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 for extension services "Tackling Climate Change in Agriculture: Approaches to Adaptation and Climate Smart Agriculture in the SADC Region"

Facilitation: Catalina Berger, Dr. Wiebke Foerch
Organisers: Dr. Alexander Schoening,
Carla Amongero Noriega
18 – 22 September 2017
Ongwediva, Namibia

Programme

Monday	Tuesday	Wednesday	Thursday	Friday
• Welcome and Opening • Presentation of participants • Outline of the seminar • Agenda	• Case study, Module A: Assessing the risk - part 1 current situation	• Module A: Presentation of results • Group feedback on Module A • Dimensions of adaptation measures	• Recap of excursion • Presentation 5 : The importance of gender in CSA	• Preparation of final presentations – ctd. • Group results' presentation
• Thematic introduction: Climate change, adaptation, mitigation • Presentation 1 : Climate Change projections and the importance of climate services for agriculture in SADC	• Action learning: risk functions • Case study, Module A: Assessing the risk - part 2 future situation	• Case study, Module B: Identifying adaptation options • Preparation of excursion	• Case study, Module C: Selecting adaptation measures • Preparation of final presentations	• Elaboration of action plans • Reflections and conclusions on the Climate Proofing approach
Lunch break				
• Exposé: Concept and steps of Climate Proofing	• Presentation 3: Introduction to CSA: technologies, practices and strategies	Excursion to SCORE and CUVE Water project sites	• Presentation 6: Prioritizing CSA practices with Data	• Presentation 7: Conservation agriculture • Presentation 8: Information, Communication and Knowledge Management of CCARDESA • Evaluation of training • Certificates • Closure
• Presentation 2: Agriculture: victim and culprit of CC and adaptation options, CSA • Presentation of three case studies, composition of working groups	• Presentation 4: 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:

- 24 practitioners from agricultural extension services in SADC member states
- Countries: Namibia (23) Botswana (1 participant)
- Institutions: Ministry of Agriculture, Water and Forestry (MAWF), Botswana Young Farmers Association
- Gender balance: 16 women, 8 men

Day 1 - Overview

- Welcome and opening
- Presentation of participants
- Thematic introduction: Climate change, adaptation, mitigation
- Presentation 2: CC projections and impacts in SADC and importance of climate services for agriculture
- 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 – overview

- **Dr. Alexander Schoening** from GIZ's Adaptation of Agriculture to Climate Change Programme gave some background concerning the training and welcomed the participants on behalf of GIZ Namibia
- The training was then officially opened by **Ms. Mildred Kambinda**, Director of DAPEES at the Ministry of Agriculture, Water and Forestry of Namibia.
- **Dr. Simon Mwale**, Acting Executive Director of CCARDESA gave a presentation on the Regional Agricultural Policy (RAP) of the SADC region.
- The opening was followed by the self-introduction of the **course participants.** During the presentation round, 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, learn about CSA and acquire practical knowledge and skills to implementing CCA in rural areas.
- 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 a third presentation, participants learnt about the role of the **agricultural sector as victim of and culprit** of climate change at the same time.
- During an exposé about the **Climate Proofing (CP)** approach, participants gained insight about the objectives, steps of implementation as well as the CP modules covered during the training.
- The day was closed by the presentation of **case studies** and the composition of working groups for the Climate Proofing tool.

Introduction by Dr. Alexander Schoening, GIZ

Dr. Schoening explained that this training will be implemented by support of CCARDESA upon request of Namibia's Ministry of Agriculture, Water and Forest (MAWF). The MAWF received feedback from participants in the Cape Town training 2016 and subsequently decided to offer the training for their staff. The training in Ongwediva is supported by GIZ ACCRA, the Conservation Agriculture Programme and the BMCC (Biodiversity Management under Climate Change) Programme of GIZ.

He highlighted that there are many important topics on the week's agenda – looking beyond conservation agriculture to look at CSA. He further expressed the hope that participants take some of the learnings this week back home and also implement new ideas in their work.

Welcome and opening by Mildred Kambinda, MAWF

Speaking on behalf of the MAWF, Ms. Kambinda welcomed CCARDESA, who is represented by the acting executive director Dr. Simon Mwale. She stressed that the participants are a vibrant team of colleagues, whom will be very engaged and fun to work with during the training.

Ms. Kambinda reflected that climate change is here to stay, but we are not very well versed in implementing responses to this challenge and urged participants to keep on studying all the materials participants will receive.

Ms. Kambinda's opening remarks were followed by her presentation on "Climate change policies in Namibia".

Presentation: Climate change policies in Namibia by Mildred Kambinda, MAWF

Namibia is strongly committed to implementing measures to promote and advance sustainable development, which is enshrined not only in the Constitution, but also in the long-term development framework of Vision 2030 and in the country's **Intended Nationally Determined Contributions** (INDC). So far, the focus of Namibia's CC response has generally been on adaptation to moderate the negative impacts and to some extent exploit beneficial opportunities associated with the impacts of CC. Although adaptation measures are set as key priorities in tackling the impacts of CC, the country is also committed to undertake mitigation measures where they strongly contribute to national development goals.

The **National Policy on Climate Change** (NPCC) of 2011 is the national vision on addressing CC. It seeks to outline a coherent, transparent, and inclusive framework on climate risk management in accordance with Namibia's national development agenda, legal framework, and in recognition of environmental constraints and vulnerability. The policy further takes cognizance of Namibia's comparative advantages with regard to the abundant potential for renewable energy exploitation. The goal of the NPCC is to contribute to the attainment of sustainable development in line with Namibia's Vision 2030 through strengthening of national capacities to reduce CC related risks and build resilience.
The **National Climate Change Strategy and Action Plan** is key instrument to operationalise the NPCC over a period of 8 years from 2013 – 2020 as a first comprehensive and practical tool which offers guidance on the mechanisms, means and manner in which implementation can happen.

The 2008 **Climate Change Vulnerability & Adaptation Assessment** suggests numerous adaptation measures to cope with the expected impacts (e.g. diversification options, management practice, improving the characteristics and use of best technical options and disaster risk preparedness).
Namibia's **Climate Smart Agriculture Programme (2015-2030)** focus is on six fields of intervention:

1. *Improved productivity and incomes*
2. *Building social and environmental resilience and associated mitigation co-benefits*
3. *Value Chain Integration*
4. *Research for Development and Innovations for scaling up CSA*
5. *Improving and sustaining agricultural Extension Services*
6. *Improved policy and Institutional Coordination*

Welcome and opening by Dr. S. Mwale (CCARDESA)

Dr. Mwale, Acting Executive Director of CCARDESA, expressed his gratefulness that Namibia made the request for this training - “we all need to keep moving and cannot sit and wait for things to happen – we need to move forward”. He then gave a presentation on the SADC **Regional Agricultural Policy** (RAP).

He highlighted the role of agriculture for poverty reduction and reminded the audience, that the sector provides livelihood for 61% of the SADC population and contributes to 17% of the region‘s GDP.

He recalled the purpose of the **RAP** which is “to define common agreed objectives and measures to guide, promote and support actions at regional and national levels in the agricultural sector of the SADC Member States in contribution to regional integration and the attainment of the SADC Common Agenda.”

RAP is thus the legally binding instrument linked to planning and budgeting in the SADC member states. The overall objective of the RAP is to contribute to sustainable agricultural growth and socio-economic development. Dr. Mwale also mentioned the climate change interventions in the RAP, which will be implemented through the **Food and Nutrition Security Strategy 2015-2025**.

The speaker then explained the “**Comprehensive Africa Agriculture Development Programme** (CAADP)”, which is “Africa’s policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all” and detailed that **CCARDESA** falls under pillar 4 (Agricultural research, technology development, dissemination and adoption) of the CAADP.

Dr. Mwale concluded his opening speech by highlighting the support of the **GIZ-ACCRA** (Adaptation to Climate Change in Rural Areas) Programme and wishing the participants a fruitful training.

Q&A

Q: How can countries benefit from CCARDESA?

A: CCARDESA has a coordinating role and works very closely with the departments of research in the countries.

In Namibia CCARDESA has a project through the International Food Policy Research Institute (IFPRI) that implements research in the country.

CCARDESA also works with the directors of extension who advise us about the priorities one the ground. E.g. the Agricultural Productivity Program for Southern Africa (APPSA) operates across several countries to promote technology development. CCARDESA is active in capacity building, facilitate projects in countries, facilitate linkages with CGIAR (Consultative Group on International Agricultural Research) centers and amongst countries.

Thematic introduction: Climate Change, adaptation and mitigation by C. Berger

The thematic introduction from Catalina Berger, consultant, 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

Q: Avoid the unmanageable (mitigation): I work in the field with farmers, what can I tell farmers how they can avoid, for example floods in the areas where I work? Theoretically I understand the concept, but how does this work locally, how do I translate this into the local language?

A: We will be working on concrete examples through the climate proofing approach, it will help you look at a farming system and will help you work through the climate implications and adaptation options to reduce negative impacts. Ideally you are then able to apply the tool with your farmers in the field. The idea is to work through options together with farmers, coming with pre-defined solutions is usually difficult, since the farmers know a lot about their environment.

Q: Climate signals and the impact of land loss. Is it the same as soil erosion? It also contributes to loss of rural income, is it the same?

A: Land loss in this presentation refers to loss of coastal areas because of sea level rise. This is nothing that is of a big concern in Namibia, since there is no farming on the coast and the coasts are very steep.

Q: Theoretically the concept is ok, but practically difficult. E.g. if you look at livestock as major contributor of emissions, but it is also an important livelihood for farmers. It is difficult to tell farmers to stop keeping livestock. How do we handle the situation?

A: Yes, this is a big issue in industrialised livestock systems, not as much here

Q: Especially for livestock and if you talk about emissions, Namibia is contributing a lot of emissions. Key here is the management of the livestock, other countries have more intensive systems, our extensive systems need to be better managed and this is where we are contributing a lot to emissions.

A: Yes, livestock is part of Namibia's NDC. But then if you look at a smaller country with lots of animals like Germany you have much higher emissions.

Other issues come with intensive systems, related to animal welfare, etc.

Presentation: CC projections and importance of climate services for agriculture in SADC by Lisa van Aardenne, UCT

The thematic introduction on CC was followed by a presentation by Ms. Lisa van Aardenne, Chief Scientific Officer from the Climate Systems Analysis Group of the University of Cape Town.

She started by explaining the **key elements of the climate system** (radiative balance, solar radiation, global distribution of heat, global circulation patterns). Observing the climate system is a challenging undertaking esp. since there are only dispersed **weather stations** out of South Africa and data collection is not done nationwide in many African countries. With the available data, scientists developed a variety of climate projections, the **Global Climate Models (GCM**). Examples were shown of GCM on surface temperature and average precipitation. The presenter then explained the methods of downscaling from the global scale to the **regional scale** (numerical and statistical downscaling).

She elaborated on the topic of data to information and reminded that **data is not information**. There needs to be an **interpretive chain**. We have to learn to work in a context of an envelope of climate information to reach actionable outcomes. This is most robustly done in collaborative efforts between **stakeholder community and user-sensitized climate community.**

She concluded her presentation with a series of slides **on climate change in Namibia** and the projection on climate change in future for the country. She also gave two examples of so called **climate narratives**, where contemporary witnesses share their observations of the changing climate in Namibia.

Q&A

Q: Is there hope that scientists will be able to provide farmers-oriented predictions, to help them prefer the next season?

A: There is hope: predictions will get better. However, a plateau will be reached regarding the reliability/probability of the prediction happening

Q: What to tell to the farmers, when the predictions that were shared with them do not come true?

A: Randomness is an inherent part of weather predictions, and climatic models are *per se* limited; they can only be used as a tool for better orientation, indicating always the probability of the predictions coming true. It is important to insist on the difference between natural variability of climate and climate change. Before people will be able to cope with climate change, they need to learn how to be properly adapted to climate variability. We have to admit we do not know enough about what will happen as a consequence of climate change. Robust solutions need to be identified and implemented at all levels (e.g. water conservation measures). We need to focus on which parameters we know for sure will change, and react accordingly.

Q: What is the periodicity of El Nino/La Nina? Are there predictions?

A: El Niño has switched to La Niña in the past year, which is slowly retreating already. It is difficult to get clear predictions of the ENSO (El Niño Southern Oscillation) dynamics.

Q: Data quality and prediction reliability

A: Some organizations sell the results of their model calculations as basis for decision making. There might be need for actions being taken based on unreliable results (especially when the quality of the data used for the model was poor).

Presentation: 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**.

Comments/discussion and Q&A

Discussion about how to **curb population growth**: what is important is how we manage the population, how we ensure that people have a base of living. We need to be able to provide for our populations and spread the benefits. Who is going to do the labour if we have fewer people?

Yes, BUT it depends where you are and things cannot be taken across the board. We do have enough land, so where is the challenge here?

If we intensify, we will have less agricultural producers, what will those do that do not continue farming?

Meat consumption discussion:

Q: Why should we reduce meat production? Everyone in Namibia has a cow

A: Yes, but alternatives (e.g. fish) is too expensive in the local market – how will people access alternatives? As a conclusion, this topic is difficult and complex and depends on the context and the culture.

Q: There are traditional means of weather forecasting but we seem to be ignoring these systems.

A: Indigenous Knowledge (IK) is very important and it is up to us to bring this together with our scientific knowledge. Usually, scientific explanations unpin a lot of the traditional knowledge

A: People are working on documenting this knowledge – IK does not rely only on one indicator, but several indicators at the same time.

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.

http://saaiks.net/wp-content/uploads/2017/03/SADC_Training-Manual_eng-10-2016-wf.pdf

Q&A

Q: How valuable is it to integrate this climate proofing into environmental assessment?
A: In the past this was not considered, for example in infrastructure projects, but now this is actually being asked for more and more. E.g. to protect infrastructure against flooding, or if the dam is not too large, if water availability is going to reduce significantly

The Climate Proofing brochure is slightly outdated in terms of the terminology, but the steps are still the same. The brochure is available on the memory stick.

Day 2 - overview

- Case study work - Module A-Part 1: Assessing present risk
- Action learning: risk function
- Case study work - Module A-Part 2: Assessing future risk
- Presentation: Introduction to CSA - technologies, practices and strategies by , Sarah Beerhalter, GIZ
- Presentation: Water and land management in CSA: opportunities and constraints by Sarah Beerhalter, GIZ

Day 2

- The three groups started to work on Module A of the case work, which is split into two parts: **1: Assess the risk – current situation and 2: Assess the risk – future situation.** The groups started with part 1.
- The following **action learning** introduced the risk terminology as it is used according to the 5th IPCC Assessment Report and will also be used during the CP case work
- Consecutively, the groups progressed with Part **2: Assess the risk – future situation**
- The group work was followed by a presentations on **Introduction to CSA: technologies, practices and strategies** by S. Beerhalter, GIZ ACCRA
- After this, S. Beerhalter gave one more presentation on **Water management and soil conservation in CSA: opportunities and constraints**

Each presentations was followed by a **Q&A session**

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

The details of the group work are presented from slide 32 onwards.

Introduction to three case studies

Three case studies have been chosen by the participants to support their learning process towards the Climate Proofing approach:

Horticulture: While Namibia is self-sufficient in cabbage, sweet melons, sweet corn, spinach and watermelons, about 95% of what is marketed through the formal sector is still imported from South Africa (especially fruits). For the 2012/2013 horticulture season, the Namibian production volumes accounted for about 19 500 tons. The main commodities produced are, in order of decreasing market value: potatoes, onions, tomatoes, carrots, cabbage and lettuce. Watermelons, sweet melons and sweet peppers also represent a significant share of the local production.

Pearl millet: Pearl millet is the dominant cereal crop in Namibia due to its better tolerance to harsh weather conditions such as drought as compared to other cereals such as maize. Pearl millet is produced both in commercial and subsistence farms. Pearl millet is the dominant crop in the northern part of Namibia where about 60 % of the population lives. The greater part this population are subsistence smallholder farmers who depend on agriculture as a major source of food and income. In these subsistence farms, production is on an average of 2.0 ha per household. In total, the production land under pearl millet accounts for 355200 ha.

Communal livestock: The communal areas occupy about 48% of the total farming area of Namibia, and its 82 000 livestock farms hold approximately 50% of the total cattle population, 51% of the goats and 0.3% of the sheep. They differ markedly from the freehold areas in their production systems, objectives and property rights; only the cropping areas are normally allocated to individual households, while the grazing areas tend to be shared by members of a community. The communal areas also encompass a wide range of environmental conditions and ethnic groups.

Module A: Assess the risk
Part 1: current situation

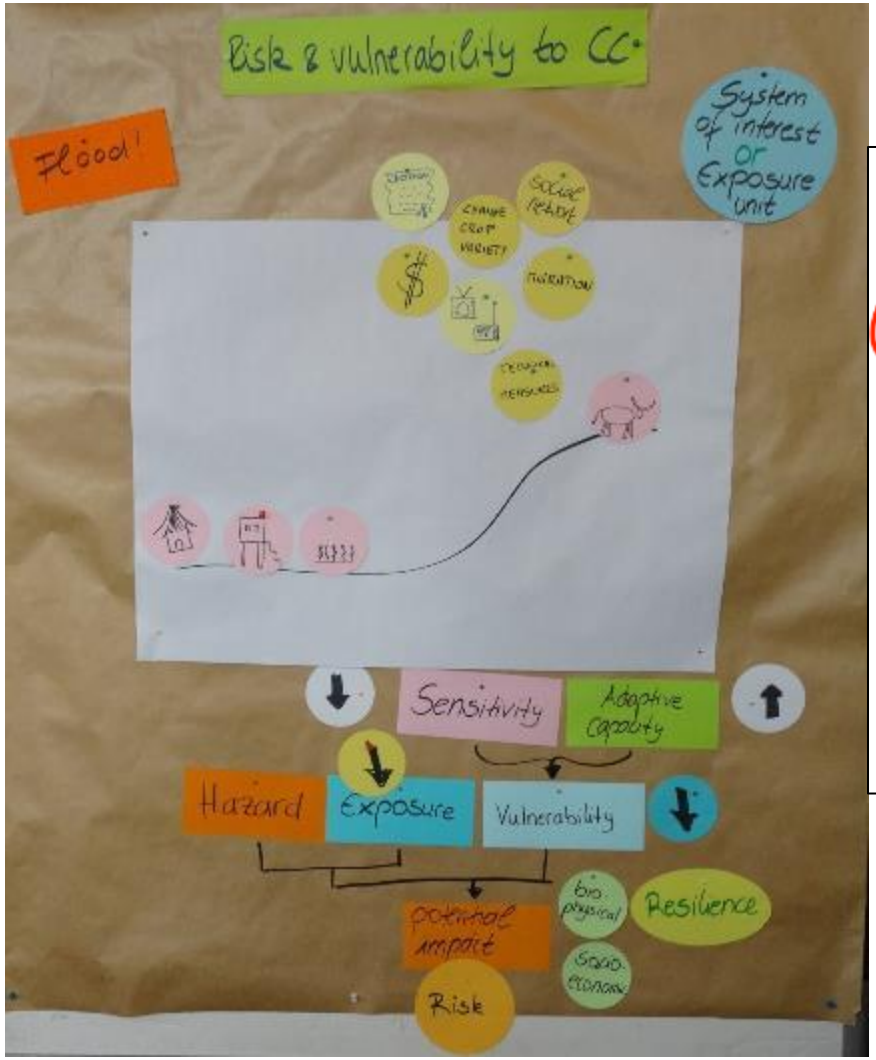
Learning objectives:

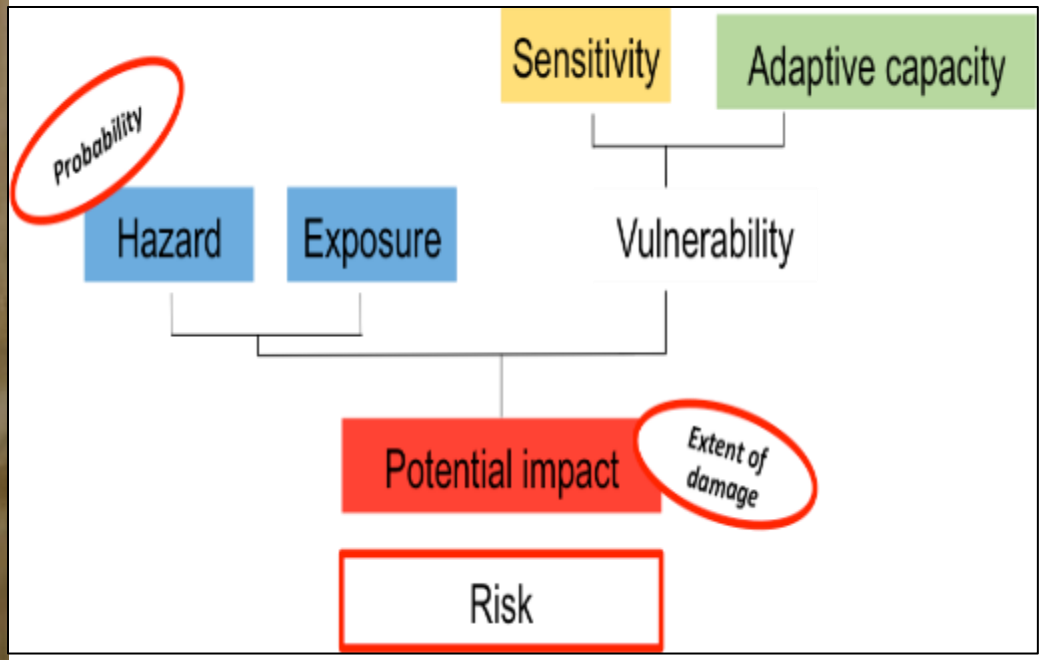
- Analyse the current risks and additional challenges caused by climate change in a defined system of interest
- Identify and handle the different factors contributing to “risk” in a system: sensitivity, adaptive capacity, basic vulnerability, hazard, exposure, and potential impacts
- Define the need 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 – I





IPCC 2014

Action learning Risk function – II

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

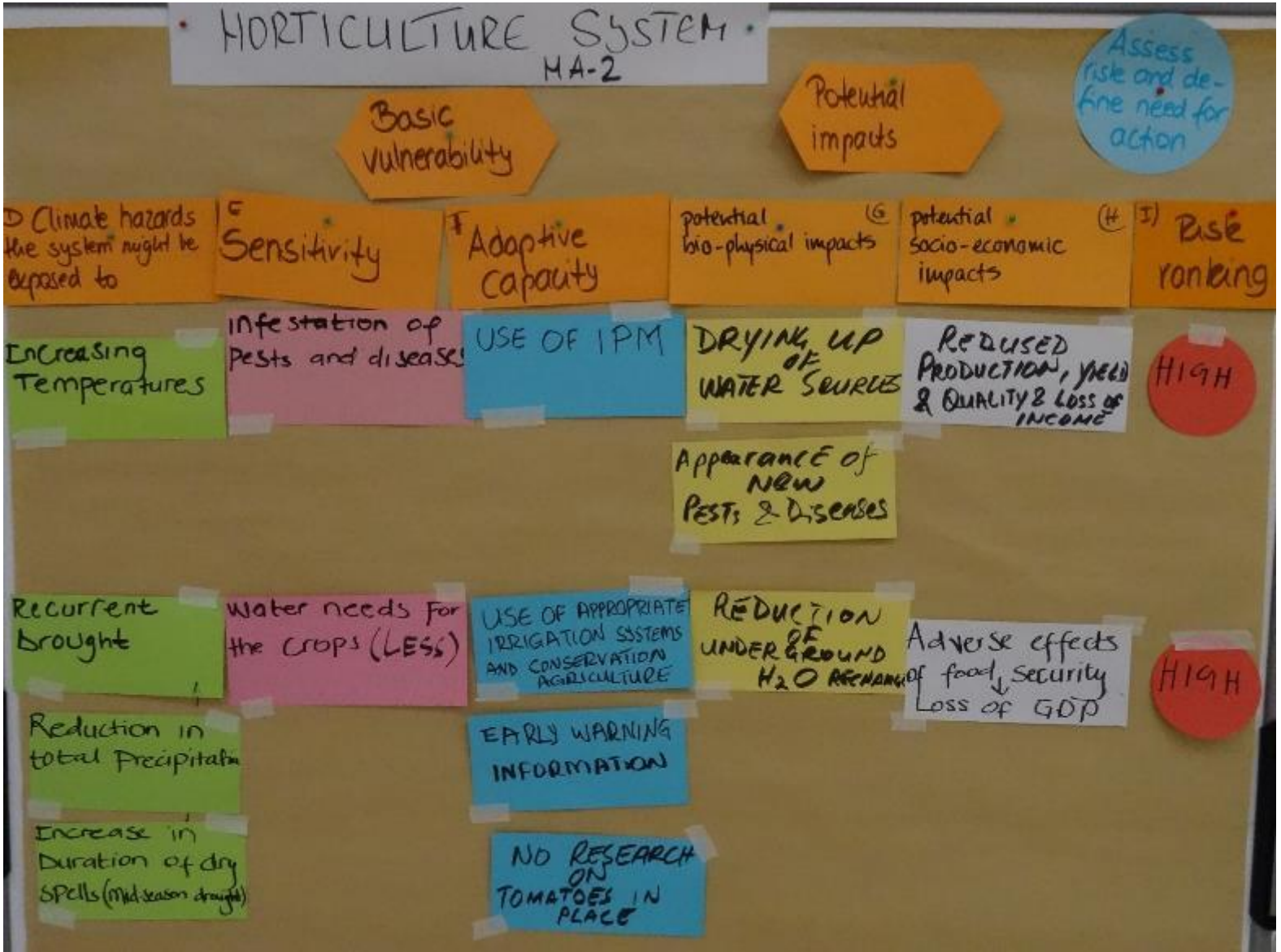
1. Agree on the set of selection criteria
2. Discuss each option using the criteria and score them by using 1 – 5.
3. Do the overall score
4. If too many options have similar evaluations, try to be more specific by introducing another criterion or weighting the criteria.
5. Add an estimation of the mitigation potential for each measure (-/ 0/ +)

Results Case 1

HORTICULTURE

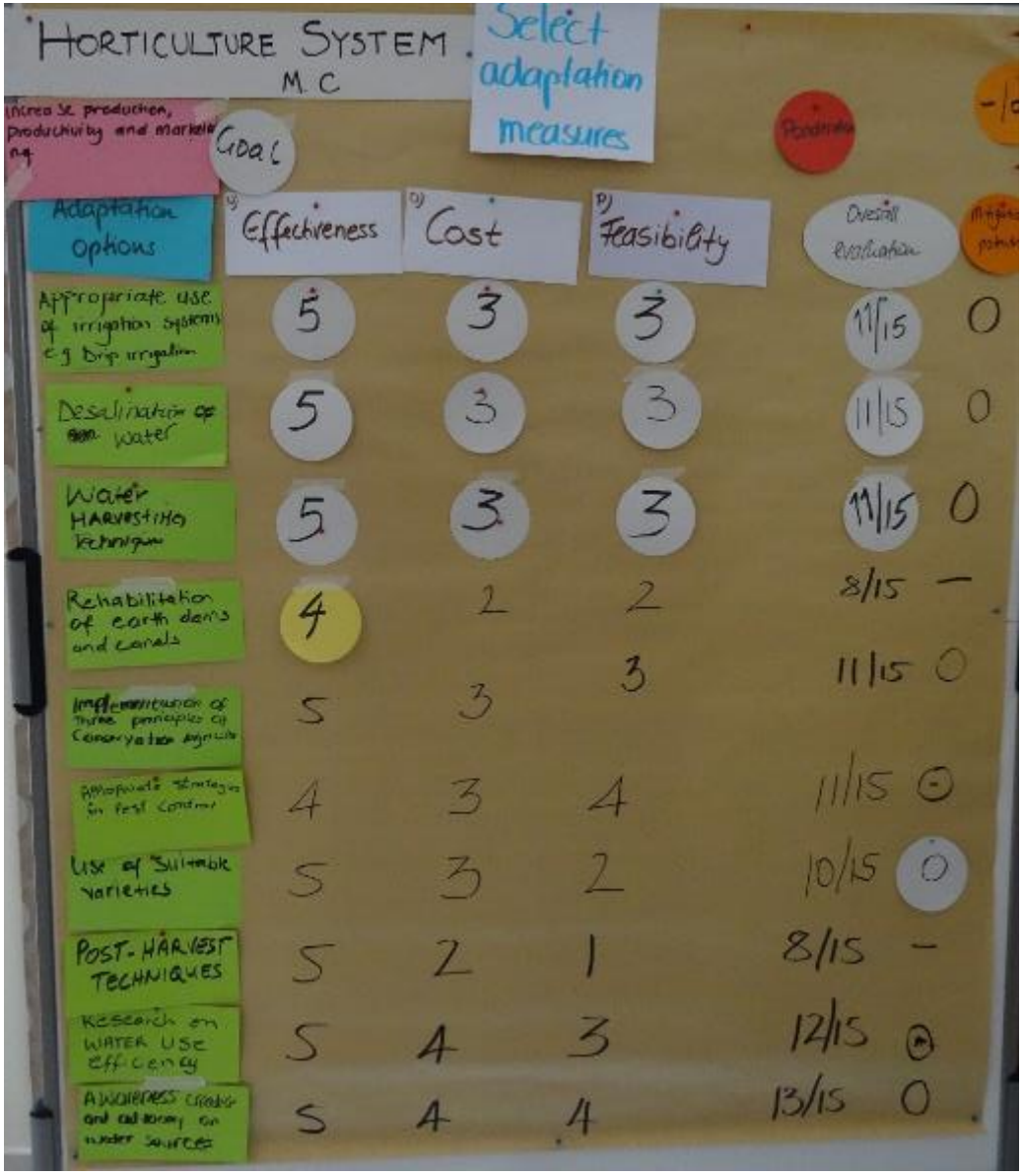
Module A.1 – current situation
Case 1: Horticulture

Module A.2 – future situation
Case 1: Horticulture

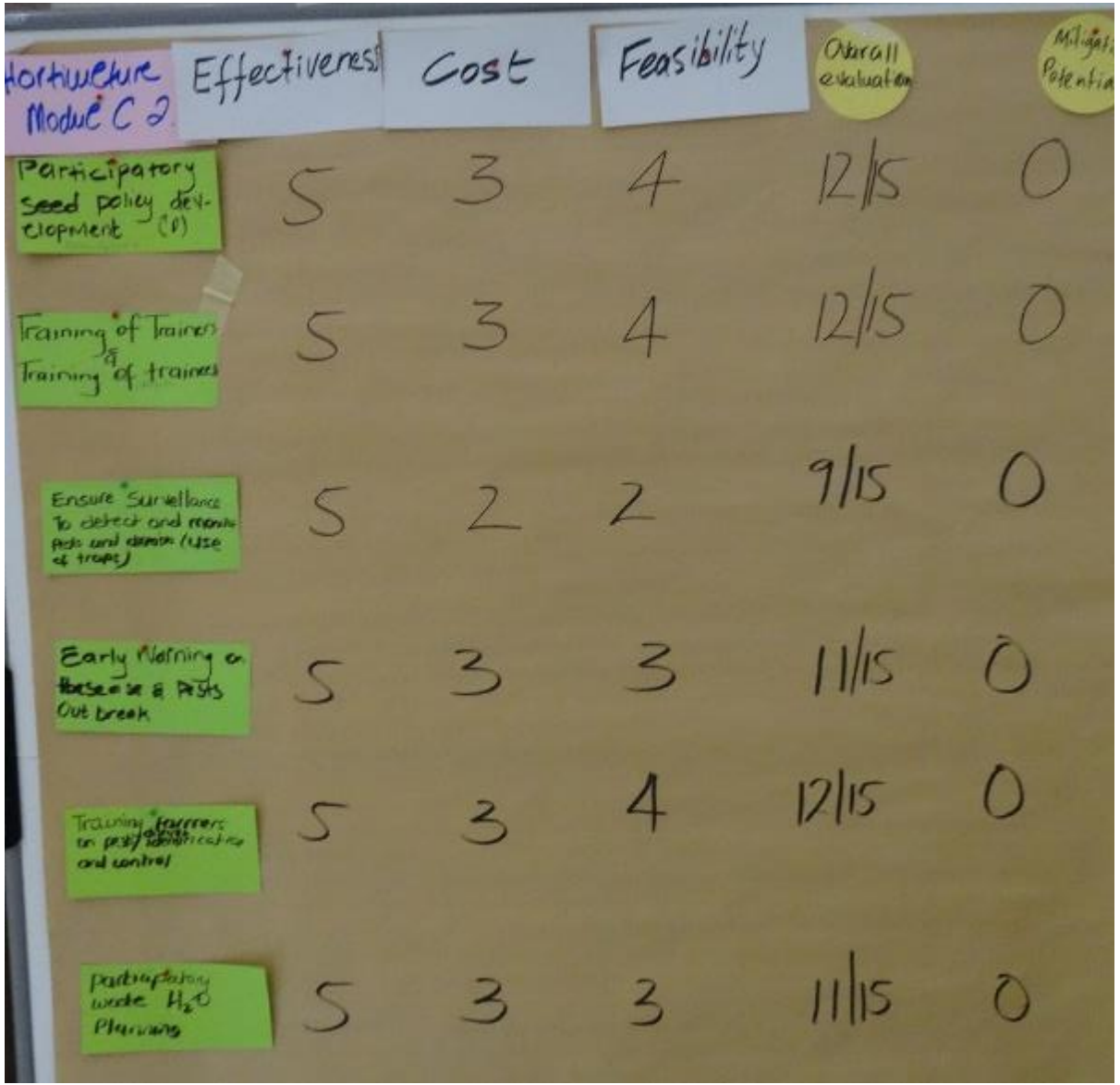


Module B – Case 1: Horticulture

Module C - Case 1: Horticulture (1)



Module C - Case 1: Horticulture (2)



Presentation of final adaptation measures
Case 1: Horticulture

ADAPTATION OPTIONS AND MITIGATION POTENTIALS FOR THE HORTICULTURE PRODUCTION SYSTEM OF OLUSHANDJA, NAMIBIA

Group members:

Martin Embundile
Margreth Matengu
Sesilia Martin
Martha Shigwedha
Mildred Kambinda

Introduction

GOAL:

Increase the production, productivity and marketing of horticulture produce mainly to tomatoes and onions of Olushandja in Namibia

BACKGROUND

- Horticulture is identified as a priority area for development in Namibia:
  - It is a source of income
  - Improving food and nutrition security
- Horticulture farms categorized according to surface and technological development
  - Large scale farms – 20 -30 Ha (market oriented)
  - Medium scale – 3 – 6 Ha (local market oriented)
  - Small scale: 0.1 to 3 Ha (household level consumption oriented)
  - Olushandja farmers belong mainly to small and medium scale categories

CHALLENGES

- Olushandja farmers faced with climate Hazards such as:
  - Water scarcity due to sporadic rainfall
  - High temperature
  - Desertification
  - Prolonged dry spells
  - Reduction in total precipitation
  - Recurrent droughts

CHALLENGES

- The climate hazards have negatively impacted production of Olushandja farms through:
  - Reduced production
  - Low quality of produce quality
  - Introduction of new pests and diseases
  - Loss of income
  - Drying up of water sources

ADAPTATION OPTIONS

- Awareness creation and advocacy on water sources
- appropriate use of suitable varieties
- Desalination of water
- Water harvesting techniques
- Implementation of CA principles
- Appropriate strategies for pest control
- Rehabilitation of earth dams and canals
- Post-harvest techniques
- Research on water use efficiency

ADAPTATION OPTIONS

- Participatory seed policy development
- Training of trainers
- Ensure surveillance to detect and monitor pests and diseases
- Early warning on disease and pest outbreak
- Training farmers on pest and disease identification and control
- Participatory waste water planning

Mitigation potential

Quick wins:

- Awareness creation and advocacy on water sources
- Participatory seed policy development
- Training of trainers
- Training farmers on pests and diseases

Mitigation potential

GCF funds:

- Research use of suitable varieties
- Desalination of water
- Water harvesting techniques
- Implementation of CA principles(Use of appropriate implements)
- Research on appropriate strategies for pest control
- Rehabilitation of earth dams and canals
- Post-harvest techniques
- Research on water use efficiency

Mitigation potential

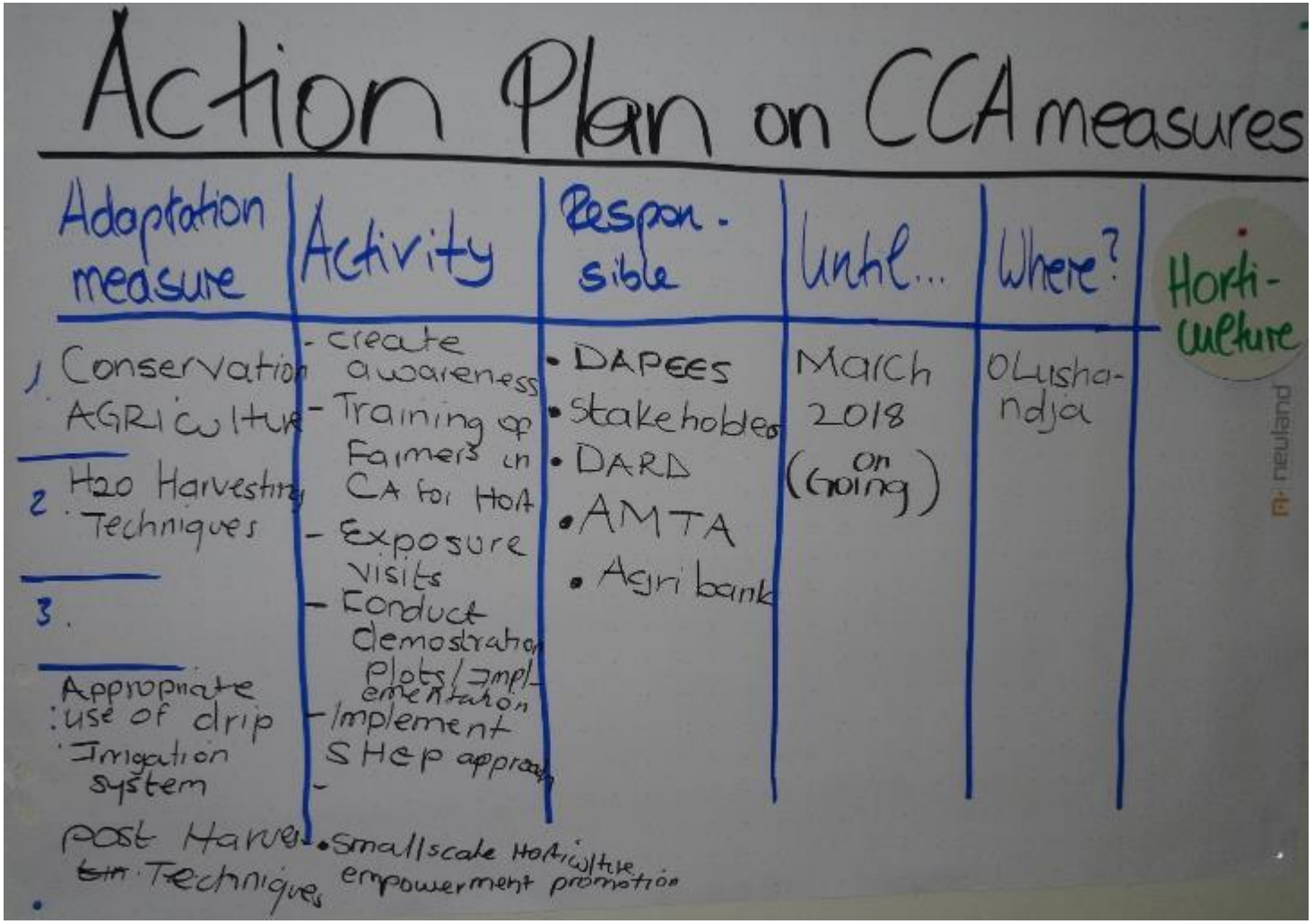
GCF funds:

- Ensure surveillance to detect and monitor pests and diseases
- Early warning on disease and pest outbreak
- Training farmers on pest and disease identification and control
- Participatory waste water planning

Conclusions and recommendations

- Namibia as arid to semi-arid country
- High crop failure
- High livestock mortalities
- High budget spent on negative climate effects (drought/erratic rainfalls)
- Therefore, there is need to increase horticulture production for food security, nutrition and income generation

Action plan Case 1: Horticulture



Q & A Final presentaiton Horticulture

Q: In terms of your adaptation options – you did not pick the ones that are outstanding options

A: The options were given in the order to importance and the evaluation process that we went through

Q: Quick wins – did you assess financial cost for these options?

A: We looked at what we can do within our current work plans – we did it this way since we need to make our own contribution to this project. We cannot just wait for external funds.

Q: Timeframes – when can quick wins be implemented?

Q: Size of farmers and market orientation – why are small farmers (up to 3ha) only oriented towards own consumption, how can they eat all those vegetables?

Q: How many producers are being targeted by the project; what is the gender ratio?

A: We have about 80 producers, we expect 80% to be males

Q: I am lacking one of the main challenges – the use of pesticides/technical product.

A: Most farmers use chemical products that are not hazardous

Q: How is desalination accomplished?

A: Existing projects are already looking at desalination of groundwater, at trial level, but at very high costs (renewable energy not yet sufficiently used). We need to weigh the costs and benefits.

Q: Out of your 3 water options (desalination, water harvesting, earth dams) which ones would you recommend?

A: What would be most beneficial are earth dams and water harvesting, especially on small farms. For large farms it is more difficult, it is mainly water from the canal.

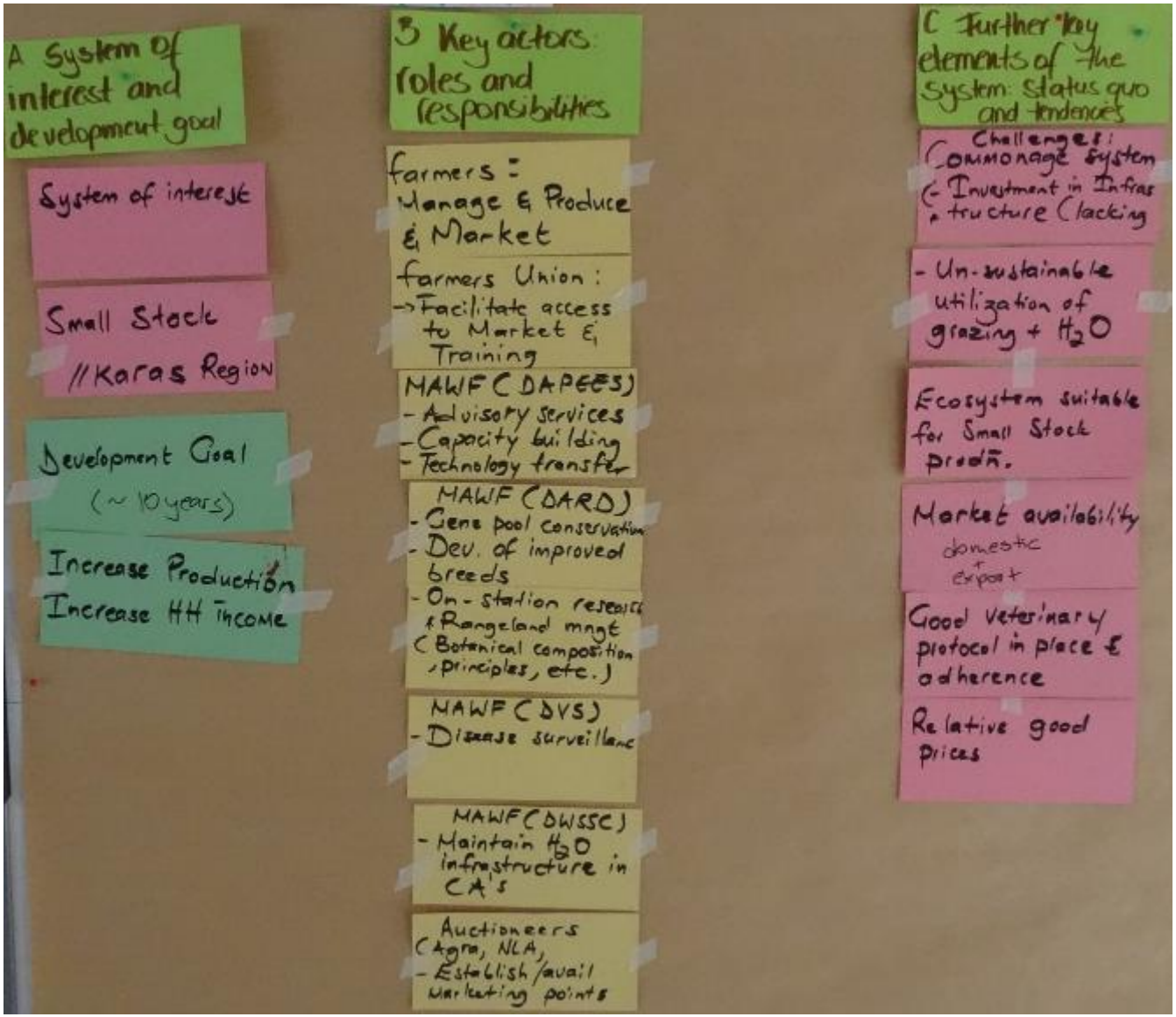
Q: How are you planning to support post-harvest management and market access/information?

A: We have clustered a whole range of issues in the post-harvest option. From harvesting, local processing, etc. Here we also include a marketing plan that needs to be in place.

Results Case 2

COMMUNAL LIVESTOCK

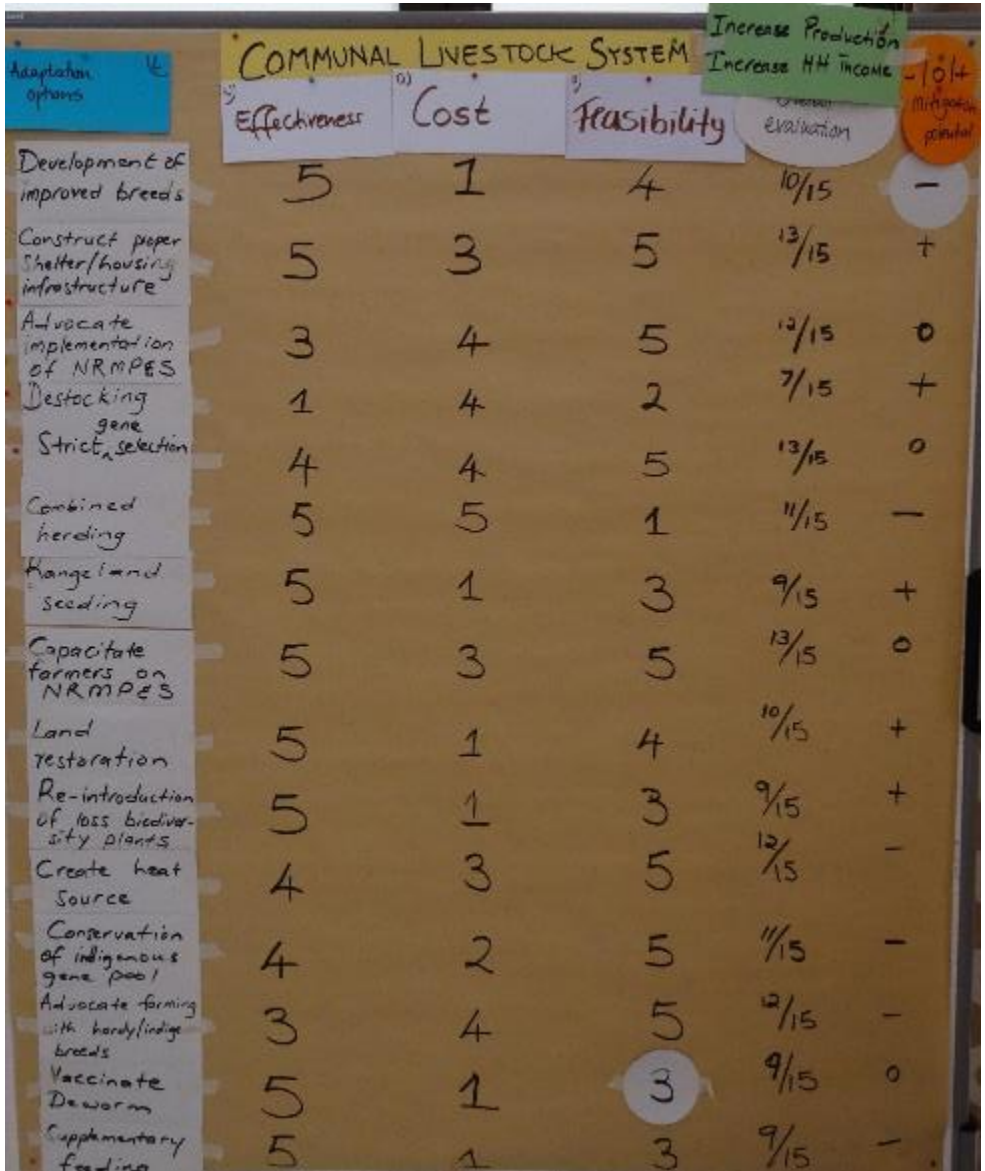
Module A.1 – current situation
Case 2: Livestock



Module A.2 – future situation
Case 2: Livestock

Module B – Case 2: Livestock

Module C - Case 2: Livestock



Presentation of final adaptation measures
Case 2
Livestock

Communal Livestock System Small Stock: //Karas Region

Background

- Commonage, non-title deed, resource (water and grazing) sharing
- //Karas communal area: 1 597 062 ha
- Consist of 2 constituencies i.e Berseba & Karasburg East
- Communal agricultural wards: Berseba, Bethanie, Tses & Bondelswarts
- Approximately 3 000 communal farmers

Cont’ Background

- Rainfall ranges from 50 mm – 200 mm with an average 160 mm/annum
- Temp range: -4 – 40˚C
- Livestock numbers: Cattle – 10 135, Sheep – 44 762, Goats – 53 185, Donkey – 5108 & Horses – 4290 (Livestock census, 2016)
- Dwarf shrub savanna
- Shallow underground water table (approx 3 m)

Objectives

- Increased production
- Increased Household (HH) income

Adaptations measures:
Rangeland seeding

Effectiveness:

- Increase biodiversity
- Increase biomass (forage quality)
- Increase carrying capacities
- Improve livestock condition
- …increase production, off-take = Increase HH income & Food security

Adaptations measures:
Rangeland seeding

Cost:

- Procurement of seeds (species such as *S. uniplumis, S. papophroides or kalahariensis, C. ciliaris, A. pubescens, etc.)*
- Mobilization of communities (TA. Farmers & Union, etc.) × 4
- Development of training material (translations in local vernaculars)
- Training cost (teaching aids, transport, accommodation, meals)
- Establishment of demonstration/pilot plots × 8

Adaptations measures:
Rangeland seeding

ESTIMATED COST

Cost Implications			
Items	**Qty**	**Unit cost**	**Total Cost**
Procurement of seeds (1 kg=1ha)	10	300	3000
Community mobilization	4	7500	30000
Development of training material	500	150	75000
Capacity building sessions	8	11900	95200
Establishment of demo/pilot plots	8	10000	80000
TOTALS	**530**	**29850**	**283200**

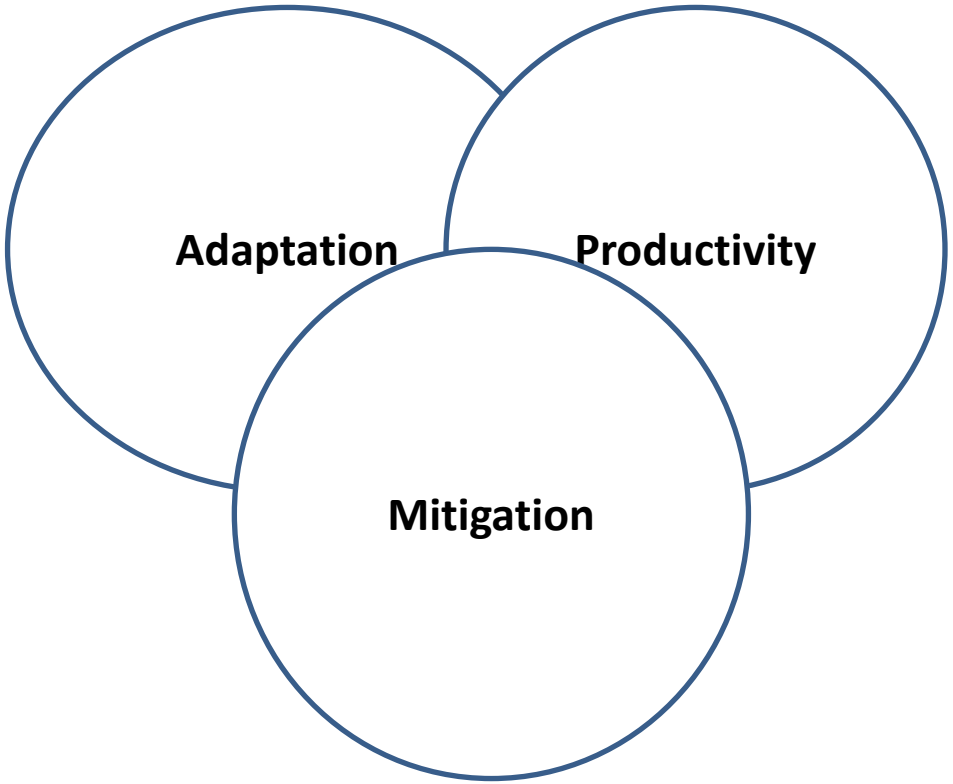
Adaptations measures:
Rangeland seeding

Feasibility:

- Implementation is supported by the National Rangeland Management Policy & Strategy (NRMP&S)
- Use of native grass species (can germinate in existing climatic conditions and seeds can be harvested locally)
- Availability of grass species with local retailers
- Available human resources to conduct/facilitate trainings
- Cost implications (seeds, training, training material, labour)
- Coordination in commonage system (grass poaching, combined herding)

Adaptation, Productivity & Mitigation

- Impact of rangeland seeding



Adaptation, Productivity & Mitigation

- Land restored/reclamation (combating degradation)
- Lost biodiversity is re-introduced
- Less supplementation
- …mortalities decreased, gene pool preserved
- …increased production, reduced carbon foot print, increased off take = Increased HH income & Food security..


THANK YOU!
OMAKE!

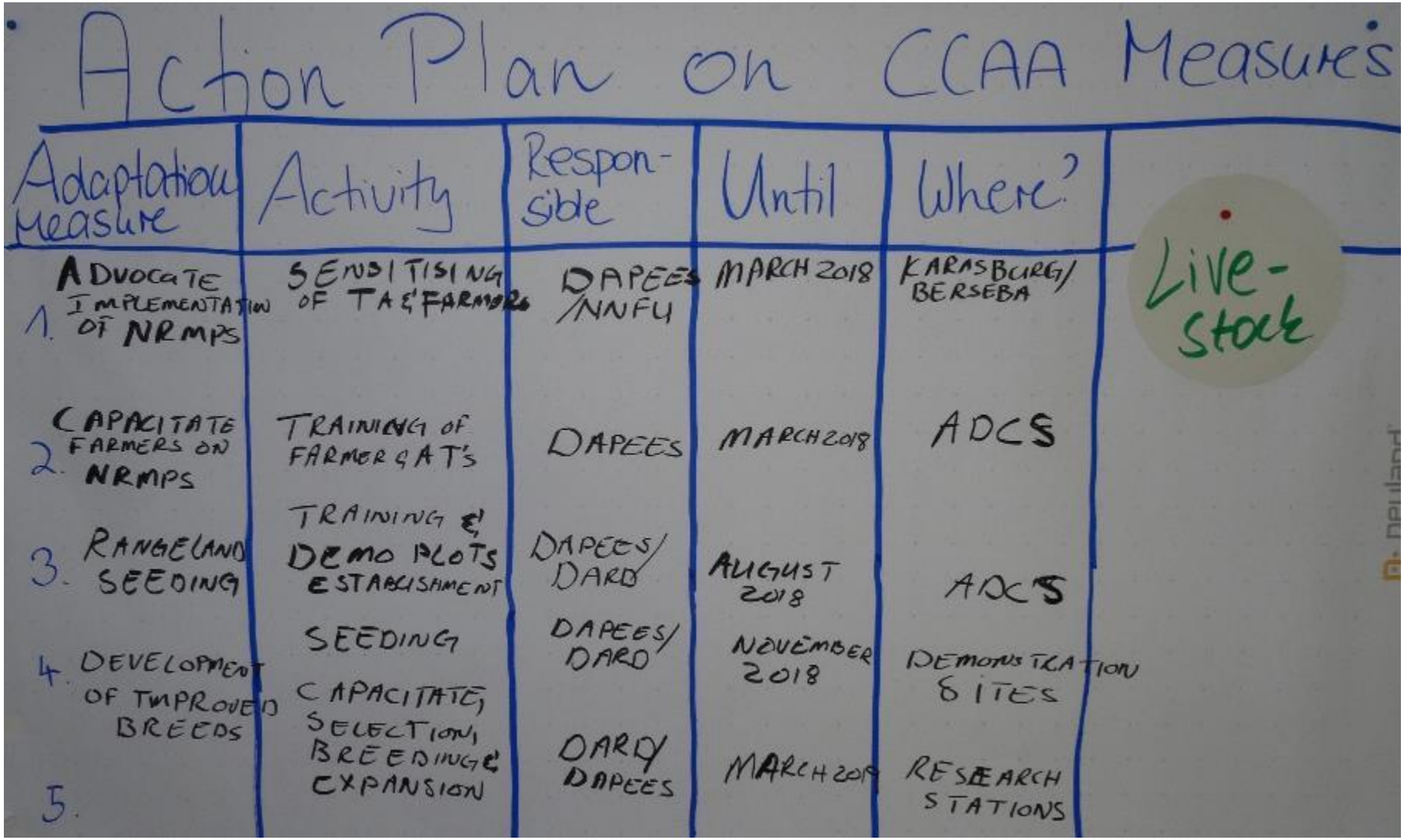
Q & A Final presentation
Livestock

Q: Livestock is a contributor to greenhouse gas emissions – how do you convince us?
A: Yes, we are increased stocking rates, but this is neutralised through better ecosystem management and better biodiversity – so it balances out.

Q: Community involvement and benefit sharing in communal landscapes is difficult – how will you enable communities to invest when they have no direct control over the land? You pilots will run well, but how do you take this to scale?
A: This communal area is unique – it is not completely open but groups of farmers (7) are within a certain area that is fenced off and fall under a certain water point committee. Plus we have been working with these communities for a long time, this project is demand driven – our approach is very participatory, so that the adoption and buy in happens early. We are convinced if we can prove the value of this approach then there will be adoption. We are also involving traditional authorities and farmers union to help create community buy in

Q: We need to spend more money, not just one adaptation option. What else can we fund as GCF?
A: We have shallow groundwater, so we can work on supplementation by producing fodder crops
A: We can scale this up and would need much more resources for that
A: Additionally – breeding of improved breeds, etc – we have other options in our pocket

Action plan Livestock



Action Plan on CCAA Measures

Adaptation measure	Activity	Responsible	Until	Where?	
1. ADVOCATE IMPLEMENTATION OF NRMPS	SENSITISING OF TA'S/FARMERS	DAPEES /NNFU	MARCH 2018	KARASBURG/ BERSEBA	Live-stock
2. CAPACITATE FARMERS ON NRMPS	TRAINING OF FARMERS/AT's	DAPEES	MARCH 2018	ADCS	
3. RANGELAND SEEDING	TRAINING & DEMO PLOTS ESTABLISHMENT	DAPEES/ DARD	AUGUST 2018	ADCS	
4. DEVELOPMENT OF IMPROVED BREEDS	SEEDING	DAPEES/ DARD	NOVEMBER 2018	DEMONSTRATION SITES	
5.	CAPACITATE, SELECTION, BREEDING & EXPANSION	DARD DAPEES	MARCH 2019	RESEARCH STATIONS	

Results Case 3

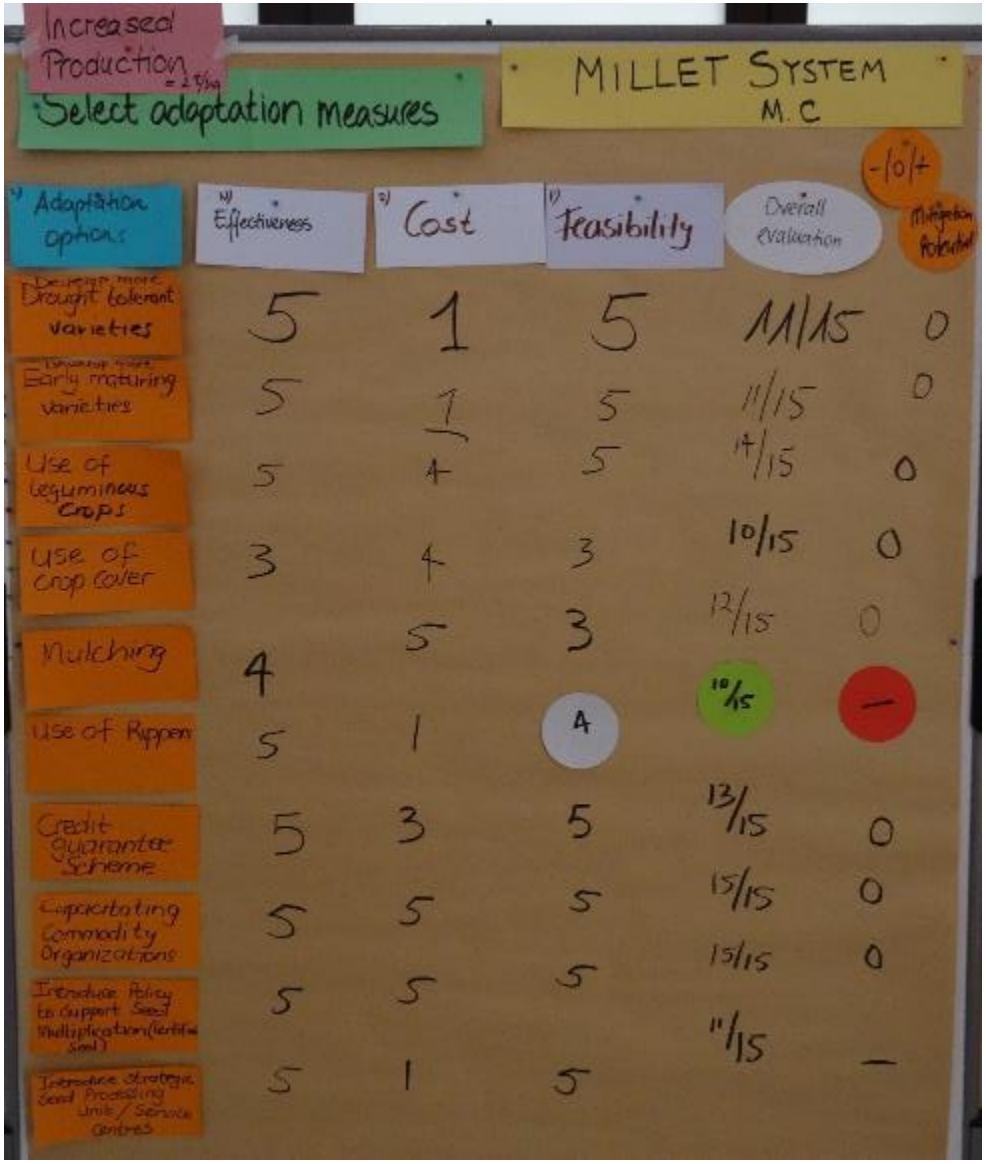
PEARL MILLET

Module A.1 – current situation
Case 3: Pearl millet

Module A.2 – future situation
Case 3: Pearl millet

Module B – Case 3: Pearl millet

Module C - Case 3: Pearl millet



Presentation of final adaptation measures
Case 3
Pearl millet

Adaptation measures for Pearl Millet System in North Central Namibia

Introduction

- Approximately 70% of the farmers in North Central Namibia depends on Pearl millet production
- The total population in North Central Regions (NCRs) is 847 259 of which 458 403 Female and 388 856 male
- The production of Pearl millet in North Central Namibia is currently low due to the following climate hazards:
  - Drought
  - Erratic rainfall
  - High temperature
  - Heavy rainfall in short period of time
  - Poor soil fertility

Developmental goal

- To increase Pearl millet production from 0.2 ton/ha to 1 ton/ha

Adaptation options

- Develop more drought tolerant and early maturing varieties
- Introduce service centres
  - Inputs
  - Services
  - Advisory

- 1. Develop more drought tolerant and early maturing varieties
- Current situation

Inadequate specialised human resources;
Lack of institutional capacity by seed cooperatives;
Inadequate funds/operational budget;
Lack of incentives to stimulate private sector in seed production;
Inadequate seed production equipment and machinery;
Inadequate institutional capacity (legal, regulatory and resources) for quality seed production;
Inadequate seed processing and storage facilities;
Harsh climatic conditions.

2. Service centres

current situation

- 1 service centre
- Limited capacity
- Infrastructure
- Human resource

Solution

- Build Additional 4 service centers
- Introduce organic/chemical fertilizers
- Capacity to multiply certified seed
- Advisory

- Avail different seed varieties of high quality and quantity to the farming community.
- Facilitate the generation of income by selling certified seed.
- Employment creation
- Improvement of household livelihoods
- Participation of more seed growers in the scheme

- **Financial Implications**
- The detailed budget breakdown is as follows:

Item Description	Quantity	Unit Cost (u$)	Total Cost (us$'000)
Production of pearl millet foundation seed on 60 ha in Omusati and Oshikoto Region (120 t/yr x N$10000/ton x 5yrs = N$ 6 000 000.00	60 ha x 2 t/ha x 5yrs = 600 t	10,000	6,000
Establishment of three irrigation systems	3	900,000	27,000
Construction of a full house processing plant	5	25,000,000	125,000
Tractors (80-90 KWA) with matching trailer, plough, planter, disc harrow, ripper, weeding cultivator, fertilizer applicator, and herbicide boom sprayer	3	945,000	2,835
Tractors (60-70 KWA) with matching trailer, plough, planter, disc harrow, ripper, weeding cultivator, fertilizer applicator, and herbicide boom sprayer	3	945,000	2,835
Develop of varieties		220,500	662

Q & A Final presentation
Pearl Millet

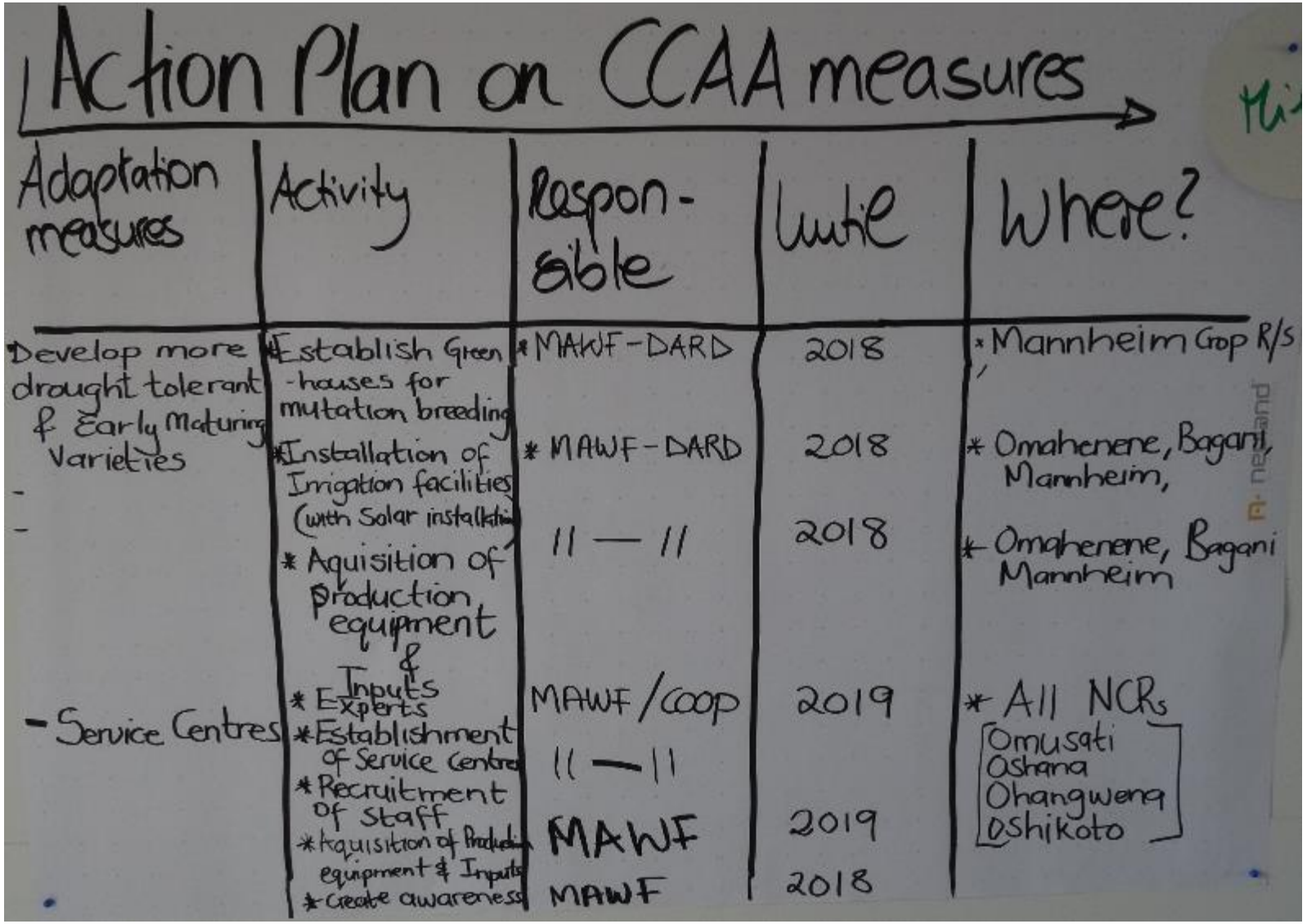
Q: Are the services centers private – what role are these centers taking? They are taking away the role of the extension service!
A: We want to encourage cooperatives with the help of government
A: These are in addition to the extension services – but the current ratio of extension to farmers is too small

Q: Are 4 centers enough? Do they make a difference? Maybe we need to expand this and make sure we provide the required services/inputs at the local level
A: Agreed, if there is money

Q: With millet seed, where is the biggest bottleneck? Do we have the varieties, or do we not produce enough seed, or is it the distribution?
A: All 3 of them are problematic

Q: Experience from other countries shows that there is also a role for agro-dealers, who are the producers/distributers of seed – this could also be an option here.
A: In Botswana, with the introduction of service centers our production has been increasing – farmers do not have to travel far for services/inputs, and also agro-dealers are being trained there and participate

Action plan Pearl millet



Action Plan on CCAA measures

Adaptation measures	Activity	Respon-sible	Until	Where?
*Develop more drought tolerant & Early Maturing Varieties	*Establish Green-houses for mutation breeding	* MAWF-DARD	2018	* Mannheim Crop R/s
	*Installation of Irrigation facilities (with Solar installation)	* MAWF-DARD	2018	* Omahenene, Bagani, Mannheim,
	* Aquisition of production equipment & Inputs	11 — 11	2018	* Omahenene, Bagani Mannheim
- Service Centres	* Experts	MAWF/COOP	2019	* All NCRs
	*Establishment of Service Centres	11 — 11		Omusati, Oshana, Ohangwena, Oshikoto
	* Recruitment of Staff	MAWF	2019	
	* Aquisition of Production equipment & Inputs			
	* Create awareness	MAWF	2018	

Reflections and lessons learnt by participants - Module A

- Define the linkage clearly between the system of interest and the development goal
- It was hard to define sensitivity
- One group struggled to do the risk ranking properly
- It was not so easy to link the sensitivity/current adaptive capacity and bio-physical impacts

- The stepwise approach helped to understand the system of interest
- When doing climate proofing in “real life“ you take the farmer’s perspective into account, too

Reflecting on the overall Climate Proofing approach by participants

- The systematic approach helped to understand the system of interest and its components
- The approach is implementable and close to the real work
- Helps to reflect and getting theory and practise together
- Good to work with real cases
- Climate Proofing makes planning much easier

- It was good to share cross-country ideas from Namibia and Botswana
- Vibrant and energetic group work
- Very participatory and active participation is required
- CP is a learner's centred approach

Presentation: Climate Smart Agriculture Overview by Sarah Beerhalter

Sarah Beerhalter, Programme Manager of the GIZ ACCRA program in Botswana, presented the new challenges for agriculture: **doubling the world food production** by 2050, make the sector more **resilient** towards CC and **mitigate** GHG. These targets are strived to be met by the Climate Smart Agriculture (**CSA**) approach. **CSA is an approach to help guide the management and transformation of agriculture for food security under the realities of climate change.**

CSA is not just about new technologies, it is combining **indigenous knowledge**, **common agricultural practices** and appropriate **new technological developments** for agriculture to increase sustainably production efficiency – to ensure food security for future generations.

The presenter further explained the **three pillars of CSA** and also gave examples of **climate-smart practices** in smallholder agricultural production (agroforestry, (post) harvest losses, indigenous varieties/breeds, integrated pest management and agricultural risk insurance).

She concluded her presentation with the appeal “There is uncertainty about the future extent of climate change events/impacts, but there is also sufficient information and knowledge to take action - now.”

Q&A

Q: Why is it called “Smart”?
A: It does not mean that the farmers not using CSA are not smart, but that it is a smart way to react and adapt to climate change.

Q: How to get investors and insurance companies to offer their services in areas where the risk of losses are very high (e.g. dry lands in which there might be several bad years in a row)?
A: The best solution from practice seems to be for private providers to “bundle services together”, such as providing cell phone network and a small agricultural insurance, and provide this service over a large share of the population and at a regional level (as the risk is spread over more people and land, the probability to incur into losses diminishes)

Q: When we talk about “small scale farmers”, do we focus on commercial or on communal, subsistence farmers?
A: Communal farmers often do not have access to these services nor to the capital to invest in an insurance, while commercial farmers most of the times do have it (as well as the property rights to guarantee the long-term return of their investment). We usually refers to subsistence farmers.

Q: What is the carbon footprint of CSA? Is it not higher when investing these resources into “smarter” production than the one incurred when producing with conventional practices?
A: No, because when obtaining a higher production by using resources in a more efficient way, we reduce overall resource consumption (and thus carbon footprint)

Resources invested in R&D projects are oftentimes mis-invested, either in the wrong field, or with the wrong setting –e.g. lack of follow up, not relevant to the local practices, etc.
Pests and diseases:

- They are a big problem in Namibia, and it is not addressed properly: there are not enough agrochemicals available, the price is not affordable, and not enough research is carried out.
- The investments in seed production and development are not enough; more labour and better planning are required if progress is to be made.

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

Ms. Beerhalter showed a map of **rates of land degradation** worldwide and a second map 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, leading 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.

Q&A

Q: If a farmer is dealing with fish and vegetables (and he takes water from the dam with fish in it to irrigate his plants, is this waste water?

A: No, only water coming out of municipal sewage is waste water. But sooner or later we need to use waste water. Irrigating with waste water (mixed with other water).

Q: The reuse of sewage water, is it usable for crops?

A: Yes, if it goes to a treatment plant. Nitrogen and phosphate is staying in the water, germs get removed. So this water can be used. It is a big advantage. But people have a reluctant perception is using waste water.

Q: Is it scientifically proven that after treatment of sewage water it has no negative effect for humans?

A: You can use it. As in the former generations, they use the leftovers from latrines (nowadays not allowed).

Examples: Sewage pumps outside Gaborone, gardens get irrigated (not allowed for root plants), but for maize etc. In Namibia, GIZ funds a project on treatment of sewage water.

Household waste water is going for treatment in Windhoek. NAMWater is one of the best water supply companies in the world.

Comment: Experience: shared water process. Countries got a bigger share of water, other only a small one on the same water source/rivers. Okavango, Kunene… This poses a big problem to get a fair share. Needs to be renegotiated.

A: setting up transboundary water commissions (Ex.: Orange River Commission)

Day 3 - overview

- The day started with a presentation of results and a feedback on Module A
- This was followed by an action learning input on the different **dimensions and levels of adaptation options**
- The participants went back in the three working groups to elaborate on **Module B: identifying adaptation options**
- Before starting the field visit, the whole group was subdivided in four groups and equipped with a question each to exploit during the excursion
- After lunch, the whole group started to their **excursion to** SCORE Project and CUVE Waters project sites, 30’ hrs drive from the training venue

Preparation of the excursion to 3 sites

The group was divided into four sub-groups. Each group was equipped with one question to be answered during the field visit.

Group 1: What are the climatic challenges?

Group 2: How do these challenges influence the system?

Group 3: What kind of adaptation measures did you observe?

Group 4: Where do you still see room for improvement?

Excursion to Omulathitu and Epyeshona village

- **Scaling up community resilience to climate variability and climate change in Northern Namibia, with a special focus on women and children (SCORE) Project site** in Omulathitu village: Micro-drip irrigation systems for community and individual gardens. All the beneficiaries received training on gardening and maintenance of these systems; mentorship is still provided by SCORE and the Extension Officers to ensure sustainability.

www.na.undp.org/content/namibia/en/home/operations/projects

- **CUVE Waters project sites**: in Epyeshona "Green Village" systems to collect rainwater from roof tops ("roof catchments") and on ground catchment. The water collected is used for gardening. In the "Green Village" Lipopo a floodwater storage system with gardening can be visited.

Cuve Water project site Information

Micro-drip irrigation system for an individual garden was set up in 2009 with the support of Kenyan and German support. The rain water is collected from the roofs of the homestead and discharged by an underground pipe into a ferrocement tank which captures ca. 30m^3.

With a treadle pump, the garden owner pumps water from this tank into a 1.000 l water tank on stilts. From the stilted tank, she waters her vegetable garden with drip irrigation. In the garden, she grows tomatoes, spinach, onions, cabbage for her own consumption and for sale at the surrounding markets and her neighbours. Unfortunately, the garden is not in operation for the time being due to following challenges (next slide).

Cuve Water project site 1 Challenges/measures

Challenges:

- The owner of the garden is an old lady and her work force is not sufficient to operate the treadle pump. The water from the 1.000 l tank lasts only one day for irrigation the whole surface, so that she would need to pump every day.

- Family members are having their own business so that they can not support her in pumping the water

- Also the rainfall in the region became more erratic (5-6 months of good rain, 3-5 months of low precipitation.

Further possible adaptation options:

- Train younger family members on how to operate the pump
- Introduce mulching to conserve more soil moisture and reduce water needs
- Introduce alternative technology to pump the water (e.g. solar panel, although costs are implicated).

Cuve Water project site 1
Impressions

CUVE project site 2 Information

The second site visited was the CUVE Waters project site in Epyeshona, the "Green Village" systems. CUVE installed a micro-drip irrigation system for a community garden. This site was established in 2015 by a Kenyan-German cooperation programme. 6 households (HH) were involved into the project to water a community garden. The infrastructure set up consists of a large concrete ground catchment for rain water which gets collected into an underground tank. From there, water gets pumped with a treadle pump ca. 200 m to the communal garden plots. The garden is drip irrigated. In 2011, a greenhouse has been erected on the plot.
Unfortunately, the garden is fallow since some time due to disputes within the user group. Another problem is the need of rainwater harvesting has been identified by the Namibian government and not by the user group itself.

http://www.cuvewaters.net

CUVE project site 2
Challenges/measures

Challenges:

- ❑ Dispute within the community about the management of the garden
- ❑ Lack of motivation

Measures:

- ❑ Allocate garden to one committed member of the community
- ❑ Meditation and conflict resolution by a third neutral party
- ❑ More support by Agricultural Extension Service officers

CUVE project site 2
Impressions

Score project site 1 Information

The third site visited was the Score project site in Omulathitu Village, Okatana Constituency. In this village Score equipped five individual garden owners with 1.000 l tanks and micro-drip irrigation kits. The source of the water is tap water.
The choice of people to participate in the programme was done by extension officers and traditional authorities. The garden owners were equipped with the necessary technology and seedlings in the first year.

Grown vegetables are butternut, sweet potatoes, spinach, maize. The two harvests per year are sold on the local markets and for own consumption. Crop rotation, mulching, crop cover and minimum tillage are practiced.

Score project site 2
Challenges/measures

Challenges:

- ❑ Use of (costly) fresh water from the tap
- ❑ No rain water harvesting
- ❑ Competing for the same local markets (the products get on the same local markets close to the village → prizes are not competitive)
- ❑ Problem with transport (transport costs are high and there is lack of transport vehicles)
- ❑ Post harvest losses (due to lack of appropriate storage capacity/cooling)
- ❑ Issues with pest (butternut) (spiders, caterpillars, termites)

Further possible adaptation options:

- ❑ Excavation of a rainwater catchment to collect and appropriate store rain water (and to cut costs of fresh water use)
- ❑ Training on Integrated Pest Control (to avoid pre-and post harvest losses)

Score project site 1
Impressions

Day 4 - overview

- The day was opened with a **recapitulation of the excursion** in plenary. Each of the four groups presented their main finding during the excursion.
- A presentation of the "**Importance of gender in CSA**" followed the recap of the field visit.
- The three thematic groups then worked through **Module C: Selecting adaptation measures**
- The day was closed with a presentation on "Prioritising CSA practices and technologies for agricultural value chains in SADC with Data"

Recapitulation of the excursion

The next morning after the field visit the participants brainstormed about the key take home from the field visit. These were:

1) What are the climatic challenges for the exposure unit?
2) How can the CC influence the system (positively/negatively)?
3) What kind of adaptation measures did you observe?
4) Where do you still see room for improvement?

Recapitulation of the excursion – Results of group work 1

1) What are the climatic challenges for the exposure unit?

1. Erratic rainfall resulting in vegetable garden to be idle.
 * Good year- 5-6 months
 * Bad year – 3-5 months
2. High temperature (quality, evaporation, pests & diseases)
3. Water harvesting technique – the size to catchment is small to ensure production throughout (site 1)
4. Pests and diseases infestation
5. No water harvesting technology for sustainability (SCORE projects)
6. Soil type: affected by wind erosion.

2) How can the CC influence the system (positively/negatively)?

→ No team work
→ No production/high chance of production
→ No responsibility
→ Lack of water/insufficience
→ Alternative use of water
→ High rainfall = better chance of water harvesting
→ Wastage of materials
→ Lack of awareness

3) What kind of adaptation measures did you observe?

1. Rain water harvesting
2. Use of drip irrigation systems
3. Use of shade nets
4. Ripping (minimum tillage)
5. Crop diversification
6. Capacity development (CC)?

4) Where do you still see room for improvement?

→ Use of solar panels
→ Sustainability (household food security)
→ Commitment, cooperation, change in mind-set (more apparent in community gardens)

Sites SCORE:

→ Water harvesting techniques (no regret)
→ Soil cover (conflict livestock feeds vs. Soil cover)
→ Risk of project collapse after project cycle ends –> capacity building
→ Markets availed (AMTA)
→ GAP (quality)
→ Future expansion (land) greenhouses
→ Involvement of more youth

Q&A - Recap excursion

Q 1: What are the CC of the exposure unit?
Size of catchment too small (first site). 2nd site: more on social problems.

Q2: misunderstood the questions (they→ the people in the system, not CC).
Alternative use of water: middle age people to pensioners. Issue of income, because you pay for the water. This influences the system negatively and individuals do not make a big profit.
Complement rainwater with tap water (when the tanks is empty). Labour intensive work on tread pump. For elderly not very adapted. Better use solar panels. You need to be in a team, also for the marketing of produce. No team work in the first site.

Q3: Also mulching as plant covers, crop rotation are adaptation measures. Interaction between livestock and crop. Feeding livestock.

Q4: drip irrigation is a no regret measure. Risks of projects collapsing after end of phase: lot of conflict in community gardens → moving more into individual gardens? Might be an approach, but it is not a guarantee. Individual HH is a homogeneous group, they work better together than heterogeneous group. Government has no resources to give subsidised gardening equipment to individuals (infrastructure etc.). We need to find a way on how to work with community groups. Mainstreaming donor support in the MAWF. Advocate for the donors to stay and working as partners. When NGO pulls off, there should be no gap afterwards. When you pull off you should continue with the resources. Vocational training for young people to be trained and sustain the projects. Exposure trips to visit successful projects. Identification of the problem of the farmer should be done at first to properly address their needs. Also bring people to a project hat has failed to prevent the people from doing the same mistakes. Sometimes donors says that e.g. harvesting water is not in their focus. Donors are often not open for adjustments. Constant information and motivation is needed. 2nd project: everything must work as a group, the whole plot is not subdivided to individuals, but it is still not working well. There should be a number of sites for individual HH. But will these other options work (looking at the 1st site)? Youth involvement: at least there was some of youth part of the project.

Presentation:
CSA and Gender by Dr. W. Foerch

The presenter gave background information to “gender and rural development”: **70%** of world‘s poor people live in rural areas in developing countries, generally depending on agriculture, women provide on average more than 40% of agricultural labor force (up to 50% in Sub-Sahara Africa), women generally **produce food** for (household) consumption, men are involved in wage labor and cash crops, women are often involved in unpaid or low paid labor and women and children are affected by migration of men. If women had the same access to productive resources as men, they could **increase yields on their farms by 20-30%.** This could raise the total agricultural output in developing countries by 2.5 – 4%, which could in turn reduce the number of hungry people by 12 – 17%.

The Global **Gender Gap Index** examines the gap between men and women in four fundamental categories:

a) economic participation and opportunity,
b) educational attainment,
c) health and survival
d) political empowerment

Wiebke presented a table on **CSA practices and gender considerations** and gave an overview of what is needed to empower women: capacity building, involvement of women in decision making processes, avoidance of additional burden, increase income of women and labour-saving climate smart technologies.

She finished her presentation with concluding that more equal gender relations within households and communities lead to better agricultural and development outcomes, including increases in farm productivity and improvements in family nutrition.

Q&A Gender

Q: Based on the observations from the excursion, one would say that groups perform worse than individuals (in this case women groups). This contrasts with the presentation.
A: In some countries women perform better when organized as a group than when acting alone; it depends on the social structure, power distribution, etc. As long as there is a strong common ground, groups can perform well. And being all women, with similar needs and interests, is usually a strong cohesion factor.

Q: How to link Youth and old age with CSA? What is the relationship between them? Why only focusing on women?
A: The key is to bear in mind the implications of CSA for all groups within the household, what are the trade-offs of adapting CSA. Key opportunities for youth and elderly need to be identified and fostered; this will contribute to the sustainability of the achieved results.

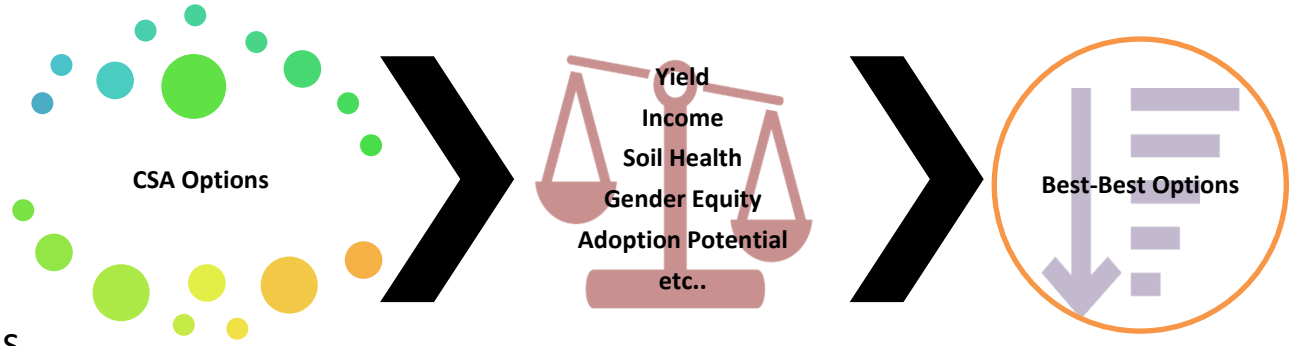
Mr Kalabo: a way to attract youth to work in agriculture would be to improve its economic performance. Youth are more "cash-oriented"; they need to be convinced that working on the farms can also produce economic benefits and be worth the effort; "white collar jobs" are not the only option. Youth could also be encouraged to use new technologies, as they are usually more attracted and opened to (and knowledgeable about) new technical solutions.
Extension services should be able to give advice to both men and women. Namibia's gender balanced extension services are an exception in Africa; in many countries, extension services are offered by men for men.

Q: The widespread lack of firewood increases the workload of women. How could biogas be mainstreamed? How to overcome the competition for organic residues between the biogas production, animal feed and soil organic fertilizer?
A: It is important to take into account and think thoroughly all of the elements of the CSA system (gender, technical, production-marketing chain, etc.) in order for it to work best.

Presentation: Prioritizing CSA options using Data by 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 choosen 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 distributed 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

- After the **opening of the day** participants went back to their working groups to **prepare their final presentations**
- Each group had about 15 minutes to **present and "defend" their chosen adaptation measures** in plenary
- They were asked to also explain again the **system of interest and the development goal(s)** the measures are aimed at, the audience asked **critical questions**
- Afterwards, each group drafted an **action plan** on the most feasible measures and the activities.
- The climate proofing part ended with **reflections and conclusions of the CP approach**
- Presentation: **Conservation agriculture: farmer adoption of new practices and technologies**
- Presentation of CCARDESA's Information, Communication, Knowledge & Management System
- The last step of the whole training was the **evaluation part** which was done by filling in of **questionnaires**
- **Ms. Johanna Andowa (Director of DARD) closed** the training by giving an **outlook of the roll-out** of the training on a country-basis and encouraged participants to approach GIZ/CCARDESA for (training) and support requests
- Finally, the **certificates and USB sticks** with photos and relevant documents were handed over to each participant

Presentation: Conservation agriculture: farmer adoption of new practices and technologies: evidence and lessons learnt by Dr. I. Nyagumbo

Dr. Isaiah Nyagumbo, researcher at the International Maize and Wheat Improvement Center (CIMMYT) in Harare, Zimbabwe, joined in with a presentation on Conservation Agriculture (CA). He explained that **CA reduces soil and land degradation**, helps to **adapt production** to CC, is more **water-, nutrient-, and energy-efficient** and **improves the productivity** of current farming systems. This was undermined with graphics of research results.

CA is defined by FAO as "A way of farming that conserves, improves and makes more efficient use of natural resources through integrated management of the available resources combined with external inputs". The three principles of CA are:

- **Reduced or minimal soil disturbance**
- **Provision of permanent soil cover**
- **Use of crop rotations or associations**

Some **challenges of CA** were also mentioned, amongst them residues, weeds, fertilizer, donor driven adoption and slow adoption/understanding of the CA issues. A **multi-agent** innovation system may be required for CA, brining together **various players** (innovative farmers, input suppliers, extension agents, researchers etc.). He then explained some **practical steps** on how to get started on CA.

The presentation finished with some **reflexions and recommendations** on CA.

Q&A

Q: For every 1t/ha of grain you get almost the equivalent in biomass yield, but the challenges are the low yields. In the early years we will not take fodder from the system, since our productivity is too low, the stover will stay in the field.

A: Good agronomy is key in addition to CA – the yield benefits will be more significant

Q: One of the practices used in Namibia it was doing well, but when we had water logging, the seedlings of maize/millet got submerged. Seedlings can take that for only some time, how would you deal with it?

A: When you are planting in furrows it is problematic. We are then working in systems with raised beds to put the crop on top of the ridge rather than into the hole. But this depends very much on your soils.

Q: Ripping is not CA, it is just a water smart practice. It is good to add additional practices. If your rainfalls are above normal you can have flooding, this is difficult. But it is key to embrace all aspects of CA not only one of them. The aim is minimum tillage and where appropriate even to move to zero tillage

A: Yes, if you are just ripping without soil cover and cover crops, then it is not CA (though it might be CSA) – this has proven to be helpful in some situations, but it is not CA.

A: Compaction of the soil is an issue, as it supports runoff . So breaking this compacted soil is a good idea, but this is not necessary every year

Q: How do you deal with termites?

A: Biological control or chemicals. There was only one effective chemical (Fipronil etc.), a lot did not work. We need to do local testing to see what is most effective. But local measures seem to be mostly ineffective. Challenges remain and adoption continues to be low – many other factors determine adoption.

Q: What are the key drivers and what deters farmers?

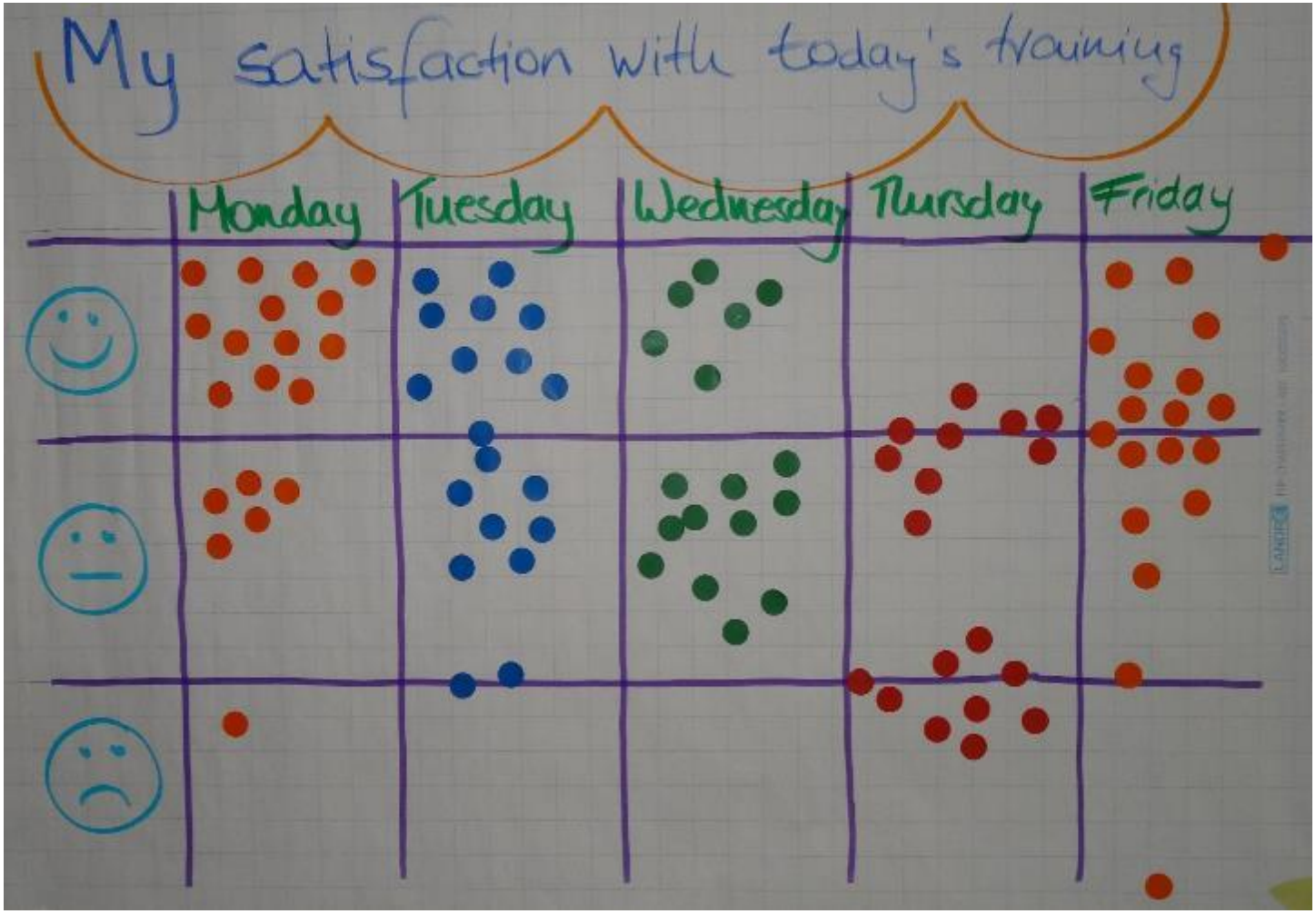
A: Yield increases and labour decreases are good incentives. Some countries have done well, e.g. Malawi, because they use ridges and it is a huge labour reduction, especially with herbicide use. Local factors and existing system matters a lot, which crop is being produced matters, how much pressure there is from livestock matters, etc. market drivers matter

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

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

Daily evaluation



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

- Partly met expectations – new methods to adapt to climate change
- No mobile phones in the next training!
- Learn more CSA approaches, how to deal with CSA – yes, my expectations were met
- CCAA knowledge gained – yes, I learned a lot
- Adaptation options for Namibia, exposure – yes
- CCAA knowledge – yes, I got that, especially when we went to the field – also to see the challenges in the field, that there are missing things
- More CCAA knowledge – yes, new knowledge, I enjoyed the group work where we exchanged a lot of information, a lot of which was new – exposure showed that we also need to know how to get the needs from the farmers, not imposed things – learn from the past and don't ask to just try to implement your own ideas
    - There should also be respect for other people, even if we have done some things wrong
- Learn about cc effects – achieved
- Knowledge on CCAA – achieved, I learnt a lot through teamwork – I did not know much about CSA but I learnt a lot and will try to implement. I want to keep acquiring more knowledge
- Learning on CCAA coping strategies – especially the field exposure and group work I learned, any measure needs to be done with the farmers not for them
- Learn about CSA and CCAA approaches – yes I got a lot out

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

- Learn about Namibia situation – I learned a lot, made new contacts, teamwork is key – and it is there within this team, I like that. They should also grow the farmers and especially the young farmers and young extension agents –
- Learn more about CSA – in terms of CA there was some new knowledge, I am grateful to Isaiah, also about CSA and the trade offs, putting everything together, I got a good idea about CSA
- Supplement my knowledge – yes, it has happened, I had some experience with this already through workshops and seminars – CSA is new and that has helped me to supplement my knowledge
- Mitigation and understand CCAA– I met the expectations, especially in the group work – there was a nice flow and I get to understand the components. I am in a better position to include CSA in our existing extension messages – but we also need to update our extension messages moving forward
- Approaches for adaptation – through group work and presentations we received a lot of information and learned from each other. I learned a lot
- New approaches – yes, we learned about planning approaches and my expectations are highly met
- Learn about coping mechanisms – when we were at university long time ago we did not learn about climate change – I am happy that I got what I expected

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

- I was ambitious, I did not expect it to be fully met, being able to put CSA CAA policies into action for efficient resource utilisation in the extension system. I have seen what works, we probably got 75%. Certain policies still need to be reviewed, some advocacy for implementation of policies is needed (we have some good ones), as only few have seen these policies, let alone promote their implementation – it was a good learning experience and I am happy
- I expected to get a better understanding of CSA, everyone is talking about it, and what is embedded in that term. I think I got to know the concepts, we can now say where we are already on the way with our approaches. What was very interesting, when it came to adaptation options, the issues of synergies and trade-offs and that we need to use the data – for me that was interesting! What options we have based on evidence
    - I was one of the cell phone culprits. You travel with your office, unfortunately. Sorry for that, but for some of us there was no choice, unfortunately.
- I learned a lot, especially on the CP tool. It will be useful for my work and I look forward to learn more and work with it
- Understanding of CSA for Namibia – yes, it was met
- I wanted to learn with and from you about CSA in Namibia – my expectation has been met, especially in the groups

Final feedback round on how far the expectations of the *trainers* were met

- Learning and working together in a relaxed atmosphere. Happy everyone was always punctual, thank you. Not so happy standing in front and having to raise my voice since people talk on the sides. It has given me a tough time. Going out with cell phones is ok, but I saw a lot of people watching videos. It is not fair to the trainings, since it is a huge effort to prepare and implement these trainings. It is a matter of respect – both ways. It is a tough job, short time preparations, I would like to get a hand now and then. But I saw you working very well in the groups and it was great. Next time, please respect the person in front and one day you might be in that situation, imagine how you would feel. Bear it in mind please. It helps for a relaxed and enjoyable workshop atmosphere.

Closing remarks by Johanna Andowa, Director of Directorate of Agricultural Research and Development

"The SADC Region is extremely vulnerable to the impacts of climate change. The SADC Climate Change Strategy and Action Plan sates that about 70% of the region' population depends on agriculture for food, income and employment. Therefore the regional agricultural policy also focuses on climate change adaptation in agriculture. As a result SADC the goal of increasing the resilience of the Region to Climate Change and the ACCRA programme is designed to support this objective. This programme operates within two areas: Regional Knowledge Dissemination on Climate Smart Agriculture and Climate Proofing of Agricultural Value Chains. It is in line with the above objective that SADC has mandated CCARDESA to implement the ACCRA programme jointly with GIZ and hence this course. I learnt that the main objective of this training course is to develop capacities to better address the effects of climate change in the agriculture sector. Some of topics covered include overview of the challenges posed by climate change to agriculture (both crop and livestock).

The training which targeted managers and supervisors of field staff from agricultural extension and research came at the right time as Namibia experiences the effects of climate change and to need to embark upon technologies to adapt and mitigate climate change. One such approach is Climate smart agriculture.

The importance of this course cannot be overemphasized as demonstrated by presence of Directors of DARD and DAPEES together with our respective Deputy Directors and Heads of Subdivisions.

Many of us have a lot of expectations, amongst them:

- Learn about CCAA Smart Agriculture
- Practical knowledge and skills in the implementation of CAA in rural areas
- Understand and implement concepts of CCA
- Learn approaches to CCA and CSAC
- Learn Mechanism /strategies or approaches to cope (adapt) to climate change

I am convinced that most of our expectations have been met during the course of the week as we learnt new concepts, we put them into practice during the visit to selected projects to experience firsthand the meaning of these concepts such as resilience, climate change adaptation and mitigation. As the training has come to an end, we are now the drivers of CSA. I therefore urge you not to keep the knowledge and skills gained during this training course to your yourself but become ToTs of this new approach, be leaders and be in the forefront in putting into practice of the new approach. Allow me at this juncture let convey my sincere gratitude and appreciation behalf of the Ministry of Agriculture, Water and Forestry to CCARDESA and GIZ for organizing this training course in Namibia."

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/