CCARDESA
Centre for Coordination of Agricultural Research & Development for Southern Africa
Centre De Coordination De La Recherche Et Du Développement Agricole De L'afrique Australe
Centro para a Coordenação da Investigação e Desenvolvimento Agrário na África Austral

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
SADC
TOWARDS A COMMON FUTURE

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Training on "Tackling Climate Change in Agriculture: Approaches to Adaptation and Climate Smart Agriculture in the SADC Region"

Facilitation: Catalina Berger, Wiebke Foerch
Organisers: Sepo Marongwe, AGRITEX, Elke Stumpf and Sarah-Kay Schotte, GIZ

25 – 29 September 2017

Cresta Lodge Harare, Zimbabwe

Programme

Monday	Tuesday	Wednesday	Thursday	Friday
• Welcome and Opening • Presentation of participants • Outline of the seminar • Agenda	• Presentation : Introduction to CSA: technologies, practices and strategies	• Module A: Presentation of results • Action learning: dimensions of adaptation options	• Recap of excursion • Presentation : Conservation agriculture and Agricultural policies in Zimbabwe	• Preparing final presentation • Group results' presentation
• Presentation: Thematic introduction: Climate change, adaptation, mitigation • Presentation : CC projections and impacts in SADC	• Case study, Module A: Evaluating present and future vulnerabilities- part 1 current situation • Action learning: risk functions • Case study, Module A: Evaluating present and future vulnerabilities- part 2 future situation	• Case study, Module B: Identifying adaptation options • Preparation of excursion	• Case study, Module C: Selecting adaptation measures	• Feedback on CP approach
Lunch break				
• Presentation : Agriculture: victim and culprit of CC and adaptation options, CSA	• Presentation: PICSA – Participartory Integrated Climate Services for Agriculture	Excursion to Ngwerume family, Mawanga Ward, Domboshawa, Goromonzi District	• Presentation: Prioritizing CSA practices with data	• Presentation : Youth and CSA • Presentation: CCARDESA's Information, Communication and Knowledge Management System • Evaluation of training • Certificates • Closure
• Exposé: concept and steps of Climate Proofing • Presentation of case studies, composition of	• Presentation : Water management and soil conservation			

Objectives and participants

The overall objectives of the training were:

- to train participants on the Climate Proofing (CP) approach with a focus on Climate Smart Agriculture (CSA)
- to enable them to apply these concepts in their individual working contexts
- getting to know concepts of climate change adaptation and climate smart agriculture for agricultural extension services
- to enable the participants to apply such concepts in their extension work
- to use feedback and lessons to further improve the training for future application in the region

Participants:

- 30 practitioners from agricultural extension services in SADC member states
- Countries: Botswana (2 participants), Malawi (2) and Zimbabwe (24)
- Institutions: Ministries of Agriculture, ACCRA
- Gender balance: 9 women, 21 men

Day 1 - Overview

- Welcome and opening
- Presentation of participants
- Presentation 1: Thematic introduction: Climate change, adaptation, mitigation
- Presentation 2: CC projections and impacts in SADC
- Presentation 3: Agriculture - victim and culprit of CC and adaptation options
- Exposé: concept and steps of CP
- Presentation of case studies and composition of working groups

Day 1

- The training was opened by **Bernard Mache**, Director of AGRITEX, **Jan Moejes**, GIZ AISP programme, **Dr. Simon Mwale**, Acting Executive Director of CCARDESA and **Josef Gondo**, Principle director of the Department of Agritex of the Ministry of Environment. This following, the Permanent Secretary of the Ministry of Environment, Engineer **Ringson Chitsiko** also welcomed the participants and officially opened the training.
- The opening was followed by the self-introduction of the **course participants.** During the presentation, participants had the opportunity to present themselves and express their expectations for the training course.
- **Key expectations** raised were to gain more knowledge on CC adaptation (CCA) and mitigation strategies, practical implementation of CCAA, sharing knowledge on CCAA as well as sharing of experiences and networking with colleagues
- The thematic part of the course started with a presentation on **climate change basics,** followed by a more specific presentation on **climate change projections in the SADC region.** During the third presentation, participants learnt about the role of the agricultural sector as victim of and culprit of climate change at the same time.
- This was followed by an exposé about the **Climate Proofing** approach and an explanation about the objectives, steps of implementation as well as the modules covered during the training.
- The day was closed by the presentation of the **case studies** and the **composition of working groups** on the CP approach

Welcome and opening by Bernard Mache, Director of AGRITEX and Jan Moejes, GIZ AISP

Mr. Mache, Director of AGRITEX, underlined that the MoA is very happy with the support they are getting from GIZ and others in capacitating the ministry, especially on the topic of this training. The MoA is aware of the challenges of climate change, but this training will help to give more appreciation about the challenges and how to respond.

He expressed his hope that at the end of the workshop the trainees will be experts in Climate Change Adaptation and urged them to please train their colleagues in their respective areas, and most importantly, the farmers that the extension officers are working with.

Jan Moejes, from GIZ's AISP Programme also welcomed the participants and underlined that GIZ has been very happy to support the training when approached by AGRITEX. He also welcomed the four participants from outside Zimbabwe and expressed his hope to learn from each other and share experiences.

Welcome and opening by Dr. S. Mwale - CCARDESA

Dr. Simon Mwale, Acting Executive Director of CCARDESA also welcomed the 30 participants from Zimbabwe, Botswana and Malawi.

He reminded the participants that we have gathered here around the issue of climate change, but we are beyond the stage of discussion now, we are now facing the impacts of climate change. Over the past few weeks alone, we have heard about drought, cyclones and other extreme events. These are also having impacts close to home.
In countries dependent on agriculture, such as Zimbabwe and others, the importance of agriculture and the effects of climate on the sector is realized at national and regional level. There are policies in place that help address productivity increase under climate change.

At regional level, the RAP outlines the priorities, of which climate change is one. The domestication of those policies is critical, but it is the task of the extension to bring these policies to the field level. But it also goes the other way: the needs and demands of the farmers need to be taken up to national/regional levels.

He then gave an overview of CCARDESA and GIZ's ACCRA programme.

Dr. Mwale urged participants to make use of the knowledge and skills that are being provided to them this week – they are the conduit with the farmer and it is critical that they keep working with the farmers also on this important topic. We want to see change at the farm level.

Welcome and opening by Josef Gondo, Principle director of the Department of Agritex

Mr. Gondo, wo spoke on behalf of the PS of the MoA, also welcomed the wide range of participants in the room, which is a good mix of practitioners and experts from the field as well as guests from abroad to share their knowledge.

He appreciated the support from GIZ to get this training off the ground – this is a great platform to share ideas and experiences, and exchange on what can achieve results, what are the best practices out there. He also recognized CCARDESA, representatives from GIZ, Government officials, ZFU representatives once they come, and visitors from the outside.

He underlined that adaptation is a key issue here in Zimbabwe and that the MoA is thus grateful for this training course to help to provide the relevant support to the farmers

Impacts of climate change can already been felt, as the country is affected by drought, erratic rainfall, resulting in substantial crop and livestock losses. Support needs to be provided to farmers that goes beyond production alone. It is also access to inputs, post-harvest processes, value addition and market linkages, there was tendency to not give these enough attention in the past. Only with integrated approaches vulnerability can be reduced in the future, e.g. through a value chain perspective. No rigid solutions are needed, but attention been paid to the context and also recognize indigenous and local knowledge.

Welcome and opening by the Permanent Secretary of the Ministry of Environment, Engineer Ringson Chitsiko

The group was honored by the visit of the Permanent Secretary of the Ministry of Environment, Engineer Ringson Chitsiko. Mr. Chitsiko welcomed participants to this training and said that CC and CSA are critical topics for this country. In Zimbabwe, water is the bottom line, as drought and flood, with almost the same consequences, are key challenges to productivity. Climate change brings increasing uncertainty into agricultural production, this calls for a total paradigm shift in the manner of thinking, planning and conducting business in agriculture.

Trainees will leave with tools and a changed mind set, we want to clone that expertise so that change can be built into the farmers. These are the people at the forefront. If we manage to do that, then we can be in sync with what current climate scenarios demand.

Presentation: Climate Change, adaptation and mitigation by C. Berger, consultant

The thematic introduction elaborated about climate change in general and adaptation and mitigation in particular.

First, an overview was given about the basic definitions on **weather, climate, climate variability** and **climate change** to make participants understand the terminology and differences.

This was followed by the explanation of the term **Mitigation**, which is determined as **Emission saving**/reducing measures**.** She also explained sources of Greenhouse Gases (GHG) as well as the most important GHG who contribute to global warming.

The main sectors of anthropogenic GHG emissions are **energy** (66%) and **land use change/agriculture** (26%). **Signals of climate change are** sea level rise, change in temperature and precipitation patterns. The impact chain of the climate signal “sea level rise” was explained from loss of land to **bio-physical** and **socio-economic impacts.**

To manage the unavoidable, **adaptation** is needed to adjust to actual or expected climate and its effects. Both mitigation and adaptation are complementary strategies for a climate-compatible development.
The presenter reminded the audience that the Climate Proofing training focuses on adaptation measures, but that the mitigation potential of selected measures will also be determined.

Q&A

Comment: Explaining these concepts on the ground is a challenge – especially mitigation, where only very few are concerned about it. Adaptation is easier, as people are experiencing it

Comment: Mitigation is a challenge for our extension agents, it comes up more and more but the issue has become more prominent now in developing countries. Developed countries went through a certain process and we also intend to go through this process to become developed, but this contributes to climate change. It becomes a problem to emphasize mitigation when we want to talk about development

Comment: This is an unfortunate example, e.g. US produces a quarter of the emissions, this is not a good example to follow

A: Agreed, we need to look at who emits most and these are not in Africa – China, US, EU, India, etc.

Comment: Mitigation is a policy issue, and for making technologies available that are beneficial

A: We will see adaptation measures, that have mitigation potential – let's look at synergies

Comment: Farmers should be aware of their impacts on emissions and think through their contribution this

Comment: We need incentives for farmers to mitigate, so if it comes with a premium then it might be an incentive to consider

Presentation 3: Climate Change projections and impacts in SADC by Dr. Piotr Wolski, UCT

The thematic introduction on CC was followed by a presentation by Dr. Wolski, Senior Scientist from the Climate Systems Analysis Group of the University of Cape Town (UCT).

He explained the difference between climate change and climate variability with the support of graphics showing the 1979-2013 extreme rainfall and number of rain days in the Zambezi Catchment.

Climate variability are variations in the mean state of the climate, e.g. extreme dry or wet years within a 30 years timeline.

He then explained different regional scale projections and showed examples of how different these are, depending on the model used. He advised the audience to never trust one single model projection. Finally, Mr. Wolski showed an info graphic on different scenarios for Lusaka, ranging from „hotter and drier“ to „warmer and more erratic and extreme rainfall“ to „warmer and extreme rainfall“.

He concluded his presentation with two graphics on seasonal forecast.

Q&A

Q: Variability versus climate change

- Variability continues and the change will make years slight drier on average (if we see a declining rainfall trend)
- Variability happens from season to season, change means this variability orients itself to one of the two extremes
- We need to learn to deal with variability, this will help us also with dealing with change, though it might not be enough

Q: Precipitation – will it change?

- Precipitation is likely to become more erratic through higher intensity events, though local context changes things (topography, land cover, etc.) – it is very difficult to predict clear patterns

Q: Models come with lots of uncertainty – while there is information we need to be very careful about how we use it.

- Seasonal forecasting in Zimbabwe is generally quite good – there is a certain level of predictability (ENSO relatively predictable impacts), if combined with results of global climate model results. But it is still probability based, so you will not always be right

Q: Cloud seeding – how does this come in?

- You engineer the climate system through this, it happens at a very large scale. It creates dependencies, and the effects on other countries would need to be taken into account, it is also an ethical question. Not much evidence that it can work on a commercial scale yet.

Q: Climate impact narratives/infographics

- these are developed by stakeholders where the data gets interpreted in a specific context
- science versus indigenous knowledge – there is a lot of physics in the indigenous predictions – so a lot of the predictions are compatible with each other – the question becomes how you react and what you do in response.

Presentation 4:
Agriculture: victim, culprit and potentials for adaptation and mitigation by Dr. S. Mwale

Dr. Mwale summarized the **effects CC will** have **on agriculture**, whereby he stressed that this sectors suffers from CC but at the same time also contributes to global warming (by the release of GHG).

Ca. 10% of the global GHG emissions are stemming from the agricultural sector (soil, fermentation, rice cultivation, energy, manure management and other) and **14%** from the **change of land use**.

He then presented a slide on different types of ecosystems and their **CO_2 storage capacity**. It became clear that **wetlands** have got the highest storage capacity per km^2.

Examples for **mitigating GHG** in agriculture and land use change were shown, amongst them tree planting, appropriate fertilizer application, planned land use change and reducing post harvest losses and food wastage.
Adaptation in agriculture is a multi-dimensional and multi-level process from farm to community to the public level. The presenter illustrated each level with examples and closed with criteria for **sustainable agriculture**.

Q&A

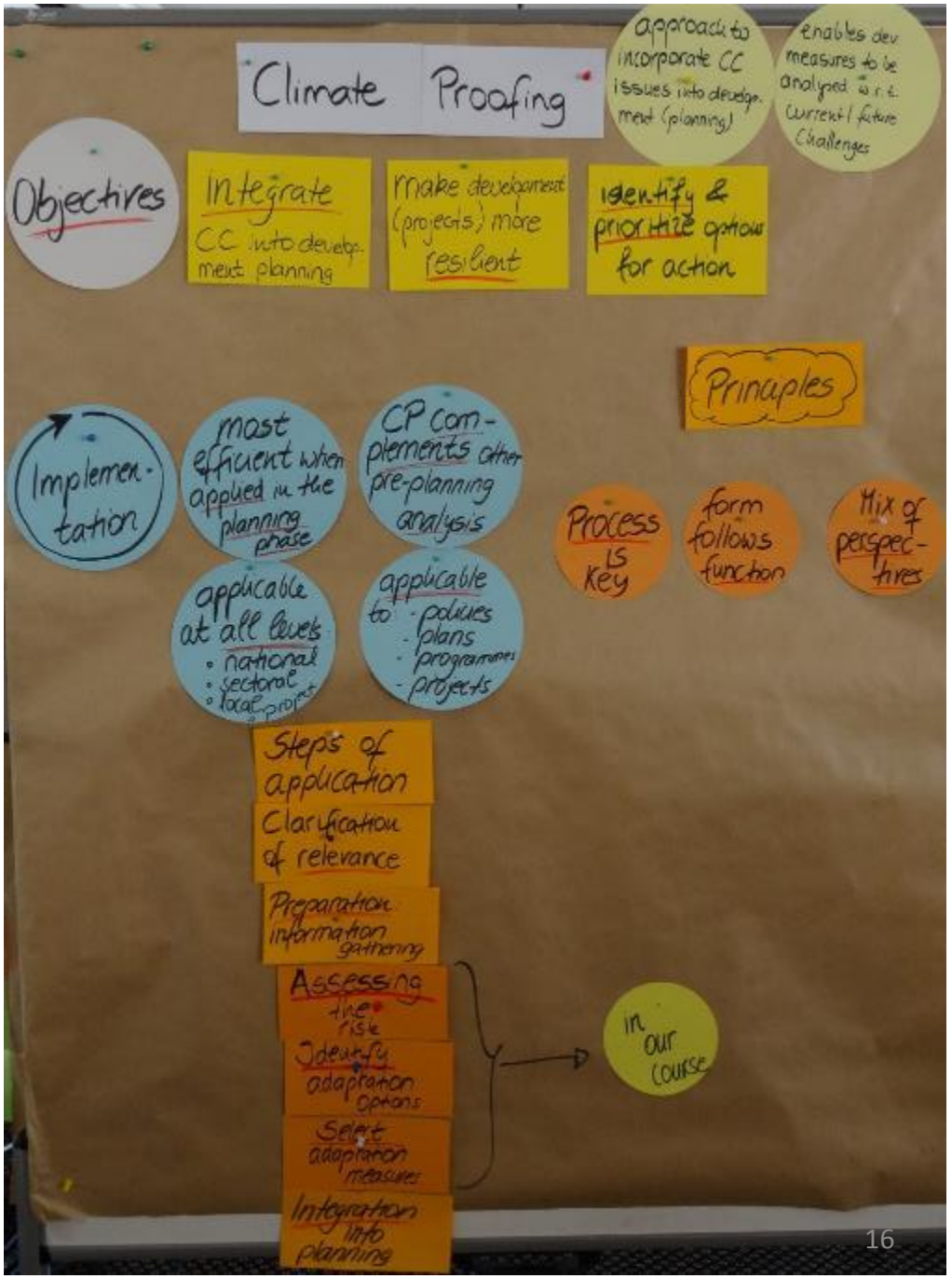
Comment: Population growth as indirect measure to avoid creating new emission is an issue of acceptance, lack of conducive policy, also polygamy is a problem

Comment: climate sensitive diet cannot be proposed to people who have no food. First we have to achieve food security
Difficult to expose limitations externally, these need to be coming from the inside

Comment: Farm level interventions – we now have drought tolerant varieties, but then we have conditions where drought conditions are followed by high intensity rainfall – what do we do then….

Introduction: the Climate Proofing approach

Climate Proofing:
A methodological approach aimed at incorporating issues of climate change into development planning. It enables development measures to be analysed with regard to current and future climate challenges and opportunities presented by climate change.



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Presentation of case studies and composition of working groups

Four case studies were prepared beforehand by Mrs. Sepo Marongwe from AGRITEX to work on through the Climate Proofing approach.

- Horticulture
- Cereal production
- Livestock and crop
- Cotton

Each participant was asked to choose the one study he/she is most interested in. Finally, the case studies on **horticulture, livestock and cereal production** were chosen to be climate proofed. Sub-groups of 8 to 10 participants were formed per case study.

Day 2 - overview

- The day started with the **Introduction to CSA** presentation by Sarah Beerhalter, GIZ-ACCRA
- Afterwards, the three sub-groups started to work on Module A of the case work, which is split into two parts. The group work started with part **1: Assess the risk – current situation**
- The following **action learning** introduced the risk terminology as it is used according to the 5th Assessment Report of the IPCC
- The groups worked through Part 2: **Assess the risk – future situation**
- The group work was followed by two presentations:

➢ Graham Clarkson gave an introduction on the **PICSA tool: Participatory Integrated Climate Services for Agriculture**

➢ Sarah Beerhalter gave a prenstation on **„Water management and soil conservation“**

Each presentations included a **Q&A session**

Presentation: Introduction to CSA: technologies, practices and strategies by Sarah Beerhalter, GIZ

Ms. Beerhalter programme manager of GIZ's ACCRA programme in Botswana presented the new challenges for agriculture addressed by several organisations which led to the development of the **CSA concept in 2010** by the FAO.

She also mentioned the Agenda 2030, the Paris Agreement as well as the (I)NDCs, who are also incorporating the agricultural sector. She then gave a definition of CSA which is: "**CSA is an approach to help guide the management and transformation of agriculture for food security under the realities of climate change**".

NGOs and Civil Society Organizations raised some concerns about this concept, e.g. the strong focus on mitigation and carbon markets and the danger of small-scale farmers to focus too much on carbon certificates rather than improving resilience.

The presenter further explained the **five components of CSA** and also gave examples of **climate-smart practices** in smallholder agricultural production.

Sarah closed her presentation with showing an ideal **climate-smart landscape** and **eight steps in planning CSA measures.**

Q & A

Q: Agroforestry – not easy to convince farmers of the benefits – the yield benefits of intercropping are overestimated

A: it depends on the context what is really feasible in terms of yield increases, benefits take some time to achieve, additional environmental benefits

Q: adoption during projects and the abandoning new practices is a big issue. Why is this happening?

A: The time lapse in yield benefits for agroforestry is tricky

Q: The farmer needs to start understanding that there are bigger questions at stake – CC – how to explain these things in such a way that farmers grasp the bigger issue?

A: One solution is exposure visits to other farmers that are doing it and are successful

Comment: Agroforestry works well if it is funded from the outside

- Not everything will work everywhere – it is about local priorities and seeing what people need/want/can do
- Task of the extension agents to not provide blue print solutions but to work with farmers to see what is realistic
- The climate proofing tool is an approach that will help you make these decisions, to work with farmers to determine what is the most appropriate solution

Comment: Post harvest losses – also includes losses prior to harvest – if you look at factors that affect potential yield then you have huge numbers of losses

A: Yes, we also have losses due to bad crop management on the field – however, let's not forget about the other issues along the value chain

Comment: Big challenge with tomato tuta absoluta last year – no post harvest management helped – do other countries have experience how this was dealt with?

Comment: African risk capacity – a bank that is starting to offer insurance products – especially successful for livestock insurance

- There is also a local solution in Zimbabwe – Econet offers insurance as part of a bundling - more and more solutions are being offered

Comment: People are skeptical of insurance products, since they are not always able to claim when needed – the details are often not understood, when claims can be made, etc.

A: There is a role in extension services to provide advice on these products and support farmers

Comment: ECOFarmer, there are some good experiences with this

Comment: The modalities of insurance solutions need to be discussed in more detail, what works for which system and what is needed in which system

Climate Proofing of 3 agricultural systems

For a consistent overview, the results of the Climate Proofing exercise of the three cases studies are grouped together per case.

Module A
Assess the risk Part 1: current situation

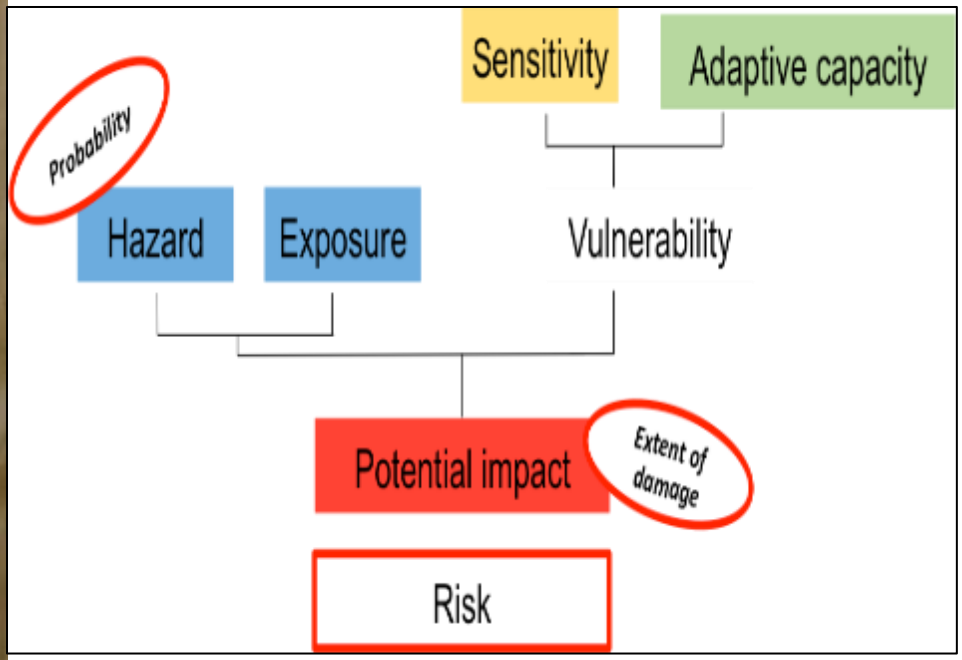
Learning objectives:

- Analyse the current risks and additional challenges caused by climate change in a defined system of interest
- Identify and handle the different factors contributing to “risk” in a system: sensitivity, adaptive capacity, basic vulnerability, hazard, exposure, and potential impacts
- Define the need for action according to the projected risk (the probability of climate hazards and the extent of damage) in the system

Steps:

- Discuss within your group the system of interest: the exposure unit you will assess during the training.
- List up to five key actors of the system of interest and also explore their roles and responsibilities.
- Explore further key elements of the system such as social, technical or natural components and give an estimate of their actual status quo on the tendencies.

Action learning
Risk function



IPCC 2014

Risk function Definitions

Risk: The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the **interaction of vulnerability, exposure, and hazard**. In this sense, the term risk primarily refers to the risks of climate-change impacts.

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. In the IPCC AR5 report, the term hazard usually refers to climate related physical events or trends or their physical impacts.

Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services and resources, infrastructure or economic, social, or cultural assets in places and settings that could be adversely affected.

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Sensitivity: The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise).

Adaptive capacity: The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.

Adaptation measures can 1. reduce sensitivity, 2. increase coping & adaptive capacity (and 3. potentially reduce exposure)

Module A
Assess the risk Part 2 - future situation - I

- Identify the **key climate related hazards** (observed & projected) of concern to which the system might be exposed. If possible, also note the frequency to which the system might get exposed to these signals.
- Consider next, if and how the system of interest's actors and assets are **sensitive** to climate hazards. Think of ecological and social sensitivity. Relate your assessment to the condition and trends of the system of interest. Take into consideration the actual situation and possible developments in the system (part 1).
- Note down the system's **current adaptive capacity** that would increase the adaptive capacity of a community. What is the adaptive capacity of institutions to support climate adaptation? Are national or local governments and organisations supporting planned adaptation?
- Now brainstorm the **potential impacts** of the climate related hazards to the system of interest.
  - First brainstorm the potential impacts to the **biophysical** part of the system by considering hazard in combination with the vulnerability factors.
  - Then brainstorm **socio-economic** impacts, resulting from the biophysical impacts.

Module A
Assess the risk Part 2 - future situation - II

In the last column, assess the probability of hazard and the extent for every potential biophysical and socio-economic impact. Discuss the column using the following questions:

- How relevant are the potential impacts to the development objective?
- Define a time horizon according to the objective of your analysis
- How likely is the impacts' occurrence?
- What is the extent of expected damage?
- Asses the level of risk (low, medium, high) of each impact by combining the likelihood of each biophysical impact with the severity of its socio-economic impact.

Module B
Identifying adaptation options

Task : Brainstorming “What could be done to respond to the challenges in order to be able to meet the development objective(s)?”

1. Find the selection of impacts you have rated as “high risk” from the previous module.
2. Brainstorm as many adaptation options as possible per impact to reduce the risk of climate change
3. Add adaptation options from policy, capacity development, technical or research
4. Finally, note as main actors whose contributions are necessary to implement the adaptation options.

Before the group work started, the facilitator led the participants through an action learning exercise on different levels and types of adaptation options (see next slide)

Levels and types of adaptation measures

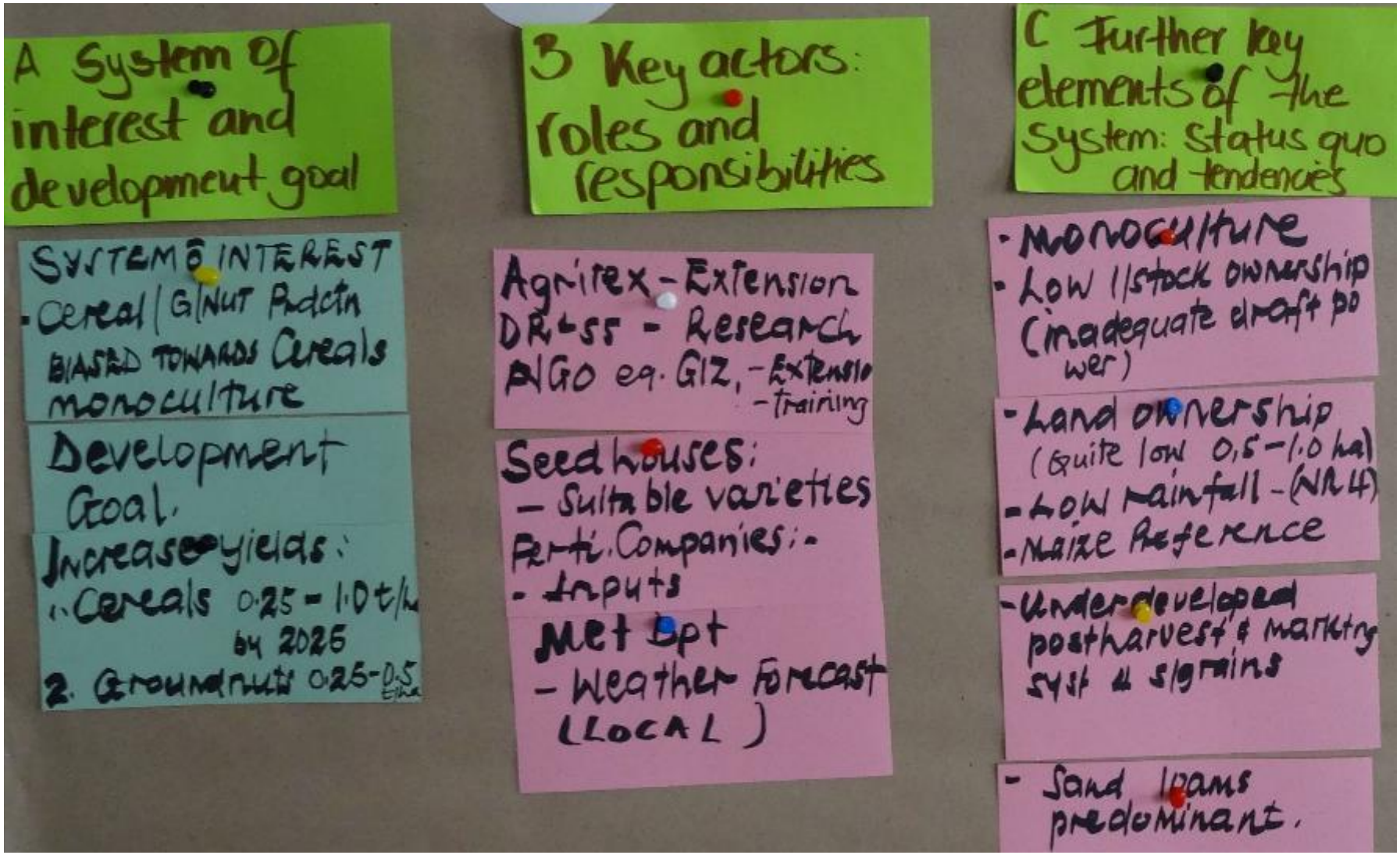
	no-regret measures →		specific measures	
Categories of adaptation goals	Addressing drivers of vulnerability	Building response capacity	Managing climate risks	Confronting climate change
Type of intervention	*Goal: enhanced buffer capacity (individual/ community)*	*Goal: enhanced problem solving capacities*	*Goal: use climate information to take strategic decisions*	*Goal: reduce direct risks of climate change*
Policy		Enhancing local participation in land use planning	Mainstreaming of ACC into sectoral plans	Land use plans forbid settlements in flood prone areas
Technical measure	Implementation of a vaccination program to eradicate animal diseases	Revive traditional enclosures to encourage vegetation regeneration	Planning of eco-corridors on the basis of observed migration patterns	Construction of a dam to reduce the risk of outburst floods from a glacier lake
Capacity development	Alphabetisation Providing women with crossbred goats and instruction in graze-free feeding	Training local community in reforestation to combat flood-induced landslides	Training of administrative staff in using climate information	
Research			Providing regional climate data	Conservation of genetic variety in/ex-situ

Module C:
Select adaptation measures

1. Agree on the set of selection criteria
2. Discuss each option using the criteria and score them by using 1 – 5.
3. Do the overall score
4. If too many options have similar evaluations, try to be more specific by introducing another criterion or weighting the criteria.
5. Add an estimation of the mitigation potential for each measure

CEREAL PRODUCTION

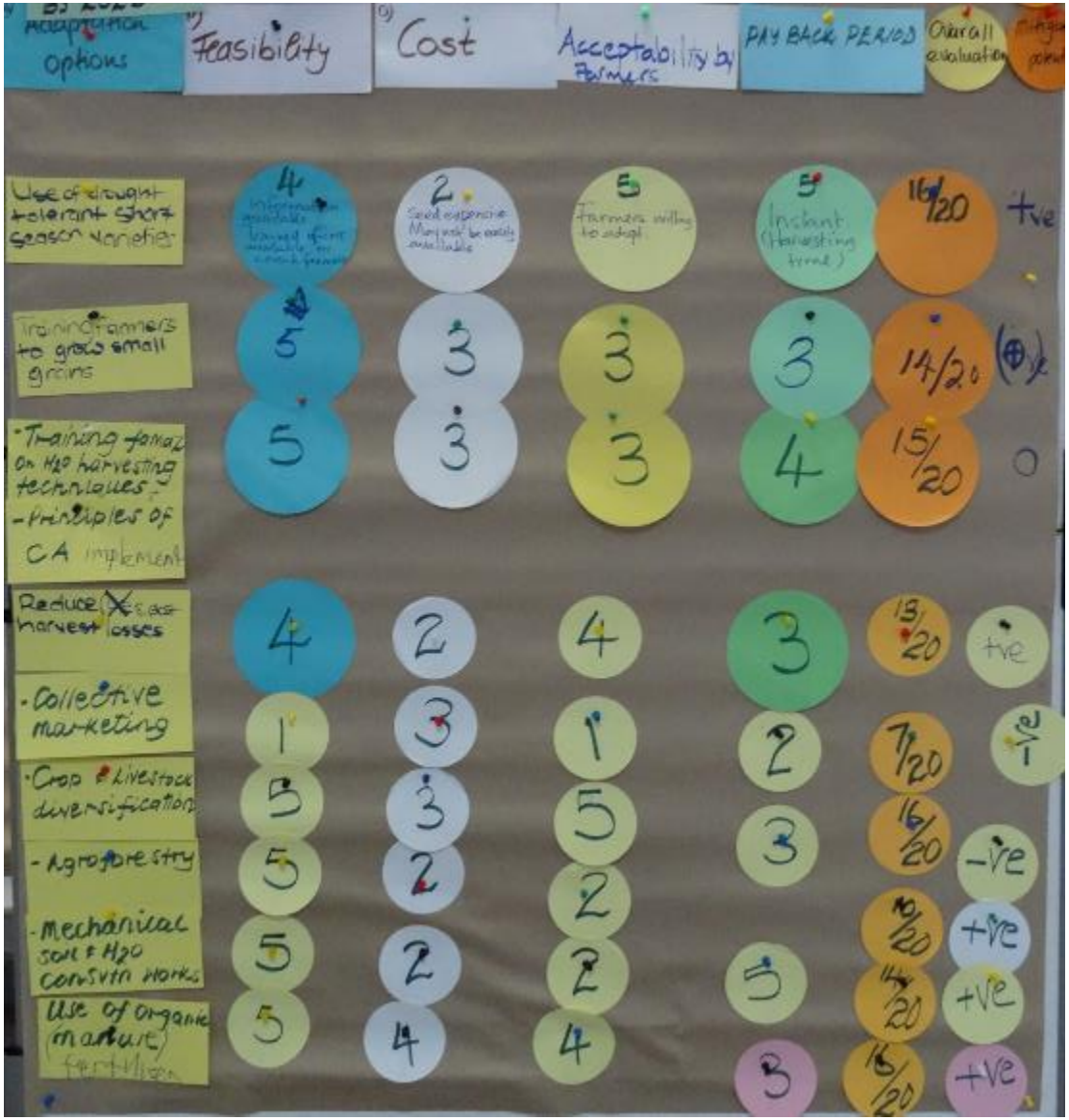
Module A.1 – current situation
Case 1: Cereal production



Module A.2 – future situation
Case 1: Cereal production

Module B
Case 1: Cereal production

Module C
Case 1: Cereal production



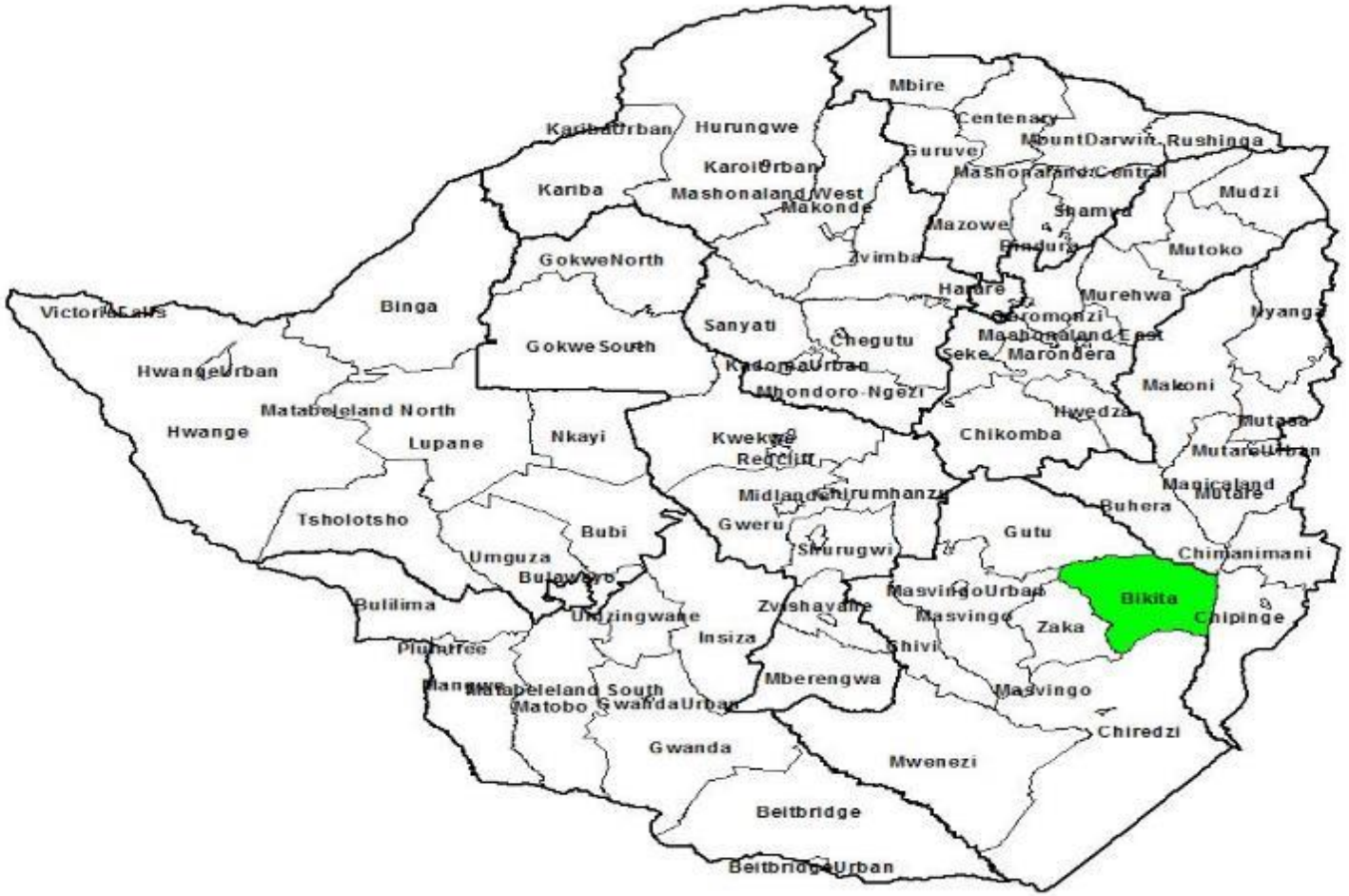
Presentation of final adaptation measures
Cereal production

Climate Proofing for Bikita District, Masvingo Province, Zimbabwe

Presentation Outline

- Background information
- System of interest and development goal
- Climatic hazards
- High risk impacts
- Key actors
- Adaptation options, drivers and their ranking
- Value of investment
- Sustainability of the concept

Location of Bikita District



Basic information

- Located in Masvingo province (South East Zimbabwe)
- Basically in Natural Region IV
- Has annual rainfall ranging from 400-650mm
- Sandy loam soils being predominant in the area
- Major crops grown include, maize, sorghum, millets and groundnuts
- Area characterised by erratic rainfall
- Has 40,000 farming households

Crops being grown

System of Interest and Development Goal

- **System of Interest**-Cereal/groundnuts production with a bias towards cereal monoculture

- **Goal**-To increase yield of cereals from 0.25-1t/ha and that of groundnuts from 0.25-0.5 t/ha by 2025

Climatic Hazards

- Erratic start of rainy season
- Low and Erratic rainfall
- Frequent mid season dry spells
- Early tailing off of rains
- High temperatures
- More intense rainfall

High Risk Impacts

- Poor yield and grain quality due to moisture stress
- Pronounced food insecurity
- Reduced income levels
- High soil erosion and siltation
- Leaching of nutrients

Key Actors

- Agritex
- DR &SS
- NGOs
- Universities
- Met Department
- Farmers Union
- Enthusiastic farmers
- ZINWA
- DDF
- Insurance Companies
- Central Government

Adaptation options, Drivers and overall Ranking

Adaptation Options	Feasibility	Cost	Acceptability	Pay back period	Overall evaluation (%)	Mitigation Potential
Use of DT and short season variety	4	2	5	5	80	positve
Train farmers to grow small grains	5	3	3	3	70	0
Train farmers on water harvesting tech and CA principles	5	3	3	4	60	0
Reduce post/harvest losses	4	2	4	3	65	positive
Collective marketing	1	3	1	2	35	Negative
Crop & livestock diversification	5	3	5	3	80	negative
Agroforestry	5	2	2	1	50	positive
Mechanical soil & water conservation works	5	2	2	5	60	positive
Use of organic fertilizers	5	4	4	3	80	positive

Anticipated Value of Investment

- Improved food security for 40,000 farming households
- Improved income levels for the people
- Positive contribution to standards of living in Bikita
- Improved water availability
- Increased carbon sequestration
- Improved co-existence/social capital

Wars used to be on oil, now it's water

Sustainability of the concept

- Capacity building to farmers
- Involvement of various government departments
- Increased interest/cooperation by the locals

End of presentation

Thanks for your attention

Q & A Final pres. Cereal production

Q: How do you take the needs/information/knowledge from farmers into account?

A: We are planning an M&E system that gets fed by farmers through evaluation meetings to get their views, progress review workshops with farmers

Q: Can you clarify again on which options are now the ones to tack forward. In which chronological order?

A: There are trade offs and synergies that do not come put clearly here – but we can look at the overall evaluation and mitigation potential – also, some of the options can be run concurrently. So the highest scores – using drought tolerant and short season varieties, diversification and use of organics fertilisers are to be done first

Q: Though, resources are not adequate to undertake all options – so what are your best bets?

A: Yes, you are right. But farmers are also contributing – so some options are easy to obtain

Q: I am very interested in reduced post harvest losses. For me this is just one item in the holistic thinking of from field to plate – so this is much more than that – waste is also important to consider – think holistically, bring in more actors,

A: We discussed these ideas in the group – we have looked at the whole chain of post harvest management along harvesting, transportation and marketing – yes, you are right

Comment: It would be good to include the issue of cost implications – what are the cost-benefits of your options

Q: How much money do you need for this – a lot of organisational development, where do you really see the investment requirements?

- Communication means are key – including training materials, training materials, equipment,
- We need training centers in the districts to accommodate meetings with farmers, extension and others
- Investment in improved breeds and reproduction (AI kits) needed
- Nurseries for agroforestry species needed
- Water supply systems are needed
- Diversification – there is increasing emphasis on aquaculture and beekeeping – there are investment requirements on these new technologies

Q: Demand for small grains is low and thus utilisation is limited – there should be more emphasis on options for utilisation, processing and creating demand for consumption but also for processing (industrial)

A: Here, there are also many quality consideration in processing to be taken on board

Q: Have you considered early warning and climate information as a key option?

A: We had ranked it as a medium risk – so this was not considered further due to the climate proofing ranking

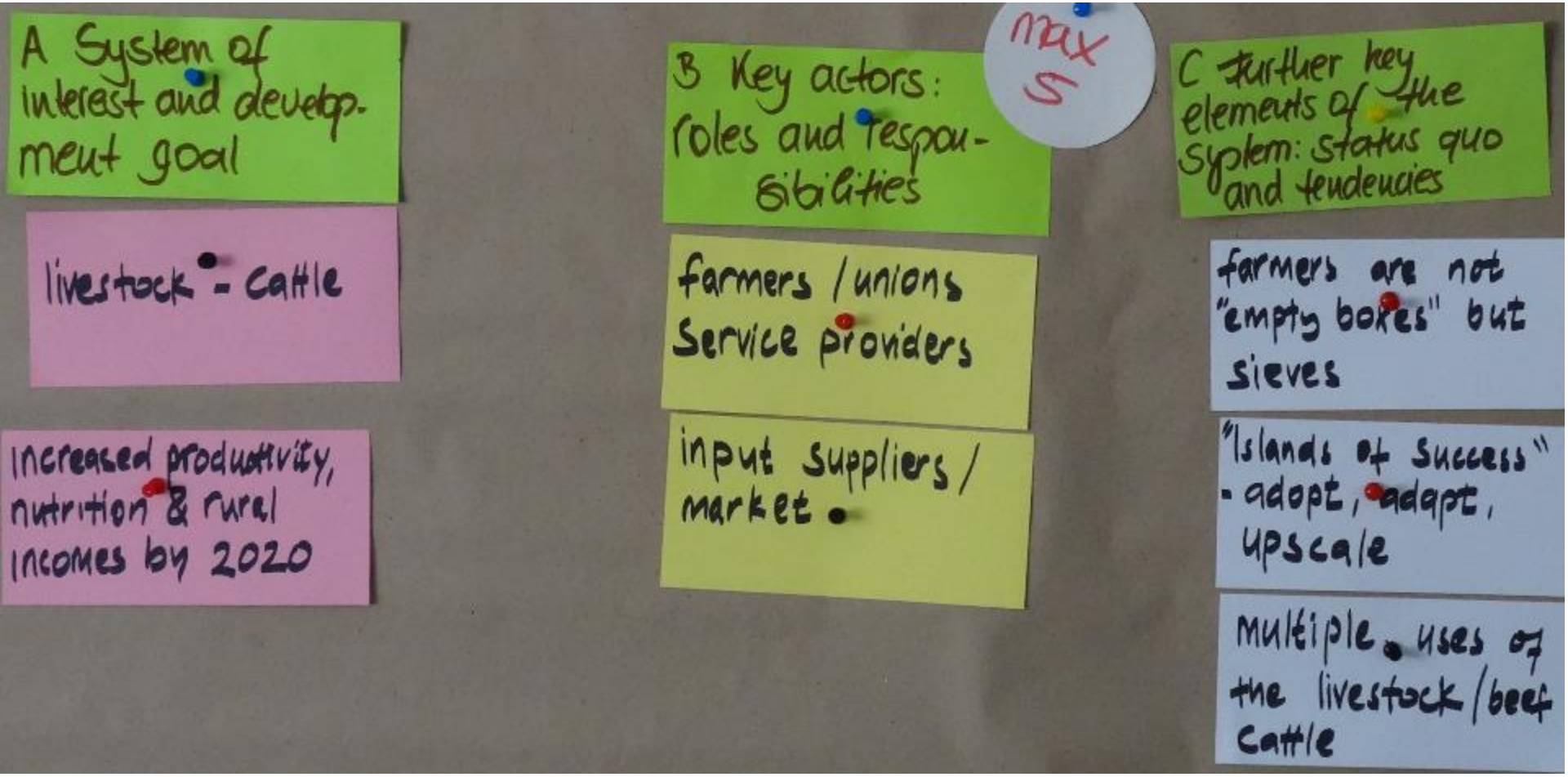
Action plan
Cereal production

Adaptation Option	Activity	Until	Who	Where	Comments
1. DT & SSX	TRAINING OF FARMERS. DEMO Plots FARMER Visits	2025 AND BEYOND	AGRITEX FARMERS SEED HOUSES NGOs	ALL WARDS	TRAINING MATERIAL DEMO PACKS (seed, fert) COMMUNICATION SYSTEMS
2. O/Fert	~~Use of Or~~ TRAINING DEMO PLOTS	As ABOVE	FARMERS NGOs AGRITEX FORESTRY COMM	As ABOVE	As ABOVE
3. C/hst DIVERSIFCTn	TRAINING PASS-ON SCHEMES L/stock handling facilities set up	As ABOVE	AGRITEX FORESTRY COM FARMERS VET, NGOs	"	As ABOVE
4. SMALL GRANS	GAP PROPER HARVESTING TECHs, Post Harv processing & marketing	"	AGRITEX FARMERS Dept Mech SMEs, Farmers Unions, GMB export markets	"	"
5 Red. p/harv losses	TRAINING DEMO plots Con of enhanced storage structures	"	As for No 4 above	"	As above but leaving out seed & fert packs.

Results Case 2

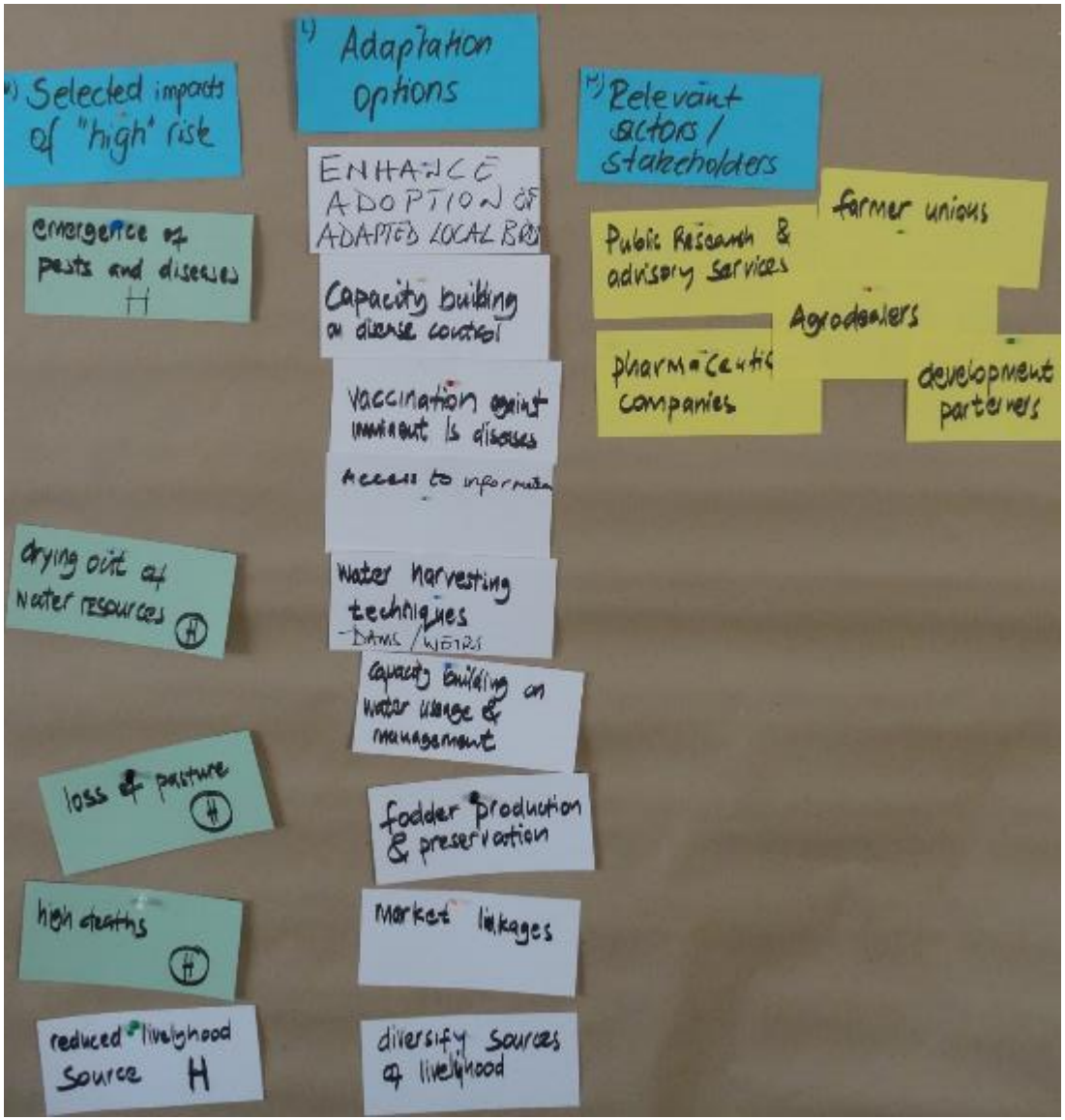
LIVESTOCK

Module A.1 – current situation
Case 2: Livestock



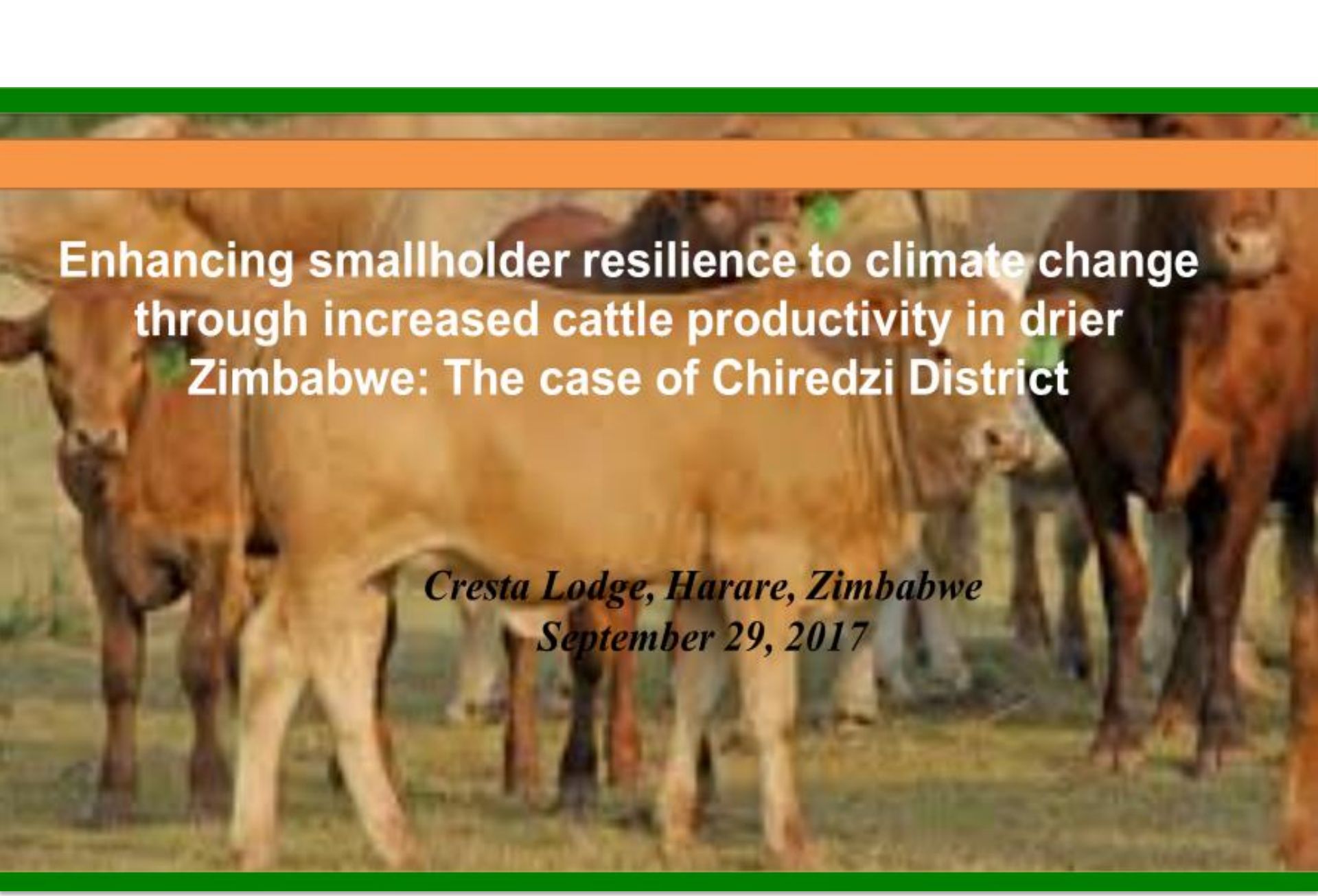
Module A.2 – future situation
Case 2: Livestock

Module B
Case 2: Livestock



Module C
Case 2: Livestock

Presentation of final adaptation measures Livestock



Enhancing smallholder resilience to climate change through increased cattle productivity in drier Zimbabwe: The case of Chiredzi District

Cresta Lodge, Harare, Zimbabwe
September 29, 2017

The Context

- Zimbabwe has been experiencing a warming trend, evidenced by a 0.4 degrees Celsius increase in annual mean temperatures,
- Minimum temperatures increasing more rapidly than maximum temperatures
- An overall 5% decline in amount of rainfall
- Rainfall has exhibited considerable spatial and temporal variability
- Extreme weather events including droughts and floods have increased in occurrence and intensity.
- Southern areas of Zimbabwe, comprising the administrative districts of Chiredzi are projected to experience more significant climate change impacts than the rest of the country

Baseline Scenario in Chiredzi District

- Farmers and their livelihoods are heavily dependent on agriculture and water resources
- Because livestock production is their major livelihood source, they are extremely susceptible to changes in water availability and floods
- Water is already a scarce and variable resource and the district increasingly suffers from droughts and floods
- Livestock have traditionally provided a major source of insurance against seasonal crop failures which is rampant in the district
- However, with increasing intensity of droughts, this traditional coping strategy may no longer suffice in future without major interventions
- Lack of livestock feed resources during the dry season is a perennial challenge for smallholder farmers in Chiredzi
- Livestock are increasingly being squeezed out of the farming systems. Lack of feed due to droughts is another problem and severe droughts have caused massive cattle deaths

Baseline Scenario in Chiredzi District

- Although Zimbabwe is the second dammed (over 2000) country in SA, the majority of rural population in these communal areas still have no access to water sources for livestock
- Many of dams and watering facilities are not climate-proofed (during design) nor operated and maintained with an understanding of the changing weather and climate patterns, owing to lack of access to information, knowledge, and technical capacity among relevant institutions and farmers.
- The interplay between inefficient and inadequate water infrastructure, water scarcity, and less adapted breeds significantly contributes to food insecurity and low household incomes creating a vicious cycle of poverty
- While smallholders are also trying very hard to move out of subsistence and commercialise their livestock activities, the lack of access to weather and climate information to support water resource management and resilient livestock production, resilient livestock resources, markets and finance is inhibiting these efforts.
- Accumulation of all these factors makes rural smallholder livestock farmers, the poorest communities in Zimbabwe, extremely vulnerable to climate change

Climate Change Impacts

- Rising temperatures and rainfall variability have caused an increase in the frequency and severity of **droughts** and **extreme flood events**, significantly impacting livestock production and the livelihoods of vulnerable farmers in Chiredzi
- Coupled with the enormous burden of a declining economy, Zimbabwe's poorest rural communities in drier areas in the south such as Chiredzi have been directly exposed to climate induced gross water deficits
- Women have been disproportionately affected as they are exposed to gender-specific vulnerabilities due to their household role in ensuring food production and food/nutrition security, despite their unequal access to land, information and inputs
- Potential benefits from years of investment in smallholder livestock production by GoZ have not been realised or have been lost due to climate induced dry spells, high temperatures, as well as flooding and torrential rains that destroy water infrastructure, thereby reducing water storage capacity
- Livestock dependence on water renders the sector vulnerable to climatic changes

Climate Change Impacts

- Zimbabwe's Second Communication to the UNFCCC suggests that projected decreases in precipitation coupled with increases in temperature will cause a corresponding decrease in Net Primary Productivity, which will reduce livestock productivity in Zimbabwe
- Periodic outbreaks of diseases are also exacerbated by climate change and pose a significant risk to livestock production, and severe droughts have caused massive cattle deaths.
- According to 2012 and 2015 ZIMVAC reports, in 2012 Matabeleland South province lost over 12 000 cattle. In 2015 El Nino caused a loss of over 15,000 cattle in 3 provinces in southern Zimbabwe
- The main challenge for the country is to safeguard livelihoods and investments in water and agriculture against climate change
- To promote climate resilience of agricultural livelihoods, this initiative focuses on two key priorities of the Zimbabwe draft National Climate Policy and a costed National Climate Change Response Strategy (NCCRS), namely: adaptation in agriculture and water sectors

Adaptation Solution

- With the anticipated continued increase in climate variability and change, Zimbabwe's current coping strategies for livestock farmers are becoming increasingly ineffective.
- This necessitates defining transformational adaptation innovations to achieve lasting climate resilience among rural farming households in Chiredzi district.
- A paradigm shift entails developing a holistic approach that takes into consideration the intricate nexus between secure water supply, feed supply, and farmer incomes in the face of a changing climate.
- Increased resilience of smallholder farmers' livelihoods to climate variability and extreme weather events require investments that raise them out of subsistence living.
- Climate-resilient agricultural inputs, practices, livestock and land management are critical to enhancing crop/livestock productivity to promote food security and sustainable production that can underpin commercial markets for staple and non-staple crops and livestock.
- Market development with value-addition activities, market linkages, and finance is fundamental to transformational change, enabling farmers to act as micro-small enterprises and lifting them out of subsistence..

Adaptation Solution

Capacity Building

- **Train: Smallholder farmers lack technical capacity for adaptive operation and maintenance of infrastructure (climate risk management)**
- **Highly feasible using less resources as determined by the approach Capacity building is the critical missing link and that's likely going to be very effective in enhancing the achievement of the objective**
- **Capacity building takes into cognisance gender dynamics associated**

Indigenous Breeds

- **Indigenous breeds such as Mashona, Tuli and Nkone are highly adaptive to local harsh conditions and better placed than the exotic breeds currently being adopted by farmers**
- **Re-introduction of indigenous breeds rhymes with the GoZ policy of restocking and is very feasible given conservation efforts done so far both by public and private developmental units across the country**
- **The design of the strategy ensures entitlement to both capacitated male and female farmers within the district**
- **Currently, there are limited market incentives for adopting drought tolerant livestock breeds**

Adaptation Solution

Climate-proofed water harvesting infrastructure

- Limited fiscal space resulting from poor economic growth has been the major barrier to fund climate-proofed water harvesting structures. Although this has a significant cost implication, potential to contribute to the objective is very high

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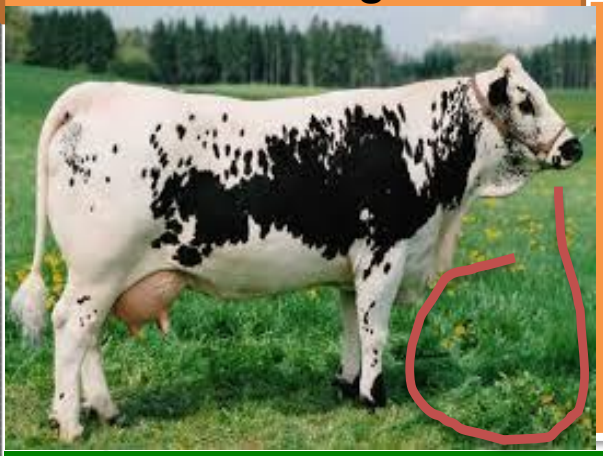
Adaptation Solution

Sustainable Disease Control Systems

- Droughts and floods bring into play emergence of new and previously eradicated pests and diseases. Capacity to manage such a scenario is very critical to enhance the development of the livestock sector
- Feasibility is high since this builds from the initiatives by DLVS
- Farmers are currently struggling to control diseases and are very much willing to cooperate on initiatives meant to solve the impasse

Fodder Management



- Fodder management and preservation is very critical for livestock production culminating into healthy animals
- With enhanced capacity building and introduction of initiatives which ensures farmers produce, manage and preserve fodder for their livestock, high quality, resilient animals will surely be achieved
- This literally improves the marketability of the animals and reduce susceptibility to pests and diseases

Adaptation Solution

Market linkage

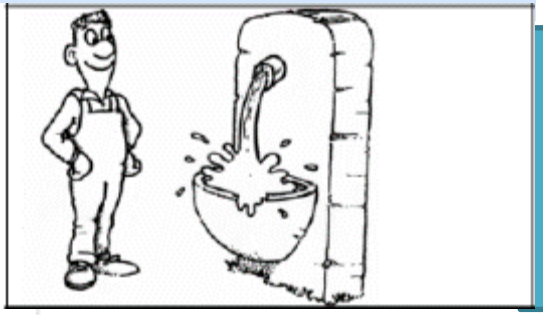
- Marketing livestock for farmers is like climbing a mountain
- There is lack of bargaining power
- Market linkages ensures a sustainable linkage to high value markets by farmers to enhance their profitability
- This enhances chances of getting funding for management of remaining stock
- This is highly feasible, effective, less costly and does not affect

Services and Insurance

- Funding opportunities are a headache for the farming communities
- Enhancing linkages to funding and sustainable insurance models is very effective for the achievement of this objective
- Working insurance models will cushion the farming communities in terms of catastrophic challenges

Adaptation Solution

Climate Information



- **Climate information, both weather forecasting and early warning information, and its understanding and application allows smallholder farmers to make climate-informed planning and decision-making for resilient livelihoods**

Q & A Livestock

Comment: It would be good to quantify the figures of losses

Q: Government supports climate adapted livestock – I need some clarification. The new livestock policy, is it already in place and implemented?

A: The new policy is still awaiting approval, but despite this there is no vacuum as there are ongoing programmes that work on the ground. The thrust of government is the preservation of indigenous genetic materials, so there is emphasis on slightly pushing the productivity of indigenous breeds. We have a challenge on policy formulation – the channel of getting them done are tedious, though they are already under implementation

Q: When we talk about value chains, we often look at the market first, rather than starting with the farmers. Did you also negotiate with the private sector to see if they are keen on the products? This should be the starting point, the market conditions.

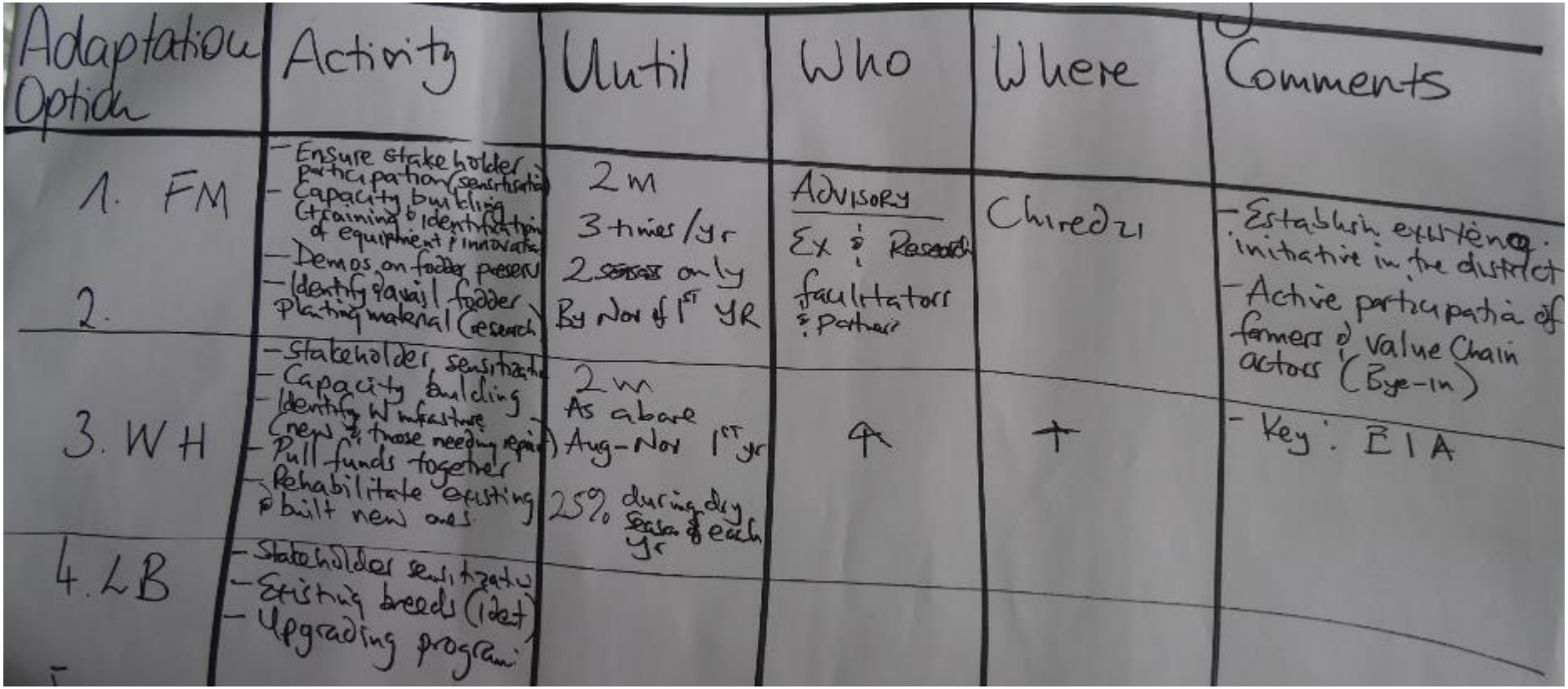
A: We have a lot of information, but we had to limit ourselves on the farm level aspects. But of course other value chain players come in and require continuous interaction. This will be included in our approach moving forward. For example, an innovation platform approach could bring the stakeholders together around these questions. Interactions between various value chain actors exist – different fora are ongoing through various associations. Opportunities exist.

Comment: Climate adaptation terminology is not there – the word is there, but it is not institutionalised. However, we discuss drought and adaptation – so it is pertinent in the minds of the players.

Q: What were your development goals, these are not clear – maybe also elaborate what your positive impacts expected are on gender and youth (which was one of your assessment criteria of options)

A: See poster for development goal. Gender implications: majority of beef ownership is male, women play a larger role in owning small stock. So promoting beef without looking at gender aspects you reinforce gender disparities. We are trying to engage on this topic. Youth: we are targeting youth in capacity building to get them more involved. Also, the creation of micro enterprises is an opportunities to engage youth (youth are keen only on money)

Action Plan
Case 2: Livestock

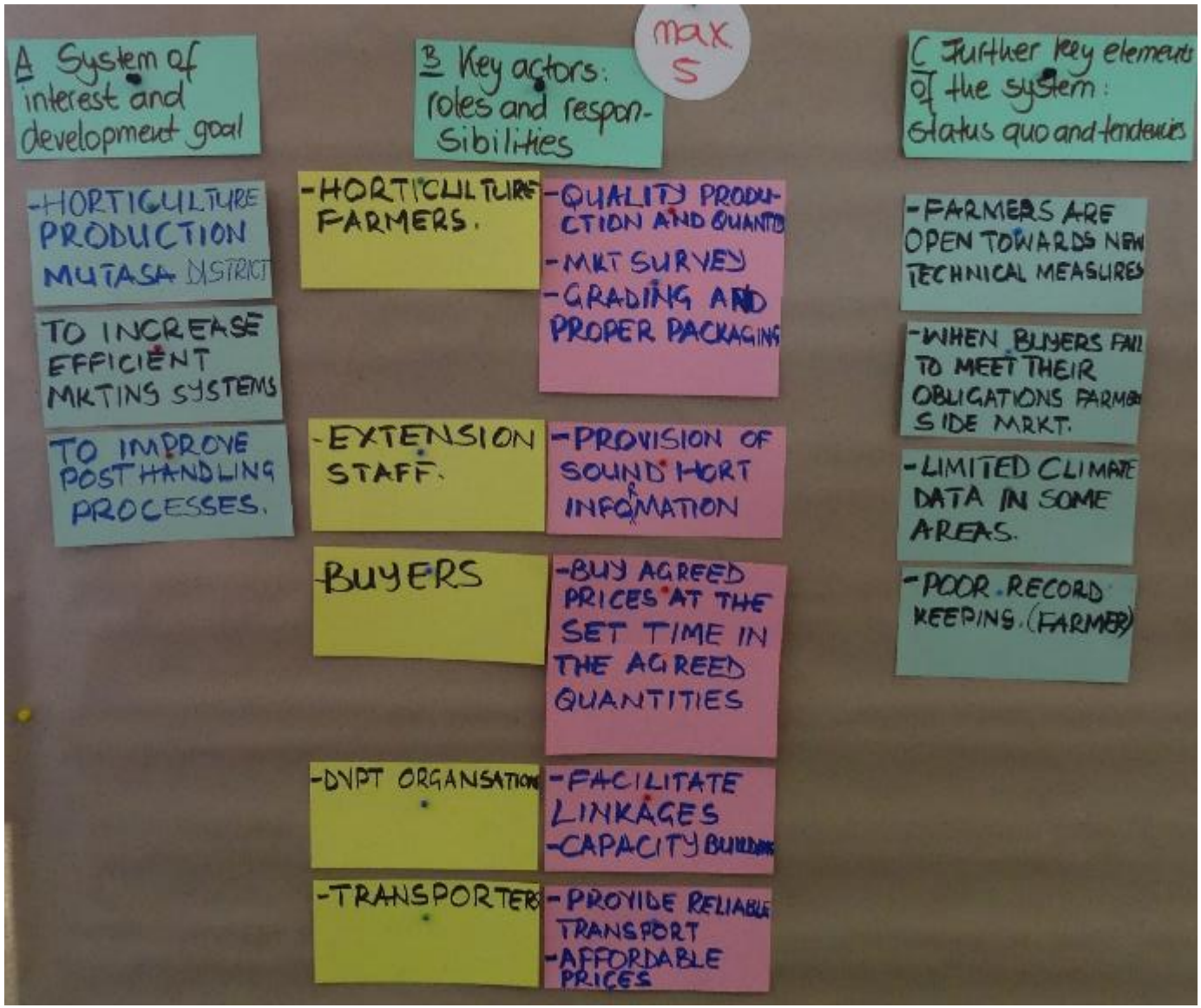


Adaptation Option	Activity	Until	Who	Where	Comments
1. FM 2.	- Ensure stakeholder participation (sensitisation) - Capacity building (training & identification of equipment & innovation) - Demos on fodder preservation - Identify (avail) fodder planting material (research)	2 M 3 times/yr 2 seasons only By Nov of 1st YR	Advisory Ex & Research facilitators & Partners	Chiredzi	- Establish existing initiative in the district - Active participation of farmers & value chain actors (Buy-in)
3. WH	- Stakeholder sensitization - Capacity building - Identify W infrastructure (new & those needing repair) - Pull funds together - Rehabilitate existing & built new ones	2 M As above Aug-Nov 1st yr 25% during dry season of each yr	4	+	- Key: EIA
4. LB	- Stakeholder sensitization - Existing breeds (ident) - Upgrading program				

Results Case 3

HORTICULTURE

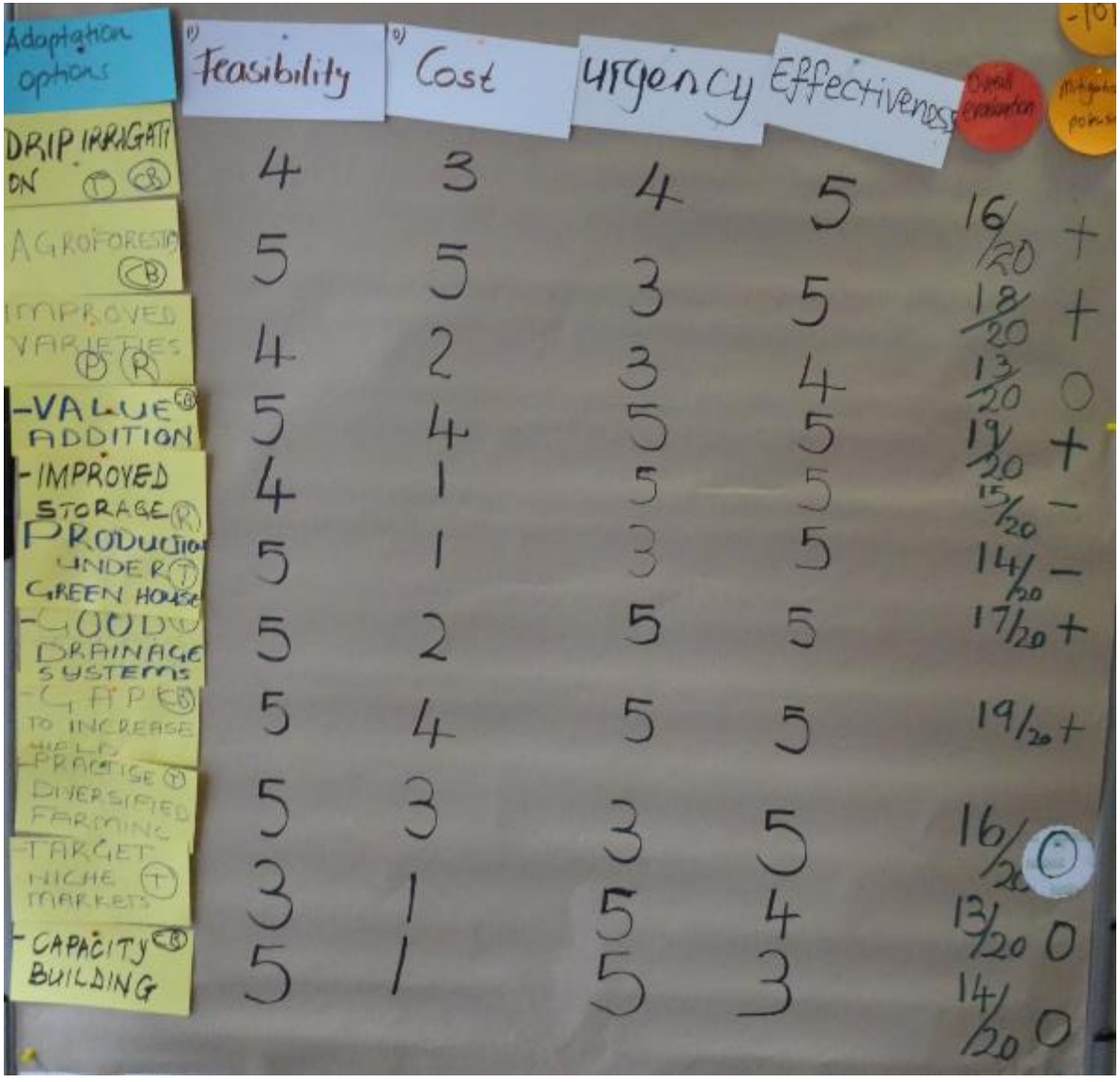
Module A.1 – current situation
Case 3: Horticulture



Module A.2 – future situation
Case 3: Horticulture

Module B
Case 3: Horticulture

Module C
Case 3: Horticulture



Presentation of final adaptation measures Horticulture

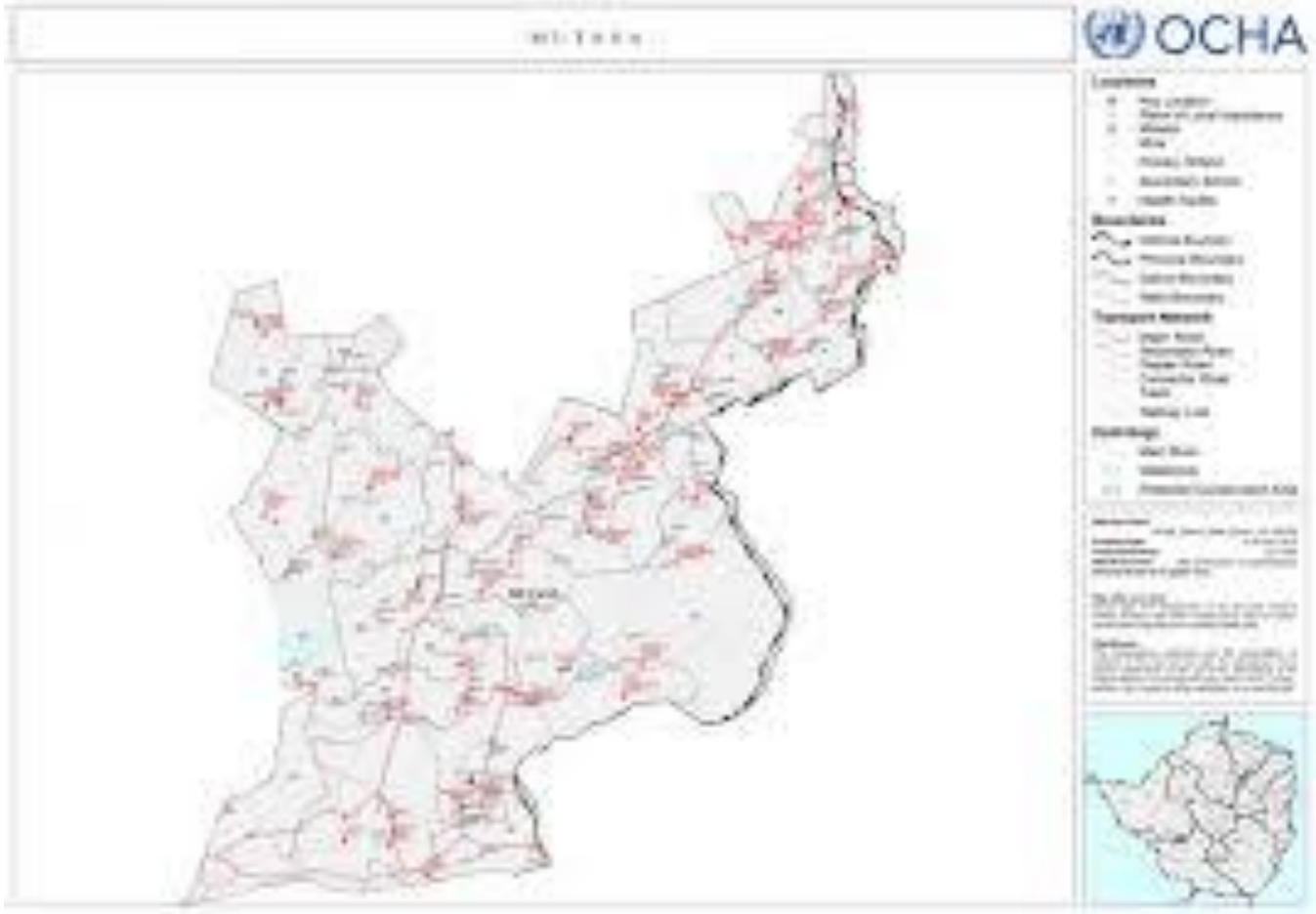
Horticultural Production System in Mutasa District of Manicaland Zimbabwe

Team: Clemence Marevesa, Paul Gova, Dennis Makiwa Brighton Hadzirabwi, Caroline Musungo, Betty Muchesa, Beauty Zendera, Grace Manyuchi, Liberty Murwira

Development Objectives

- To improve on horticultural production and reach yield potentials by 2025.
- To improve post handling processes to minimise losses and maximise income.
- To increase efficient marketing systems in Mutasa District by 2025.

Mutasa District



Background

- Mutasa district lies predominantly in Natural Region 1 and Natural Region 2 where rainfall falls between 800-1200mm annually.
- It has heavy textured clay soils and the average land holding size is between 0.5 – 2ha.
- Crops under production include leaf vegetables, tomatoes, bananas, coco yams, avocado pears and tea plantations.

Horticultural Crops grown in Mutasa

Assessment tool used

- The Climate Proofing tool

Evaluation of the current system.

- In Mutasa the system of interest is mainly Horticulture Production.
- The key actors in the system include; Horticulture farmers, Extension agents, Buyers, Transporters, Seed houses, development organizations and other stakeholders.
- Further elements of the system are that farmers are open to new technologies but are also prone to side marketing.

Assessed Future Climatic Hazards included

- Flooding
- Erratic rainfall
- High temperatures
- frost

Potential Impacts

- Erosion
- Sun scorch
- Decreased yield
- Loss of quality
- Loss of food security
- Loss of income security
- Water logging and leaching of soils

Adaptation Option 1
Value Addition (19/20) +

- It increases income.
- It also increases the shelf life of most horticultural products.
- There is an improvement of nutrition and food security.
- Mitigation potential - Minimum post harvest losses thereby minimum GHG emissions.

Adaption Option 2
Good Agricultural Practices (19/20) +

- It improves yield, soil fertility, crop stand, controls pests and diseases.
- Encourages good drainage and reduces erosion.
- Promotes a healthy soil for good plant growth.
- Mitigation potential – through having a lot of vegetation that helps in carbon sequestration.

Adaptation option 3
Drip Irrigation(16/20)+

- Improves yield and quality of products
- Efficient use of available water resource
- Maintain the soil structure and controls erosion
- **Mitigation potential-**it sustains green plants all year round.

Adaptation option 4
Diversified Farming (16/20) 0

- Opens up other sources of income thereby reducing risk.
- Increases production, income and improves nutrition.
- Decreases costs through use of manure from livestock.

- Mitigation potential – Does not affect or contribute directly to GHG emissions.

Adaptation option 5

Improved Storage (15/20) -

- Improves shelf life of produce and maintains quality.
- Reduces post harvest losses.
- Ensures higher income.
- Mitigation potential – Does not affect or contribute directly to GHG emissions.

Conclusion

- Climate Smart Agriculture should be the thrust to sustain and improve horticulture production in Mutasa District.
- There should be a multi-sectoral approach to achieve set objectives.

Q&A Final presentation Horticulture

Q: What exactly are your options, too general, I still don't know what will be on the field (good agricultural practices, value addition). Do you have clear beneficiaries?
A: We are looking at horticultural farmers as key target group

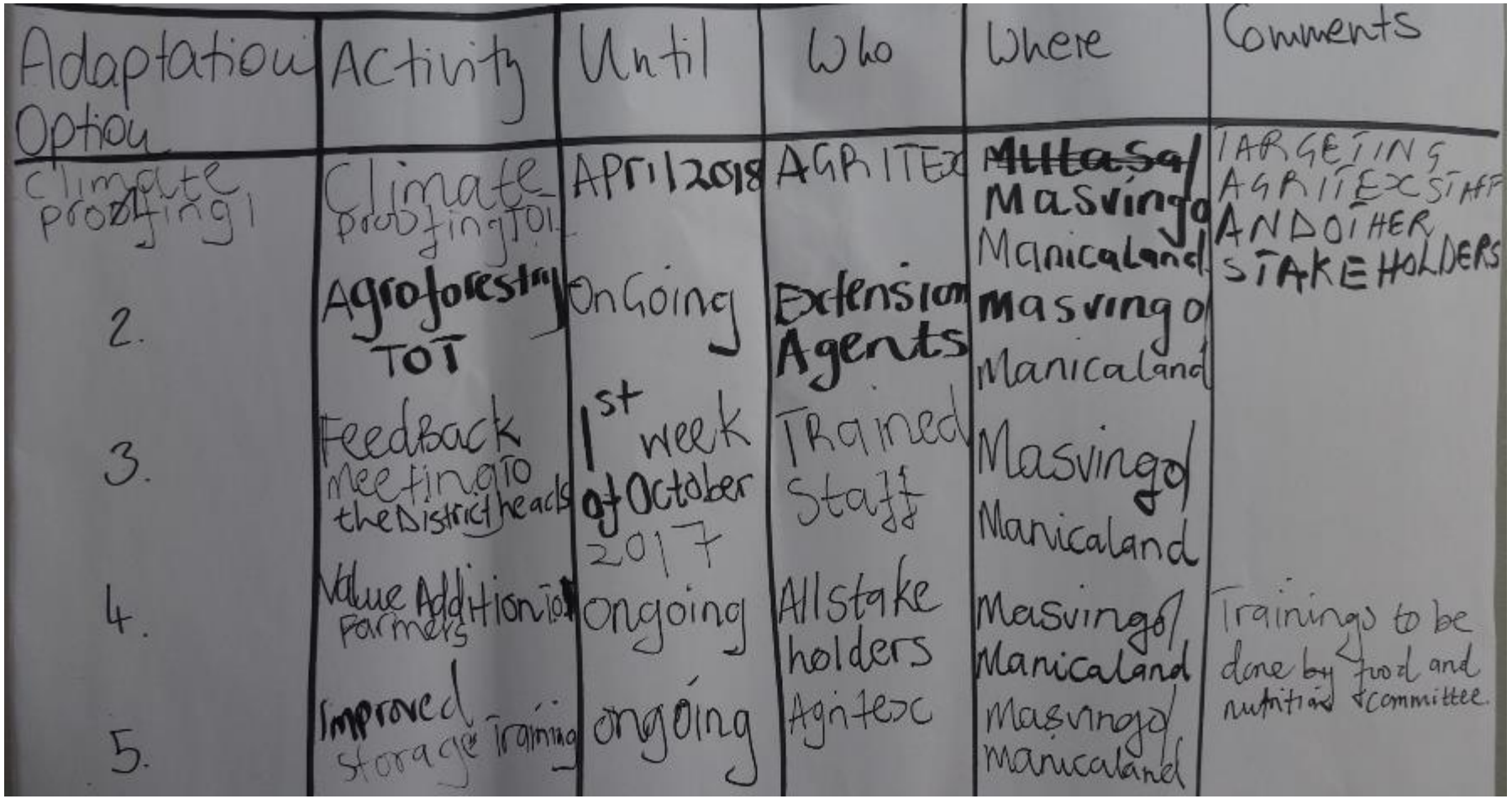
Q: How many farmers do you want to reach, what is the gender ratio?
A: In this Honda valley, there are more women than men, but I cannot give you the numbers

Q: If you get funding, how is the sustainability after project funding, can it sustain itself?
A: High emphasis on capacity building, we want to do transformation for change trainings, focusing on CSA, transforming attitudes and their way of thinking. Sustainability is also achieved through capacitating the extension agents, to reach more farmers, and to focus on the new adopters to provide training and inputs. Multisectoral approach – we are looking at the system from all angles in order to ensure sustainability . But we have had so many projects were things disappear after funding stops – we need to make things different to before – we need to think about that

Q: What exactly are the practices of value addition?
A: We have tomato, avocado, leafy vegetables – we solar dry the leafy vegetables. Processing e.g. tomato – puree, canning, tomato sauce, tomato jam. Banana drying, Avocado – oil, lotion

Q: What exactly are the good agricultural practices in horticultural production?
A: Good choice of varieties, minimum soil disturbance, rotation to control pest, pest control – repellent effect of onions, planted side by side with leafy vegetables (to control aphids, white flies),

Action plan
Case 3: Horticulture



Adaptation Option	Activity	Until	Who	Where	Comments
Climate proofing	Climate proofing TOT	APRIL 2018	AGRITEX	~~Mutasa~~/ Masvingo/ Manicaland	TARGETING AGRITEX STAFF AND OTHER STAKEHOLDERS
2.	Agroforestry TOT	On Going	Extension Agents	Masvingo Manicaland	
3.	Feedback meeting to the District heads	1st week of October 2017	Trained Staff	Masvingo/ Manicaland	
4.	Value Addition for Farmers	ongoing	All stake holders	Masvingo/ Manicaland	Trainings to be done by food and nutrition committee.
5.	Improved storage Training	ongoing	Agritex	Masvingo/ Manicaland	

Reflection and lessons learnt by participants - Module A

- Helped to understand the terms and the terminology
- Challenging to keep the focus (from hazards to impacts)
- One needs base line surveys/information to know the reality on the ground. This helps to know your starting point
- The group work was helpful to have different perspectives (district level but also mixed country groups)

Reflecting the overall Climate Proofing process by participants

- Learnt how to come up with adaptation and mitigation measures
- Development of a SMART development goal is key
- Be precise with the development of criteria for assessing adaptation options
- Work with the „right“ level of information
- Name and describe adaptation options precisely
- Avoid one option to cover many other (basket full of options)
- The elaboration of action plans helps you to stay focused and realistic
- Be open when it comes to trade-offs and synergies

Presentation: Participatory Integrated Climate Services for Agriculture (PICSA) by Graham Clarkson

Graham Clarkson, Research Fellow at the University of Reading (UK) explained the Participatory Integrated Climate Services for Agriculture (PICSA) to the audience. PICSA was applied in Zimbabwe in 2011-2013 with support of AGRITEX and Practical Action. 78 trainers were trained on PICSA in the country.

PICSA activities start before the growing season, when farmers meet with a training team to pore over historical graphs of their region's temperature, rainfall and seasonal cycles. Next, the farmers compare crop, livestock and livelihood options. They look for crops whose water requirements or season lengths match the recent climate trends and learn to calculate the probability of suitable conditions. Trainers share a list of potentially appropriate crops and varieties, but farmers make the final assessment – and develop their own coping strategies for their climate.

The PICSA approach is broken down into 12 clear and logical steps. These steps enable the trainer to work with farmers to use a range of sources of climate, weather, crop, livestock and livelihood information for their planning and decision making. Each step has a set of activities that the facilitator implements with a group of farmers through a series of meetings.

Q&A – I

- Explain again the unique selling point of the approach
  - The historical climate information is added to existing approaches – it brings new evidence to the decision. Currently many farmers rely on their perceptions/experience. It helps provide a new perspective on your context
  - Having a set of structured tools – it is a facilitated exercise where peers share with each other, joint learning – learning together, bringing things back together
- Sustainability, do you go to a community more than once?
  - Some information stays the same, but it gets updated over time – the seasonal forecast changes every year. We do a full training 2 years in a row – once you learnt the tools, you can use them – same with farmers. Afterwards we revisit with seasonal forecasts…. The initial push is in the first year
- How is this compatible with our current approaches, is it totally changing what we are doing already? Extension service change of mindset is challenging
  - A key thing is to ensure that the approach fits into what you already do with farmers – it helps you do a little extra, but it does not replace the existing approach – it works well where it has been integrated into the job description of extension workers through their supervisors
- Previous training participant: we have really benefited from the capacity development, we are still using the data and updating it – other actors, e.g. Oxfam, have adopted the approach and trainings are ongoing. Practical Action did an evaluation and found that farmers are still using the approach in some areas and they are using the tools. The perception of the farmers has changed as they realized the importance of climate information in decision making

Q&A – II

- Experience capitalization – knowledge management and upscaling the approach is critical is a challenge. Another challenge, historical climate information is for sale
  - Climate data – this is why we do capacity development in met services so that they become a more useful service and provide information and not data itself
  - Sustainability – important to institutionalize approaches, a challenge not unique to Zimbabwe – we are currently working with WFP to help institutionalize these things
- I see it as a specialization of an extension approach which was done in the past – participatory extension approach – this has to be built into extension staff before specializing into PICSA
  - In some countries we are working on getting the approach into the curriculum of extension worker training at university/etc.
- Another approach, participatory scenario planning – we develop forecasts, bringing scientific and farmers approaches together – CARE
  - In some countries we work with them to integrate the two approaches
- Discussion whether we should approach farmers as individuals or as a community – decisions are often determined by the community, rather than only individually
  - What we try to do – a lot if group based and looking at communities – but then individuals need to make their own decision with regards to options by context - it should be a mix
- Impact assessment
  - in some countries right after the season, in some 1-2 years after – we hope to keep going back in future. On a season by season bases your decision is less important that the actual weather conditions. It will take a few years to see more influence
    - but evidence shows that farmers feel they might have done even worse without the knowledge

Presentation: Water management and soil conservation for a climate-resilient agriculture by S. Beerhalter, GIZ

Sarah showed a map of **rates of land degradation** worldwide and a second map with of global physical and economic **water scarcity**, pointing out the SADC region which suffers from economic water scarcity. From all available water on earth, **97,5% is salt water, only 2,5% fresh water**. She explained that Southern Africa is a very **water scarce region**, and the impacts of CC are worsening the situation. Water of several big transboundary rivers is already over allocated this leads to negative consequences for the environment, increases business risks and also has political implications. Currently, the SADC region is going through the **worst drought since 35 years** (2015/16), and regional drought disaster has been declared in July 2016.

The **competition** for water is high, with many actors involved like industry, power generation, urban development and agriculture. Agriculture is the biggest water user world wide and accounts for approx. **70 %** of the total fresh water withdrawal. It is therefore the question, how to increase the water use efficiency. This can be done by applying water directly where it is consumed, irrigate plants in the early morning or evening, support water storage capacities etc.

Ms. Beerhalter also explained the subject of **soil and water conservation** and showed a lot of practical examples and a film on it.

Q&A

Q: What is the difference between grey water and waste water?

Comment: If the produce irrigated with waste water is labelled, then nobody would use it.

A: Greatest problem is the control of the water system – some sewage is getting into river systems and controls are weak

A: People are very worried about heavy metal contamination, but this is not an issue at all in SADC yet. If it is high, it is from mining or natural conditions, not from industry

Day 3 – overview

- Directly after the opening, each of the working groups presented the **results of the Module A**. Questions and some corrections were made by the group and the facilitator
- The presentation of the results was followed by a reflection of module A in plenary – lessons learnt, difficulties in executing the tasks etc.
- This was followed by an action learning exercise in plenary about types and dimensions of adaptation options
- The group then split into working groups again to work on Module B: identifying adaptation options
- Before lunch break, the group was subdivided into four sub-groups and each sub-group equipped with one question to elaborate on during the excursion.
- In the afternoon, the whole group started to their **excursion to two farms,** in Mawanga Ward, Domboshawa in Goromonzi District, about an hours drive from the training venue

Excursion to Ngwerume, Mawanga Ward, Domboshawa, Goromonzi District

The area is situated about 50 km from Harare. The homestead is about 10 km off the main Domboshawa-Harare road. The objective of the visit is to expose participants to local CSA farm practices and understand CSA as a context-specific concept and to interact with the farmer. The host farmer is the ward chairperson for the Zimbabwe Farmers' Union. The ward falls under Natural Region II and receives an average rainfall of 700 to 800 mm. Other wards get more than 1000 mm. The rainfall is sufficient for cropping, but the major challenge is mid-season dry spells that are a regular occurrence during most seasons. The major crops grown in the area are maize, groundnuts, small amounts of finger millet as well as horticultural crops. Horticultural crops are a major income earner in the area due to its proximity to the Harare urban market.

Conservation agriculture (CA) has been promoted in the area since 2012, mainly to address productivity and the mid-season dry spells. About one third of household in the area use CA practices. Production of leguminous fodder crops was also recently introduced in the area to address the declining availability of grazing land due to increasing settlement by urbanites. The use of biogas digesters for domestic energy was introduced in 2014 to address declining availability of firewood which is the most common source used. This technology has however not been taken up by many farmers in the area due to the cost of construction of the digesters.

Mr. Ngwerumes's 'green' household includes the following among other practices:

a) Production of biogas for domestic purposes from livestock manure

b) Use of Conservation Agriculture (manually dug planting basins) for intensive crop production

c) Use of the by-products from biogas as fertility amendments in the crop fields

d) Production of legume fodder crops for livestock

e) The family also manages a variety of exotic and indigenous trees for multiple purposes.

f) Use of solar driers

g) Use of solar water heating for domestic purposes.

Site 1 Location: Domboshava, Mashonaland East, 27km north of Harare, Natural Region 2B

Mr Ngwerume is a farmer and also an ex-teacher who practices conservation agriculture as well as other climate smart practices. These include use of biogas for cooking, manufacturing of stock feed using maize stover, mukuna shells , molasses & salt blocks, solar water heating, solar vegetable dryer, drip irrigation technology as well as planting basins. Mr Ngwerume used to have a cattle herd count of 30 which now stands at 9. He is trying to reduce it due to the reduction of grazing land. With cattle he also benefitting from the cow dung whereby he has a biogas digester which in turn he uses the gas for cooking. He needs about four 20litre capacity buckets a day of cow dung to use for household cooking. When the manure in the digester is no longer producing gas it is pushed away in the digester when fresh manure is added. The used up manure is then mixed with stover etc. to produce manure which is even more powerful than inorganic fertilisers like Compound D. From an area of less than one acre Mr Ngwerume has managed to harvest more than 3 tonnes of maize because of the manure. He has recently adopted drip irrigation for a small portion of his land which he has grown spinach and red pepper though they have not thrived well as they were planted in winter. With the drip kit he also does fertigation with liquid manure and therefore plans to expand the area under drip irrigation.

Motivation to innovations

- Use of cow dung manure (biogas) it is cost free
- Contribution to protection of environment – trees
- Cattle can give him more besides milk, beef and can benefit from their waste
- Fertiliser is now very expensive and is not organic like manure
- Economic savings

Contribution to Community awareness of CSA/CA

- He is Vice Chairperson of the Zimbabwe Farmers Union (ZFU) in the area and therefore motivates others during meetings, visits etc. especially on conserving indigenous trees
- He encourages the community to visit his plot to see his practices
- Exchange with neighbours on information. Has neighbour who has nursery of indigenous trees who has given seedlings for free.
- There is a group of 28 female farmers in the area who are well renowned for their CA practices on their plots

Drivers to CA implementation

- Protection & conservation of the soil
- Likelihood of achieving more yield with practice

Sources of Climate/weather information

- Attends workshops and trainings by extension staff, NGOs
- Use of mobile phone weather and climate platforms
- Own historical records of change in start of the growing season, mid season dry spells etc. have also informed him that climate is changing

Site 2

Mr & Mrs Twamba have been practising conservation agriculture for 9 years for both field and horticultural crops. They have experienced higher yields under CA than under conventional farming. On a small area of less than a hectare, where they had planting basins, mulching and crop rotation was practised they attained more than 6 tonnes.

In terms of awareness of CA and attainment of knowledge & practices they gone for training to Foundations for Farming institute in Harare which is a well known CA training centre as well as working well with the local extension staff.

They have two gardens, one domestic garden in the family compound and a larger more commercial one a bit further from the homestead. The produce from these gardens is well favoured by the community as produced is organically produced and is of good quality.

Planting basins are used on a year to year basis and are clearly marked though slight adjustments are made when rotation of crops is done. Mukuna is also grown and the beans are used for livestock feeding with the thresh used for mulching. No heavy tillage is done and for the government Command Agriculture programme which they have signed up for, they will continue to use the basins.

Challenges with CA

- Labour challenges but happy with the outcome. When there is a lot of work they employ one labourer but as for preparation of the basins they do it themselves to maintain precision
- Labour is mostly for collecting grass for mulching
- In the area there are no problems with grass though some other people are jealous of her mulching techniques such that they burn the grass

1st sign of change after starting practising CA

- This was after two years but they did not get disheartened because extension workers encouraged them

Timing of planting

- This is done after the first effective rains
- Use of the rain gauge also helps to see if the rains are affective. Over the years the dates of the effective rain days have changed which could be due to climate change
- In the past they have used mechanised CA like direct seeders

Impressions from both sites

Day 4 - overview

- The day started with the **recapitulation of the excursion** with each of the four groups presenting their findings
- Then Sepo Marongwe shared a presentation on **Conservation agriculture** and agricultural policies in Zimbabwe
- The groups then split again in working groups to work on **Module C: Selecting adaptation options**
- Finally, Christine Lamanna, World Agroforestry Centre gave a presentation/practical work on **Prioritizing CSA practices with data**

Recapitulation of the excursion – I

1) What are the climatic challenges for both sites?

- Erratic starting of the rainy season
- Mid-season droughts
- Rainfall distribution – across the season

2) How do these challenges influence the systems?

- water logging
- erratic rainfall is influencing the system of what he can plant, when and whether he needs to supplement with irrigation
- with climate change, there might be heavier storms which lead to water logging – CA has had a positive advantage in reducing the impact
- fruit trees affected by caterpillars at a large scale – first time these appeared and the farmer was afraid that this might also affect their crops – it might be related to climate change/or not?

3) What kind of adaptation measures did you observe?

- supplementary irrigation during dry spells, borehole with water easily available, water tanks for storage
- drip irrigation system installed
- fodder conservation for livestock feed during the dry season
- diversified farming – horticulture, chickens, livestock, cereal, etc.
- biogas production for cooking – covers kitchen electricity supply – enough cow dung (5 buckets) per day enough to maintain the house, the slurry was going to the field
- minimum soil disturbance, minimum tillage
- environmental conservation – he maintains the trees around his yard – especially also fruit trees
- solar water heating system (ctd.)

Recapitulation of the excursion – II

3) What kind of adaptation measures did you observe? (ctd.)

- receive weather information on the cell phone; also from Ecofarmer

second farm

- CA – to conserve moisture in the soil – mulching, minimum tillage
- value addition/preservation of foods – mumare (maize) is a way of preservation
- solar panels
- intensified production – 6t on her area (realistic)
- crop rotation and diversification

4) Where do you still see room for improvement?

- zai pits – especially where the land is sloping a little bit to increase infiltration
- livestock productivity – without a bull there is no constant production – look for alternative options
- biogas utilisation but this could probably be optimised – manure vis a vis output
- land scarcity – farmer was requesting for additional land to improve productivity – urban development, lack of grazing land,
- improved rotation – the second farmer was more systematic, land was weed free
- need more information on what herbicides were used – is that a reason why CA was interrupted
- roofing needed for fodder storage facility – opportunity of rainwater harvesting
- cattle feeding point could be improved
- cattle manure might need to be covered to reduce leaching of nitrogen due to sunlight

Overall: It would have been nice to see farmers who have not adopted, to also see the other side of the coin and discuss reasons. A lot of open questions were used to talk to the farmers, it was good. Two positive examples that were very convinced of their approach and wanted to sell us CA. Both farmers have knowledge about the importance of rainfall measurements – though the positioning of the rain gauge was not ideal.

Presentation: CA and Agricultural Policies Zimbabwe

Sepo Marongwe (AGRITEX) started her presentation with more information on farmer adoption of new practices and technologies and reflected evidences and lessons learnt. She herby focused on the **Conservation Agriculture** method and gave more background information of facts and figures to it.

The second half of the presentation dealt with Zimbabwe's **Agricultural and Climate change policies**. Sepo highlighted the country's commitment to respond to CC (signed and ratified the **Paris Agreement**) and on-going efforts to pilot/demonstrate Climate Smart practices and support mobilization i.e. technical, financial, technological etc.

Further, Zimbabwe launched its **National Climate Change Response Strategy** (NCCRS) in 2015 and its **Intended Nationally Determined Contributions** (INDCs) in September 2015. Also, the **National Adaptation Plan (NAP**) process is ongoing.

Q&A

Q: Small tractors (2000 USD), are they really so beneficial if they cannot actually pull all kinds of implements? Yes, they can support their neighbours but it is enough?

A: For small scale farmers it does not make sense to own a large tractor. It is not efficient. Maybe not in the short run, but maybe in the long run

Q: Seed quality in CA is often not considered

A: Key challenge. Especially when you use machinery seed quality is an issue. Seed is often not graded by size, which makes it difficult. A lot of farmers use hybrid seed so quality is not such a huge concern

Q: Climate information – which time frames are these forecasts covering?

A: We have seasonal forecasts, but 10 day forecasts are usually what farmers use mostly, there are also shorter ones.

Q: Do we also give market information to farmers?

A: Econet is sending weather and market information, but this is not yet very developed. These are issues we need to tackle. Unfortunately we are very focused on our small fields, we need to overcome this issue moving forward.

Q: Blanket assumption (CA improved yields) do we have spatial information of where this is true and where not? Regional differences are huge

A: Degree of productivity increases varies with location – there is evidence out there that shows these differences. It will also vary with which technology is used where, whether water logging is an issue, seasonal variation depending on rainfall – you cannot use basins everywhere, if you need to capture water the ripper is better than direct seeding

A: Agree, we should talk about return on investment and gross margins – we need to get better at packaging information and also talk about constraints (bringing in weeds with crop residue, etc.)

Comment: In Malawi we brought a farmer who was not doing CA in and tried to understand the barriers to adoption of CA – labour requirements for CA practices is key for women and here cost comes in

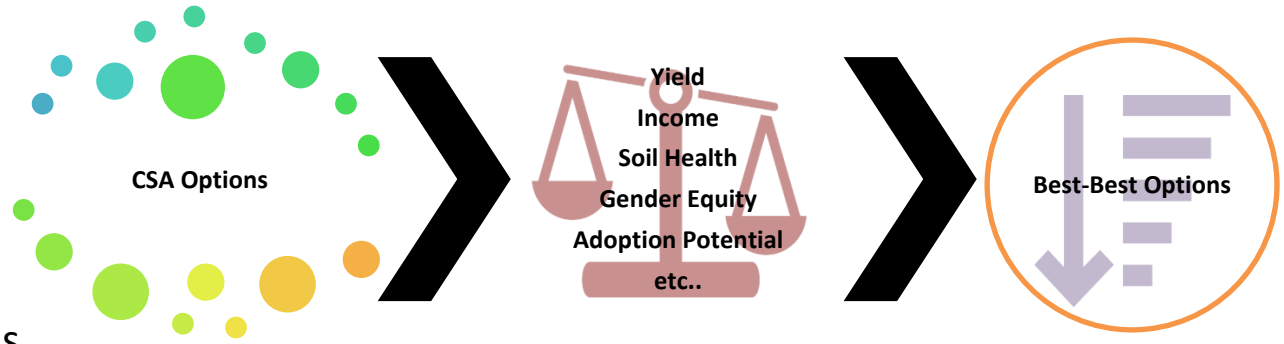
Q: If we talk about CA adoption – what do we mean that the farmer adopts all three principles or only one? Yesterday the extension agent said she had 500 households doing CA – is that true? What are we counting?

A: Not all farmers that are being counted maintain all 3 principles – surveys show that only a very small proportion do the whole package, especially mulch is a problem. The benefits even of only basins are good. But overall the surveys show that some people do parts of it only – all this gets counted. Context matters, whatever works locally is what matters and the concept needs to be applied in a certain location

Presentation: Prioritizing CSA measures using data – Dr. Christine Lamanna

Dr. Lamanna, Climate Change Decision Scientist at the World Agroforestry Centre in Nairobi/Kenya presented the participants a data-based approach on how to prioritize CSA options. This is done in six steps:

1. Identify the context
2. Identify the options
3. Identify the outcomes
4. Generate evidence
5. Evaluate the evidence
6. Chose the best-bet options



Participants were given the opportunity to **prioritize their own adaptation options** according to a chosen parameter (e.g. soil fertility). The prioritization was done on blank sheets which got distributed to the working groups. Results showed that some of the options have very positive effects on the soil structure, some lesser effects.
She then explained the **Trade-offs and Synergies of options:** some options have positive impacts for one outcome, but neutral or negative impacts in others (and made it clear on the example of the outcomes “Resilience” and “Productivity”.). Participants were then asked to chose two outcomes and plot their options in trade-off space on a blank sheet. Again it showed that not necessary the best ranked option e.g. for “soil fertility” would also be a the best one to increase food security but that there are sometimes trade-offs to be expected.

Day 5 - overview

- Participants were asked after the opening to prepare the **final presentation** per working group as a PowerPoint presentation of max. 15'.
- After each presentations, questions were asked by the audience and the **results discussed.**
- This was followed by a **reflection and conclusions** of the CP approach – what did you learn, how can you apply CP in your own work?
- Then Mr. Muchena from ZFU gave a presentation on **Youth and CSA** in Zimbabwe.
- The presentation part ended with Wiebke giving an overview of CCARDESA's **Information, Communication and Knowledge Managment**
- The training ended with the evaluation and hand over of certificates and USB sticks to each participant

Presentation: Youth and CSA by Simba Muchena, ZFU

Mr. Simba Muchena from the Zimbabwe Farmers' Union (ZFU) joined in with a presentation on Youth and CSA. The ZFU is a membership based farmer organisation represented in all the eight provinces of the country. The main activities are Farmer representation, organisation of farmers into producer groups and associations, provision of information and technical expertise and provision of Training and Education (Study Circles, Farmer Field Schools and Farmer Forums). The purpose of the farmer-led scaling up of CA is to promote the adoption of CA by smallholder farmers through demonstration plots managed by Young Farmers' Clubs (YFCs) and Conservation Agriculture Clubs (CA). Target areas are Mashonaland East and Manicaland Provinces. So far, 100 School-based Young Farmers Clubs (YFCs) Demo Plots and 80 Community Demo plots were supported – working with farmers from community (appr. 80 farmers each ~ total 4000 farmers organised into CA Clubs). Key activities are Awareness &Training on CA. Targeted young farmers, lead farmers, Agricultural teachers and Extension Staff. Further, demo plots are established to demonstrate key principles of CA.

Amongst the achievements so far he highlighted high levels of appreciation of CA principles by young farmers and smallholder farmers, high quality demos, exceptional crop stands, vibrant, passionate, proud CA groups, YFCs (100 YFCs, 4260 members), an intense farmer to farmer learning and exchange and active participation of women, highly motivated in mechanized CA (Community adopters – 4240 Women and 1550 Males).

Challenges though are high cost of inputs, lack of adequate resources for the necessary investments e.g. drip irrigation kits, implements and for scaling-up the project to other regions.

For more information: www.zfu.org.zw

Q&A

Q: What do you call youth? A: Under 35 is officially – but a lot of our projects are younger than that

Q: Interesting targeting of school children – what is your take on the argument – do you target the resourceless and poor – will young children be able to take that into practice? A: If you look at ZIM, we try to impact the knowledge of the youngsters who can also inform their households about new technologies and to bridge the information gap on agriculture as they often do not participate in community field days – so we try to avoid a vacuum there

Q: We should try to work together on some of these initiatives with Agritex and others.

A: We collaborate closely with Agritex especially at district level – the limitation is on the resources to upscale

Q: Would it be a programme of ZFU or district committee in terms of ownership – what is the role of ZFU in extension – we should avoid conflict and duplication of effort

A: Agritex are providing our trainings, they are the experts on the technical aspects

Comment: I have been to a lot of their sites and there is a lot of engagement – the parents are very closely involved and benefit from these activities – the parent committees are often very active, they participate and take their learnings home – a lot of school and local extension agents ownership

Comment: Young people want quick money – what is important is to look at the value chain to see where the youth can make money and get engaged beyond agricultural production per se. we had projects on post harvest processing, for example, since money can be generated quickly – using mechanised equipment (threshers, CA rippers, etc) – look at the whole agricultural value chain to see what the opportunities are

Q: More emphases on mechanised CA – which equipment have you seen working properly and being effective?

A: Rippers and planters were used and showcased – adoption of these are location specific

Q: Herbicides are costly, did farmers say this?

A: Yes, farmers have said that. This is the general feeling amongst farmers (not the young ones)

Q: More women are adopting then men, can you provide more insights into this?

A: We have more women in the communal sector, as per our statistics. Usually the demographics are such that more women find it easier to interact with others at such gatherings. They are more willing to learn. Men often believe they know already and don't attend those functions or trainings. Women are also a major provider of labour in agriculture. In the households, the situation is that when we come to the table at mealtime – it is the mother that is asks to provide food, not the man – the women have to make extra effort. These gatherings bring openings to support them

Q: Is ZFU a source of funds, or are there other funds? A: It is a regional project funded through a Norwegian fund

Presentation of CCARDESA's ICKM System by Dr. W. Förch, GIZ

Wiebke gave an overview on CCARDESA's main objectives, being regional knowledge dissemination on CSA. She then presented the key websites of CCARDESA's Information, Communication and Knowledge Management (ICKM) system. Further she explained to the audience how they can benefit and participate.
The relevant websites are:

http://saaiks.net
www.facebook.com/ccardesa
www.twitter.com/ccardesaa
CCARDESA D-groups
www.ccardesa.org

Final feedback round on how far the expectations of the *participants* were met - I

- How best to assist farmers and learn from each other – I am happy with the result. I was able to learn from experiences from outside of ZIM that was good
- Share knowledge – we shared a lot amongst ourselves and with the farmers – excellent
- Learn about CP measures – I learnt a lot but the issue will come in implementing then since they take resources, not sure what the next step for implementation is
- I wanted to learn about CP – covered
- Learn about CC in SADC – I learnt a lot, I can share my messages with farmers and other extension staff
- Insight into CC and how crops/livestock can adapt and reduce disease outbreaks and save plants from extinction – we learned something towards this regards
- Know more about threats, adaptive measures and about mitigation – we learned about measures, especially adaptation
- Learn about adaptation mechanisms – we learned a lot for our three systems of interest
- Validate my shopping list of what I already know – I realised that I have learnt a lot of new thing, one those of few workshops were we learned something new – in contrast to many other workshops. Now we might need to touch a bit more on implementation. There are very good ideas but how to implement

Final feedback round on how far the expectations of the *participants* were met - II

- Learn more about CC – I learned a lot and learnt a lot to take home
- Learn about cc – I met my expectations
- Know effects of cc and what causes it – yes, I appreciate what I learnt, it was very well presented
- Clear, concise, practical and end user friendly proceedings – most was clear, few was not concise, we were able to participate in practical assignments, if we integrate what we learned with what we are practicing – all good
- Learn about cc and solutions – done
- Impact of cc and mitigation measures – met, a lot of discussion and in the groups, we exchanged a lot of information
- Be well equipped with info on cc – I was fully equipped especially on adaptation and mitigation
- Learn about benefits of CSA – if we all manage to cascade this information from here to farmers then we will realise high yields
- Know more about cc and adaptive techniques – all information was provided, but more even was the process itself, which was great
- Meet new people – met; learn new topics – I have learnt about climate proofing and the discussions we had – I felt challenged by the first farmer, which was great

Final feedback round on how far the expectations of the *participants* were met – III

- Get in-depth of CC – satisfied, in a position to spell it out to colleagues and farmers
- Learn new ways for adoption, get to know different approaches – we hope this gets taken down to grassroots level and implemented, then our communities will be improved
- Knowledge in CSA – achieved well, even through discussions I gained a lot from different people from different contexts. I am now in a position to cascade this
- Discuss ways of cc mitigation and adaptation – we have discussed a lot on options, I have acquired a lot of new information
- I wanted everything to go well – I am glad, we were able to achieve what we came here for. I have learnt a lot, there was lots of new things from the previous training and the interactions were rich
- How to mainstream youth in CSA – I appreciate the few interactions we had today
- Water use efficiency – some of this was covered, but took a lot of new things from here
- Learn more about cc in agriculture – learnt a lot and was expecting to get information to take home, I will be happy to take it home – happy to share this with my colleagues
- From all our worries, we would like to suggest = can we a form a community of practice to come up with workable proposals in the two provinces – could there be assistance, if we define a way forward as a team? We want to work in a what app group to define a proposal and start implementing a few things
- ***Catalina*** : working together in a relaxed atmosphere: one hundred percent met – you were one of the best groups we ever had!

Closing remarks by Dr. Elke Stumpf, Program Manager of GIZ AISP programme in Mutare

Elke thanked the whole group for the nice discussions, great spirit and atmosphere. She reflected that at the beginning, with Sepo, GIZ made plans and Sepo put in a lot of effort and it worked well. She also thanked the ACCRA/CCARDESA team and recalled that the contact was initiated with Mr Mache last year to further regional cooperation. She also thanked the many other people working behind the scenes, with special thanks to Liberty and Sarah-Kay from GIZ AISP. She also thanked Catalina, the facilitator of this training.

She underlined that the work should not end with the training, which generated interesting discussions and lots of great ideas. This was the main idea – these two provinces, GIZ is already working closely with Agritex in these regions. So all have started networking in the two provinces and with the macro level – and with the regional level. GIZ already has suggested to walk the talk and to come together to collaborate. She invited participants to meet up again and look what GIZ can finance from its programme and support provincial and government plans and also the ideas that were developed by participants in this workshop. We want to have impact on the ground. GIZ looks forward to connecting again in the future and keep each other updated and try to arrange for new activities, meet regularly, do exchange visits etc. The training is a great start and she is looking forward to close collaboration. She expressed that she is very happy the training took place and urged Sepo that there is need to organise more trainings and have a real impact in the country!!

Daily evaluation

For further information

- ✓ www.ccardesa.org
- ✓ www.africacsa.org
- ✓ www.fao.org/gacsa/en
- ✓ http://saaiks.net
- ✓ www.wocat.net
- ✓ www.agriwaterpedia.info
- ✓ www.fao.org/climate-smart-agriculture/en
- ✓ www.adaptationcommunity.net
- ✓ www.cip.csag.utc.ac.za
- ✓ https://csa-guide.ccafs.cgiar.org
- ✓ Join-climate-l@lists.iisd.ca
- ✓ www.worldbank.org (then search for climate change knowledge portal)

Tools for measuring sustainability on a farm:

Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)
http://www.fao.org/in-action/sharp/en/

RISE – getting sustainability down to earth
https://www.hafl.bfh.ch/en/research-consulting-services/agricultural-science/sustainability-and-ecosystems/sustainability-assessment/rise.html

Sustainability Assessment of Food and Agriculture systems (SAFA)
http://www.fao.org/nr/sustainability/sustainability-assessments-safa/en/