FANRPAN
Food, Agriculture & Natural Resources Policy Analysis Network

POLICY BRIEF 14/2017

CLIMATE-SMART AGRICULTURE IN MAURITIUS

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).

Mauritius 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: Ensure adequate plans for implementation of intended CSA activities identified in the agricultural sectoral strategy and Mauritius' NDC are in place and have adequate support.

TWO: Empower stakeholders in government, NGOs, and extension services to understand, promote, and implement CSA.

THREE: Identify appropriate incentives to promote uptake among of CSA practices amongst farmers.

FOUR: Work towards institutional coordination between private and public agriculture and climate-related institutions at national (e.g. the Climate Change Division), regional, and international levels to garner increased support for CSA initiatives.

FIVE: Closely monitor the impact and success of CSA projects in Mauritius (as is planned) to understand the potential of initiatives to contribute to agricultural transformation and livelihoods, and attract increased investment.

POPULATION Total population of 1.2 million of which 60% live in rural areas (World Bank, 2015).

ECONOMY Real GDP growth increased slightly to an estimated 3.6% in 2016, from 3.4% in 2015, with further increases projected for 2017 and 2018. A stable macroeconomic environment with single-digit inflation (averaging 1.3% in 2016) (African Economic Outlook, 2017).

POVERTY Less than 1% of the population below the international poverty line (World Bank, 2017a).

AGRICULTURE IN ECONOMY Currently less than 5% of GDP is from agriculture (World Bank, 2017b). Statistics Mauritius (2015) revealed that almost 10% of the total rural labor force is employed in agriculture.

CLIMATE CHANGE Mauritius' greenhouse gas emissions make a minimal contribution global emission (World Bank, 2017c).

Context Overview

AGRICULTURE IN MAURITIUS

The Republic of Mauritius is an island nation in the Indian Ocean. The country includes the islands of Mauritius, Rodrigues, and the outer islands.

Agriculture in Mauritius occupies about 40% of the land area and includes about 22,000 small-scale individual sugarcane planters, and about 12,000 small growers of food crops, tea, tobacco, palm, fruit and flowers (GoM, 2010).

Agriculture in Mauritius is dominated by sugarcane, with about 70% of the sugarcane sector under corporate management, while the remaining 30% is owned by individual planters.

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). **As a Small Island Developing State (SIDS), Mauritius is highly vulnerable to the effects of climate change and its adverse impacts on socio-economic development.**

Temperatures in Sub-Saharan Africa are already close to or beyond thresholds at which further warming reduces (already low) yields (Cline, 2008), and Mauritius' National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) notes that the country is expected to be 3.8 degrees Celsius warmer by 2050 (GoM, 2016).

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 Mauritius.

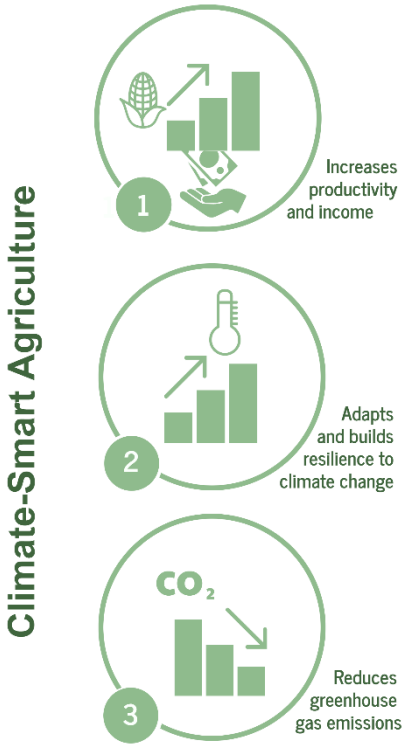
The mean temperature in the country has been increasing by 0.13°C per decade. On the other hand, rainfall has seen an overall decrease of about 100 mm over the last 50 years. Tropical storms are increasing in strength, with more frequent flood events. Mean sea levels have risen (GoM, 2010).

Furthermore, the ecosystem and natural habitat of fish and other marine species are being rapidly eroded due to adverse impacts of climate change, with some coral reefs under the threat of extinction, and natural assets, such as beaches, which are vital to the tourism industry may deteriorate, posing threat to some $50 million in value from the sector by 2050.

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 Mauritius (UN News Centre, 2016). Although the El Niño has receded, the impact of the higher- than-average temperatures and the lower-than-average rainfall continue to be felt. El Niño also has a negative impact on coral reefs.

According to the World Risk Report, Mauritius is ranked as the 14th country with the highest disaster risk and ranked 7th on the list of countries most exposed to natural hazard (Birkmann et al., 2014).

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 developing 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) in place, and/or National Climate Change Response Strategies.

Mauritius recently launched its Strategic Plan for the period 2016 – 2020 for the Food Crop, Livestock and Forestry Sectors. The strategy sets the goals for Mauritius to improve food security, food safety and promote more sustainable agriculture.

CSA POLICIES

The major agriculture policies in Mauritius are broad-based and designed for food security and agricultural productivity in the nation, rather than for climate-smartness *per se*.

However, Mauritius has, in its NDC, made it clear that CSA is a specific mitigation strategy it intends to implement. Furthermore, the Strategic Plan for Food Crop, Livestock and Forestry Sectors identifies CSA as one of the cross-cutting matters that must be addressed, along with twelve specific actions to do so.

INTERNATIONAL ENVIRONMENT

As a non-Annex I party to the Paris agreement, Mauritius has no obligations to reduce GHG emissions, but has an obligation under the 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.

Mauritius has submitted its nationally determined contribution (NDC) to the convention and this was ratified in April 2016. Herein, Mauritius stated its intention to reduce overall GHG emissions by 30% by 2030 (with the business-as-usual scenario used as the baseline). This emission reduction is not conditional; however, Mauritius has appealed to the international community to help in the form of technical and financial support (GoM, 2016).

Regionally, Mauritius 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. Mauritius signed its CAADP compact in 2015, but does not yet have a National Agricultural Investment Plan (NAIP).

NATIONAL POLICY ENVIRONMENT

The Mauritius Ministry of Environment, Sustainable Development, and Disaster and Beach Management (MOESDDBM) is the focal point for UNFCC. It coordinates the country's actions on climate change through its Climate Change Division (CCD), which has put in place a system to monitor and assess vulnerability and adaptation to climate change. The planning process for climate change will be reinforced with the proposed introduction of a Climate Change Bill.

Climate-Smart Practices

Mauritius has several examples of agricultural practices that can be deemed climate-smart, but they are not all mainstreamed. Farmers adapt to changing conditions through a combination of traditional practices and modern techniques recommended by the extension staff. Some CSA relevant practices are described below.

MIXED CROPPING

Farmers in Mauritius and Rodrigues often grow several crops together. This ensures some harvest in the event of a failure of the main crop (ensures food security), and there are also other benefits, such as reduced pest and disease attack, better utilisation of water and nutrients, maintenance of a soil cover for a longer period of time (an adaptation to climate change).

MULCHING

Farmers in some parts of Mauritius use sugarcane or maize stalks as mulch to prevent soil erosion and maintain soil moisture. Although some farmers in Rodrigues use maize stovers as mulch, most prefer to keep maize stovers to feed to cattle rather than as a soil cover. Research on innovative mulches has identified banana leaves, coconut leaves, vetiver as organic mulches as well as textile fabric (Lalljee, 2012, 2013).

Mulching has been shown to reduce soil temperatures, retain moisture in the soil (which helps in water conservation), prevent soil erosion, reduce incidence of pests and weeds, add to nutrients in the soil, and increase yields (ensures food security as well as adaptation to climate change). The organic mulch decomposes and gets incorporated into the soil, thereby adding to the carbon pool in the soil (mitigation). However, the shortage of organic mulch materials is a drawback to this climate-smart practice in Mauritius.

ADJUSTING PLANTING DATES TO RAINFALL

In Rodrigues, there is increasingly late onset of rains. Since maize and beans are only planted after the first rains, the uncertainty about the onset of rains has led to farmers modifying their farming practice to adapt to this situation. They prepare the land, but plant only when the rains come. Late rains mean late planting, which shortens the growing season considerably.

Although the Mauritius Meteorological Services provides rainfall forecasts for up to one week in advance, there is nonetheless considerable variation in forecasting efficiency, mainly due to the small size of the islands. Presently there is no source of advice to farmers on the specific issue of adapting to the observed changes in rainfall patterns.

WATER HARVESTING IN FIELDS

Most farmers in Rodrigues, and several in the southeast coast of Mauritius, dig ponds in the fields to collect rainwater and runoff from adjacent higher ground. These ponds provide water for irrigation, preparing spray volumes for pesticides, and other farm activities for several months in a year, and thereby reduce the use of river or municipal water. They are a particularly useful adaptation measure during periods when there is no rain.

BIOLOGICAL CONTROL OF INSECT AND OTHER PESTS

Natural enemies have been introduced by the agricultural Ministry for several of the key pests of sugarcane and food crops in Mauritius. As a result, there is no use of insecticides in sugarcane fields, all insect pests being controlled by the introduced natural enemies. In the non-sugar sector, several important pests are controlled using this approach, with varying degrees of success. Increasing agricultural biodiversity and/or reducing use of synthetic pesticides is an important adaptation practice. Biological control in Mauritius is not applied by farmers; it is institutionalised at the level of the Ministry of Agroindustry and Food Security (for all crops, except sugarcane) and the Mauritius Cane Industry Authority (for sugarcane). While this increases efficiency of introduction and release of the natural enemies, as well as the bio-security aspect, it does not involve the farmers sufficiently. The result is that many farmers are not aware of the role of natural enemies in pest control and do not feel sufficiently involved in this activity to ensure the survival of these natural enemies, e.g. through reducing their application of synthetic insecticides, or using selective insecticides that do not kill the natural enemies.

POLICY GAPS

Climate-smart agriculture is context- and location-specific; therefore, implementation of CSA in Mauritius' agricultural system should use existing policy instruments as a launch pad.

KNOWLEDGE SHARING, CAPACITY BUILDING, AND EXTENSION

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

INVESTMENTS AND FINANCIAL FLOWS

The government of Mauritius has clearly expressed their commitment to addressing climate change, but have strongly emphasized the need for

Gaps and Challenges in Climate-Smart Agriculture

Current agricultural and related sectoral policy instrument objectives resonate with a CSA framework and have identified specific actions to promote CSA.

RECOMMENDATION: Ensure adequate plans for implementation of intended CSA activities identified in the agricultural sectoral strategy and Mauritius' NDC are in place and have adequate support.

There is a need to foster inter-linkages between different sectoral policies, and to ensure appropriate representation of all the sectors that have relevance to CSA.

RECOMMENDATION: In planning for CSA implementation it is important to work towards institutional coordination between private and public agriculture and climate-related institutions at national (e.g. the Climate Change Division), regional, and international levels to garner increased support for CSA initiatives.

Community-and locally-based networks and associations should thus be strengthened for better management and delivery of services for CSA, and to facilitate locally appropriate adaptation measures.

RECOMMENDATION: Empower stakeholders in government, NGOs, and extension services to understand, promote, and implement CSA.

Farmers practising CSA must be supported through economic and in-kind incentives, such as subsidies, insurance schemes, farm inputs etc. in order to encourage and support their active participation in CSA projects and strategies.

RECOMMENDATION: Identify appropriate incentives to promote uptake among of CSA practices amongst farmers.

financial and technical support to do so. It would thus be expedient to implement steps to bolster national capacity to access financial resources available for technology development and transfer, investments and capacity development for CSA.

Several innovative options for financing CSA are emerging and should be explored. For instance, combining financing from public and private sources to meet the investment requirements of CSA, e.g. using revenues from taxes on GHG emissions to subsidize CSA projects.

Standards and indicators (social, economic and environmental) for CSA should be built into plans for monitoring and evaluating progress and for greater transparency and accountability as has been planned.

RECOMMENDATION: Closely monitoring the impact and success of CSA projects in Mauritius (as is planned) to understand the contribution of initiatives to contribute to agricultural transformation in order to attract increased investment.

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 practice (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 a) share the draft CSA scoping study report outputs with stakeholders; b) validate the outputs from the draft CSA scoping study report; and c) solicit policy recommendations from stakeholders. The draft reports were reviewed externally, and both recommendations from the national dialogues and external reviewers were incorporated into the CSA scoping study's final reports.

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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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