Àppendix 1
Climate Smart Agriculture Principle and Practice

Climate Smart Agriculture

Concept, Principles and Practices
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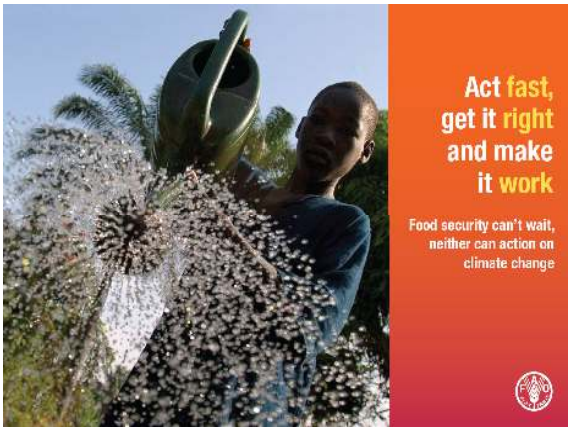


Climate Smart Agriculture: The Challenge

- To address simultaneously three intertwined challenges:
  - Ensure food security through increased productivity & income
  - Adapt to climate change
  - Contribute to climate change mitigation

Climate Smart Agriculture: The Challenge

- To address these three intertwined challenge:
  - Food systems have to become, at the same time, more efficient and resilient, at every scale
  - They have to become more efficient in resource use
    - ✓ Use less land, water, and inputs to produce more food sustainably
  - Become more resilient to climate change and variability shocks

Climate Smart Agriculture: Defining the Concept

- CSA is defined by its intended outcomes, rather than specific farming practices
  - The agricultural technologies and practices that constitute a CSA approach are, in most cases, not new, and largely coincide with those of sustainable agriculture and sustainable intensification.
  - Under a CSA approach, these are evaluated for their capacity:
    - ✓ To generate increases in productivity, resilience and mitigation for specific locations, given the expected impacts of climate change.

Climate Smart Agriculture: Defining the Concept

- It integrates the three dimensions of sustainable development
  - Economic
  - Social
  - Environmental
  - by jointly addressing food security and climate challenges.
- It is composed of three main pillars:
  - Sustainable increase in agric productivity & incomes
  - Adapting and building resilience to climate change
  - Reducing and/or removing GHG emissions, where possible.

Climate Smart Agriculture - Ambition

- Although CSA aims for all three objectives, that does not mean all three can be achieved in every case.
  - In every CSA intervention, it is necessary to consider each of the three objectives
    - ✓ at both the local scale and the global scale
    - ✓ In both the long term and the short term.
  - But in each location and situation, you will need to weigh up the relative importance of each objective.

Climate Smart Agriculture - Ambition

- With some climate-smart interventions, there are unavoidable trade-offs between the three objectives.
  - For example, smallholders shifting to a new farming system might have to trade off short-term productivity against a long-term improvement in both productivity and resilience.
- The best solutions are those that achieve synergy between two or more objectives.
  - For example, an investment in long-term resilience through crop diversification and improved access to markets might also increase farm incomes in the short term and, at the same time, reduce emissions.

Climate Smart Agriculture: Approach

- CSA is an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security under climate change.
- The CSA approach is designed to identify and operationalize sustainable agricultural development within the explicit parameters of climate change.

Climate Smart Agriculture – the Approach

- CSA is not a single specific agricultural technology or practice that can be universally applied
  - It is an approach that requires site-specific assessments to identify suitable agricultural production technologies and practices.

Towards Climate Smart Agriculture – The Transition

- Transitioning to climate-smart agriculture requires a transformational architecture of a systematic shift away from business as usual and a comprehensive program for building the adaptive capacity of physical, socio-economic, human and institutional dimensions of farming systems.
- The threat of extreme climatic events devastating farms and destroying productive potential is a wake-up call for Lesotho to look at agriculture through a new lens

Climate Smart Agriculture – New Messages

- Agriculture is long overdue for a radical transformation to increase productivity sustainably.
  - Although new approaches are now needed, productivity should remain the overachieving objective for Climate-Smart Agriculture

Climate Smart Agriculture – New Messages

- Farmers urgently need access to productivity-enhancing technologies and practices such as improved soil, water and rangeland management, high yielding and adaptable crop varieties and livestock breeds, nutrient-enhancing inputs, and appropriate mechanization.

Climate Smart Agriculture – New Messages

- Fundamental changes and investments are required to build adaptive capacity of physical, socio-economic, human and institutional dimensions of farming systems

Climate Smart Agriculture – New Messages

- Key areas for investment include innovative finance, partnership-focused research and extension services, timely information services, early warning and other risk-mitigation measures, and a new generation of service-oriented farmer organizations

Climate Smart Agriculture – New Messages

- Driving the transition to CSA requires coordinated, large-scale and long-term efforts by multiple stakeholders.

Key CSA Priorities for Farmers: Improving access to productivity-enhancing technologies and practices

- CSA Issues
  - Improved soil, water and rangeland management
  - Use of high-yielding and adaptable crop varieties and livestock breeds
  - Nutrient enhancement
  - Appropriate mechanization
  - Improved crop and animal husbandry

Key CSA Priorities for Farmers: Improving access to productivity-enhancing technologies

- **Key CSA Issues**
  - Moisture stress is a key constraint n crop performance, and climate change is worsening this hazard
  - Farmers urgently need high-yielding varieties that are tolerant to drought and retain important nutritional, taste and storage qualities despite elevated carbon dioxide and temperature levels.
  - Practices that improve soil health and water management to conserve available moisture are also crucial responses to the climate challenge.

Climate Smart Agriculture in Practice

- Responding to climate change does not mean throwing out everything we have learned about agriculture and rural development, or having to re-invent entirely new solutions.
  - In fact, CSA shares the objectives and guiding principles of well-known approaches to agriculture such as
    - ✓ Sustainable intensification
    - ✓ Ecosystem management
    - ✓ Landscape management
    - ✓ Conservation agriculture
    - ✓ Agro-ecology, eco-efficiency, and green economy
  - However, CSA builds on these approaches by addressing wider challenges with a clearer focus on climate risks and food security.

Climate Smart Agriculture in Practice

- Climate-smart approaches entail a greater investment in:
  - Managing climate risks e.g. by investing in land management that decreases flood and erosion risks, or in financial services that help farmers recover from weather shocks
  - Understanding and planning for adaptive change e.g. by providing extension services to support smallholders change from one farming system or livelihood to another
  - Reducing or removing GHG emissions wherever possible– e.g. by raising finance to support and reward low-emission agricultural development strategies

Climate Smart Agriculture in Practice

- CSA is a holistic concept that brings together a number of agricultural development objectives, as well as other global development objectives, covering environmental, social and economic issues.
- CSA talks to a particular set of farming practices, an approach to doing agriculture differently, but it is not just about those practices – it is about much more: in particular and very importantly, it is about the process of transforming the support environment for farmers.
- CSA is those practices, technologies, tools, policies, partnerships and support services required by farmers to sustainably increase productivity, improve the resilience of their production systems, and reduce emissions.

Climate Smart Agriculture in Practice

- So we can think of CSA as a process
  - We know that we must do something different from what we have done in the past.
  - While we have some insights and good examples of success,
    - ✓ new scientific approaches and insights are needed to provide further guidance to policy makers and farmers.
- So CSA informs decisions and practices both on-farm and beyond the farm – in research, technology, policy making and finance.

Climate Smart Agriculture in Practice

- CSA highlights the need to coordinate activities between stakeholders and institutions that might not have a history of working together.
  - Successful interventions require a unified collaborative effort with strong links and information flows between:
    - ✓ The private sector (farmers adapting to new practices)
    - ✓ The financial sector (credit for investment in new practices)
    - ✓ Government (policies on rural credit, subsidies and incentives, input and output pricing, tenure, extension and safety-net programs)
    - ✓ Research and extension (locally-relevant information on climate change, new technologies and adaptation options)
- Thus, CSA involves bringing farmers, scientists, policy makers and others together in a sustained process to identify and refine fruitful actions, with confidence that these integrated efforts will be productive over time.

Climate Smart Agriculture: Technologies and Practices

- The most valuable CSA approaches are those that can demonstrate multiple benefits among the three main CSA objectives
- These projects are likely to attract the most development assistance and international public finance for scaling up.

Climate Smart Agriculture: Technologies and Practices

- Over the last few decades, a number of approaches have been developed and tested, and are found to deliver multiple benefits. These approaches generally have the following things in common:
  - They make maximum use of natural processes and ecosystems
  - They reduce the use of external inorganic inputs
  - They enhance diversity of production
  - They match production intensity to the capacity of the landscape
  - They use a mix of traditional and new technologies

The Impacts and Benefits of these approaches

Approach	Primary Impact	Multiple Benefits
Maximum use of natural Processes and ecosystems	Maintained and enhanced groundcover	➢ Yields ➢ Profit ➢ Climate resilience ➢ Emissions reduction ➢ Local pollution reduction ➢ Poverty reduction
Less external inorganic Inputs and waste	Healthy soil tha tcan retain nutrients and moisture	
Diversity and proportionality of production	Enhanced biodiversity	
Mixture of traditional & new technologies	Multi-seasonal In-situ water storage	

The Tried & Tested Practices

- Terracing: prevents soil loss through erosion and water flooding, and thereby loss of soluble nutrients, while allowing water retention.
- Minimum or zero tillage, coupled with crop rotation and the application of manure, compost or mulching, and the fallow system can improve soil structure and fertility and build up organic matter in the soil and its water-holding capacity.
- Adding manure to the soil supports a mixed system of livestock/crop production that diversifies risk across different products.
  - This also requires a system of crop rotation– production of both food crops and fodder crops – which reduces risk at the farm level and often improves family nutrition.

The Tried & Tested Practices

- Agroforestry is another integrated system that combines trees with agricultural crops and/or livestock.
  - The trees can be a source of income, timber, firewood or fodder depending on the species.
    - ✓ They can also serve to improve soil quality through nitrogen fixation (if they are legumes) and capture nutrients from deep in the soil (making them available through leaf litter), in addition to creating a more favourable microclimate.
- Better management of grazing land can increase soil carbon content and productivity.
  - Rotational grazing, or a combination of grazing and stall feeding with fodder crops, can result in increased productivity in the livestock sector, combined with a buildup of carbon stock in the rangelands.

Key CSA Priorities for Farmers: Improving access to productivity-enhancing technologies

- Appropriate mechanization of production systems to improve efficiency and reduce drudgery has is a pipe dream for the majority of farmers
  - The hand-hoe remains the most dominant tool across despite rapid technological advances almost every other sector
  - The intense manual labour associated with farming and its limited commercial orientation have no doubt earned the sector negative perceptions, especially among youth.

Key CSA Priorities for Farmers

- Prospects of a transition to climate-smart agriculture are bleak without significant improvements in access to labour-saving and productivity-enhancing innovations in agricultural production systems.
- Although raising productivity alone is not sufficient to support CSA in the long term, it is low-hanging fruit and will go a long way in delivering immediate and substantial socio-economic and environmental benefits that are necessary for building a resilient agricultural system.
- A series of complementary support systems are required, however, to build and sustain CSA.

Key CSA Priorities for Farmers

Key CSA Priorities for Farmers: Transforming farmer support services

- Adoption of CSA at scale will rely on well functioning farmer support services in areas such as:
  - Research and extension
  - Information exchange
  - Financing and insurance
  - Market access
  - Capacity building and farmer organization.
- Numerous initiatives spearheaded by different stakeholders are currently being implemented with varying levels of success.
  - Significant innovation is required in providing such support functions if they are to drive a climate-smart revolution.

Key CSA Priorities for Farmers: Transforming farmer support services

- **Reorienting research services**
  - The gap between research priorities and farmers' needs will have to be narrowed considerably if CSA is to take off on the continent.
  - Action research and farmer managed research trials must become the norm rather than the exception in agricultural research.
  - Co-creation of knowledge with farmers should be a top priority, moving away from traditional top-down models of disseminating information that farmers had no role in generating.

Key CSA Priorities for Farmers: Transforming farmer support services

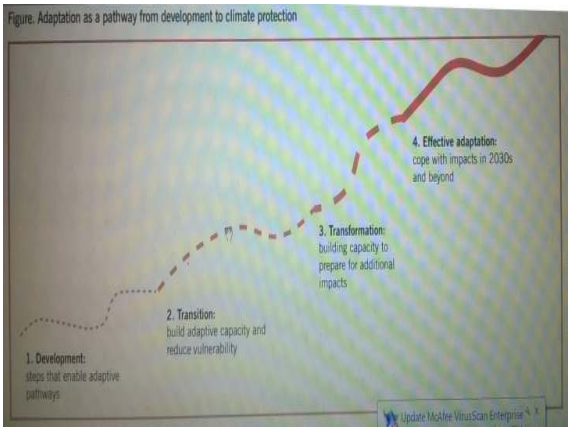
- **Re-orienting Extension /Advisory Services**
  - State-led extension approaches have largely failed across the continent, with catastrophic consequences for farmers.
    - ✓ Inadequate budgets,
    - ✓ A lack of sufficiently motivated personnel in required numbers
    - ✓ A lack of depth in technical practical matters

Key CSA Priorities for Farmers: Transforming farmer support services

- **Reorienting Extension /Advisory Services**
  - Some of the weaknesses that have contributed to an ineffectual extension system.
  - A large majority of farmers have not had any meaningful contact with extension-services
  - Traditional agronomic practices are still the norm in smallholder systems with little input from scientific and technological advances in the sector.
- The scale of challenges brought by climate change requires that these shortcomings be confronted head-on.
  - Innovative and more cost-effective extension models
  - These new models should facilitate greater involvement of the private sector, farmers' organizations and farmer-to-farmer exchanges.

Key CSA Priorities for Farmers: Transforming farmer support services

- **Information systems, early warning & other risk mitigation measures**
  - Geographical and infrastructural limitations present major challenges in the development of efficient and cost-effective information systems for supporting farmers
    - ✓ However, the explosion of cellular technology into rural communities a game changer in recent efforts to develop next-generation platforms for connecting farmers with information and financial services.
  - The full potential brought ICTs need to be fully exploited to improve access to a range of information services, including weather-related data and warnings.



Issues in Community Based Adaptation Planning

Planning Parameters	Aspects of the Issues
Local Capacity	Participation Nature of Resource Base Degree of Communal Cohesion Local Governance
Economic Factors	Nature of Resource Base Markets
Management	Local Governance Adaptive Management Planning and Planning Process Vertical and Horizontal Integration Learning and Diffusion

Issues in Community Based Adaptation Planning

Planning Parameters	Aspects of the Issues
Politics and Policy	Tenure (Rights of access, Degrees of rights) Framework (Policy, Legislation, Institutions)
Resource base	Nature of Resource Base Competing Land Uses Conservation Adaptive Management

Issues in Community Based Adaptation Planning

Planning Issues	Aspects of the Issues
Outsiders	External Inputs (Funding, Technical Support, Training) Planning and Planning Process
Cross cutting issues	Participation Incentives
Stand alone issues	Community Conservation Protected Areas

Resources Affecting Adaptive Capacity

Human Resources	Knowledge of climate risks, conservation agriculture skills, good health to enable labour
Social Resources	Women's savings and loans groups, farmer-based organizations, traditional welfare and social support institutions
Physical Resources	Irrigation infrastructure, seed and grain storage facilities
Natural Resources	Reliable water sources, productive land, vegetation and trees
Financial Resources	Micro-insurance, possible diversified income sources

Planning Factors that influence vulnerability to climate change

Institutional Factors	➢ **Informal skills local knowledge formal education** ➢ **Skills and technology** ➢ **Informal networks** ➢ **Formal security networks** ➢ **Strength of local institutions**
Economic Factors	➢ Labour ➢ Health ➢ Access to natural resources ➢ Access to communal natural resources- in particular biodiversity ➢ Access to alternative economic opportunities
Environmental Factors	➢ Risky environments ➢ Degraded environments ➢ High dependence on climate-sensitive sectors ➢ Natural resources ➢ Communal lands and resources

Adaptive Capacity Indicators

- **Asset Base**
  - The various financial, physical, natural, social, political and human capitals necessary to best prepare a system to respond to a changing climate.
  - This category incorporates the importance of various capitals, often informal, non-monetary and reliant on various social networks.

Adaptive Capacity Indicators

- **Institutions and Entitlements**
  - The ability of system to ensure equitable access and entitlement to key resources and assets is a fundamental characteristic of adaptive capacity.
  - Given that entitlements to key resources needed to adapt can be differentiated along age, ethnicity, class, religion and gender (to name but a few), an institutional environment that allows equitable opportunities to all groups, particularly the marginal, and most vulnerable to the impacts of climate change is essential to building the capacity to adapt.
  - Representation and participation in key institutions is also emphasized to enable equitable distribution of resources
  - Access to key resources, participation in the decision-making process, and empowerment are key elements of the characteristic.

Adaptive Capacity Indicators

- **Knowledge and information**
  - Successful adaptation requires information and understanding of future change, knowledge around adaptation options, the ability to assess them, and the capacity to implement the most suitable interventions.
  - In the context of climate change it is important to ensure that systems are in place to distribute relevant information at both community and scales.
  - In addition, forums for dialogue and discussion amongst all stakeholders must be made available.

Adaptive Capacity Indicators

- **Innovation**
  - A key characteristic of adaptive capacity relates to the system's ability to support innovation and risk taking.
  - Innovation can be
    - ✓ Planned, high-tech orientated, and geared towards large scale innovations;
    - ✓ Autonomous, local-level initiatives that help innovate or adapt to changes to the local climate.
  - An enabling environment that promotes and allows for experimentation and the exploration of niche solutions is required to take advantage of new opportunities and to confront challenges presented by climate change.
  - The environment also needs to protect against risks of failure associated with innovation

Adaptive Capacity Indicators

- **Governance**
  - Informed decision-making, transparency, and prioritization each form key elements of adaptive capacity.
  - Ensuring that local organizations are informed on future climate impacts and take appropriate measures to plan for the future.
  - Similarly, flexibility to allow for systems, and the institutions that govern them, to evolve and adapt to a changing environment is a crucial characteristic of adaptive capacity.

Community Based Adaptation – Context of Your Project

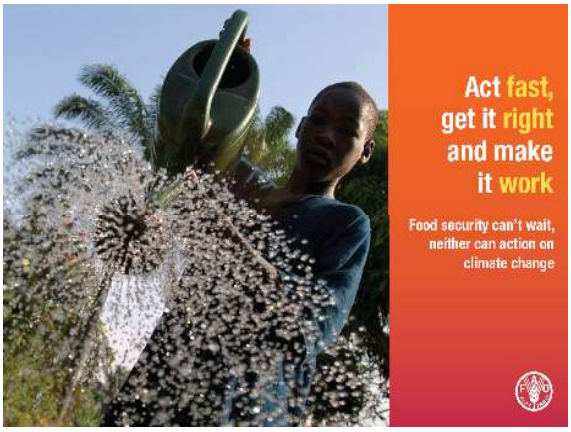
- Test the efficacy of the Local Options for Communities to Adapt and Technologies to Enhance Capacity (LOCATE) methodology
- Develop a tried and tested methodology for setting baselines, monitoring and evaluating changes in climate adaptation capacity
- Reduce the vulnerability and enhance the capacity to adapt to climate change of particularly vulnerable communities in the three districts

Community Based Adaptation – Context of Your Project

- Develop the capacity of relevant stakeholders to mainstream climate change adaptation into plans and activities through knowledge exchanges and information provision
- Strengthen existing networks to enhance understanding of the climate adaptation needs of vulnerable communities
- Enlarge the body of knowledge and information on vulnerability and adaptation.
  - The project demonstrates a practice where communities drive with research and poverty-reduction given equal footing to CCA
  - Capacity building and support is being given to NGOs and communities through training to facilitate integration of climate change into their plans and activities.
  - The intermediary NGOs work with, and support the implementation of community level activities geared towards climate change adaptation.

Concluding Points

- Create space for a direct and practical involvement of communities in conservation and rural development initiatives
- The devolution of power from central government to communities recognized by policy and law
- The establishment of mechanisms to ensure the provision of tangible benefits for communities from conservation initiatives
- Capability of replication and diversification to other sectors beyond wildlife



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