



# CLIMATE-SMART AGRICULTURE IN MADAGASCAR

## Introduction

The effects of climate change on agriculture are severe, and one of the most significant emerging challenges to household livelihoods in Africa. As such, it is imperative that efforts to address agriculture in the context of food security and rural development take climate change into consideration. Climate-smart Agriculture (CSA) is defined as agricultural practices that sustainably increase productivity and system resilience, while reducing greenhouse gas (GHG) emissions. It is not a single specific agricultural technology or practice that can be universally applied; it is a combination of policy, technology, and finance options that involves the direct incorporation of climate change adaptation and mitigation into agricultural development planning and implementation (FAO, 2010). Madagascar holds great potential for CSA, but this needs to be further explored. Although the country has traditional agricultural practices as well as research-based programmes and techniques that have CSA qualities, CSA promotion requires concerted action from multiple actors to allow for context-specific approaches.

## KEY RECOMMENDATIONS

- ONE:** Place a significant focus on integrated policy development at national and local level in Madagascar to ensure a coordinated response to climate change – including through CSA.
- TWO:** A strong emphasis must be placed on building the capacity of extension workers, producers, and other stakeholders in the use of CSA technologies and practices in Madagascar.
- THREE:** A multipronged approach to diversify the funding base for CSA should be developed and implemented, tapping into sources of funding from private and public agriculture and climate-related institutions at national, regional, and international levels.
- FOUR:** Closely monitor the impact and success of current CSA projects to understand the potential of initiatives to contribute to agricultural transformation and livelihoods, and through this attract increased investment.



**POPULATION** Total population of 24.9 million of which two-thirds live in rural areas (World Bank, 2015).

**ECONOMY** Real GDP growth increased to an estimated 4% in 2016, from 3% in 2015, with further increases projected for 2017 and 2018. A stable macroeconomic environment with single-digit inflation (averaging 7.4% in 2016) (African Economic Outlook, 2017).

**POVERTY** More than 75% of the population lives below the international poverty line (World Bank, 2017a).

**AGRICULTURE IN ECONOMY** Currently 25% of GDP is from agriculture (World Bank, 2017b). Three-quarters of Malagasy are employed in agriculture (World Bank, 2015).

**FOOD SECURITY INDEX** Low ratings on Food Security Index (relative to African countries); within the lowest 50% of countries globally (Food Security Index, 2015).

# Context Overview

## AGRICULTURE IN MADAGASCAR

Rice is the main produce and main export crop of Madagascar. It is mainly planted in a terraced paddy system in the central highlands. Other major subsistence crops include cassava, corn, and sweet potato, while coffee, cloves, vanilla, and other cash crops are exported.

Among livestock, zebu account for most of the cattle, while pigs, sheep and poultry are also raised. Fishing is popular, and aquaculture has grown in importance.

Madagascar has seen high rates of deforestation, and the illegal extraction of highly valued timber species such as mahogany, ebony, and rosewood threatens native stands. The traditional slash-and-burn agriculture (*tavy*) together with population growth put increasing pressure on the diverse native flora of Madagascar.

## VULNERABILITIES

The Fifth Assessment of the Intergovernmental Panel on Climate Change (IPCC) has shown that global climate change is already damaging crops and undermining food production capacity, particularly in poorer countries (IPCC, 2014).

The vulnerability of African countries, including Madagascar, to climate change is compounded by strong dependence on rain-fed agriculture and natural resources; high levels of poverty; low levels of human capital; low levels of preparedness for climate events; and poor infrastructure in rural areas.

Temperatures in Sub-Saharan Africa are already close to or beyond thresholds at which further warming reduces (already low) yields (Cline, 2008), and temperatures in Madagascar are expected to continue rising (IFPRI, 2012).

A comparative assessment (FANRPAN, 2017) reveals that the impacts of climate change are already being perceived both by formal experts and by rural populations across Eastern and Southern Africa, including Madagascar.

Madagascar is currently positioned 5th worldwide among countries most exposed to risks due to climate change and first among countries in Africa exposed to such risk (FAO, 2016). The agricultural sector of Madagascar is being affected by soil degradation and exhaustion, biodiversity degradation, and human environment degradation.

Decreases in precipitation have been observed over several decades in the highlands of Madagascar. This poses a serious threat to rice yields.

Countries in Southern Africa are also affected by El Niño (warm) and La Niña (cool) events in the tropical Pacific. The most recent El Niño (2014-2016) and La Niña (2016-2017) have impacted on agriculture in Southern Africa, including Botswana (UN News Centre, 2016). Although El Niño has receded, the impact of the higher-than-average temperatures and the lower-than-average rainfall continue to be felt.

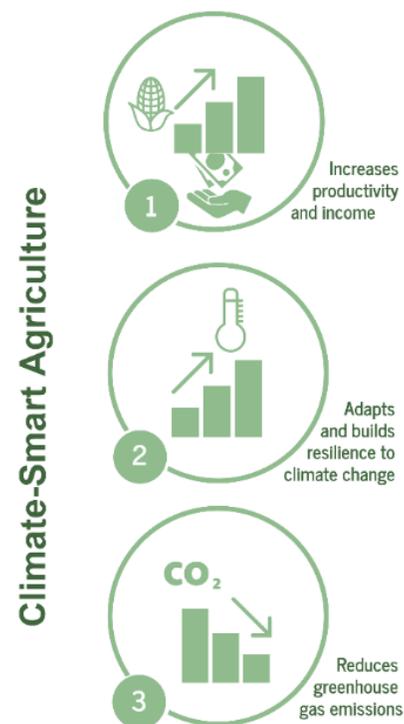
These environmental factors are further complicated by lack of infrastructure, inadequate markets, lack of support

services, and limited access to water systems.

## AGRICULTURE IN DEVELOPMENT

Agriculture remains one of the most effective pathways out of poverty. Gross domestic product (GDP) growth that originates in agriculture is approximately four times more effective in reducing poverty than GDP growth that originates in other sectors (World Bank, 2008). The risk which climate change poses to the sector thus has significant implications for poverty-reducing capacity.

In this context, CSA is critical for food security and development. It is an approach that can help reduce the negative impacts of climate change and can increase the adaptive capacity of farming communities to long-term climatic trends (FAO, 2010).



# Climate-Related Policy Environment

Eastern and Southern African countries generally have policies on agriculture and climate change, and do recognize the impacts of the latter on the former. Some countries have developed National Climate Change Policies, while other countries have National Adaptation Programmes of Action (NAPA), and/or National Climate Change Response Strategies in place.

## INTERNATIONAL ENVIRONMENT

As a non-Annex I party to the Paris agreement, Madagascar has no obligations to reduce GHG emissions, but has an obligation under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement to report on the anthropogenic sources and sinks of GHGs, and to identify measures to minimize the impacts of global warming and climate change.

Madagascar submitted and ratified its nationally determined contribution (NDC) to the convention in September 2016, and therein stated its intention to reduce national GHG emissions by 14% (compared to the business-as-usual, or BAU scenario). Furthermore, Madagascar

aims to increase GHG absorption by 32% by the year 2030.

Regionally, Madagascar is implementing the Comprehensive Africa Agriculture Development Programme (CAADP) Framework (2010), which emphasizes sustainable land and water management for improved agricultural productivity through research, technology adoption and dissemination, and agricultural GHG emissions reduction.

Madagascar signed its CAADP compact in 2013, and has finalized its National Agricultural Investment Plan (NAIP).

## NATIONAL POLICY ENVIRONMENT

Madagascar has framed specific climate-change adaptation measures in its *Politique Nationale de Lutte contre le Changement Climatique* (National Policy for the Fight against Climate Change), that was developed in 2010. This national policy has as first strategic target to “strengthen adaptation to climate change, considering Madagascar’s realistic needs”.

Other national framework documents that reflect awareness of and actions taken towards mitigating and adapting to climate change include the *Politique Générale de l’Etat* (General State Policy)

and the *Plan National de Développement* (National Development Plan) 2015–2019.

A National Adaptation Programme of Action (NAPA) was developed in 2006, and a National Adaption Plan is being developed – the finalization and implementation of which has been identified as a priority action before 2020. Madagascar’s NDC specifically mentions development of “Resilient Agriculture Integrated Models” that center on CSA as a priority action.

Madagascar has set up a National Bureau of Climate Change Coordination (BNCCC) which works closely with the National Climate Change Committee, sectorial ministries, and NGOs to implement all measures to address climate change.

Madagascar has various agricultural policies and policy instruments directing the sector, but no overarching comprehensive agricultural policy.

## CSA POLICIES

There is currently no specific CSA policy or strategy in place; but has a Climate Change National strategy for the agriculture - livestock - fishery sector for the period 2012 – 2025 which is highly relevant to CSA.

### Selection of national policies, plans, and strategies in Madagascar related to CSA

National Policy for the Fight against Climate Change	Strengthen adaptation to climate change, considering Madagascar’s realistic needs.
National Adaptation Programme of Action (NAPA)	Identify priority activities that respond to urgent and immediate needs, allowing them to adapt to climate variability and climate change.
Climate Change National strategy: agriculture - livestock - fishery sector 2012 - 2025	By 2025, Madagascar sustainably developed the agriculture - livestock - fishery sector as pillar of a green economy to agricultural vocation, resilient to the effects of climate change, contributing significantly to GDP, ensuring food self-sufficiency rural and urban, expanding to foreign markets, and using modern techniques respectful of its environment and its socio-cultural identity.

# Climate-Smart Practices

Actions and initiatives on CSA have been undertaken for several years to reduce vulnerability or to adapt to adverse climate change effect. The techniques that support CSA developed in Madagascar were: (a) Conservation Agriculture (CA), (b) SRI (System of Rice Intensification), and (c) Watershed management. Other approaches such as Agroforestry and reforestation have also been implemented.

The most commonly practiced approach is conservation agriculture (CA).

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## CONSERVATION AGRICULTURE

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Conservation Agriculture (CA) emerged in Madagascar under the Direct Planting on Permanent Soil Cover (DPPSC) system in the early 1990s.

Two platforms lead CA activities in Madagascar: GSDM (Groupement Semis Direct de Madagascar – direct seeding group of Madagascar) is the focal point of promoting CA in Madagascar; the NCATF (National Conservation Agriculture Task Force) is the focal point for national coordination of all actions on CSA and for broadening the area of intervention to CSA.

These two platforms promote CA/CSA at both institutional and operational level.

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## SYSTEM OF RICE INTENSIFICATION

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The basic strategy with SRI is to create soil, water, and nutrient conditions that accelerate the growth of the rice seedling. SRI principles and practices have been adapted for rain-fed rice as well as for other crops, with yield increases and associated economic benefits.

All 22 regions in Madagascar practice the SRI.

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## DONOR PROJECTS

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The FAO, with funding from the Common Market for Eastern and Southern Africa (COMESA), and in collaboration with the East African Community (EAC) and the Southern African Development Community (SADC), has implemented the program entitled "Programme on Climate Change Adaptation and Mitigation in Eastern and Southern Africa."

The objective of this program is to support the scaling of the adoption of CSA techniques to enhance livelihoods and food security of small farmers in the regions of Eastern and Southern Africa, including Madagascar.



# Gaps and Challenges in Climate-Smart Agriculture

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## POLICY GAPS

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Coherence, coordination, and integration between sectors dealing with climate change, agricultural development, and food security are key requirements for creating a policy environment for CSA. CSA policies and support need to be mainstreamed into broader public policy, expenditure, and planning frameworks at the national, subnational, and local level.

CSA also requires coordination between concerned agencies across different sectors, promoting partnerships with non-state stakeholders that play a key role in CSA.

### RECOMMENDATION:

Place significant focus on integrated policy development at national and local level in Madagascar to ensure a coordinated response to climate change – including through CSA.

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## KNOWLEDGE SHARING, CAPACITY BUILDING, AND EXTENSION

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A crucial precursor for the uptake of CSA in the country is the sensitization and institutionalization of the concept within the ministry of agriculture through leadership awareness of the potentials benefits of CSA, as well as training of extension staff and other stakeholders

(farmer organizations, NGOs) on CSA frameworks.

CSA practices are knowledge-intensive, and promoting their adoption requires well-designed, inclusive, and innovative knowledge-management systems.

### RECOMMENDATION:

A strong emphasis must be placed on building the capacity of extension workers, producers, and other stakeholders in the use of CSA technologies and practices in Madagascar.

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## INVESTMENTS AND FINANCIAL FLOWS

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Financing the activities associated with upscaling and mainstreaming CSA is costly. Currently, most financing of CSA in Madagascar is based on donor funding.

### RECOMMENDATION:

Closely monitor the impact and success of current CSA projects to understand the potential of initiatives to contribute to agricultural transformation and livelihoods, and through this attract increased investment.

The Government needs to secure funds for climate change in the agriculture

sector. Mainstreaming of CSA into national- and local-level strategic investment is thus an important step. Development partners should be engaged to give technical and financial support to the agricultural sector to prepare bankable project/program proposals, and thereby access global climate funds such as the Green Climate Fund.

Public-private partnerships also have high potential for contributing to the development and uptake of CSA in Madagascar through, for example, innovative insurance schemes and investment in (and testing of) new technologies.

### RECOMMENDATION:

A multipronged approach to diversify the funding base for CSA should be developed and implemented, tapping into sources of funding from private and public agriculture and climate-related institutions at national, regional, and international levels.

# Mapping CSA Policy and Practice in Africa

This policy brief is an output emanating from a larger study conducted in collaboration between the **Food, Agriculture, and Natural Resources Policy Analysis Network (FANRPAN)** and the **Earth System Governance Project**, on policies for climate-smart agriculture. The Earth System Governance Project is an international social science research network in the area of governance and global environmental change.

The study was funded by the Norwegian Agency for Development Cooperation (NORAD) and the African Capacity Building Foundation (ACBF).

**The research project consisted of a comparative assessment of relevant CSA policies and practices in 15 countries across Eastern and Southern Africa.** The research was commissioned by FANRPAN to analyze the barriers and opportunities for promoting CSA in sub-Saharan Africa. This means agriculture that (i) increases productivity and income; (ii) adapts and builds resilience to climate change; and (iii) reduces greenhouse gas emissions where needed.

FANRPAN commissioned CSA policy scoping studies through the work of national consultants and assessed the responsiveness of policy frameworks in 15 Eastern and Southern African countries (Botswana, Democratic Republic of Congo, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Uganda, Tanzania, Zambia, and Zimbabwe).

The main objectives were to:

- Conduct a comprehensive review of the existing CSA policies at national level;
- Analyze gaps in the existing policy frameworks;
- Assess the CSA technologies, innovations, and practices (as well as untapped opportunities);
- Identify key stakeholders in CSA;
- Identify relevant policy recommendations; and
- Develop and share policy recommendations at national and regional levels.



The study processes included review of existing documents and interviews with key informants from a wide range of organizations. In all countries, national policy dialogues were convened to (i) share the draft CSA scoping study report outputs with stakeholders; (ii) validate the outputs from the draft CSA scoping study report; and (iii) solicit policy recommendations from stakeholders. The draft reports were reviewed externally, and recommendations from both the national dialogues and the external reviewers were incorporated into the CSA scoping study's final reports.



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**FANRPAN**  
Food, Agriculture & Natural Resources Policy Analysis Network



**Norad**

## About FANRPAN

The Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN) is an autonomous regional stakeholder driven policy research, analysis and implementation network that was formally established by Ministers of Agriculture from Eastern and Southern Africa in 1997. FANRPAN was borne out of the need for comprehensive policies and strategies required to resuscitate agriculture. FANRPAN is mandated to work in all African countries and currently has activities in 17 countries namely Angola, Benin, Botswana, Democratic Republic of Congo, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

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