

POLICY BRIEFING

Financing nature-based Solutions and Climate-Smart Agriculture in Mauritius

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Policy pointers

Nature-based solutions and

climate-smart agriculture can help the government to achieve its food self-sufficiency, resilience, and food security and safety objectives.

Only 2.7% of the total budget of the

Ministry of Agro Industry and Food Security and 21% of agricultural subsidies are used to support measures promoting NbS and CSA, while 44% of subsidies support the use of inorganic fertilisers, which lead to unwanted pollution of water, decline in soil health, and impacts on biodiversity and human health.

The government could reap

significant benefits by repurposing subsidies for costly imported inorganic fertilisers, to support locally produced bio-inputs; and by improving the administrative procedures and uptake of existing biofarming schemes, while supporting farmers during the transition phase to biofarming.

Such reforms should be coupled with

improvements in product certification, compost supply, research, training and extension services, and the policy and legal framework for NbS and CSA.

A more coordinated approach

and more intense consultations with all stakeholders is required for proper implementation to enhance the outcomes expected from these measures.

As a small island developing state, Mauritius is experiencing adverse impacts of climate change on agriculture and needs to conserve the natural resource base that underpins productivity. The agriculture sector is heavily dependent on increasingly costly imported inputs, including subsidised chemical fertilizers, despite national policies on sustainable, climate-smart and nature-based agriculture. This policy brief, prepared by the UN Partnership for Action on Green Economy (PAGE), examines the environmental and socio-economic impacts of existing agricultural fiscal policies, and identifies a toolkit of reforms needed to promote the adoption of nature-based solutions (NbS) and climate-smart agriculture (CSA), including potential new green finance instruments. It assesses the impacts of these reforms and the challenges and opportunities for implementing them, in order to scale up finance and investments towards sustainable food systems in Mauritius.

The challenges caused by the aftermath of the COVID-19 pandemic, rising inflation, devaluation of the local currency, the ongoing conflict in Ukraine, coupled with the impacts of climate change is threatening the food security of Mauritius. Although the contribution to GDP and employment has seen a decreasing trend in the agriculture sector (see figure 1), it is an economically important sector and the uncertainties prevailing in the global supply chain for food and agricultural commodities and rising input prices are leading the government of Mauritius to pursue strategies that can improve food self-sufficiency and sustainability. This situation therefore presents opportunities for investing in and adopting NbS and CSA which in turn can reduce GHG emissions, improve resilience to climate change, enhance food security and protect biodiversity, while creating green jobs and contributing to a green recovery. Long-term use of agrochemicals is known to deplete soil health and can lead to water pollution and harm biodiversity, while contributing to GHG emissions.

Mauritius ratified the Paris Agreement in 2016 and the updated Nationally Determined Contribution (NDC) of the Republic of Mauritius (2021) outlines actions focusing on CSA and NbS for adaptation and mitigation to climate change. Under the NDC, Mauritius commits to adopt the following for its agriculture and livestock sectors: i) reduction of the use of fossil energy-based inputs (gasoil, pesticides, fertilisers) by a shift to agroecological and resilient practices; ii) improve efficiency in the use of inputs (water, chemicals); iii) enhance the potential of carbon sequestration and improvement of soil fertility and iv) reduce post-harvest losses. For the livestock sector, agroecological practices will be applied to lower GHG emissions. Mauritius has committed to adopting CSA practices, natural farming systems and sustainable agriculture, as stated in the National Food Systems Pathway for the UN Food Systems Summit. Enhanced resilience, food security and food safety are important government priorities reflected in key national development policies. The country has adopted the 2030 agenda for sustainable development and promoting NbS and CSA aligns with Goal 2 – zero hunger, Goal 7 – clean energy, Goal 13 – climate Action and Goal 15 – life on land. The Climate Change Act 2020 establishes a legal framework towards making Mauritius a climate resilient and low emissions country.

This policy brief presents the results of a UN PAGE study conducted in 2022 to assess the impacts of existing agricultural fiscal policies in Mauritius and develop a toolkit of reforms to promote the adoption of CSA and NbS (Brizmohun and Hardowar, forthcoming).

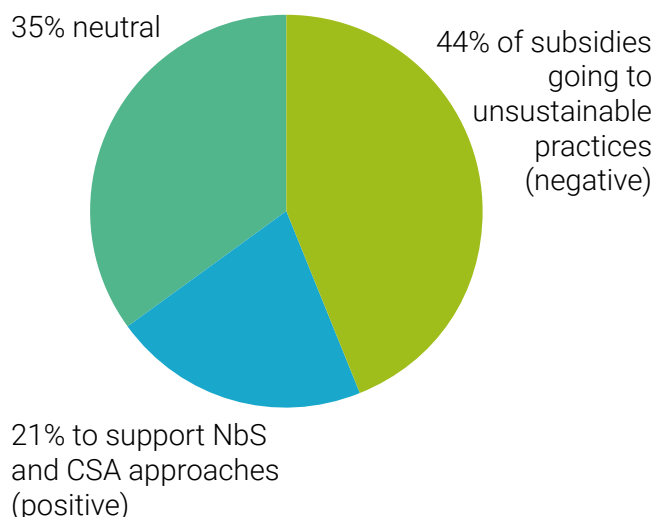
Box 1 - Nature-based solutions and climate smart agriculture

The PAGE study used the UNEA-5 definition of NbS: ‘actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits’. The FAO defines CSA as an approach that helps to transform agri-food systems towards green and climate resilient practices.

Assessing finance and fiscal schemes for NbS and CSA

Over the past decade, Mauritius has been promoting agriculture using different support mechanisms including a number of fiscal policies, incentives and financial instruments, which mainly aim to enhance productivity. The types of support provided by the government are subsidies, grants, income tax incentives, tax exemptions for agricultural equipment, and preferential agricultural loan schemes through government owned banks. However, not all of the current support to agriculture helps to shift towards a more sustainable pathway. Most strikingly, subsidies for inorganic fertilisers in sugarcane and tea growing subsectors together comprised about 44% of the subsidies in the agriculture sector in 2021–2022. Such subsidies encourage the use of inorganic fertilisers and excess fertiliser application or the wrong timing of application can lead to nitrate pollution in water and can harm biodiversity. The actual expenditure for chemical fertiliser schemes increased during that fiscal year because of increases in the price of fertilisers. Chemical fertilisers also deplete soil health over time and can adversely affect the health of farm workers and consumers. By contrast, subsidies for sustainable and organic agriculture and CSA comprised only 21% of actual expenditure on subsidies for the agriculture sector and 2.7% of the total expenditure of the Ministry of Agro-Industry and Food Security (MAIFS) (Figure 1).

Figure 1: Environmental impacts of subsidies



Out of the 11 agricultural fiscal schemes analysed, three were found to have negative environmental impacts: the Fertilizer Subsidy Scheme for Sugarcane Planters (MUR 108 million in 2021–22); the Fertilizer Subsidy Scheme for the non-sugar sector introduced in 2022 (MUR 60 million); and the Livestock Feed Promotion Scheme (MUR 21 million in 2021–22) given GHG emissions from livestock and maize and soybean imports from Brazil and Argentina.

Eight schemes were found to support sustainable or organic practices and climate-smart agriculture (not NbS specifically), but these schemes receive limited finance and many have faced problems with implementation. A number of good initiatives, including biofarming, sheltered farming and rainwater harvesting schemes have been hampered by complex administrative procedures which deter applicants. Applicants for the sheltered farming scheme, which promotes climate resilience and resource use efficiency, have had to wait up to two years to receive funds. Biofarming schemes have also seen limited uptake due to low returns on investment from organic farming and limited capacity resulting in low yields. The Biofarming Promotion Scheme has received no applications since 2018 because many farmers have not been able to fetch premium prices for organic products due to limited consumer demand and problems with product certification. Another key constraint for farmers is limited reliable sources of bio-inputs such as good quality certified compost. A compost factory was closed down due to questionable quality.

Toolkit for financing nature-based and climate-smart agriculture in Mauritius

The government of Mauritius has clear intentions to promote sustainable agriculture as indicated in policy documents and budget speeches by the Minister of Finance, Economic Planning and Development. Actionable and contextualised priority reforms to the economic and fiscal policy environment to improve the adoption of NbS and CSA are proposed as means for the government to implement its commitments. The following **fiscal reforms** are needed to reduce harmful subsidies and improve implementation of schemes that support biofarming and CSA:

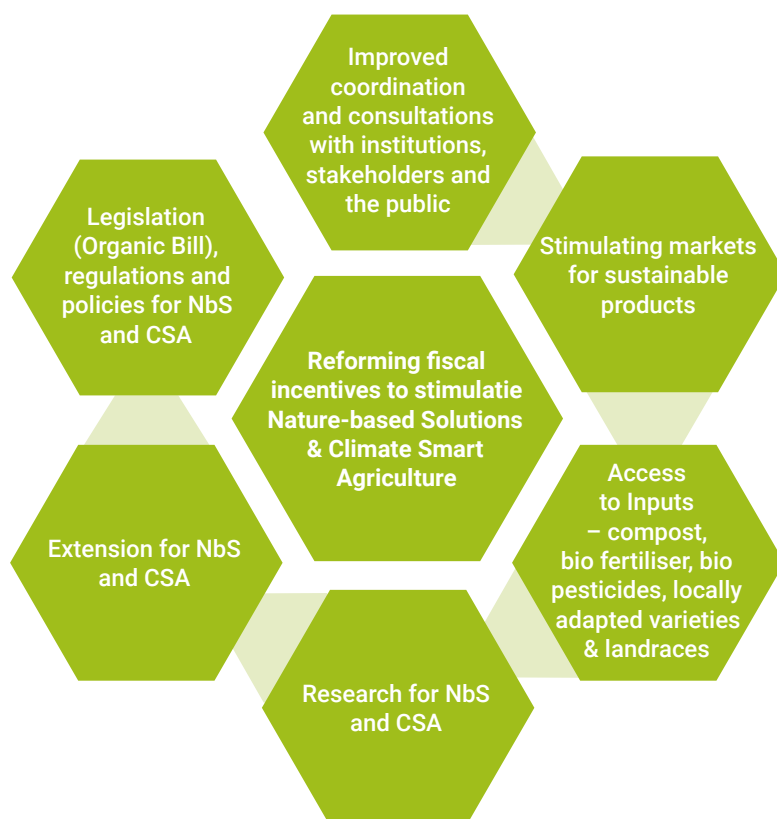
Repurpose harmful subsidies notably chemical fertilisers: The costly fertiliser subsidy schemes for the sugarcane and non-sugar sectors should be phased out. The funds saved could be used to subsidise bio-inputs and provide financial support to farmers during the transition period from conventional to biofarming. In Andhra Pradesh, India, the Zero Budget Natural Farming programme has dramatically decreased fertiliser use and provided low cost biological inputs, generated consistent yields, enhanced resilience to extreme events, restored ecosystem services and biodiversity on-farm, produced safe and nutritious food, improved health and empowered women farmers.

Improve the application process for existing schemes that support biofarming and climate resilience: This would reduce the administrative burden and processing time and thus enhance uptake. This includes streamlining schemes provided by different organisations, as well as digitalisation of procedures and use of smart apps to simplify the application process. Inter-institutional committees should be set up to review applications and speed up disbursement, eg. for the sheltered farming and rainwater harvesting schemes which involve grants from MAIFS and loans from Development Bank of Mauritius. This is in line with the e-government initiative in Mauritius.

Improve the implementation of biofarming schemes: The biofarming support scheme should test imported bioproducts to ensure their efficacy in Mauritius, and constantly update the list of imported bioproducts that can be subsidised by improving linkages amongst importers, farmers, FAREI and the Small Farmers Welfare Fund. It should also promote locally available bio-inputs and practices based on local and traditional knowledge that often support nature-based solutions and can reduce reliance on imports. A list of registered biofarmers should be made available to speed up the review process. The Biofarming Promotion Scheme should be reformed to provide grants to farmers to support the transition to biofarming instead of loans, as many farmers are not prepared to take on additional loans. The concept of NbS and agroecology could be further integrated into the scheme to enhance climate resilience.

However, to move along the pathway for more sustainable agricultural growth, a number of system-wide interactions need to be strengthened, as shown in Figure 2. Fiscal policies are most effective as part of complementary policies promoting other key drivers to stimulate the systemic and behavioural changes needed to shift towards NbS and CSA.

Figure 2: Drivers of NbS and CSA in the pathway for greening agriculture in Mauritius



A number of **complementary measures** have been identified to support effective fiscal policy reforms:

Improving coordination and consultations with institutions, stakeholders and the public: A multi-stakeholder committee should be established comprising of public, private and civil society, dedicated to the adoption of sustainable agriculture practices, NbS and CSA, to provide advice prior to the implementation of fiscal schemes.

Stimulating markets for sustainable products: The market share for sustainably produced agriculture products is relatively small. Unless the demand for such products increases, fiscal incentives promoting the adoption of NbS and CSA have limited impacts. Farmers will only invest time and money for products that have a market. Therefore sensitisation campaigns for such products will be required and a budget allocated accordingly. Secondly, the Maurigap certification scheme should be strengthened as certification and labelling of products from sustainable agriculture is important for farmers to get a premium. An independent body should be established to administer the Maurigap scheme to avoid conflicts of interest.

Improving access to inputs (compost, bio-fertiliser, bio-pesticides, locally adapted varieties and landraces): Limited access to certified quality compost in Mauritius limits the implementation of the compost subsidy scheme and biofarming schemes – there is a need to develop a certification standard for quality compost. NbS involves the use of plant varieties and animal breeds which are well adapted to the local context. The MAIFS propagates local seed varieties on a small scale because of limited capacity; hence there is a need to enhance capacity for local seed production through staff training and modernisation of equipment. Farmers should also be encouraged to multiply, exchange, save and store local seeds. Breeding of livestock species with local genetic material will contribute to NbS and CSA, for instance, the Creole cattle breed is known to be well adapted to the local context, even though production

of milk may not be as high. Breeding support schemes can be reformed to support robust local varieties.

Enhancing research on locally effective approaches for NbS and CSA: The adoption of NbS and CSA in Mauritius requires contextualised knowledge of these approaches and strengthening of research institutions. Limited uptake of the Biofarming Promotion Scheme may be attributed to the lack of research on effective organic practices. The biofarming support scheme would have a greater impact if appropriate bioproducts are recommended to farmers based on impact studies. Although some research has been undertaken by different institutions, a more coordinated approach to research for the promotion of NbS and CSA in Mauritius is required, along with more investment in NbS research. Furthermore, participatory research with small-scale farmers is required to explore traditional knowledge relating to local biodiversity, agroecology and ecosystem services and improve their integration in biofarming techniques.

Strengthening Extension Services for NbS and CSA: Research on NbS and CSA should actively engage farmers and the results should be shared with farmers more widely through the extension services. Capacity building of extension services is a prerequisite for participatory research and transfer of knowledge on Nbs and CSA from research to farmers, to support locally effective and productive approaches.

Legislation (Organic Bill) and policies for NbS and CSA: The Organic Bill is still in draft form and will be a key document for promoting organic agriculture in Mauritius. In addition, policy developed by MAIFS for the agriculture sector should include strategies that promote NbS and CSA for sustainable food production and consumption. The policy document should provide the enabling conditions and framework for the adoption of sustainable agricultural practices by ensuring that the drivers that will promote NbS and CSA are put in place.

In addition, the study identified four **potential new green finance instruments** and tools to scale up and channel finance and investment towards sustainable food systems:

- 1. Green financing for innovative technologies in agriculture:** The adoption of new technologies such as remote sensing, GIS for soil profiling and adjustment and Innovative Drone Technology for use in precision pest management can improve the way agriculture is done in Mauritius. These technologies are highly relevant for Mauritian agriculture as the sector faces multiple challenges linked to climate change, soil degradation, pest and disease control, and shortages and high costs of labour. Research is needed on the use of new technologies in agriculture, with emphasis on climate-smart agriculture and exploring their potential for supporting NbS and agroecology. Simultaneously, tax exemptions, grants, green loans and green investments should be used to encourage a paradigm shift to adopt such technologies. Incentives for investment in these technologies should be developed by the MAIFS in close collaboration with FAREI and the Economic Development Board.
- 2. Green investment promotion schemes:** Sustainable agriculture may benefit from the expertise of 'green' investors promoting NbS and CSA in Mauritius. It is important for Mauritius to create an enabling environment for innovative agriculture to emerge. One way is to propose financial schemes to incentivise foreign companies to set up innovative NbS and CSA enterprises in Mauritius through mechanisms at the level of the Economic Development Board.
- 3. Integrating NbS and CSA in green building plans and real estate development:** Mauritius is seeing a surge in real estate development. Integrating a component for NbS and CSA in the design of buildings is an innovative way to promote sustainable urban agriculture (eg. rooftop gardening and vertical farming). Collaboration is required between relevant stakeholders to propose amendments in legislation to facilitate the uptake of such proposals, and the development of innovative financing schemes to support urban agriculture should be explored. The lead for such a scheme may fall within the purview of the Ministry of Housing and Land Use Planning in close collaboration with the MAIFS.
- 4. Capacity building for green fiscal instruments by banks:** Green loans are available through commercial banks in Mauritius through refinancing by development partners. However, only a very limited number of agricultural enterprises have benefited from these loans. The riskiness of such

projects is high, deterring CSA or NbS promoters to apply and benefit from these loans. Also, the farmers often find it difficult to draft business proposals that meet the criteria for green loans. Therefore, capacity building for preparing NbS and CSA business plans and development of criteria for assessment of green loans is required.

Table 1 below presents an assessment of the potential impacts of the reforms proposed.

Scheme	Description of reform and instruments	Environment	Economic	Social
Biofarming support scheme	Extend a wider product range eligible for biofertiliser and biopesticide subsidy	✓	✓	✓
Biofarming promotion scheme	Provision of grants for the adoption of NbS and CSA rather than loans coupled with a mechanism to support payments for ecosystems services	✓	✓	✓
Rainwater Harvesting System Scheme	Integrate the loan and grant components into one application, simplifying process for applicant	✓	✓	✓
Sheltered Farming scheme	Integrate the loan and grant components into one application, simplifying process for applicants	✓	✓	✓
Fertiliser scheme for sugarcane and non-sugar sectors	Review scheme to encourage the adoption of bio-fertilisers as an alternative to chemical fertilisers	✓	✓	✓
Cattle Breeders scheme	Reform scheme to promote local landraces such as the Creole cattle breed	✓	✓	--
Goat/Sheep/Pig Breeder scheme	Reform scheme to promote local landraces	✗	✓	--
Calf Productivity Incentive scheme	Favour local breeds through this scheme to promote NbS.	✗	✓	--
Investment in research for NbS and CSA in Mauritius	Clearer focus on research to stimulate uptake of NbS and CSA is required by institutions, along with support from development partners to strengthen institutions	✓	✓	✓
Strengthening Extension Services for NbS and CSA	Strengthen capacity of extension services for improved knowledge on NbS and CSA	✓	--	✓
Stimulating markets (certification and consumer awareness)	Sensitisation of consumers to create a pull in demand for sustainably produced, certified and labelled produce, generating a premium for farmers	✓	✓	✓

Scheme	Description of reform and instruments	Environment	Economic	Social
Improving access to bio-inputs (compost, bio-fertiliser, bio-pesticides, IPM, locally adapted varieties and landraces)	Investing in compost manufacturing and certification, and enhancing access to other bio-inputs and local varieties to promote NbS and CSA	✓	--	✓
Improved coordination and consultations with institutions, stakeholders and the public	The buy-in of stakeholders, institutions and the public is required for successful implementation of schemes promoting NbS and CSA	--	--	--
Legislation (Organic Bill) and policies for NbS and CSA	The legislative framework, regulations and policies for NbS and CSA have to be in place	✓	--	✓
Digitalisation of procedures and smart apps	Investment in the digital infrastructure for implementation of schemes promoting NbS and CSA	--	✓	--
Incentivising a circular economy for greening agriculture	The process of green waste collection at different levels requires the setting up of incentives that will bring about changes in behaviour	✓	✓	✓
Green financing for innovative technologies in agriculture	The adoption of disruptive technologies requires appropriate mechanisms and a combination of green finance instruments for farmers	✓	--	✓
Green Investment promotion schemes	The Economic Development Board may propose green investment strategies to stimulate FDI in greening agriculture	✓	✓	✓
Integrating NbS and CSA in green buildings and real estate	Legislation required to integrate NbS and CSA in new buildings and real estate development, promoting sustainable urban food systems	✓	✓	✓
Capacity building for green fiscal instruments by banks	Improving disbursement of green fiscal instruments by banks through enhanced capacity may have multiplier effects for greening the agriculture sector	✓	✓	✓

Key: ✓ positive impact ✗ negative impact -- no impact

Challenges to reforming fiscal policies and ways forward

Key challenges to reforming existing fiscal policies and introducing new policies and ways to address them include:

- **Training and capacity building:** There is still limited understanding of NbS and CSA concepts amongst many actors, including policy and decision makers and producers. Regular training is needed for government ministries, farmers and banks, particularly on NbS which is a relatively new concept, given staff turnover. This should be linked to research and may require support from international partners and specialised agencies.
- **Mobilising finance:** Most schemes analysed and the reforms proposed are costs to the government. Costly fertiliser subsidies could be phased out to support these reforms, and ODA could also be sought from international partners.
- **Political economy and governance:** Sugarcane growers may be opposed to reducing or repurposing chemical fertilisers for fear of reduced productivity and may need targeted support in the form of grants to make the transition to biofarming. To promote greener sugar production, while maintaining the sugar sector, Mauritius can explore the possibility of marketing a greater share of sustainably produced sugar at premium prices through certification. It may be easier to reform the newly introduced fertiliser subsidy for the non-sugar sector. Strengthening cross-sectoral coordination between government ministries is also key to creating an enabling environment for NbS and CSA.

Currently the majority of agricultural finance in Mauritius promotes chemical intensive monocultures, rather than nature-based or climate-smart approaches, conflicting with government policies that aim to transition to sustainable agriculture. Mauritius is a small island state with limited land, therefore safeguarding the quality of land and soil for sustained productivity is crucial. It also imports 77% of its food. Promoting sustainable local production provides a way to reduce GHG emissions and vulnerability to shocks, while reducing reliance on increasingly costly imported inputs. The reforms proposed to increase the adoption of NbS and CSA can assist the Government's COVID recovery efforts by creating green jobs (eg. in compost and bio-input production) and enhancing incomes from niche markets. A wide range of complementary financing schemes can be integrated to enhance finance to promote the adoption of CSA and NbS in Mauritius.

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