KP22
Knowledge Product 22

CCARDESA
Centre for Coordination of Agricultural Research and Development for Southern Africa

OPTIONS PAPER:

Options for Improving Adoption of Climate Smart Agriculture

CLIMATE SMART AGRICULTURE
KNOWLEDGE PRODUCTS FOR EXTENSION WORKERS
Customised Information Tool for Agricultural Professionals

Audience: Directors of Research, Directors of Extension, Heads of NARS and National Level Extension Staff

Options Paper | Gender | Youth | Climate Smart | Technology | Practice

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BACKGROUND

A lot is said about adoption, but very often, little is understood. This **Options Paper** is a response to extensive discussion that was triggered by a post on the CCARDESA D-Groups discussion group during the 4th Global Conference on Climate Smart Agriculture in November 2017 and subsequent discussions lasting until today.

The post highlighted some possible reasons why adoption of CSA has been limited across SADC member states and asked the following question: **what could be the reasons for low adoption of technologies?** The ensuing discussion highlighted the importance of this issue for researchers and extension staff across the region.

This paper aims to outline some of the options available to CSA programme designers and decision makers on how to maximise the adoption of CSA practices/technologies in their target areas.

CURRENT SITUATION

Ensuring agriculture becomes **climate smart** is a priority for addressing the need for adequate, nutritionally balanced food for a growing and more demanding population in a situation of resource limitations and climate change and variability. Agriculture is an adaptation priority in all Nationally Determined Contributions (NDCs) across 16 SADC Member States and a mitigation priority in 8 Member States. Despite the recognised importance of **Climate Smart Agriculture (CSA)** by a range of national and international initiatives, the dissemination and uptake of climate smart technologies, tools, and practices by male and female farmers across the region is still a challenging process (GACSA, 2016).

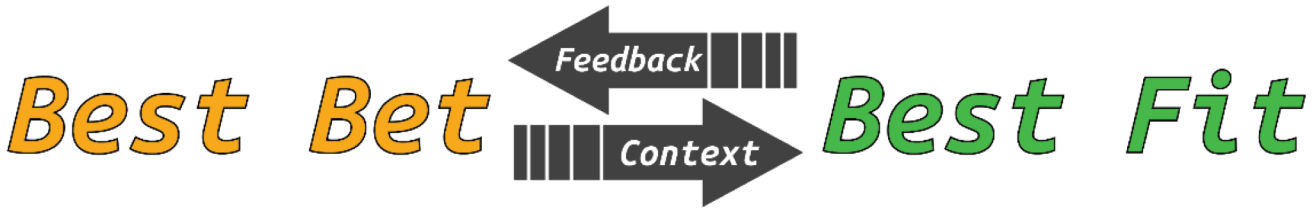
CSA is not just a simple set of practices/technologies that can be easily replicated in every context. Farming systems are **complex systems that must be understood** in connection with their climate, weather, the farmers' own socioeconomic context and gender dynamics. This understanding is needed to move from the, often unsuccessful, promotion of **best bet** practices/technologies to **best fit** practices/technologies that meet female and male farmers' individual priorities.

Key Messages:

1. If adoption of Climate Smart Agriculture (CSA) is to go to scale, systematic approaches are required. This includes:
   a. Political leadership & commitment
   b. Use of CSA prioritisation tools to select best bet areas for interventions
   c. Use of subsidies/incentives to promote large-scale adoption
   d. A systematic extension approach that places climate/weather information and farmers' priorities at the heart of the decision-making process
2. As with CSA practices/technologies themselves, there is no one-size-fits-all when it comes to adoption
3. Scaling up CSA requires definitions of adoption, and measurement of baselines so that progress can be accurately monitored.

Political will is crucial if widespread adoption of CSA is to be achieved, through supporting and coordinating the many stakeholders involved. It can assist in channelling resources to where they are most likely to achieve results under all three pillars of CSA:

1. Increased productivity and food security
2. Greater resilience/adaptation
3. Reduced emissions of greenhouse gases, and mitigation.



WHAT IS CLIMATE SMART AGRICULTURE (CSA)?

CSA comprises three interlinked pillars, which need to be addressed to achieve the overall goals of food security and sustainable development:

1. **Productivity:** Sustainably increase productivity and incomes from agriculture, without negative impacts on the environment
2. **Adaptation/Resilience:** Reduce exposure of farmers to short-term risks, while building capacity to adapt and prosper in the face of shocks and longer-term stresses (resilience). Attention is given to protecting ecosystem services, maintaining productivity and our ability to adapt to climate changes
3. **Mitigation:** Wherever and whenever possible, CSA should help to reduce and/or remove greenhouse gas (GHG) emissions. This implies that we reduce emissions for each unit of agricultural product (e.g., through decreasing use of fossil fuel, improving agricultural productivity and increasing vegetation cover).

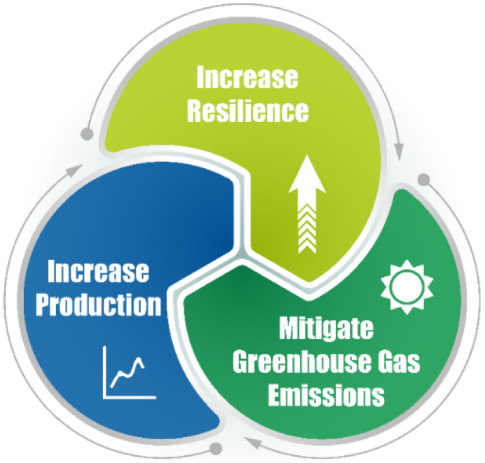
CSA = Sustainable Agriculture + Resilience – Emissions.

How is CSA Different?

1. CSA places greater emphasis on **hazard and vulnerability assessments** and **emphasises weather forecasting** (short term) and **climate scenario modelling** (long term) in the decision-making process for new agricultural interventions
2. SA promotes the **scaling up of approaches** that achieve **triple wins** (increase **production**, increase **resilience** and [if possible] **mitigate GHG emissions**), while at the same time **reducing poverty** and **enhancing ecosystem services**
3. CSA promotes a systematic approach to:
   a. Identifying **best bet** opportunities for agricultural investment
   b. Contextualising **best bet** options to make them **best fit** their specific context through learning and feedback loops
   c. Ensuring the **enabling environment** is in place so that farmers (and other stakeholders) can invest in CSA practices and technologies to catalyse adoption.

Entry Points for CSA

- CSA practices and technologies
- CSA systems approaches
- Enabling environments for CSA.



Relevant knowledge is widely available, and CSA provides a significant opportunity to make the science, that is still confined within the boundaries of scientific literature, move into operational action. It also embeds high-value traditional agriculture skills and tools – easily recognised and accepted by farmers.

BEST BET OPTIONS FOR SCALING UP CSA ADOPTION IN THE SADC REGION

There is plenty of literature available discussing the reasons for limited adoption of CSA practices/technologies. What is common across all of them is the fact that each context is different, and what works in one scenario may not work in another. **Gender** considerations can often be overlooked when designing/selecting CSA interventions. This is true at **national** and **local** scales. Below are some options that can be used individually, or in combination, to give the best chance of success in large-scale adoption of CSA practices/technologies across the SADC region. All of the following options require a systematic approach to CSA if scale is to be achieved.

CSA prioritisation frameworks

A range of **technological, institutional,** and **policy** options exist for climate-smart interventions, with varying environmental and economic impacts and costs. Identifying appropriate interventions requires trade-offs across levels from farmers to sub-national and national policy makers, and consideration by decision-makers about what is appropriate for given contexts.

Decision–support tools are needed to assist stakeholders to prioritise interventions – to improve the resilience, adaptability and efficiency of agriculture and rural livelihoods in the face of climate change (CSA Guide).

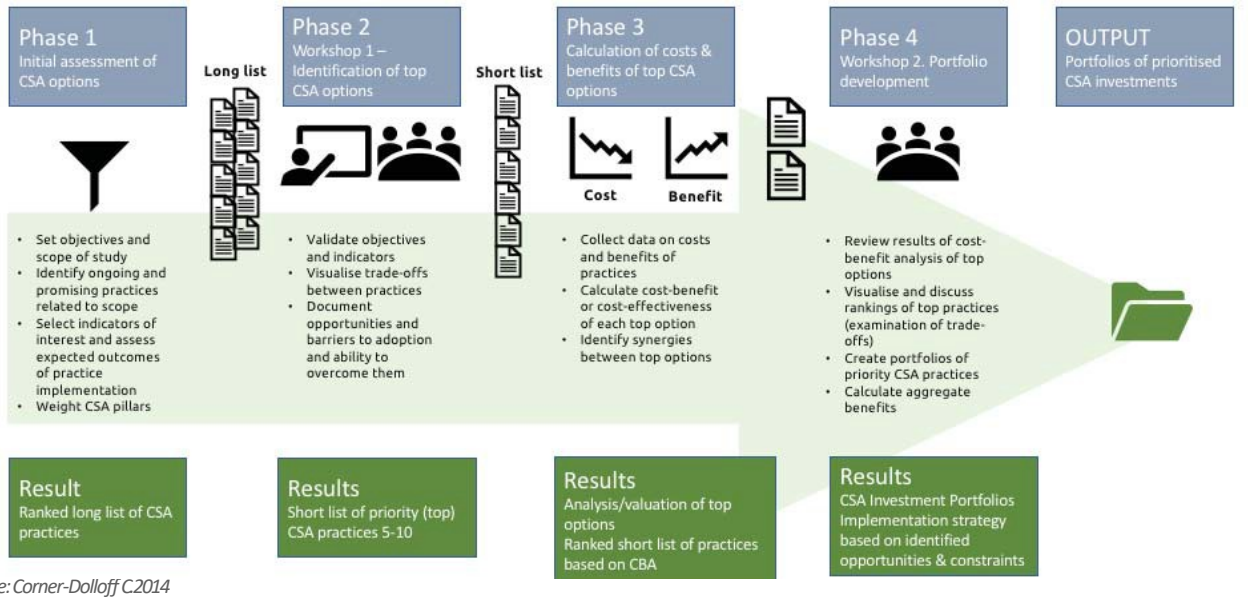
Targeting and prioritising approaches can narrow down an extensive list of possible practices, services, and policies to a range of **best-bet** options that may serve to attract investment and funding. These options can be further tested under local contexts to make them **best fit**, so that they can be scaled-out.

- What **regions, production systems, and users** should adaptation interventions be prioritised for?
- What **existing and promising adaptation** options should be assessed for investment?
  - Are these the same for men and women?
- What **criteria** should be used to evaluate and prioritise options?
  - Ability to build resilience
  - Achieve co-benefits such as mitigation
  - Economic costs and benefits?
- What **barriers to adoption** exist, and how can these be overcome for investments to have an impact at scale?
  - What role does gender play in limiting adoption, if any?
- What are the **optimal policy options** to support adaptation and transformation across spatial and temporal scales?

The **CCAFS-CIAT CSA Prioritisation Framework** (Figure 1), designed to guide CSA investments, has the objective to help decision-makers identify best-bet CSA investment portfolios that achieve gains in food security, farmers' resilience to climate change, and low-emissions development of the agriculture sector. The Framework does this by helping to identify existing and promising CSA practices, assessing the trade-offs between practices using indicators of CSA, analysing the costs and benefits of these practices, and identifying possible barriers to adoption. This process aims to contribute to optimised national and sub-national planning, promoting a participatory process for the development of CSA investment portfolios through four phases:

1. Initial assessment of CSA options
2. Identification of top CSA options (workshop)
3. Calculation of costs and benefits of top CSA options
4. Portfolio development and evaluation of barriers (workshop).

Figure 1: Climate smart agriculture investment prioritisation framework.



Source: Corner-Dolloff C.2014

Other tools available to help with prioritisation of CSA practices/technologies include:

- The Mitigation Optimisation Tool
  - Estimates greenhouse gas emissions from multiple crop and livestock management practices in different geographic regions, providing policy-makers across the globe access to reliable information to make science-informed decisions about emission reductions from agriculture
- The Ex-Ante Carbon Balance Tool (EX-ACT)
  - Developed by FAO, this tool provides ex-ante estimates of the impact of agriculture and forestry development projects, programmes and policies, on the carbon-balance. Mostly used at project level
- Participatory Identification of CSA Priorities
  - The tool includes the following elements:
    - » A framework for identifying and assessing CSA in the field
    - » Cost–benefit analysis of some selected climate-smart farming systems
    - » A participatory process of prioritising CSA options with villagers.

Policy incentives/subsidies

Once the priority entry points for CSA have been identified, the next step is to consider whether incentives/subsidies might be an effective means of promoting adoption – and where this support could/should be targeted. In some cases, the availability of funding may be a key determinant in selecting priorities for CSA interventions. Care should always be taken when trying to match the priorities of donors/investors with those of farmers, and the concept of **best fit** (adapting best bet technologies or practices to local contexts) should always be observed.

At the national scale, subsidies can be a very effective means of promotion (as seen across Europe and North America). This has also been effective in some SADC contexts, such as Malawi, where the **Farm Input Subsidy Programme** (FISP) has subsidised the cost of fertilisers for smallholder farmers. This project was initially very successful in increasing national production. At a smaller scale, most NGOs also provide free or subsidised inputs to vulnerable groups of farmers – with the aim of incentivising changes in behaviour and long-term adoption of CSA practices and technologies.

If incentives/subsidies are to be successful, careful consideration needs to be given to where they can best be targeted. In the case of NGOs, subsidised inputs have contributed to a dependency syndrome among smallholders. Knowledge transfer and participatory prioritisation of technologies/practices are at least equally important as subsidised inputs if adoption is to be achieved. The carrot-and-stick approach can be an effective means of promoting adoption:

- A **carrot** in the form of subsidised inputs or cash payments for adopting CSA practices/technologies can be provided
- A **stick** in the form of fines or loss of subsidy for not adopting the CSA practice/technology.

Incentives/subsidies can take many forms and can be targeted at many stakeholders. Identifying where best to target subsidies/incentives is key to their success. Some options include:

- Promoting research and development on a specific CSA practice/technology
- Providing incentives to agri-dealers to establish in certain areas, and/or to promote certain products/practice
- Provision of subsidised vaccination services
- Increase funding to extension services
- Incentivising local extension providers by allocating greater resources to those areas that have met adoption targets
- Targeting specific vulnerable groups, such as women/child-headed households, for direct support
- Active promotion of new value chains aimed at diversifying production to more climate smart crops/livestock.

Political leadership is required if incentives/subsidies are to be made available at national scales. Identifying **CSA Champions** in the form of individuals and/or institutions is a critical success factor, especially since widespread adoption of CSA requires broad consensus across multiple departments and institutions (Research, Extension, Policy development, Water, Nutrition/Health, Crops, Livestock, Private Sector, Civil Society, etc.).

Local-level CSA champions are also important; they can be farmers, extension officers, extension coordinators, specific projects, or local leadership (village chiefs; religious, local celebrities, etc.).

Extension approach

Widespread implementation of CSA involves changes in the behaviour, strategies, and agricultural practices of millions of farmers in the SADC region. Farmers need support to understand the **impacts of climate** change and to **adopt CSA practices**.

Extension services have a crucial role to play in linking farmers with sources of current information and tools so that they can transition to more CSA practices/technologies.

Extension personnel[1] – especially those working at the field level, have a detailed understanding of the local vulnerability context, as well as of the existence of local support and service networks. Farmers are often more receptive to their advice, as they have long been supporting farmers with information on new and improved technologies and practices.

Though extension services generally have very good local knowledge on agronomic practices and livestock husbandry, there are limits to the technical and functional capacities to understand and promote CSA. Incorporating climate and/or weather-related data in decision making is a key area where capacity needs to be built. There are several other institutional and policy bottlenecks in the wider enabling environment that are also constraining extension services in playing a significant role in promoting CSA. Effective **coordinated governance**, improved **access to agro-meteorological information**, and **enhanced climate-related human and technical** skills development are critical factors in enabling climate change actions by extension services.

Apart from investment in the overall extension system, there are specific extension approaches that can be used to effectively scale CSA in specific areas, as described below.

Landscape approach

A common definition by the Food and Agriculture Organisation of the United Nations (FAO) states that landscapes are "an area large enough to produce vital ecosystem services, but small enough to be managed by the people using the land which produces those services". **Landscapes should not be confused with ecosystems**, as a landscape can contain various ecosystems, and human activities and institutions are viewed as an integral part of landscapes –not as external agents.

[1] Extension personnel include NGO, private sector and government extension service providers.

Landscape approaches aim to **integrate sustainable management of ecosystems** and **natural resources** with **livelihood considerations**. They recognise that landscapes are multifunctional, providing benefits and services for a wide range of ecosystem processes, species, and social actors. Landscape approaches aim to understand the different elements and related interests in the landscape (e.g., water resources, agricultural production, biodiversity conservation and forest management) and their interdependencies. The main reason for applying landscape approaches is to move away from narrow sectoral approaches with uncoordinated and competing land uses, to integrated planning and management where the multiple interests of stakeholders are considered, synergies identified, and trade-offs among different uses negotiated.

Landscape approaches include integrated watershed and river basin management, sustainable landscape approaches, ecosystem approaches, integrated crop–livestock management, agroforestry, sustainable fisheries management, sustainable forest management, and improved rangeland management.

From a CSA perspective, the main objective of a landscape approach is to **enhance the synergies between CSA's three pillars**, while sustaining the ecosystem services which the environment produces and regulates – such as clean air, water, food and materials. The premise is that only a holistic approach that integrates all sectors and stakeholders in a landscape can **sustain such ecosystem services** and achieve sustainable development.

Innovation platforms

One of the traditional roles of extension organisations is a **bridging function**, linking farmers to other rural stakeholders and service providers. Recently, extension service providers in many countries have been supporting agricultural innovation systems by playing various roles in the establishment/running of multi-stakeholder **Innovation platforms**.

These include acting as the main innovation broker (the organisation that catalyses the innovation process and brings the actors together), functioning as a **bridging** organisation – facilitating interaction between actors (coordinating and creating networks), and supporting these actors (facilitating access to information, knowledge and expertise, and providing technical backstopping).

Innovation platforms are one kind of institutional innovation that can contribute towards adaptation to, and mitigation of climate change, and are an area where extension service providers can play a critical facilitation and brokering function for various activities – such as bringing farmers together to develop adaptation practices with researchers and designing climate service tools. Extension providers can contribute to mitigation efforts by, for example, strengthening farmer groups and rural organisations – linking them to voluntary and regulated carbon markets, and supporting payment for ecosystem services programs. Besides strengthening existing linkages between farmers and their conventional partners (researchers, non-governmental organisations [NGOs], traders, input suppliers, credit institutions), extension services can also facilitate engagements with new types of institutions related to climate change – such as insurance companies, humanitarian agencies and meteorological services.

To support innovation processes, extension service providers need skills in areas they typically do not have – such as network building and brokerage, process facilitation, and process monitoring. The Global Forum for Rural Advisory Services (GFRAS), FAO and other institutions, have developed the **New Extensionist Learning Kit** (NELK) to help bridge this gap in capacity.

Farmer field schools

Appropriate technological solutions will vary depending on local circumstances, and therefore an understanding of the specific context is essential – requiring knowledge that is complex and diverse. While past extension work was mainly an act of transferring technologies to farmers, there is now a growing focus on farmer participation in the innovation process and on the facilitation of experimentation among communities. This is where the farmer field school (FFS) approach comes in. FAO has developed a set of **non-negotiables** (FAO, 2016) that must be included in the FFS methodology if it is to be successful:

What is an innovation platform?

An Innovation Platform is a space for learning, action, and change. It is a group of individuals (who often represent organisations) with different backgrounds, expertise, and interests: farmers, traders, food processors, researchers, government officials, etc. The members come together to diagnose problems, identify opportunities, and find ways to achieve their goals. They may design and implement activities as a platform, or coordinate activities by individual members.

1. Farmers' needs define and drive FFS and FFS programmes

2. Farmers' local knowledge co-produces and co-creates new knowledge, science, and public services (i.e. extension) alongside science-based knowledge

3. The learning process and knowledge generation are central to FFS and FFS programmes:

   a. FFS are based on fields (or animals) through which to learn and experiment

   b. Structured hands-on, experiential learning is primarily used

   c. Adult learning cycles emphasise observation, critical analysis, sharing and debate, conclusion/decision, and implementation to enhance knowledge and decision-making skills that combine local and science-based knowledge.

   d. Learning is a continuous process – regular meetings are held at critical crop/enterprise development stages to correspond with the decision-making of farmers/pastoralists

   e. The practical and critical development of skills and competences is the focus

   f. Diversity in age, gender and experience enriches FFS when all are involved in production.

4. Building trust and strengthening groups to develop:

   a. Critical analysis skills

   b. Feedback and evaluation skills

   c. Planning skills

   d. Basics of group work and collaboration (group dynamics exercises)

5. Facilitation of the learning process: competent master trainers and facilitators (technical, methodological, and organisational skills)

6. Situation/location-specific activities, i.e. locally-appropriate learning curriculum.

FFS can be hugely successful in promoting adoption of CSA when implemented according to best practice. Too often, FFS are established more as demonstration plots in a top-down approach to extension. FFS require a much more systematic approach to context-specific, incremental **best fit** improvements in farming systems.

Jonathan Odhong, IITA, 2017

Supporting Climate Smart Decision Making

At the farm level, decision making on what practice/ technology to adopt is based on multiple criteria that will change from one smallholder household to the next. Selecting truly climate smart agricultural practices should consider criteria such as:

- The science
- Weather and climate information
- Individual and community risks and vulnerabilities
- The availability and accessibility of inputs
- Gender dynamics
- Labour distribution and availability
- Cost–benefit or other economic forecasting/analysis.

There are multiple technical guides available to guide extension staff on how to implement specific CSA practices, such as composting; but, decision support tools to help extension staff make more climate smart decisions with their farmers – on which technologies/practices to test and how to adapt these to local conditions – are much less available. In recent years, some new tools such as the Participatory Integrated Climate Services for Agriculture (PICSA) manual have been released.

CCARDESA has developed a set of decision-support tools specifically focused on CSA options for livestock, sorghum, maize, and rice, but which may be applicable to other value chains as well. These decision tools are specifically designed to help extension staff make climate smart decisions on everything from seed selection to postharvest management, and pest and disease control in livestock. All these tools follow a similar format, and require the extension officer to:

- Understand the farming system
  - Crop, livestock interactions
  - Climate, weather, seasonality
  - Who does what, when?
- Understand the socioeconomic context
  - How is crop/livestock production prioritised as a source of livelihood within the household?
  - Availability and accessibility of agri-inputs
    - » Does gender affect this?
  - Availability and accessibility to information/ knowledge services
- Assess the individual farmer's priorities and preferences
  - Are these different for men and women?
- Select the **best bet** CSA options
- Assess feasibility of each best bet option
  - Is the option economically feasible?
  - Is there any other reason (such as labour constraint) that might not make it feasible?
- Test each option selected
  - Collect detailed information over a growth season/life cycle
  - Gross margins analysis or other participatory assessment
- Reflect and improve to make **best fit**.

Measuring adoption

Most CSA projects and programmes include the **number of farmers that have adopted** a practice/technology as a **key indicator of success**. However, very few, if any take the time to **define what adoption is**. If there is no definition for adoption, then it is very difficult to measure it.

CSA prioritisation tools generally focus on the impacts of adoption – such as an increase in food security, reduced GHG emissions, increased carbon stored in the soil, or improved resilience. Yet the main objective of partnerships, such as the African Climate Smart Agriculture Alliance, are to have six million farmers practicing CSA by 2021. Without a definition of adoption, **how will this be measured**?

At a smaller scale, most projects focus on the numbers of farmers reached, rather than the number of farmers who have adopted a practice. Projects also tend to be spread across large areas, with small groups of farmers supported in each community. The focus tends to be on a certain group of farmers who will receive subsidised inputs or incentives. Encouraging adoption at the local landscape-level is rarely included as an overall objective.

This is understandable in short-term projects that only run for 3–5 years, but it is counterproductive if the long-term goals are the widespread adoption of a climate smart practice/technology.

One study by an NGO, who had been promoting CSA practices in Malawi for several years and wanted to assess adoption in its target areas, defined adoption as:

- A farmer who was implementing the practice on their farm for at least two years
- Doing so without external support (this did not include training, but did include input support)
- Who had expanded the area covered by the CSA practice.

Different practices/technologies require different approaches to measuring adoption. If adoption at the landscape-level – and beyond those directly supported by a project/programme – is not included as a high-level objective, it is highly unlikely that adoption will be achieved. **If it is not measured, it will not be managed**.

CONCLUSIONS

Many reasons abound for why farmers have not adopted CSA practices/technologies at scale in the SADC region, yet evidence on what practices farmers currently implement – and whether these are climate smart or not – is not available. Neither is there a definition of what adoption is, or how it can be measured. If adoption of CSA is to go to scale, systematic approaches are required. As with CSA practices/technologies themselves, there is no one-size-fits-all when it comes to adoption, but the following commonalities exist:

- Definitions and metrics are required so that adoption is actively managed
- A systematic approach must be taken:
  - Understand the context
  - Prioritise options
  - Identify best bet options and areas for CSA interventions
  - Assess feasibility – economic, social, market
  - Test options
  - Reflect, improve and scale up
- Monitor progress, and address knowledge gaps.

WHERE CAN I FIND MORE INFORMATION?

- **CCARDESA Knowledge Hub**
  - See Best Bet Options Papers on CSA in Maize (KP02), Sorghum (KP03), Rice (KP04) and Livestock (KP05) as well as Decision Support Tools on specific practices technologies on each of these four value chains (KPs 6-21)
- **CCAFS** Mitigation Option Tool for agriculture
- **CCAFS 2016 -** Participatory identification of climate-smart agriculture priorities
- **CCAFS 2015** – CSA Guide: "This site is your gateway to implementing climate-smart agriculture. It will help you get started and guide you right through to implementation on the ground, connecting you with all the resources you need to dig deeper"
- **Department of Communities and Local Government,** London 2009 – Multi Criteria Analysis: A Manual
  - Just one tool that might be useful in making decisions, especially at the strategic level when multiple criteria need to be taken into account, as is often the case in CSA
- **FAO 2017** - Climate-Smart Agriculture Sourcebook
- **FAO 2016** – Farmer Field School Guidance Document: Planning for Quality Programmes
  - An essential guidance document for anyone establishing a Farmer Field School based extension approach
- **FARA 2018** – Strategies for Scaling Agricultural Technologies in Africa
  - A very useful resource for anyone designing CSA projects/programmes that aim to go to scale
- **GACSA** 2016 – Supporting Agricultural Extension towards Climate Smart Agriculture: An overview of existing tools
- **GFRAS 2017** – The New Extensionist Learning Kit
  - This is an excellent resource for all extension staff and extension programme designers aiming to upskill their extension staff
- **International Institute of Tropical Agriculture (IITA) and Wageningen University (WUR) under the CGIAR Research Program on Roots Tubers and Bananas (RTB)** – Guidelines for Innovation Platforms in Agricultural Research for Development: Decision support for research, development and funding agencies on how to design, budget and implement impactful Innovation Platforms
  - All you need to know about innovation platforms
- **Walker Institute 2015** – Participatory Integrated Climate Services for Agriculture (PICSA): A step-by-step guide to using PICSA with farmers
  - This is a really good resource for any extension staff who want to incorporate an analysis of weather/climate risks into farm systems planning.

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