutions and policies that affect their behaviour and performance' (Agricultural and Rural Development –ARD World Bank 2006). Following this definition, it is hard to establish trends in agricultural innovation systems in southern highlands since almost all stakeholders consulted work separately to fulfill their organization goals and aims. Agricultural activities involve distribution of agricultural inputs and provision of credits for agricultural activities this is mainly done by SACOSS, AMCOS and input suppliers. The village government facilitates good agricultural practices with other stakeholders in agricultural sector.

Service providers (agricultural extension officers and NGOs) in most cases work together on educating and advising farmers on good agricultural practices such as demonstrations on planting and use of drought resistant crops, conservation of water sources and animal husbandry.

2.6 Patterns of interaction & relationships between stakeholders (Qs 11, 12, 13, 14)

Table 2.6.1. Approaches for sharing and understanding information on farmers' situation and how they could be improved (Q11 and 12)

	Stakeholders groups					
Approaches	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Village Meetings	Village meetings, focus group discussions Details on approaches, local communities and facilitators from NGOs sit together and discuss issues regarding agriculture and environmental activities and other developmental issues		They use village meetings to deliver information to farmers and other agricultural stakeholders	Organise village meeting where all local communities and the village government leaders and committees meet and share information	They organise village meetings where all village members participate. But they also have meetings for SACCOS/AMCOS members	They share information through village meeting, farm field school groups, and development groups: This can be improved by having village calendars
Workshops/trainings	Organise different workshop to educate farmers on various issues regarding good agricultural practices and environmental conservation: This can be improved through Field visits and action research		In collaboration with other stakeholders, they conduct various trainings on good agricultural practices/soil conservation measure Farm field school tours			
Flyers	Distribute flyers which explain our activities to farmers and other stakeholders	They distribute flyers to farmers as means of advertisement especially				

		when new product is being introduced		
Mobile phone	Share information among stakeholders, extension officers and sometimes farmers	Communicate input supplies companies in different parts of the country		
Internet	Communication with other stakeholders within and outside our areas of operation			
Annual general meetings	During AGM they usually share information on opportunities and achievements of the organisations, various stakeholders including farmers participate in this meeting			During AGM they usually share information on opportunities and achievements
Personal communication		Usually share information with farmers and other stakeholders through personal communication when farmers come to buy inputs in their shop		
Billboards				Billboards are used to sensitise communities to join SACCOS

Table 2.6.2. Approaches for sharing and understanding information on other stakeholder's situation (Q11)

	Stakeholders groups					
Other stakeholders	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Meeting	√	√	√	√	√	√
Flyers	√	√				
Mobile phone	√	√	√		√	
Internet	√					
Personal coomunications	√			√	√	√
Letter	√		√	√	√	√
Ngoma				√		√

Table 2.6.3. How approaches for sharing and understanding information on other stakeholders' situation could be improved (Q12)

	Stakeholders groups					
Stakeholders	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Field visit			Community groups can be taken to *nanenane* and *sabasaba* demonstrations to learn and exchange idea with other groups			
Television and Radio				Village TV and radio will help on getting information on weather prediction, also can be used to learn from other peoples experiences through radio and television		Village TV and radio will help on getting information on weather prediction, also can be used to learn from other peoples experiences through radio and television
Cellophane				Cellophane will improve easy communication in the village instead of calling a meeting, some urgent matters can be communication through phone	Can be used to learn	Cellophane will improve easy communication in the village instead of calling a meeting, some urgent matters can be communication through phone
Use of national	Instead of having		National festivals e.g. *nanenane*			

festival	national festival at regional and districts levels, something should be done at village levels	can be used as means of communication among all stakeholders. Efforts should be made to make sure that many groups including local communities participate and learn new technologies for agricultural practices

Table 2.6.4. Examples of links between stakeholders consulted and other stakeholders (Q13)

	Stakeholder groups consulted						
Stated links	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**	**Number**
Farmers	✓		✓	✓	✓	✓	5
District extension staff	√			√		√	3
Relevant NGO	√		√	√		√	4
District Council	√	√	√	√	√	√	6
Tea Companies		√		√		√	3
Timber companies						√	1
Education Department				√		√	2
Natural Resource Department	√			√		√	3
Agricultural Department	√	√	√	√	√	√	6
Financial Institutions	√			√	√	√	4

✓ = Mentioned by at least one stakeholder in that group

For each stakeholders group consulted try to characterize the pattern of interaction with other stakeholders
E.g. The ARD World Bank Study (2006) pp 50-53 describes the following types of interactions: Farmer to farmer interaction, Interactions of businesses with the poor, Company-company interaction, Technology transfer interaction, Public-private partnerships, Interactions of multiple actors. The study also identifies 'missing interactions'.

Table 2.6.5. Awareness of NAPAs and assessment of NAPA process (Q14)

All stakeholders consulted in Mufindi and Njombe districs were not aware of the National Adaptation Programme of Action. This could be due to poor stakeholders consultations during preparation of this Programme. Project team members had to explain what NAPA is to all stakeholders, but it was not enough due to time constraints. Therefore there is still a need to raise awareness on NAPA to all stakeholders.

Stakeholders groups

Awareness (number/ % aware)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**
Assessment of process					

Strengths, weaknesses, opportunities & threats analysis of agricultural innovation systems and adaptation to CC &V (Qs 16, 17, 18, 19)

Table 2.7.1. Stakeholders' perceptions of the *strengths* of the agricultural innovation systems for adapting to climate change and variability (Q 16)

	Stakeholder groups					
Strengths (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Availability & appropriateness of seed/ varieties		✓	✓	✓	✓	
Land Availability			✓	✓	✓	✓
Human Resource	✓		✓	✓	✓	✓
Willing Community	✓	✓	✓	✓	✓	✓
Good working relationship with Farmers and other stakeholders	✓	✓	✓		✓	✓
Fund availability	✓	✓			✓	✓
Demand for Agricultural Inputs		✓				
Infrastructure		✓				✓

Table 2.7.2. Stakeholders' perceptions of the *weaknesses* of the agricultural innovation systems for adapting to climate change and variability (Q 17)

	Stakeholder groups					
Weaknesses (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Farmers' perceptions, knowledge and practices little understanding on climate changes			✓	✓		✓
Agro-ecological factors/ poor soil fertility	✓		✓	✓	✓	
Human resources	✓					
Poor Infrastructure	✓	✓	✓			✓
Lack of Agro climatic information	✓	✓	✓		✓	✓
Demand for agricultural inputs	✓	✓	✓		✓	✓
Finance/Capital		✓	✓		✓	✓

Transport	✓				✓	✓

Table 2.7.3 Stakeholders' perceptions of the *opportunities* for improving the situation for adapting to climate change and variability (Q 18)

	Stakeholder groups					
Opportunities (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Agro-ecological factors (soil fertility)	✓	✓	✓	✓	✓	✓
Capacity of seed producers and processors	✓	✓	✓	✓	✓	✓
Training		✓				✓
Extension service	✓			✓		✓
Land availability	✓			✓		✓
Willing community	✓					
Demand for agricultural inputs	✓					

Table 2.7.4. Stakeholders' perceptions of the *threats* to improving the situation for adapting to climate change (Q 19)

	Stakeholder groups					
Threats (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Government policy and support	✓	✓	✓	✓	✓	✓
Finance	✓	✓	✓		✓	✓
Extension Services	✓				✓	✓
Input supply		✓	✓	✓	✓	✓
Climatic information	✓		✓			
Infrastructure	✓		✓			

2.8 How stakeholders could strengthen their own organization's capacity to adapt to CC&V (Q21, 22)

Table 2.8.1. How stakeholders reported their own organizations' capacity to adapt CC&V could be improved (Q21)

Broad category of capacity improvement	Stakeholders groups NGOs	Private	Extension	Village govt	Financial	Community groups
Training and Workshop	Involved in Training on appropriate measures for climate change and variability and good agricultural practices and techniques	Involved in Training on appropriate measures for climate change and variability and good agricultural practices techniques	Involved in Training on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability and good agricultural practices techniques	*Involved in Training on appropriate measures for climate change and variability*	Involved in Training on appropriate measures for climate change and variability

Table 2.8.2. How stakeholders reported their own organizations' information, training and product needs to enhance their capacity to adapt CC&V could be improved (Q22)

	Stakeholders groups NGOs	Private	Extension	Village govt	Financial	Community groups
Information			Relevant Climate, weather prediction information	Relevant Climate, weather prediction information	Relevant information regarding climate and weather prediction	Relevant Climate, weather prediction information
Training	Involved in Training on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability	linvolved in Training on appropriate measures for climate change and variability	*-Involved in Training on appropriate measures for climate change and variability* *-Training on entrepreneurship, good agricultural practices, gender and development*	Involved in Training on appropriate measures for climate change and variability
Products		Package of agricultural inputs should be in		Provide farmers with alternative seed crop to	Package of agricultural inputs should be in	Package of agricultural inputs should be in

small packages such as 5, 10, 20 (kgs) so that every farmer can afford	suite the current climate situation	small packages such as 5, 10, 20 (kgs) so that every farmer can afford	small packages such as 5, 10, 20 (kgs) so that every farmer can afford		

2.9 How can farmers' and other stakeholders' capacity to adapt to CC & V be improved? (Q24)

Table 2.9.1. How stakeholders reported farmers' capacity to adapt to CC & V can be improved? (Q24)

	Stakeholders groups					
Broad category of farmer capacity improvement	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Training on good agricultural practices/innovation	Training on agricultural practices/innovation, marketing of agricultural crops and entrepreneurship skills	Training on Pesticide safety and management	Training agricultural practices/innovation	Training on good agricultural practices/innovations	Training on entrepreneurship and small scale business management	Training on good agricultural practices/innovation

Table 2.9.2. How stakeholders reported other stakeholders' capacity to adapt to CC & V can be improved? (Q24)

	Stakeholders groups reporting					
Stakeholder category for capacity improvement	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Involved in Training on appropriate measures for climate change and variability	Farmers and extension workers Involved in Training on appropriate measures for climate change and variability	Farmers should be Involved in Training on appropriate measures for climate change and variability	Farmers should be Involved in Training and workshop on appropriate measures for climate change and variability	Stockist should be involved in Training on Pesticide safety and management		
Training on alternative livelihood activities			Farmers should be trained on alternative livelihood activities			

2.10 How stakeholders would like to be involved in an initiative to improve capacity to adapt to CC & V? (Q23)

Table 2.10.1. How stakeholders would like to be involved in improving capacity to adapt to CC&V *(examples below relate to improving seed systems please remove and enter your findings* (Q23)

	Stakeholder groups					
Broad categories	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Involvement in action research	Can be involved as trainers also take part as team members in any initiative		Involved in action research	Involved in action research	Involved in action research	-Involved in action research
Seed and agricultural inputs supply and distribution		They can be involved in Agricultural input and seed supply Agricultural input distribution			Seed input supply Seed distribution Find market for agricultural crops	
Facilitate farmers on good agricultural practices/innovation	Facilitate farmers on good agricultural practices/innovation		Facilitate farmers on good agricultural practices/innovation		Participate as trainers/facilitators	
Involved in Training on appropriate measures for climate change and variability	-Involved in Training on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability	Iinvolved in Training and workshop on appropriate measures for climate change and variability	Involved in Training on appropriate measures for climate change and variability and entrepreneurship	-Involved in Training on appropriate measures for climate change and variability

3. OVERVIEW OF MAIN FINDINGS AND IMPLICATIONS

Appendix 3 Details of SWOT analysis of agricultural innovation systems for adapting to CC&V

STRENGTHS

	Stakeholder groups					
Strengths (broad category)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial (SACCOS/AMCOS)**	**Community groups**
Availability & appropriateness of seed/ varieties		-Good high yielding varieties available -Some seed meets the demands of the market -Many companies, different varieties -Seasonal availability of seeds e.g. maize and vegetable seeds	Competitive system, good varieties with high yield, disease and drought resistance and grain quality exist.	-Ability to coordinate distribution of government subsidized agricultural inputs	-Seasonal availability of seeds e.g. maize and vegetable seeds	
Land Availability			Land for agriculture and livestock	-Suitable land for agricultural practices	-Suitable land for agricultural practices	Suitable land for agricultural practices
Human Resource	Qualified professionals in agriculture, economics and environmental conservation		Profession extension officer (graduate /certificate)	Groups already engaged in good agricultural practices through farm field school		-Groups already engaged in good agricultural practices through farm field school -Availability of Oxen and Ox-cart

Willing Community	-Willingness of communities to learn and practice new idea	**-** Farmers are willing to learn new approaches	Willingness of communities to learn and practice new idea	- Community member responds quickly and participate actively in good agricultural practices training/seminar/farm field school	-Active members	-Community groups dealing with good agricultural practices through farm field schools
Good working relationship with Farmers and other stakeholders	-Integrated approaches in implementing our Activities -Good working relationship with other NGOs, research institutes e.g. Uyole, District council, and department of agriculture -Good governance (open and participatory) -Close work relationship with local communities	-Good working relationship with district council and agricultural extension officers	Good working relationship with input suppliers and communities we are serving		-Good working relationship with district cooperative officer -Good at providing education and advice regarding good agricultural practices and environmental conservation	-The village government is also involved in agricultural activities
Fund availability	Donors supports agricultural initiatives (MISERIO-Germany) and IGOTA (Italy)	Capable of accessing credit from SACCOS and Community bank			-CRDB support -Active members	-Availability of funds through SACCOS
Demand for Agricultural Input		Having seed varieties produced and maintained by public research stations.				
Infrastructure		The village is accessible (good road connecting Lupembe and Njombe town)				The village is accessible (good road connecting Lupembe and Njombe town)

WEAKNESSES

	Stakeholder group					
Weaknesses (broad category)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Farmers' perceptions, knowledge and practices			Difficulties in disseminating and implementing good agricultural practices due to lack of research based practices in our areas	-Lack of knowledge on climate change and variability -Difficulties in understanding weather forecast information		-Little knowledge on climate change issues
Agro-ecological factors	Declined in Soil fertility. Weather (2002/ 2003).	.	Fertilizer use problem – no proper soil analysis done before applying fertilizer	Low rainfall (600 mm/pa)	Soils in Southern Highland are poorer than Northern Zone.	-Soil problems due to too much artificial fertilizer & lack of animal manure. -Little capacity to capture high rainfall opportunities
Human resources	-Lack of enough extension officers at village levels	-Lack of qualified staffs	-Lack of enough extension officers at village levels (one extension officer serves 7 villages) -Lack of enough capital for training and implementing training projects			
Infrastructure	-Lack of means of transport to the villages	-Low capacity in supplying inputs to the nearest centres due to lack of transports and its cots	-Lack of means of transport to the villages		- Lack of means of transport to the villages	-Lack of means of transport (study tours)
Agro climatic information	-Lack of reliable climatic information so it is hard to advise	-Failure to deliver reliable agro climatic information to farmers	-Lack of reliable climatic information so it is hard to advise		-Inadequate knowledge on climate change and variability	-Little understanding of agroclimatic information

	farmers on type of crops to be grown during rain season -Little awareness on climate change issues		farmers on type of crops to be grown during rain season			
Demand for agricultural inputs		- Certain types of seeds does not provide good results as intended -Lack of enough capital to invest on agricultural inputs -Scarce availability of fertilizer for basal application and when available is sold at very high cost e.g. DAP is now sold at 60,000 per bag of 50kg	-Difficulties in accessing inputs due to high price and transport costs - Insufficient supply of government subsidised fertilizer		-Difficulties in accessing inputs due to high price and transport costs -Insufficient supply of subsidized fertiliser for example last year only 46 bags of DAP were distributed in 2007/2008	-Difficulties in accessing inputs due to high price and transport costs
Finance	-Dependence on donors				-Small capital sometimes its hard to fulfil the needs of our customers - Donor dependent	-Almost all our activities are donor funded

OPPORTUNITIES

	Stakeholder groups					
Opportunities (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Agro-ecological factors	- Availability of water for irrigation - Good weather suitable for different types of trees to grow	No serious drought	Possibility of producing maize or seed maize under irrigation.	Land to cultivate sunflower as commercial crop	-Prolonged rainfall suitable for tea and tree nurseries	Prolonged rainfall suitable for tea and tree farming -Investing on sunflower crop for commercial purposes
Training	-CCAA programme - Participating in action research regarding good agricultural practices -Work close with ARI uyole in exploring suitable and sustainable agricultural practices	-Participating workshops and training with other stakeholders in agriculture sector	- Participating workshops and training with other stakeholders in agriculture sector	-Education through farm field schools -Participatory approaches for exploring different means of livelihoods through different institutions working in southern highlands	-Education through farm field schools -Participatory approaches for exploring different means of livelihoods through different institutions working in southern highlands	-Participation in farm field schools through agricultural projects
Extension service		-Work together with available extension officers in transferring knowledge on agricultural inputs and how best they can be utilized for better results				-Work close with extension officers whenever possible -Participation in implementing action research
Land availability	Suitable land availability			Suitable land available for agricultural purposes		-Available land
Willing community	Willing community to					
Demand for agricultural inputs		-High demand for agricultural inputs				

THREATS

	Stakeholder groups					
Threats (broad categories)	**NGOs**	**Private**	**Extension**	**Village govt**	**Financial**	**Community groups**
Government policy and support	-Lack of Government body to oversee seed utilisation from breeding, production to marketing -Budget is donor dependent e.g. ASDP as source of funds dependent on meeting criteria.	-Lack of political will to involve private stockists in inputs supply -Lack of regulation when it comes to supply of subsidized fertilizers	Government policy – restricts movement of maize. Outside pressure on government not to provide subsidies. -Abrupt changes in government policies	-Limited by government regulations therefore not able to identify a market in e.g. Iringa.	- Government (particularly Min of Cooperatives and Marketing) failing to find markets outside the borders. Controls on marketing within the country and at the borders.	-Limited by government regulations therefore not able to identify a market in e.g. Iringa.
Finance	Donor dependence	Lack of enough capital High business competition because we are almost doing same business	Little budget is allocated to agriculture sector		Lack of enough credit. Failure to return credit on time due to poverty	Lack of enough credit.
Extension Services	Dependent on district council to provide extension officers which are few				Few agricultural and livestock field extension officers	Few agricultural and livestock field extension officers
Input supply		Inputs are sold at very high prices which farmers cannot afford	There is no subside on TSP and CAN fertilizers which are more suitable in southern highlands	Inputs are sold at very high prices which farmers cannot afford	Inputs are sold at very high prices which farmers cannot afford There is no subside on TSP and CAN fertilizers which are more suitable in southern highlands	Inputs are sold at very high prices which farmers cannot afford
Climatic information	Lack of reliable climatic information		Lack of reliable climatic information			
Infrastructure	Lack of transport		Lack of transport			

Appendix 4 How would stakeholders like to be involved in improving agricultural innovation systems?

Detailed feedback from each stakeholder consulted of how they would like to be involved.

S/NO	STAKEHOLDER	INVOLVEMENT IN IMPROVING AGRICULTURAL
1	SHILDA	-Collaborate with other stakeholders in raising awareness on climate change issues and good agricultural practices
2	CARITAS NJOMBE	Be involved in Training and seminars Capacity building activities, contributing manpower Video camera
3	INCOMET LTD 2001	-To be involved in action research - To be involved in providing agricultural and environmental education to farmers -Participate in seminar/workshop
4	TANZANIA FARMERS ASSOCIATION (MUFINDI)	-Training on the climate change and its impacts on agriculture
5	TANZANIA FARMERS ASSOCIATION (NJOMBE)	-Training on the climate change and its impacts on agriculture -Participate in capacity building activities
6	AS AGRICULTURE CHEMICALS	-Participate in training on climate change impacts on agriculture
7	MNYANG'ANDA AGRO SUPPLIERS	-Training on agricultural inputs which are important and relevant to southern highlands
8	STEPHANO GODFREY STORE	-Training on climate change impacts on agriculture and how to supply inputs according to climate information in a given rain season. -Ready to impart the knowledge acquired to farmers -Involved in training /seminar/workshop on good agricultural practices
9	NYOMBO SACCOS	-Collaborate with other stakeholders in understating climate change and variability impacts, good agricultural practices so as to understand our roles in adaptation activities and help the community we are serving to cope with climate change impacts and soil degradation problems. - To be involved in capacity building activities
10	AMCOS NYOMBO	-We are ready to be involved in training on appropriate agricultural inputs to adapt to CC&V and impart that knowledge to communities through participatory approaches
11	IFWAGI SACCOS	To be involved in capacity building activities and providing environmental education to communities we are serving whenever resources allows
12	NYOMBO VILLAGE GOVT COMMITEE	Facilitating village members to participate in good agricultural practices training and meeting/farm field schools
13	MWITIKILWA	-Facilitating village members to participate in good agricultural

	VILLAGE GOVT COMMITTEE	practices training and meeting/farm field schools -Make follow up
14	DALDO NJOMBE	-Training agricultural and livestock field officers at district and village level. -To be involved in capacity building activities with farmers and other stakeholders -To be involved in implementation of action research (facilitating farmers and monitoring different activities)
15	WAEO (IKUNA)	-Training in agricultural innovation systems and climate change and variability the science and impacts. - Be involved in capacity building activities at village level (educating farmers good agricultural practices)
16	DALDO MUFINDI	Training agricultural and livestock field officers at district and village level. -To be involved in capacity building activities with farmers and other stakeholders -To be involved in implementation of action research (facilitating farmers and monitoring different activities)
17	WAEO (IFWAGI)	-Formal training regarding agricultural innovation systems and the science of climate change and its impacts on agriculture. -To collaborate with other stakeholders in raising farmers capacity in understanding good agricultural practices and how they can adapt to impacts of climate change and variability
18	NGUVU KAZI GROUP	This group would like to be involved in capacity building activities such as seminar /workshop/training; more emphasis was on participatory training. They are capable of transferring knowledge acquire to other village members.
19	PIGGERY GROUP	This group would like to be involved in capacity building activities such as seminar /workshop/training; more emphasis was on participatory training. They are capable of transferring knowledge acquire to other village members.
20	TEA AND TREE NURSERY GROUP	This group would like to be involved in capacity building activities such as seminar /workshop/training; more emphasis was on participatory training. They are capable of transferring knowledge acquire to other village members.

Appendix 5 Contact details for stakeholders consulted (Q1)

S/NO	STAKEHOLDER	CONTACT
1	SHILDA	MR. DONALD NYINGU, SHILDA, P.O.BOX 252,IRINGA, TANZANIA
2	CARITAS NJOMBE	FRED ERICK SIGACHUNA MOB: 0752 19 08 94
3	INCOMET LTD 2001	MWAJUMA SIZYA, P.O.BOX 243, MAFINGA, MUFINDI, IRINGA TEL: MWAJUMA SIZYA(AGRICULTURAL COORDINATOR) – 0754 - 68 35 36 (msizya@yahoo.ie) ERASTO KIWALE(DIRECTOR)-0754 332772(incometltd2001@yahoo.com)
4	TANZANIA FARMERS ASSOCIATION (MUFINDI)	WERAKASYA FANUEL MASSAWE- +255 26 2772090 -0754 699 587 -0782 432 569
5	TANZANIA FARMERS ASSOCIATION (NJOMBE)	EVA MAKWETA (+255 026 278 22 07)
6	AS AGRICULTURE CHEMICALS	ANDREW SANGA, P.O.BOX 580, NJOMBE. +255 026 2 278 22 89 0755 -052799 0784 67 48 47
7	MNYANG'ANDA AGRO SUPPLIERS	+255 784 460 228
8	STEPHANO GODFREY STORE	STEPHANO GODFREY NDEDYA- 0753 00 56 48
9	NYOMBO SACCOS	ONESMO KIVALI (TREASURER) – 0786 950 224
10	AMCOS NYOMBO	ANDREAS MWENDA, -0756 86 05 52
11	IFWAGI SACCOS	IBRAHIMU (755 83 54 82) MADEGE (755 055 068)
12	NYOMBO VILLAGE GOVT COMMITEE	THADEI MWENDA, HENRICK MDEKE AND NAFTAL MWENDA (MEMBERS OF VILLAGE COUNCIL)
13	MWITIKILWA VILLAGE GOVT COMMITTEE	
14	DALDO NJOMBE	P.O.BOX 76: PHONE 0713 69 80 06
15	WAEO (IKUNA)	EDOINGTONE OWDEN TCHANAFI (
16	DALDO MUFINDI	EDNA KADUMA
17	WAEO (IFWAGI)	EDITHA MBUA (0755- 3722 92)
18	NGUVU KAZI GROUP	NYOMBO VILLAGE
19	PIGGERY GROUP	MWITIKILWA
20	TEA AND TREE NURSERY GROUP	MWITIKILWA