

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 RUNGWE AND KYELA DISTRICT IN MBEYA REGION**

By
Madaka Tumbo, Lebai Nsemwa and Brown Gwambene



National Resources and
Environment Centre



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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 Kyela and Rungwe Districts were carried out with a team of three researchers Ms. Madaka Tumbo, Mr. Gwambene Brown, and Mr Lebai Nsemwa), from the Institute of Resource Assessment (IRA), University of Dar es Salaam and Agricultural Research Institute (ARI)-Uyole). 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 Kyela and Rungwe 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 22 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 e.g. in NCG and/or as part of Learning Alliance. The report provides a synthesis of information obtained from consultations with various stakeholders in Kyela and Rungwe Districts in the southern highlands of Tanzania.

The survey involved 22 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 were 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

AMCOS	Agricultural Marketing Cooperative Society
ARD	Agriculture and Rural Development
AMCOS	Agricultural Marketing Cooperative Society
CC & V	Climate Change and Variability
DALDO	District Agricultural and Livestock Development Officer
HPI	Heifer International Program
IRA	Institute of Resource Assessment
IS	Innovation System
KYERUCU	Kyela Rungwe Cooperative Union
KYECU	Kyela Cooperative Union
NAPA	National Adaptation Program of Action
NCG	National Consultative Group
NGO	Non Governmental Organizations
SACCOS	Savings and Credit Co-Operatives
RFSP	Rural Finance Support Programme
RSTGA	Rungwe Smallholders Tea Growers Associations
RUCU	Rungwe Cooperative Union
SPW	Students Partnership Worldwide
WAE0	Ward Agricultural Extension Officer

1. INTRODUCTION

1.1 Background

Stakeholder consultations involved Kyela and Rungwe Districts including the selected villages, which are Mpunguti and Kapugi 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.

Rungwe and Kyela districts are located in Mbeya Region, south western Tanzania. Rungwe district occupies an area of approximately 2,400 sq km and in 2002 a population of 307,270 (Population Census 2002). There is a variety of topographical features, including: high volcanic mountains to the north, steeply dissected escarpments to the east and west, and undulating terraces leading to almost level ground in the south. Altitude ranges from 600 - 2,900 m above sea level (masl), with most of the district at higher elevations. The climate, except at lower elevations, is usually relatively cool, with rainfall of 1500-2000+ mm/yr. A variety of crops are grown in the district, including: coffee, tea maize, beans, bananas and round potatoes. Soils vary from volcanic soils (Andosols) to older, more weathered soils, (including Nitosols). These soils are often of medium to high fertility, but declining soil fertility is an important issue in highly populated areas. The natural vegetation varies from upper montane forest at higher altitude to wet woodland ('Miombo') at lower elevations. Much of the natural vegetation has been cleared for agriculture and habitation and most of what remains is found in government forest reserves and in locally protected areas (McKone 1995).

Kyela district occupies an area of approximately 13,422 sq km and in 2002 it had a population of 174,470 (Population Census 2002). A large proportion of the district is low lying land on the floor of the Great Rift Valley at the northern tip of Lake Nyasa. It receives rainfall ranging between 2,000 mm and 3,000 mm. Floods are common in March through May and the roads become impassable during this period. In addition to the total amount of rainfall received, its distribution is of critical importance to distinguish a good year from a bad one. A variety of crops are grown in the district, including: rice, cocoa, beans, bananas, cassava and oil palm.

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 e.g. 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 Climate Change; 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 – LUWADA- (Kyela), HPI- Heifer International- (Rungwe), SPW –(Rungwe-Kapugi), Ngobe Group (kyela), Envirocare (Kyela), Mango tree (Kyela)
- Private Input suppliers – Peru agrovet (Ipinda-Mpunguti), Ajet Farm Chemical (Rungwe), Mkulima Pembejeo za Kilimo na Mifugo (Ipinda-Mpunguti),
- Public sector (Extension staff) at District and Ward level & village government in Kapugi and Mpunguti

- Financial Institutions and Cooperative Union – Mpunguti SACCOS, Lyenje SACCOS (Kapugi), PAKATI-SACOSS (Kyela), Kyela Cooperative Union (KYECU), Rungwe Cooperative Union (RUCU)
- Community groups in Kapugi and Mpunguti 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	<p>LUWADA- (Kyela), -to mobilize people to participate in development activities so as to eradicate poverty, provide relief services during extreme flood events</p> <p>HPI- Heifer International (Rungwe - To improve livelihood through agriculture, livestock keeping, tree planting),</p> <p>SPW –(Rungwe-Kapugi), - To promote health, environment and community education,</p> <p>Ngobe Group (kyela)-Improving people livelihood through agricultural and health education, they also provide relief survives during flood event,</p> <p>Envirocare (Kyela)-Promote environmental education to local community,</p> <p>Mango tree NGO (Kyela) - main aim is to provide services for the needy especially orphans and vulnerable groups in the society like the widows, the aged and HIV/AIDS victims</p> <p>RSTGA- main aim of consolidating smallholder tea farmers in the district in order to increase their tea production so as to improve their income generation and alleviate poverty</p>	Southern Highlands	7
Private Stockist / input supply	<p>Peru Agrovet (Ipinda-Mpunguti),</p> <p>AJET Farm Chemical (Rungwe),</p> <p>Mkulima Pembejeo za Kilimo na Mifugo (Ipinda-Mpunguti)</p> <p>(Role: Supply and sale of agricultural inputs)</p>	Southern Highlands	3

Public (Extension)	Ward Agricultural Extension Officers (Malindo Ward – Rungwe & Makwale Ward – Kyela) District Agricultural Extension Officers (Kyela and Rungwe) (Role: Educating farmers & livestock keepers; Linking farmers, researchers & extension workers)	Southern Highlands	4
Public (Village government)	Kapugi and Mpunguti (Role: Organize & manage village development goals)	Southern Highlands	2
Financial Institutions	SACCOS (Pakati-Kyela, Lyenje (Kapugi), Mpunguti (Kyela) – Provide saving & credit services to local communities) Cooperative Union (Kyela and Rungwe) – Support cooperatives initiatives & Supply of agricultural inputs)	Southern Highlands	5
Community Groups	Unkombozi Coffee Production Group (Kapugi), Wanyama Kazi Group (Mpunguti) (Promote livelihood activities through small scale business, the use of animal power, coffee crop development & environmental conservation)	Southern Highlands	2

+ eg NGO, private, public

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

+++ eg 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

Seven NGOs were consulted in Mbeya region (Southern Highlands) of which four are in Kyela and three in Rungwe. Below is a summary of their main aims and activities.

RSTGA

The Rungwe Smallholders Tea Growers Associations has main aim of consolidating smallholder tea farmers in the district in order to increase their tea production so as to improve their income generation and alleviate poverty. The main activities include:

- o To mobilise and organise farmers into an association.
- o To promote improved farming practices especially for tea growers.
- o To link the farmers with the extension services from the Wakulima Tea Company (WATCO), TRIT and the district council.

HPI

The Heifer Project International main aim is to reduce malnutrition and improve household incomes among smallholder farmers in the district. Their main activities include; distribution of milking cattle and goats and chicken to low income farmers; training in sustainable agriculture (use of organic fertilizer, botanical insecticides like *Tephrosia* and pepper); promotion of fish farming; training in environmental conservation practices (contour

farming, multipurpose and indigenous tree planting, tree nurseries, water sources conservation) and establishment of farmer groups for the above mentioned activities.

SPW

Students Partnership Worldwide (SPW) is an international non-profit, non-government organization working with and for young people in Africa and Asia. SPW volunteers work as peer-educators and deliver vital health, environment and community education. The main aim is to improve health status of rural communities in Tanzania also working at Kapugi village in Rungwe district. Their activities at Kapugi include provision of health education in primary and secondary schools; conduct seminars on health education; organise and mobilise rural communities to check their health status and counselling on HIV/AIDS. They also make use of theatre and sports groups in the promotion of their activities.

NGOBE GROUP

The main aim of the group is to improve the livelihoods of poor people. The main activities include training in health and agricultural production; provision of relief services during environmental disasters and care for orphans.

ENVIROCARE

The main aim of ENVIROCARE is poverty alleviation by cultural tourism and environmental conservation. The activities they perform include awareness creation among the communities on the value of environment; promotion of environmental conservation through tree nurseries preparation and tree planting; cleanliness of Kyela town and training on malaria and its control; cultural tourism through promotion of skills for handicrafts making and promotion and advertise traditional theatre groups.

Mango Tree

Mango Tree's main aim is to provide services for the needy especially orphans and vulnerable groups in the society like the widows, the aged and HIV/AIDS victims. The main activities include provision of self-support, education, health services, counselling and needs of the beneficiaries like food, clothing and shelter. Its also provides lobbying and advocacy particularly with regards to inheritance.

LUWADA

The mission of Lusungu Wananchi Development Association is to promote development in Kyela district through education and to wage war against HIV/AIDS. The objectives of the association are:

- To mobilise the people to participate fully in development projects within their localities.
- To coordinate and cooperate with government leadership at appropriate level in organising and implementing development projects.
- To provide professional and technical advice using talents and skill of members to persons, groups and organisations involved in development process.
- Fund raising and income generation for financing LUWADA's activities and projects.
- To wage war against HIV/AIDS and the explosive diseases.
- To deal with poverty alleviation.
- To be concerned with gender issues, women and children affairs.

To meet these objectives LUWADA has had the following projects:

- i. Construction of a church and village office.
- ii. Construction of a footbridge at Kagera crossing the Lufilyo River.
- iii. Donation of drugs to the dispensary in Lusungu ward.
- iv. Establishment of nursery schools at Lukwego and Lukama in Lusungu ward.
- v. Save people's lives by awareness creation on HIV/AIDS, fight against malaria and cholera. It was also intended to reduce pupils' dropouts particularly girls.
- vi. Support for the poor and vulnerable and rural community.
- vii. Good governance at village level.
- viii. Environment and floods control.
- ix. Sensitization of community on importance of education.
- x. Establishment of the mosquito nets revolving fund.

The consulted NGOs in Rungwe and Kyela all address development among smallholder farmers. They all somehow address poverty alleviation and improve the standard of living among the beneficiaries. Nearly all the NGOs have some involvement in environment conservation sensitization and health care. While the coverage of HPI is international but operating in Rungwe, SPW is national and was found to be working at Kapugi in Rungwe district. Mango Tree was the only one working in Kyela and Rungwe districts. The coverage of LUWADA, NGOBE Group and Envirocare is Kyela district while that of RSTGA is Rungwe district. The other variation in the stakeholder group is the enterprise being addressed. While HPI is mainly dealing with livestock, RSTGA is concentrating on tea and the others are addressing the different crops generally and services.

2.2.2 PRIVATE STOCKIST

Three stockists were interviewed two in Kyela and the third in Rungwe district.

AJET Farm Chemicals

The main aim is to supply agricultural inputs as a business. The main activities include selling agricultural inputs at Kyela and Tukuyu towns but also availing the products in various places where they are in demand within the two districts.

Mkulima Pembejeo za Kilimo na Mifugo

The main aim of the enterprise is to provide services to farmers. These include sale of fertilizer, seeds and pesticides as well as veterinary drugs/pesticides. He also provides advice and veterinary services.

PERU Agrovet Centre

The main aim and activity is supply and sale of inputs at Ipinda.

In this stakeholder group all the members are in the business of selling agricultural inputs. Mkulima Pembejeo za Kilimo na Mifugo was the only one who was also providing extension and veterinary services. While the coverage of AJET Farm Chemicals is the two districts, that of Mkulima Pembejeo za Kilimo na Mifugo and PERU Agrovet Centre is Ipinda and the surrounding villages including Mpunguti in Kyela district.

2.2.3 EXTENSION SERVICES

Four respondents were interviewed two each at district and ward levels in Kyela and Rungwe districts.

DALDO Kyela district

The main aim is to provide extension services to farmers in the district. The activities undertaken must be in line with the national agriculture policy.

DALDO Rungwe district

The main aim is to improve people's standard of living through all stakeholder collaboration in utilizing available resources and other opportunities for development and deliver quality social and economic services. The activities undertaken by DALDO and his office include infrastructure improvement (construction of schools, dispensary and bridge, rehabilitation of dips and abattoirs, road maintenance and construction of irrigation scheme); environmental conservation; provide extension services and collection of revenue for the council's development.

WAEO for Makwale Kyela district

The main aim is to provide extension services at ward level. The main activity is training of farmers and livestock keepers on improved agricultural practices. The activities are training of farmers and livestock keepers on improved agricultural practices and to monitor progress and adoption of the practices.

WAEO for Malindo ward in Rungwe district

The main aim is to provide extension services at ward level.

The DALDOs and their staff are fairly similar in their functions.

2.2.4 VILLAGE GOVERNMENTS

Mupunguti and Kapugi

The villages are in Kyela and Rungwe districts respectively. The main objective of the village government is to oversee development activities in the village. The activities include construction of primary and secondary schools, dispensary; village administration and ensure security in the village and road maintenance within the village.

Their functions do not differ.

2.2.5 FINANCIAL INSTITUTIONS (SACCOS, AMCOS, COOPERATIVE UNIONS)

The five financial institutions functioning in the surveyed area were either cooperative unions or SACCOS. There were three in Kyela and two in Rungwe. These are KYECU and Pakati SACCOS with headquarters in Kyela but operating in the whole district and Ndobu SACCOS based at Makwale in Kyela district. In Rungwe district RUCU has its headquarters in Tukuyu but serving the whole district and Lyenje SACCOS at Ikuti ward but also serving Kapugi village.

KYECU

The main objective of the Kyela Cooperative Union (KYECU) was stated as assist farmers in production and marketing of their crops. The activities include provision of cooperative education; training of farmers on crops production; facilitating farmers in marketing their produce, coordinate the activities of the different primary crops and marketing cooperative societies.

Pakati SACCOS

The main objective was stated as poverty alleviation and improves agricultural inputs supply through giving loans to its members. The activities undertaken include provision of savings and credit services; soliciting credit from different sources to enhance the society's capacity to issue loans to its members; issuance of produce vouchers to facilitate farmers market their produce at competitive prices and to provide entrepreneurship skills to its members through seminars.

Ndobu SACCOS

The main objective is to improve the standard of living of its members. The activities undertaken are savings and credit; accounts keeping; searching for financial support from different sources.

RUCU

The Rungwe Cooperative Union's main objective is to collect and seek markets for farmers' produce. The activities undertaken include supply of agricultural inputs; find markets for agricultural crops and provide extension service and advice on appropriate agricultural production practices.

Lyenje SACCOS

The main objective is to alleviate poverty among its members through promotion of agricultural and livestock production as well as enhance small businesses. The activities include provision of savings and credit services; sensitize community to become members to encourage its member increase their savings and shares; training of members on loans acquisition and repayment; construction of the society's offices and keeping the office premises clean.

While KYECU and RUCU serve whole districts the SACCOS cater for the localities where they are based. The roles of SACCOS are very similar and mainly dealing with savings and credit while the unions also facilitate marketing of crop produce.

2.2.6 COMMUNITY GROUPS

Two farmer groups were interviewed one each at Mpunguti village in Kyela district and Kapugi village in Rungwe district.

Ukombozi Coffee Production Group

The main objective of the group is to improve coffee production so as to increase the income of the village community. The activities of the group include maintenance of a nursery of improved coffee varieties and provision of seedlings to its members, selling seedlings of improved coffee varieties to non-members.

Wanyamakazi Group

The main aim of the group is improve the economy of farmers through crops and livestock production. The activities include farming and crops production, use of draft animals for different purposes.

Both farmer groups consist of smallholder farmers who are intent to alleviate poverty through improved agricultural production. While one is wholly dependent on the hand hoe but making use of improved varieties the other is making use of animal power for crops production.

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 eg other projects they have been involved in.

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

The aims, interests and activities of stakeholder groups in relation to CC&V and agricultural innovation are summarised hereunder.

2.3.1 NGOs

RSTGA

It was reported that the weather has increasingly become unpredictable. In the past weather was much more stable and predictable. The aspects of change mentioned were increased windy conditions and rainfall intensity and duration. While in some year a lot of rain is received in others the amount of rain is small and the start and end of rain period fairly unpredictable. The indicators of change include increase in strength of wind, increase in the length of the dry season; increase in temperature which has enabled growing of groundnuts in Mwakaleli formerly too cold for the crop as well as increased incidence of mosquitoes and malaria.

These changes in climate have had some effect on the organisation's activities. When there is too much rain road infrastructure is seriously damaged. This affects the organisation in that collection of tealeaves from farmers is seriously hampered and delivery to the factory declines. This in turn reduces the production of the industry's processing and income for both the factory and the farmers them serves. Labour for picking tea is scarcer and hence more expensive under conditions of high rainfall thus reducing farmers' profits. During such times farmers also lose money by failing to pick most of their tealeaves.

In response to the weather changes the organisation has had to introduce changes in its activities. These have included improvement of environmental management by promotion of tree planting, erosion control measures (contour farming), conservation of water sources, and introduction of tea clones tolerant to drought.

Farmers are the primary beneficiaries of the organisation's activities. The impact of the organisation on the primary beneficiaries in the context of climate change was reported as improvement in farming practices using new technologies.

HPI

The climate is considered to have changed markedly presently as compared to twenty years back. The aspects of change include duration of rain period; instead of two months of dry season in past the dry period can now be as long as to four months. The temperature has increased and rainfall becomes more unpredictable. The indicators of the changes include increase of temperature; drop in crops and livestock production due to less rainfall and increases in diseases and pest incidence.

The influence of these climate changes to the organisation's activities include introduction of new activities like training on environmental conservation; introduction of use of biogas for fuel and electricity and promotion of the use of fuel-efficient stoves.

The primary beneficiaries of HPI are the low-income farmers within the communities. The impact of the organisation on the primary beneficiaries in the context of climate change include increases in productivity through increased use of organic fertilizers in banana, increase in local cows milk production which have led to improved incomes and livelihoods. With regards to service providers the organisation has influenced the targeting of low-income group among the communities for instance the orphans. With regard to policy in the context of climate change the organisation has influenced policy actors at village level into formation of environment committees; institution of bylaws for conservation of water sources involving village governments.

SPW

The organisation is new to the area having begun its activities in the village only recently. It is making use of volunteers working in the village for short periods. The changes in weather have an effect on its activities like affecting the farmers' attendance to training sessions hence the training aspects targeted to the community do not reach it as planned. Instead of the community attending planned training they are forced to look for ways of survival in times of climatic disasters.

To cope with the climatic changes the organisation is engaging in promotion of environment education and human rights.

The primary beneficiaries of the organisation are youth groups in communities. In terms of climate change and variability, the impact of the organisation on its beneficiaries has been provision of health and environmental education.

NGOBE GROUP

The group reported noticeable changes in the rain period. The rains, which were formally commencing in October/November, are now commencing in December or even as late as February. The rains are variable and hence unpredictable.

Since the members' livelihoods are based on rainfed agriculture, decision-making is seriously affected by changes in climate. The NGO is thus responding to climate change and variability by advocating changes in growing season. Thus shift the crops planting with the shift in the start of the rains.

The communities in which the organisation is working are the primary beneficiaries. The respondent did not mention any impacts of the organisation to the various stakeholders in the context of climate change.

ENVIROCARE

The experience of Envirocare in climate change in the area of their operation is with respect to change in duration and distribution of rainfall. The indicators of change include effects of drought on crops and decrease in rice production.

These changes have had an effect on the functioning of the organisation. Thus the innovation systems targeting poverty alleviation are not addressed in times of weather disasters as the beneficiaries give priority to coping strategies to the changes. The organisation as a result of the climate changes has had to change and give more emphasis to environmental activities and training.

The main beneficiaries are the communities including youths, women, disabled, men's groups and cultural groups. The impact of the organisation on the primary beneficiaries includes increase in individuals' income and an improvement in the environmental management.

Mango Tree

It was reported that climate was changing to the worst. The aspects of change include increase in temperature, change in rain season; rains which were initially starting in February are now coming in March. The major indicator climate change is a decline in crop production and productivity.

The climate changes have had some influence on the organisation. The organisation has had to change its activities, for instance instead of helping children it now has to help their families too. The other change is instead of building people's capacity under disasters of climate, the organisation puts its resources into helping the people to cope with the disasters.

In response to climate change and variability the organisation's priorities have had to shift to rescuing the situation first and then returning to its initial objectives later.

The primary beneficiaries are the vulnerable children. The impact of the NGO on the primary beneficiaries in the context of climate change and variability is provision of education and increase of production.

LUWADA

Noticeable changes in climate were reported as from 1978. In that year there was a lot of rain, which led to the overflowing Lake Nyasa. The indicators of change were reported to be cycles of heavy rains after every 10 years, which result in flooding. Silt deposits at the river Lufilyo entrance into the lake has led to the river course shifting and causing swamps in areas which were before under cultivation.

The climate changes have an influence on the NGO's activities. The access to the target groups is often made more difficult at times when there is too much rain.

Changes made by the organisation in response to changes in climate include having to assist in bridge construction, restart some campaign, which were otherwise considered accomplished like malaria and cholera control.

The target group for the organisation is all Kyela residents. The impact it has had on primary beneficiaries in the context of climate change include training and availing short term crop varieties, tree planting, flood control and promotion of construction of proper houses and latrines.

The impact on service providers includes collaboration with Envirocare, road repairs to enhance drainage and riverbanks control.

The organisation has had to collaborate with extension services and to influence policy the NGO has a project in good governance.

2.3.2 Private Stockists

AJET Farm Chemicals

The changes in rain season were reported.

The primary beneficiaries are farmers.

Mkulima Pembejeo za Kilimo na Mifugo

The weather has in the near past been changing to worse. The aspects of change include increase in temperature and increase in amount and unpredictability of the rains. Heavy rain is sometimes received causing flooding but stop before the anticipated end of the rain period.

The indicators of changes in climate are decrease in natural trees, increase in temperature and decline in crops production increase in incidence of pests and diseases.

The changes have had an effect on the stockist's activities. Since the climate changes affect the economy of customers they in turn affect the business as the number of customers declines.

Farmers and livestock keepers are the main beneficiaries of the stockist's services. Agricultural inputs and veterinary services are being provided to the beneficiaries.

PERU Agrovet Centre

The rain season has changed it was reported. Too much or too little rainfall leads to decline in crops production, which in turn deprives the customers of income. These in turn respond by not purchasing agricultural inputs thus affecting the business.

The main beneficiaries are farmers in Ipinda and surrounding areas

2.3.3 Extension

DALDO Kyela district

There has been change in climate in the district. The aspects of change have included rainfall amounts received and distribution.

The changes in climate have affected both crops and livestock production. The changes in the way the department is operating have aimed at ensuring food security among the communities.

The primary beneficiaries are farmers. The impact on the primary beneficiaries has included adoption by farmers of new technologies.

The department has influenced the service providers to provide appropriate needs to the communities they serve.

The department has been making use of councillors to provide guidance on climate change and variability.

DALDO Rungwe district

There has not been a major change in climate in Rungwe district as there has been adequate rain for crops production. The district receives rain for up to 10 months in a year with amounts ranging between 900mm and 2,700mm per season. In some years as in 2004, the amount of rain was below average.

Climate change sometimes affects crop production. The department has had to introduce irrigation in lowland areas so as to respond to the changes in climate with regards to unpredictability of rainfall.

The primary beneficiaries of the department's services are smallholder farmers and livestock keepers. The respondent did not indicate any of the impacts the department has had on the primary beneficiaries.

WAEO for Makwale Kyela district

There have been some changes in the climate in the district in terms of rainfall duration and distribution. While in the past the area had distinct short and long rains currently that distinction is not clear. The incidence of windy conditions has increased.

The effects of the climatic changes include disruption of communication as a result of destruction of infrastructure.

Changes in the activities in response to climate change have included promotion of early maturing drought tolerant crops and crop varieties.

Local communities who are mainly farmers are the primary beneficiaries. Farmer Field Schools have been made use of as extension approach for promotion of new technologies.

WAEO for Malindo ward in Rungwe district

The area have experience some changes in climate particularly with regards to rain season. The rains are becoming more unpredictable. While the rains in the past commenced in October/November the onset and cessation of rains has shifted to December/January and sometimes as late as February.

The effects of climate change have included change in crop productivity.

In response to climate changes there has been change in the strategy of the extension services. Early maturing varieties are increasingly being advocated for among farmers.

Farmers are the main beneficiaries.

2.3.4 Village government

Mupunguti

The village government reported that there have been some changes in climate particularly unpredictability of the rains. The amounts of rains are declining and the onset becoming much later. Indicators of change include declining crop yields like rice yields, which has dropped from 12bags/ac to two or three bags per acre. There is currently extended dry periods. Heavy rains disrupt development activities like brick making. Too much rain destroys houses and roads.

In response to climate change and variability the village government encourages the communities to plant drought tolerant crops like cassava, sweet potatoes and vegetables. Villagers are the primary beneficiaries of the village government's activities.

Impact of the organisation on primary beneficiaries includes informing higher authorities on occurrence of disasters related to climate change like floods. The government also promotes short season crops.

Kapugi

The noticeable change in climate is a shift in the onset and cessation of the rains. While in the past rains began in October/November and stopped in January/February before continuing in March, currently there is no dry spell during the rain season. The indicators of change include increased incidence of earthquakes, strong winds and temperature, which is associated with an increase in the incidence of malaria.

The changes in climate are affecting farmers' decision making as to when to start land preparation. Malaria cases have decreased manpower for agricultural production. In response to climate change the following activities have had to be introduced like the planting of trees. The village government is involved in the distribution of mosquito nets to expectant women as a measure to control malaria.

Villagers are the primary beneficiaries.

2.3.5 Financial Institutions

KYECU

There has been change in climate in that it has become less predictable. The indicators of change include occurrence of drought and floods.

These changes have resulted in decline in crop yields. In response to the climate change, the union is seeking new varieties that would suit changing climatic conditions. The union is sensitising farmers with regards to climatic changes.

The primary beneficiaries are farmers. The union has impacted on the primary beneficiaries in terms of increased education to farmers and others on good agricultural practices.

Pakati SACCOS

The reliability of rainfall has decreased is the major change. The elements that indicate change in climate include rainfall and sunshine. The indicators of change include occurrence of drought as well as floods and incidence of diseases particular in banana and cocoa.

Changes in climate have had an influence in dairy activities particularly milk production. Repayment of loans by members is also influenced by changes in climate.

Members are the primary beneficiaries of the services of the SACCOS. These include mainly farmers but also other members of the community. The impact of the SACCOS has been in availing capital to its members. The society has also contributed to increased income for its members.

Ndobo SACCOS

There has been change in climate in the area. The noticeable change is in the onset of the rains. While in the past the rains were reliably starting in September/October the onset of the rain is changed. Members are the primary beneficiaries of the services of the SACCOS that include farmers and other members of the community.

RUCU

Rainfall currently is unpredictable. It can commence as late as December or even later. The incidence of floods has increased. In addition to the rain there are also some changes in temperatures. Some of the indicators of the changes in climate include increased death rate, decline in crops yields particularly rice, increased incidence of diseases like the black rot of cocoa caused by *Phytophthora palmivora* in conditions of high rainfall and increased incidence of insect pests of crops in times of extended drought conditions.

The union depends on for its income on the income of its members. Since its members are primarily smallholder farmers the changes in climate do affect their crops productivity, which in turn affects their incomes. When their crop yields fall due to changes in climate so does their income and hence reduce their quantities of crop sales, they are able to sell through the union. When crops sales decline so does the income of the members and the union.

In response to the changes in climate the union is sensitising its leaders so that they can appropriately respond to Climate Change and Variability like for instance through seeking some funding from alternative sources like the Rural Finance Support Programme (RFSP).

Members including farmers and others in the community are the primary beneficiaries. In the context of Climate Change & Variability the organisation considers itself as having made an impact in providing capital and agricultural inputs credit to its members. The inputs credit does include pesticides. The union has had an impact on the primary beneficiaries by linking them to Pride (Tanzania) Ltd. for acquisition of credits.

Lyenje SACCOS

While experience shows that the village is in an area that receives a lot of rain, there have been some changes in climate in the locality. While in past few years there has been a marked drop in the amount of rains received, the trend appears to have changed again this season which has seen heavy rains falling which have been accompanied by occurrence of floods. Some of the indicators of changes in climate are changes in the natural vegetation, variable length in the dry season and falling yields of crops like coffee, maize and groundnuts when there is either too much or too little rain.

The organisation’s activities are linked to the economic productive activities of its members; when their incomes from crop sales fall so does their levels of savings and capacity to repay their loans from the society.

The society is sometimes forced to change its activities as a result of changes in climate. When farmers have low yields and hence incomes from sale of crops and are unable to repay their loans the SACCOS resorts to legal action for those who fail to repay in time instead of the usual persuasion. The members’ capacity to make savings is also ill affected by climate changes, which force the leadership to be patient with their members in this regard.

Farmers in the village are the main beneficiaries of the services of the SACCOS. The organisation’s impact on the primary beneficiaries in the context of CC&V includes improved banana yields and hence household incomes, which in a number of cases have enabled them, improve the condition of their houses. Other impact is that of many families being able to send their children to school despite of the climate changes. In general farmers who use agricultural inputs are able to harvest more than those who do not even under conditions of climatic changes. The other impact on the beneficiaries is the fact that the SACCOS have been able to construct its own office.

While no impact was mentioned with regard to the service providers, the SACCOS considers itself as having had some impact on policy actors at the village level. By contributing to income improvement for its members it considers that the villages’ revenue collections have improved as a result.

2.3.6 Community groups

Ukombozi Coffee Production Group and Wanyamakazi Group

While the Ukombozi Coffee Production Group did not have any responses as regards change in climate, the Wanyamakazi Group considered that climate was changing to the worse. The aspects of climate change reported were unreliability in rainfall and increases in temperature. The indicators of change mentioned were some changes in the type of crops being grown as well as varying temperatures.

Climate Change & Variability does affect agricultural production activities as well as their planning and anticipated outcomes of the activities are much more uncertain. There was no indication that the Wanyamakazi group was making any changes in their activities as a result of changes in climate.

Farmers are the main beneficiaries of the groups’ services.

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)

Element of change	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Rainfall	Unreliable rainfall, shorten in rain season, sometimes increase of rain intensity in some areas. Onset delayed, rains cease abruptly, less predictable rainfall season. Indicators of change include Low production, occurrence of landslides, floods and prolonged drought, increased of rain in ten years cycle from 1978 and shift of liver course.	Onset rainfall intensity is increased and becoming more unpredictable. Indicators include decline in production, increased incidents of pest and diseases and, emergence of new vegetation and floods.	Rainfall is unpredictable and in general there are changes in season, amount and distribution rainfall.	Shift of onset and occasion of rainfall and decrease of rainfall Indicators of changes include the increase of incidence of pest and diseases, prolonged, floods drought, soil erosion, and decline in production change in growing season and change of vegetation type.	There is a change in predictability and reliability of rainfall. Indicators for decline in production, and increase of pest and diseases, occurrence of floods, spoilage of crops and increase of deforestation	Shift of onset and occasion of rainfall and decrease of rainfall Indicators of changes include the increase of incidence of pest and diseases, prolonged, floods drought, soil erosion, and decline in production, change in growing season and change of vegetation type.
Temperature	Increase in temperature and the growing of groundnuts in Mwakaleli (area experienced could spells)	Increase of temperature, increased incidents of pest and diseases and, emergence of new vegetation.	Increase temperature	Increase of temperature. Indicators are the increase of malaria incidence.	Increase of temperature and incidence of pest and diseases	Increase of temperature. Indicators are the increase of malaria incidence.
Wind	Occurrence of Strong wind			Occurrence of strong wind. Indicator is destruction of crops (falling of Maize and banana tree)		Occurrence of strong wind. Indicator is destruction of crops (falling of Maize and banana tree)
Earthquakes				Increase of the frequency of earthquakes		

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

Vulnerable groups identified	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Widows					Widows have no ability to cope with the situation	
Youth	Youth – have weak economic base and passives that the good life is in town					
Children	Most of children are single parent and depend on the parent that has no ability to care them.	Children depend on others to get food	Children depend on other group in the community	Children have no ability to cope with the situation		Children depend on other group in the community
Poor farmers	Farmers have low harvest and have no opportunity to store their harvest and they have no reliable weather information.	Poor farmers have no harvest or less harvest.	The poor has less opportunity to cope with Climate Change & Variability	Poor have to buy food crops at high price and they have no ability to cope with the situation.	Poor family have no other alternatives and they own small size field.	Poor farmers have less harvest and they have to buy food crop at high price.
Disabled			Disabled depends on others			They cannot adapt the situation.
Orphans	Children depend on other group in the community				Because those who were helping them can not help them	Orphans has no helps
Woman	Women because they are concerned with food supplies for family and have to look for scarce firewood and water.		Women use most of time for family matters and involve in cultivation	Women they are taking care for family		If the crop fails men run away and leaves women with family

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

Groups identified	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Widows	Planting trees, buying food during food shortage, growing early mature crops, use of organic fertilizers, using mosquito nets and malaria control measures.		Involve in small business, growing early mature crops such as sweet potatoes, beans, maize and groundnuts and cassava production.		Transplanting of rice, involve in small business and growing of cassava and sweet potatoes. Engage on casual labour and gardening.	
Youth	Involved in environment management and engage on casual labour and small business. Reduction of food meals and change eating habits					
Children	Reduction of food meals and change eating habits	Engage in child labour (Small business)	Sell perennial crops and livestock and involve in non-farm activities.			
Poor farmers	Planting trees, buying food during food shortage, growing early mature crops, use of organic fertilizers, using mosquito nets and malaria control measures.	Small business, growing early mature crops such as sweet potatoes, beans, maize and groundnuts.	Involve in small business, growing early mature crops such as sweet potatoes, beans, maize and groundnuts and cassava production.	Farmers use early mature crops varieties, and selling of livestock	Transplanting of rice, involve in small business and growing of cassava and sweet potatoes. Engage on casual labour and gardening.	Farmers use early mature crops varieties, and selling of livestock and some involved in casual labour.
Aged			Sell perennial crops and livestock and involve in non-farm activities.			
Woman	Engage on casual labour and small business, also involve in growing early mature crops and buying food during food shortage,		Involve in small business, growing early mature crops such as sweet potatoes, beans, maize and groundnuts and	Farmers use early mature crops varieties, and selling of livestock		

Farmers and Livestock keepers	cassava. Involve in small business, growing early mature crops such as sweet potatoes, beans, maize and groundnuts and cassava production.	Farmers use early mature crops and selling of livestock	Transplanting of rice, involve in small business and growing of cassava and sweet potatoes. Engage on casual labour and gardening.
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Table 2.4.5. Perceptions of how other organizations/ stakeholders are making changes in response to CC and V by stakeholder group (Q10)

Organizations / stakeholders	NGOs	Private	Extension	Stakeholders groups	Village govt	Financial	Community groups
Business group						Buy food crops and sell at high price	
Religion	For example Moravian, Pentecost, and Lutheran churches They involved in projects for their member groups to participate in development and poverty alleviation to low income families.				Baptist church provide improved seeds to farmers	Churches provide support to the community especially orphans and widows	
LUWADA		Provide seminars on health and bad cultural believes					
SACCOS					Helps farmers during hard time		
NGO (KYENGO Net)	The NGO meet to discuss on the problem and then every one do according to his ability. Helps orphans						

	and vulnerable children
Wakulima Tea Company (WATCO)	Provide education on environmental management for example the use of improved stoves that use few fuel woods.
Africa Bridge	Provide support on environmental management.
Government	Corroborates in trains various techniques

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 providing 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, cooperative unions) in most cases they 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)

Approaches	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Village Meetings	Village meetings, focus group discussions 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	Organise village meetings and also have meetings for SACCOS/AMCOS members	
Workshops/trainings	Organise different training 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 and Farm field school tours	They share information through village meeting	Participate in seminar and workshops	
Flyers and letters	Distribute hand outs and flyers which explain our activities to farmers and other stakeholders	Use advertisement boards and inform farmers on the services as means of advertisement especially when new product is being introduced	Use of leaflets or circular letters and billboards	Distribute letters provide information and bill boards	Distribute letters which explain activities and provide information	Distribute letters which explain activities and provide information
Mobile phone		Share information among stakeholders,				

Field visit	Field visits used in educating and communicate with farmers and focus group	extension officers and sometimes farmers	Form farmer groups and educate them through farm field school	Conduct field tour for members
Phone			Use of mobile phone to communicate with stakeholders	
Internet	Communication with other stakeholders within and outside of operation areas			
Networking	Formation of NGO networks such as KYENONET (Kyela Non governmental Organisations Network (in Kyela district)) they usually meet quarterly to share information and experiences		Use of public notice boards at village, ward and district levels	
Annual meetings	general Share information on opportunities and achievements of our organisations, various stakeholders including farmers participate in this meeting			Share information on opportunities and achievements through seminars and meetings Participate in meeting for information sharing on opportunities and achievements
Personal communication		Share information with farmers and other stakeholders through personal communication in their		

Cinema and Drummers services
 and Drummers, choir and
 Drummers cinema/Video is used
 as means of
 presenting different
 innovations in coffee
 production and other
 good agricultural
 practises

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

Other stakeholders	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Meetings	√		√	√	√	√
Letter	√		√			
Mobile Phone	√	√			√	
Cinema	√					
Networking	√					
Personal communication		√				
Workshop			√			√
Internet	√					

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

Stakeholders	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Radio	Improve access to radio (availability and transmission)		The use of mass media such as newspaper, radio and TV	The use of mass media such as newspaper, radio and TV	Radio for cooperative union is important	
Television	Can be use in training and communicating research findings to farmers and other		The use of mass media such as newspaper, radio and TV	The village TV can be used to provide information on climate change and variability	TV for information training	

Internet service	stakeholders Introduction of internet services and e-mail		Internet is a good way of sharing information	
Cell phone				The use of telephone in villages can improve communication
Net working	Expanding network into villages through improvement of communication and locating offices in villages			
Field visits		Improvement of field visit. This will enable farmers and other stakeholders	Field visits can be used as means for sharing experiences with other farmers	Field visits are also important for SACCOS members
Information sharing	Improve information sharing through meeting, seminars and workshops, telephone communication and the use of handout and flyer	Improve information sharing through meeting, seminars and workshops, telephone communication and the use of handout and flyer	Information sharing through meeting, seminars and workshops,	Involve village government in SACCOS and Information sharing through meetings, seminar, and workshops
Drummers and cinemas	Improve drummers and choir for sensitisation and mobilization			Cinema on agriculture production and HIV AIDS
Use of Participatory approaches	Village meetings should involve all villagers, not involving leaders only.		Use of regular meeting and workshops	
Infrastructure	Improve means of communication (motor cycles, bicycle)	Improvement of transport e.g. Motorcycle	Improve transport mechanism	

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

Stated links	Stakeholder groups consulted						Number
	NGOs	Private	Extension	Village govt	Financial	Community groups	
Farmers	✓	✓	✓	✓	✓	✓	6
Ward extension officers	✓	✓		✓		✓	4
District extension staff	✓	✓	✓	✓	✓	✓	6
District council (DED & DC)		✓	✓	✓	✓		4
Traders	✓			✓			2
Village executive officers(Village Government)	✓	✓					2
Relevant NGO	✓		✓	✓		✓	4
Churches and Teachers				✓			1
District Council	✓	✓	✓	✓	✓	✓	6
Tea Companies			✓	✓		✓	3
Research institutes			✓	✓		✓	3
Financial Institutions	✓	✓	✓	✓	✓		5

✓ = Mentioned by at least one stakeholder in that group

For each stakeholders group consulted try to characterize the pattern of interaction with other stakeholders

Eg 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 Kyela and Rungwe districts were not aware of the National Adaptation Programme of Action. This could be due to poor stakeholder's 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.

Awareness (number/ % aware)	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Assessment of process	0	0	0	0	0	0

2.7 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)

Strengths (broad category)	Stakeholder groups					
	NGOs	Private	Extension	Village govt	Financial (SACCOS/AMCOS)	Community groups
Training	√	√	√		√	√
Climate information			√			
Land Availability			√			
Human Resource			√	√		
Willing Community	√		√	√	√	
Good working relationship with Farmers and other stakeholders	√	√	√			
Fund availability	√					√
Agricultural Input	√	√				
Infrastructure				√		

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

Weaknesses (broad category)	Stakeholder group					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Farmers’ perceptions, knowledge and practices	√	√			√	
Human resources	√		√		√	√
Infrastructure	√	√	√			
Agro climatic information	√		√			
Agricultural inputs	√	√			√	
Low education	√		√	√	√	
Finance	√	√		√		√

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

Opportunities (broad categories)	Stakeholder groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Animal power					√	√
Research			√			
Training	√					
Human resources	√	√	√		√	√
Extension service			√			
Land availability	√	√		√	√	
River				√	√	√
Willing community	√	√				
Roads		√		√	√	
Community groups					√	
SACCOS					√	
Agricultural inputs		√				

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

Threats (broad categories)	Stakeholder groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Government policy and support			√		√	
Education		√				√
Finance	√	√			√	
Extension Services	√				√	
Input supply	√	√				
Climate change	√		√	√	√	
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	<i>Involved in Training on appropriate measures for climate change and variability and good agricultural practices and techniques</i>	<i>Involved in Training on appropriate measures for climate change and variability and good agricultural practices techniques</i>	<i>Involved in Training on appropriate measures for climate change and variability and create awareness to policy maker</i>	<i>Involved in Training on appropriate measures for climate change and variability and good agricultural practices techniques</i>	<i>Involved in Training on appropriate measures for climate change and variability and irrigation farming</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>
Financial Resources	<i>Support workers and Improve products e.g. tubs for nurseries</i>				<i>Involve in capacity building on climate change and variability and timely provision of loan</i>	
Market	<i>Provision of market for the product and market information</i>					
Mass media				<i>Make se of TV and radio were possible to provide information and education on climate change and variability impacts</i>		

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	<i>Sensitization on climate change and variability,</i>	<i>Weather forecasting, inputs and adaptation to climate change and variability</i>	<i>Relevant weather information</i>	<i>Climate, prediction</i>	<i>Relevant weather information</i>	<i>Climate prediction trough</i>	<i>Relevant weather information</i>	<i>Climate, prediction</i>	<i>Relevant climate change and variability, farming practices and weather prediction information through radio, phone, new papers</i>	<i>Climate prediction</i>
Training	<i>Involved in Training on appropriate measures for climate change and variability, environmental issues and economic activities</i>	<i>Involved in Training on appropriate use of agricultural inputs measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability and agricultural production</i>	<i>Involved in Training on appropriate measures for climate change and variability and data management</i>	<i>Training on appropriate measures for climate change and variability and agricultural production</i>				
Products	<i>Tubes for trees nurseries (Seedling), improved seeds and transport facilities such as motor cycles</i>	<i>Package of agricultural inputs should be in small packages such as 5, 10, 20 (kgs) so that every farmer can afford</i>	<i>Meteorological stations,</i>	<i>Insect and pest side and Package of agricultural inputs should be in small packages</i>	<i>Power tiller, transport facility,</i>	<i>Capital, communication facilities, radio and Package of agricultural inputs should be in small packages such as 5, 10, 20 (kgs)</i>				

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

Broad category of farmer capacity improvement	Stakeholders groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Training on good agricultural practices/innovation	<i>Training on agricultural practices/innovation, marketing of agricultural crops and entrepreneurship skills and climate change and variability adaptation</i>	<i>Training on Pesticide safety and management and how to cope with climate change and variability impacts</i>	<i>Training on agricultural practices/ innovation and how to cope with climate change and variability</i>	<i>Training on good agricultural practices/innovations</i>	<i>Training on adaptation to climate change and variability, good agricultural practices and entrepreneurship and small scale business management</i>	<i>Training on good agricultural practices/innovation and entrepreneurship skills</i>
Improve Irrigation farming	<i>Improve irrigation facilities for dry season agriculture production</i>					
Improve infrastructure	<i>Provision of social services, improve infrastructure and reduction of inputs’ prices</i>					<i>Improve communication facilities</i>

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

Stakeholder category for capacity improvement	Stakeholders groups reporting					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Involved in Training on appropriate measures for climate change and variability	<i>Farmers and extension workers Involved in Training on appropriate measures for climate change and variability</i>	<i>Farmers should be Involved in Training on appropriate measures for climate change and variability</i>	<i>Farmers should be Involved in Training and workshop on appropriate measures for climate change and variability</i>	<i>Avail crop varieties that fit changes</i>	<i>Training on appropriate measures to climate change and variability</i>	<i>Farmers should be trained on good agricultural practices/innovation and entrepreneurship skills</i>
Improve communication	<i>Use of radio, cinema and demonstrations fields in promotion and implementation of new technologies</i>		<i>Use of practical training and receiving climate variability information</i>	<i>Involve in practical training</i>		<i>Improve communication facilities</i>

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))

Broad categories	Stakeholder groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Involved in action research			<i>Variety development</i>	<i>Involved in action research</i>	Involved in action research	<i>Involved in action research</i>
Seed supply		<i>Agricultural input supply Agricultural input distribution</i>			<i>Seed input supply Seed distribution Find market for agricultural crops</i>	
Facilitate farmers on good agricultural practices/innovation	<i>-Facilitate farmers on good agricultural practices/innovation</i>		<i>Facilitate farmers on good agricultural practices/innovation</i>			
Involved in Training on appropriate measures for climate change and variability	<i>-Involved in Training on appropriate measures for climate change and variability -Collaborate with Heifer International in training farmers on good agricultural practices</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>	<i>Involved in Training on appropriate measures for climate change and variability</i>

3. OVERVIEW OF MAIN FINDINGS AND IMPLICATIONS

- Appendix 1 Checklist
- Appendix 2 Project Flyer
- Appendix 3 SWOT analysis of agricultural innovation systems

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
Training	Include training and advice in their activities	Provision of advice to farmers	Ability of extension officers to provide advice services to farmers		Training on the importance of account and saving and conducting seminars	Training farmers on suitable land for agricultural practices
Climate information			Have information on climate change (rainfall data)			
Land Availability			Availability of good land for agriculture and livestock			
Human Resource			Presence of technical staffs (extension officers)	Presence of working force		
Willing Community	Willingness of communities to learn and practice new idea		Willingness of communities to plant trees	Village communities responds quickly and participate actively in good agricultural practices	Willingness of farmers with alternative resources to dispose to meet their household needs	
Good working relationship with	Good governance (open and	Good working relationship with	Good working relationship with			

Farmers and other stakeholders	participatory), transparence of the organizations Close work relationship with extension officers and local communities	agricultural extension officers and farmers	farmers			
Fund availability	Donors supports agricultural initiatives e.g. (WATCO)					Availability of funds through SACCOS
Agricultural Input	Input supply by having a revolving fund trough WATCO	Improve input supplies				
Infrastructure				The village is accessible		

WEAKNESSES

	Stakeholder group					
Weaknesses (broad category)	NGOs	Private	Extension	Village govt	Financial	Community groups
E.g. Farmers' perceptions, knowledge and practices	Rigidity of some farmers to change	Lack of knowledge on agricultural inputs			Little understanding on the important of the organisations. Most farmer are using traditional practices with use of limited inputs	
Human resources	Lack of enough extension officers at village levels		Shortage of manpower (extension officers)		Lack of enough extension officers at village levels	Lack of en lack of enough extension officers to facilitate seminars and advices

Infrastructure	Poor infrastructure and means of transport to the villages	Lack of transports and its cots	Inadequate infrastructure for water management (floods)			
Agro climatic information	Lack of reliable climate change and variability information especially variability, floods and drought		Inadequate communication on climate change and variability factors. Little knowledge on climate change issues			
Agricultural inputs	Inputs supplies does not meet demand	Fertilizer package 50kg is sold at high price that farmers cannot afford. Lack of capital to supply fertilizer			Use of poor quality seeds and varieties and difficulties in accessing inputs due to high price and transport costs	
Low education	Low level of education and advices and inadequate access to training for farmers		Some member of the communities are not leady to change	Lack of training opportunity for agriculture, adaptation to climate change	Low education on agriculture and climate change to farmers	
Finance	Over dependence on donors because of lack of fund	Shortage of capital,		Inadequate funds for the activities	-	Lack of fund to conduct Seminars

OPPORTUNITIES

	Stakeholder groups					
Opportunities (broad categories)	NGOs	Private	Extension	Village govt	Financial	Community groups
Animal power					Availability of Animals and implements for agricultural production	Have animals that are used in agricultural production
Research			Presence of Uyole Agricultural research station as a source of agricultural innovations			
Training	Education on good agricultural practices and climate change and variability					
Human resources	Availability of human labour, and expertise	Availability of human labour	Government plan to educate and employ many extension officers and improve transport facilities		Active human power	Availability of human labour
Extension service			Work together with available extension officers			
Land availability	Land availability	Suitable land availability		Good soil for agriculture and brick making	Suitable land available for agricultural purposes	
River				Permanent river present could be harnessed for irrigation	Plenty of water resources which are underutilized	Availability of rivers that can be used in irrigation

Willing community	Willing community to work with organisations	Farmers willing to adapt agricultural innovation system				
Roads		Good roads for transport and communication		Good roads for transport and communication	Roads for transport and communication	
Community groups					Religion and farmers groups are willing do adapt and implement agricultural innovations	
SACCOS					Availability of SACCOS in villages	
Agricultural inputs		Presence of stockist / agricultural input supplies				

THREATS

Threats (broad categories)	Stakeholder groups					
	NGOs	Private	Extension	Village govt	Financial	Community groups
Government policy and support			Land use planning, mixing agricultural land and settlement Change in leadership/ policy		Change in Government policy/ leadership e.g. (Cooperatives and Marketing) failing to find markets outside the borders. <i>Lack of political will to support cooperative union</i>	
Education		Low education (most villagers have low level of education and involves more in drinking)				<i>Lack of education on agriculture</i>
Finance	Lack of Capital, Little budget is allocated to agriculture sector	Lack of enough capital (Poverty and diseases)			Lack of enough capital	
Extension Services	Dependent on district council to provide extension officers which are few				<i>Few agricultural and livestock field extension officers</i>	
Input supply	Fertilizer is sold at high price which farmers cannot afford	Fertilizer is sold at high price which farmers cannot afford				
Climate change	Lack of reliable climatic information and unpredictable weather		Shortage of right tree species that are environment friendly and help in adaptation to climate change	Unpredictable weather	Lack of reliable climatic information, frequency occurrence of strong wind and diseases reduced crop production	
Infrastructure	Poor infrastructure		Poor roads in some area especially during rain season and lack of implements		Lack of communication facilities, social services (electricity)	

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	LUWADA	Collaborate with field staff, religious leaders and attend meetings, cultural groups and involve in project activities
2	Mango Tree	Involve in training and providing agricultural education in villages
3	EVIROCARE	Involve in training and information insemination to the community (community sensitization and training)
4	NGOBE GROUP	Provision of education to farmers in collaboration with other NGO's
5	SPW-Kapugi	Involve in training and seminars
6	HPI-Rungwe	Participate in meeting, seminars, sharing information, exchange visits/ study tours
7	RSTGA	Involve in training, receive information materials, included internet communication
8	Mkulima Pembejeo za Kilimo na Mifugo Ipinda	Involve in sensitization, seminars and workshops
9	AJET FAM CHEMICALS	Facilitate farmers on good pest management for the safety of human and environment
10	PERU AGROVERT CENTRE	Participate in workshop, seminars and training
11	DALDO KYELA	Involve in provision of education through training
12	Makwale Ward Extension Officer	Facilitate farmers through farm field school
13	Malindo Ward Extension Officer	Involve in training farmers on climate change and variability impacts and adaptation in agriculture
14	DALDO Rungwe	Involve in workshops of climate change and variability
15	Kapugi Village Government	Involve in action research through practical activities
16	Mpunguti Village Government	Involve in training on climate change and variability and agriculture and avail crop varieties that fit changed farming conditions
17	Lyenje SACCOS	Involve in initiatives as trainees as well as member participating in research activities
18	RUCU	Can participate as training of trainers and use the knowledge we have to train farmers
19	KYECU	Involve in capacity building regarding to climate change and variability issues and good agricultural practices alternatives
20	Pakati SACCOS	Involve in training
21	Ndobo SACCOS – (Mpunguti)	Involve in training on entrepreneurship and agriculture, seminars and workshop
22	Ukombozi Coffee Production Group	Involve in training, seminars on adaptation to climate change and variability and practical education
23	Wanyamakazi Farmers Group	Involve in training, seminars on adaptation to climate change and variability and education on agricultural activities

Appendix 5 Contact details for stakeholders consulted (Q1)

S/NO	STAKEHOLDER	CONTACT
1	Benson Mwaikeke	LUWADA P.O. Box 599 Kyela Mobile: 0755-821700
2	Andiliile Ibrahim	Mango Tree P.O. Box 455 Kyela Email: mangotree.andilile@gmail.com Mobile: 0756099892
3	Newton Mwakabambo	ENVIROCARE P.O. Box 410 Kyela Mobile: 0755-507740
4	Ali Mlagila	Managing director NGOBE GROUP Mobile: 0753-010510
5	Wiliam Budodi	SPW-Kapugi Mobile:0764-519957
6	Ivory Mapogha	HPI-Rungwe P.O. Box 401 Tukuyu Mobile:0784-353276 Email:i_mapogha@yahoo.co.uk
7	Johnson Mwakasege	Secretary RSTGA P.O. Box 734 Tukuyu Mobile:
8	Daniel Mwakajoka	Mkulima Pembejeo za Kilimo na Mifugo Ipinda P.O. Box 63 Ipinda Kyela Mobile:0786-690855 and 078-040405
9	MR. Mwaipopo	AJET FAM CHEMICALS Tel: +255 025 255 2122
10	Bakari Kidungwe Mbelwa	PERU AGROVERT CENTRE Mobile: 0784-201695 or 0754-635947
11		DALDO KYELA P.O. Box 188 Kyela Mobile: 0784-381413 Tel: 025 2540164
12	Loveluck Mwasapi	Ward Extension Officer Makwale Mobile: 0786-346916
13	Judika Mwaisabila	Ward Extension Officer Malindo Mobile: 0787- 920925
14		DALDO Rungwe P. O. Box 148 Tukuyu Tel: 025 2552082 Fax: 025 2552586 Email: ded-rungwe@iwayafrica.com
15	Alexander Mwabwaje	Mpunguti Village Government Mobile: 0786606890
16	Sanke Mwaikokesya	Kapugi Village Government Mobile: 0787-457307
17	Eden Enos Mwakasege	Lyenje SACCOS P. O. Box 238 Tukuyu

		Mobile: 0787-454397 (Via Sanke Mwaikokesya) : 0757-797773/0786-074677 (Vice chairman Mwanyerere)
18	Mr. Mwaipopo	RUCU Mobile: 0756-799291 Tel: +255 025 2555 2120
19	Prof. Mwakabumbe	KYECU Mobile: 0784679320 Tel: +255 0254 0555 Email: luwada1992@yahoo.com
20	Bernard Mwandemile	Pakati SACCOS P. O. Box 145 Kyela Mobile: 0786-837755
21	Patric Simon Kalomba	Ndobo SACCOS – (Mpunguti) P. O. Box 485 Kyela Mobile: 0762-611417
22	Jacob Kasege	Ukombozi Coffee Production Group
23	Magdalena N Ifwani	Wanyamakazi Farmers Group