

Findings from implementing the Climate-Smart Agriculture Prioritization Framework in Mali



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Policy brief

This policy brief summarizes findings of a pilot project aiming to develop a participatory framework to prioritize CSA practices and interventions to guide CSA investments in Mali published in Agricultural Systems.



GLOBAL ALLIANCE FOR CLIMATE-SMART AGRICULTURE

Authors: Bougouna Sogoba, Nadine Andrieu, Fanny Howland, Oumar Samake, Caitlin Corner-Dolloff, Osana Bonilla-findji and Robert Zougmore.

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What challenges does climate change pose to Malian agriculture?

Mali is experiencing erratic rainfall, resulting in more frequent dry years, which threaten agricultural productivity and growth. The national economy is vulnerable to climate change due to 50% of GDP coming from the agricultural sector and 75% of the population living in rural areas. To attain food security objectives within this context of increased climatic variability, sustainable improvements in agricultural productivity must be integrated into development and climate change policies and strategies.

The Climate-Smart Agriculture (CSA) concept arises from a need to provide innovative solutions towards the complex and integrated goals of increasing yields, improving resilience, and promoting a low emissions agricultural sector. Through an integrated approach to development, CSA emphasizes synergies between productivity, adaptation, and mitigation, and environmental, social, and economic co-benefits derived from adopting various agricultural practices, programs, and policies across levels.

A major challenge related to operationalizing CSA is the identification of priority climate-smart CSA options that decision-makers can utilize to promote agricultural systems that take climate variability and change into account in the short- and long-term. Given this, a process for prioritizing CSA options is needed to identify the tradeoffs between these options, especially their costs and benefits from a social, economic and environmental point of view. A CSA Prioritization Framework (CSA-PF) was developed by the International Center Tropical Agriculture (CIAT) and the CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS) to respond to the need

for a sound methodology and criteria to (1) quantify the impact of CSA practices on the

three pillars using limited time and resources, (2) prioritize locally relevant best bet CSA options, and (3) ensure ownership and engagement by key stakeholders and potential funders/donors. The implementation in Mali of the CSA-PF followed a first pilot in Latin America (Sain et al., 2017).

How to prioritize climate-smart investments in Mali?

The Malian Association of Awareness to Sustainable Development (AMEDD), a local NGO acting on behalf of national science-policy dialogue platforms on climate change, agriculture and food security, coordinated by the Agency of Environment and Sustainable Development (AEDD), and with the methodological support of CIAT and CCAFS, led the participatory use and development of the CSA-PF with stakeholders in Mali to find climate-smart options (practices, services, and programs).

This CSA-PF was based on four phases (Figure 1):

- A preliminary identification of vulnerable areas and farming systems with potential relevant CSA practices by a steering committee made-up of experts
- A participatory identification of best-bet CSA options
- A cost-benefit analyses of the best-bet options
- A participatory prioritization of CSA investment portfolios and action plan development

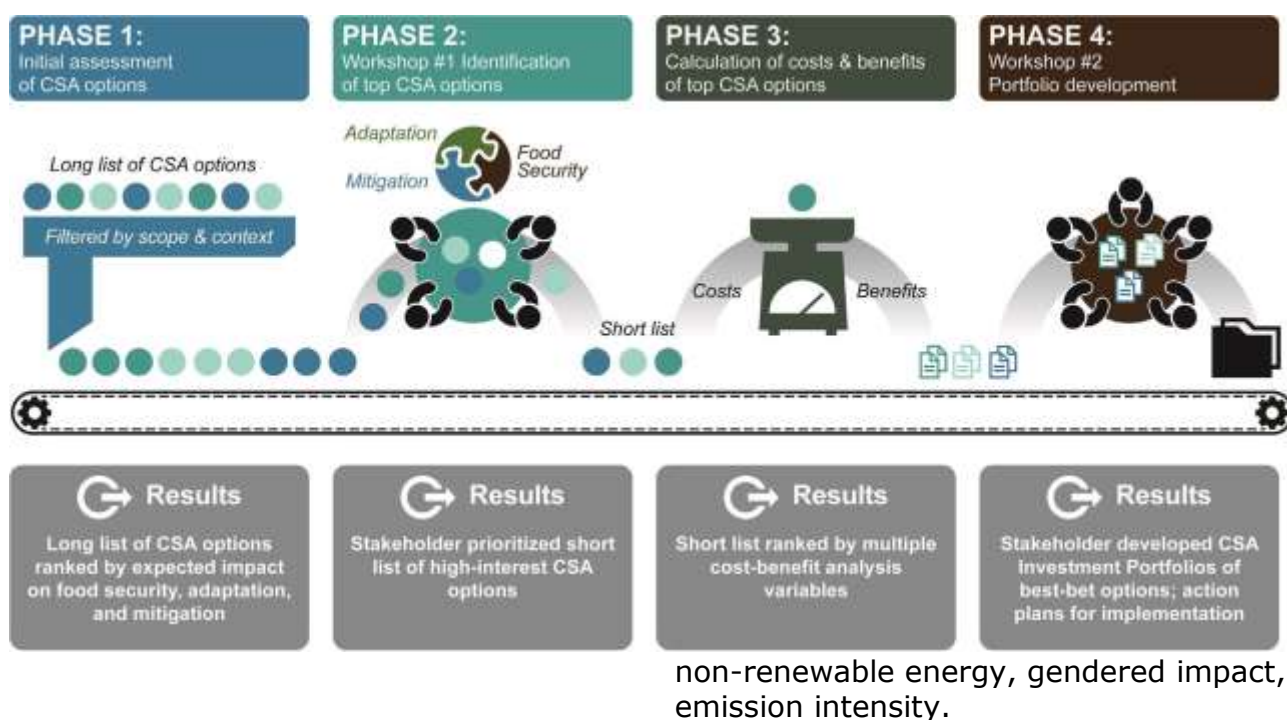


Figure 1: Overview of the CSA-PF demonstrating the phases and their goals, stakeholders involved, and results (adapted from Campbell et al., 2016).

Phase 1 - Preliminary identification of vulnerable areas and farming systems with potential relevant CSA options

Potential next-users for the CSA-PF such as donors, NGOs, and local government choose the Sahel, the Sudano-Sahelian, and the Sudanese regions for selection of practices related to their vulnerability and production systems of interest for food security (Figure 2).

They then pre-identified 24 relevant CSA practices with the support of a group of four national experts (from the NARS and the universities), with knowledge of the Malian agricultural systems and the challenges posed by climate change. They qualitatively assessed their performance against CSA pillars: productivity, adaptation, mitigation, using 10 indicators they selected such as yields, labor, income, food access, efficient use of water, fertilizers, and other agro-chemicals, use of

Phase 2 – Participatory identification of best-bet CSA options

Through a workshop with 30 representatives of ministries, local governments, research institutions, NGOs, and donors interested in scaling out CSA in Mali, specific criteria of prioritization were identified. Those criteria were related to social acceptance of practices or their agronomic potential in the identified regions. Stakeholders then evaluated the long list of practices relevant to the areas of interest and prioritized 10 best-bet CSA practices based on the criteria and analyses (Figure 3). This process led to the selection of specific practices for different regions such as the fixation of dunes in the Sahelian region, sorghum cowpea association for the Sudano-Sahelian region, and contour fields for the southern region.

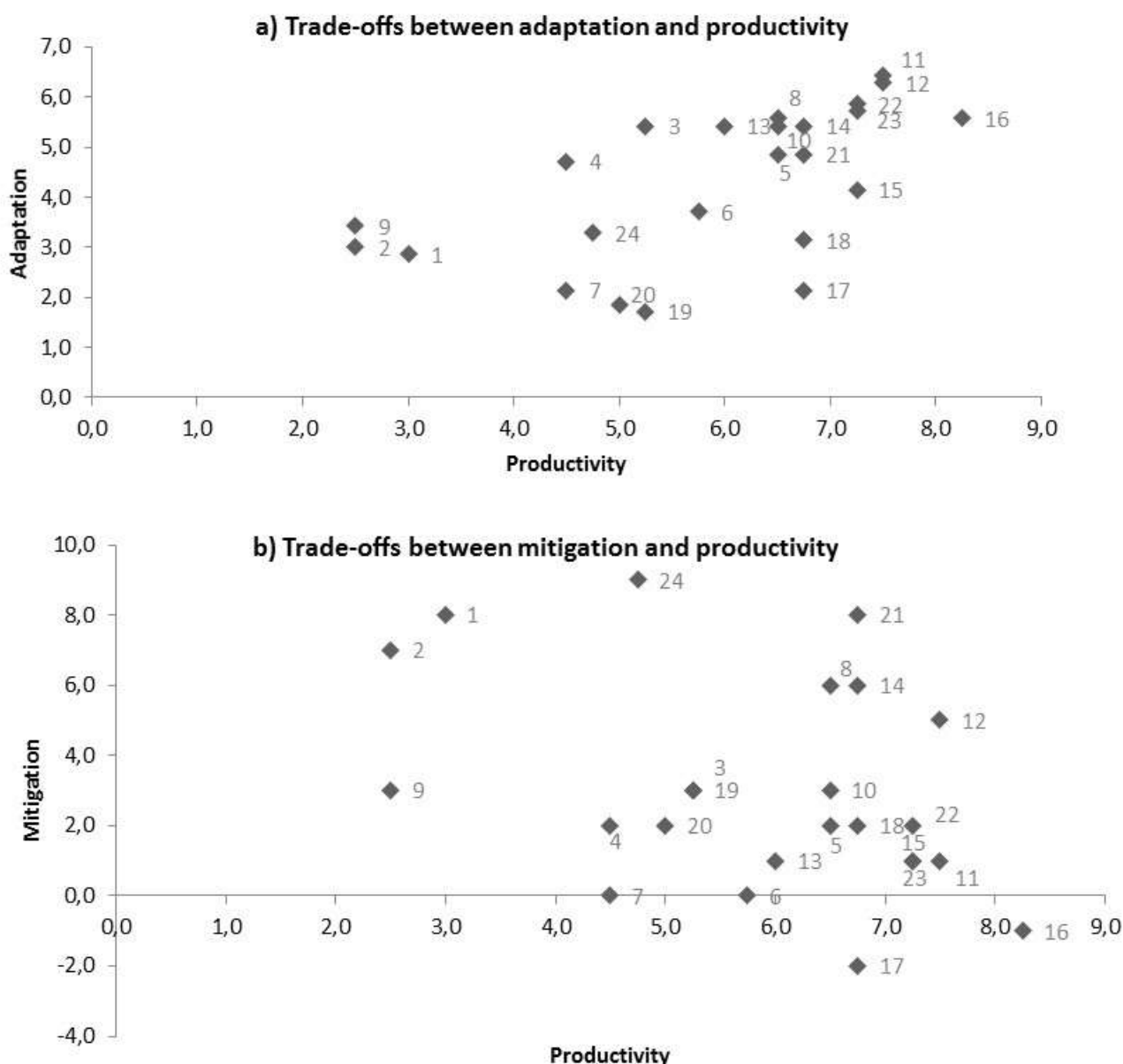


Figure 2: Results of the expert evaluation of the expected outcomes of each CSA practice on the 'long list.'

1: Assisted natural regeneration of trees; 2: Hedgerows; 3: Contour bunding; 4: Sorghum-cowpea intercropping; 5: On-farm compost production; 6: Direct and early sowing of millet and sorghum; 7: Soaking of seeds; 8: Zaï pits; 9: Contour stone bunds; 10: Half-moon; 11: System of rice intensification; 12: Development of rice valleys; 13: Tree nursery and transplanting of receding flood areas; 14: Drip irrigation; 15: Pisciculture; 16: Fertilization of fields by animal corraling; 17: Cattle fattening; 18: Aviculture; 19: Apiculture; 20: Rabbit farming; 21: "Rational" management of land (flooded and dewatered areas); 22: Bio-fertilizer; 23: Use of adapted improved varieties to different ecologies; 24: Local conventions of community management of natural resources.



Figure 3: Group discussion of the CSA practices

Barriers to adoption of practices (such as lack of access to improved seeds of sorghum and cowpea, lack of market for cowpea sub-products) and potential solutions were explored in ongoing projects or policies. For each identified practice participants indicated the type of program, service, or policy to be developed or strengthened in order to facilitate the implementation of the practice.

Phase 3 - Cost-benefit analyses (CBA) of the best-bet options

This analysis was conducted by AMEDD and CIAT for the 10 best-bet CSA practices in the Sudanese region, which is the agricultural breadbasket of the country. Estimates were made for a 5 year life cycle of practices and for the main crops found in the diversified farming systems (maize, millet, sorghum). Positive or negative externalities of the practices selected by the next-users of the process, such as those associated with carbon sequestration, gender, and social conflicts related to land access particularly important in West Africa, were considered. Existing literature and estimations by experts were used for the valuation of the parameters of the CBA.

Phase 4 - Participatory prioritization of CSA investment portfolios and action plan development

The results of the CBA analyses were presented during a second workshop attended by the same actors as the first workshop. Stakeholders validated the results of the CBA and had the crucial task of linking the results of all phases of the CSAPF and make a final prioritization of portfolios of 3 to 5 CSA practices for the Sudanese region by taking into account both the impact of practices on the pillars of CSA and the economic indicators of the CBA. Portfolios were developed in subgroups of experts and next-users. Participants also used their own expertise to determine the objective, scale, and content of their desired portfolios. Did they want to put together practices with the best synergies at the field, farm, or landscape level? Did they want the practices to have a major impact on a specific CSA pillar or that were financially profitable? Participants used visualization mechanisms to compare the tradeoffs between practices and between different portfolios of practices to aid them in selecting final portfolios. Each group developed a number of portfolios, and the workshop as a whole selected two priority portfolios for further investigation and investment considering short- and long-term challenges and the diversity of farmer types (Figure 4).

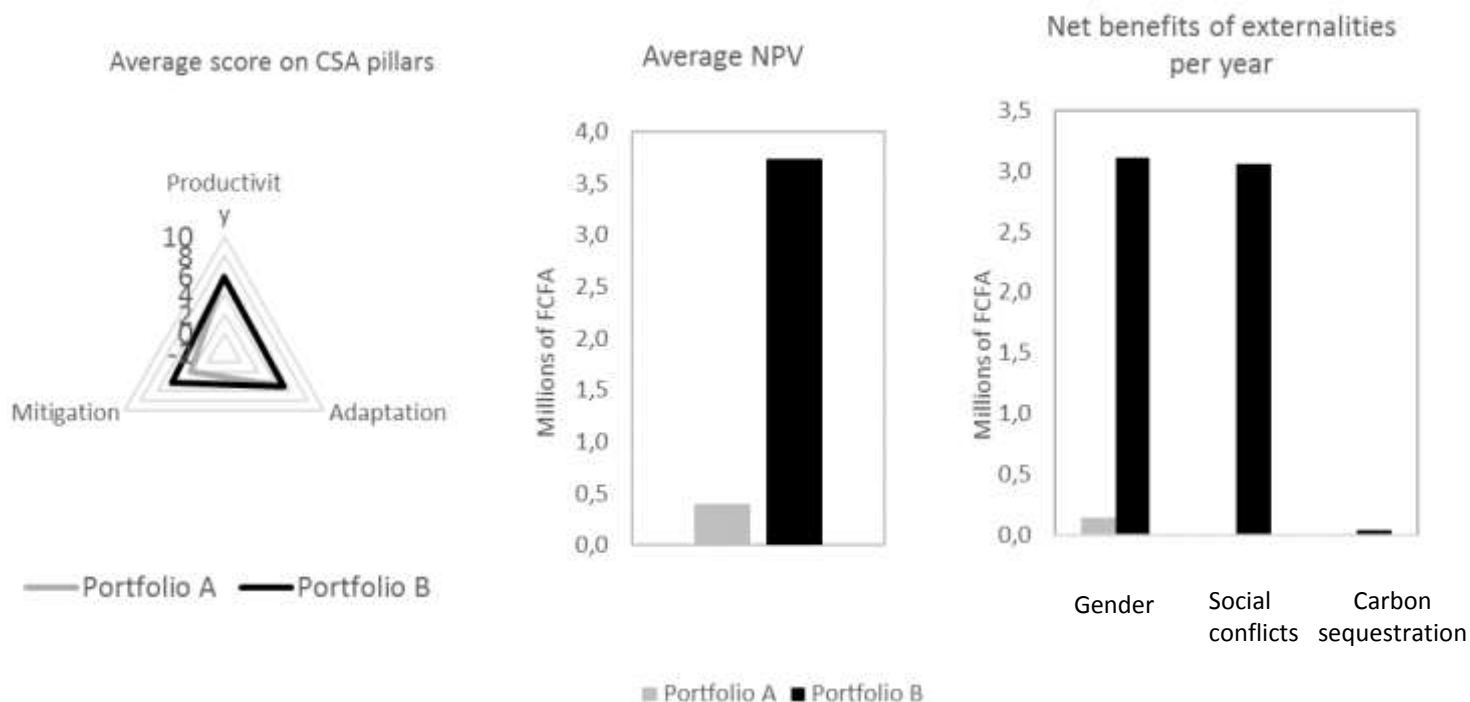


Figure 4: Portfolio analysis and comparison related to a) CSA outcomes, b) average Net present Value (NPV), and c) net benefits of externalities for the average yield scenario

- Portfolio 1 focusing on technologies integration at field level and that can be implemented by a wide diversity of farmers: contour bunds, production and use of compost, improved varieties, sorghum and cowpea intercropping
- Portfolio 2 focusing on technologies integration (synergies) at landscape level and positive externalities on gender and access to land: contour bunds, improved varieties, diversification of income with fish ponds, development of rice cultivation valleys

What are the action plans needed to promote the prioritized portfolios of CSA practices?

Action plans were also developed to provide stakeholders with pathways for mainstreaming portfolios of practices.

The prioritized practices are individually known but their integration is innovative, the identified action plans tried to address barriers of adoption focusing on four main activities:

- Research programs
- On the difficulties currently encountered by farmers to adopt the prioritized practices (some of them are already known)
- On ways of improving practices for specific agroecosystems
- Capacity building of farmers on the challenges posed by climate change and on the potential impact of the practices
- Strengthening of the institutional environment
- Local platforms to link actors of the value chains
- Implementation of practices prioritized for investment
- Monitoring and evaluation on outcomes with farmers

There were many expressions of interest by the participants in implementing the portfolios in their projects, programs, and beyond.

High-level decision-makers from the Malian government, NGOs, and donors gathered in a separate briefing to learn the results of the workshop. These stakeholders confirmed their support for the large scale implementation of CSA portfolios in Mali, applauded the assessment of multiple CSA related impacts and costs and benefit studies that included externalities, calling for further assessments of this kind. Results were highlighted as useful for design of future call for proposals, as responses to ongoing calls, methodologies for use in assessing existing projects, and presentation of results at regional and global meetings.

What are the lessons learned of this process?

1. The CSA-PF initiative is relevant in countries where there are supporting institutions aware of climate change and interested in implementing CSA. This type of enabling institutional environment ensures coherent linkage of results with national and regional realities, needs, and challenges,
2. CSA investment prioritization processes are most successful when led by a local stakeholder engaged in CSA planning that has working knowledge of ongoing and future agricultural projects and can therefore identify opportunities for the implementation of the defined portfolios throughout the process,
3. The main role of research scientists is to monitor the process and to ensure that there is limited facilitator bias,
4. The utility of the indicator assessments of the CSA process is

not primarily in achieving accurate calculations of outcomes, but rather in being able to relatively compare practices, provoke discussion of priorities, and network stakeholders,

5. The definition of agriculture development portfolios based on the performance of practices against CSA goals favors identification of synergies between sectorial objectives and the assessment of the economic performance of portfolios assists in identifying practices that have higher potential for adoption by farmers.

Are there first outcomes?

Four first level outcomes can be identified:

- 2016-2017 implementation by NGOs of CSA options in the Mopti, Segou and Sikasso regions for an overall budget of 5,177,250 USD.
- Inclusions by AMEDD of the CSA options in an ongoing project aiming to improve the productivity of mixed cereal leguminous cropping systems in the context of climate variability for an overall budget of 1,100,100 USD.
- Request for support to mainstream CSA by the ministry of agriculture (2014-2020 program)
- Presentation of the results of the CSA-PF to the Rural Development Committee (Parliament) by the science policy platform.

Next steps for the CSAPF implementing team, led by AMEDD, include close follow up of the implementation projects.

References

Andrieu Nadine, Sogoba Bougouna, Zougmoré Robert B., Howland Fanny, Samake O., Bonilla-Findji Osana, Lizarazo M., Nowak Andreea, Dembele C., Corner-Dolloff Caitlin. [Prioritizing investments for climate-smart agriculture: Lessons learned from Mali](http://dx.doi.org/10.1016/j.agsy.2017.02.008). 2017. *Agricultural Systems*, 154 : 13-24. <http://dx.doi.org/10.1016/j.agsy.2017.02.008>

Campbell, B.M., Vermeulen, S. J., Aggarwal, P. K., Corner-Dolloff, C., Girvetz, E., Loboguerrero, A.M., Ramirez-Villegas, J. Rosenstock, T., Sebastian, L., Thornton, P. K., Wollenberg, E. 2016. Reducing risks to food security from climate change. *Global Food Security* 11, 34-43. <https://doi.org/10.1016/j.gfs.2016.06.002>

Sain, G.; Loboguerrero, A.M.; Corner-Dolloff, C.; Lizarazo, M.; Nowak, A.; Martínez-Barón, D.; Andrieu, N. 2017. Costs and benefits of climate-smart agriculture: The case of the dry corridor in Guatemala. *Agricultural Systems* 151, 163-173. <http://dx.doi.org/10.1016/j.agsy.2016.05.004>

<https://ccafs.cgiar.org/blog/climate-smart-solutions-malian-sahel#.VtXLUv SnIU>

POLICY BRIEFS ON CSA

The Policy Briefs provide a summary of a particular issue related to climate-smart agriculture and articulate some key recommendations in terms of policy options to deal with it. Please visit <http://www.fao.org/gacsa/> for more information.

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Authors

Bougouna Sogoba is head of AMEDD (Malian Association Awareness for Sustainable Development).

Nadine Andrieu is a CIRAD senior scientist working on the design with stakeholders of climate smart farming systems.

Fanny Howland is CIAT anthropologist, working on access, perception and use of information & communication technology in agriculture, adoption processes of innovative practices in a context of climate change.

Oumar Samake is head of the Bougouni Office of the NGO AMEDD (Malian Association Awareness for Sustainable Development).

Caitlin Corner-Dolloff, project leader climate smart prioritization framework.

Osana Bonilla-findji is Science Officer for the CCAFS Climate Smart Technologies and Practices Flagship. She is based in Cali, Colombia at CIAT's Headquarter.

Robert Zougmore is the Africa Program Leader of the CGIAR research programme on Climate Change, Agriculture and Food Security (CCAFS).

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