

*Coffea mauritiana* / Mukesh Rughoo

## POLICY BRIEF No. 49

# Crop Wild Relatives in the South African Development Community

An urgent need to establish a network for crop wild relative conservation in the region

## Introduction

The countries of the South African Development Community (SADC) are facing unprecedented challenges related to food security, climate change and poverty reduction. The conservation and sustainable use of crop wild relatives (CWR), which is worth an estimated US\$120 billion globally, should be an urgent priority for the region. This policy brief outlines the current status of the SADC's CWR and provides an outline for policymakers to form a regional network to better protect CWR to improve food security, livelihoods and the conservation of biodiversity.

### KEY MESSAGES



Crop wild relatives are worth an estimated **US\$120 billion** annually



The SADC is a hotspot for CWR but they are **threatened and poorly protected**



**CWR protection can improve** food security, climate change readiness, and socioeconomic development



**130 million people in SADC** could potentially benefit from CWR protection

## Overview

The SADC region has 16 member states with diverse ecosystems including miombo woodlands, rainforests, Mediterranean temperate areas, islands, deltas and deserts. SADC countries are home to some of the world's top biodiversity hotspots. South Africa, Madagascar and the Democratic Republic of the Congo are the most biodiverse countries in Africa. Combined with the high diversity of agricultural practices, the region evolved a rich diversity of plant and animal genetic resources that have significant value for agriculture, food security and poverty eradication.

The SADC Regional Indicative Strategy Development Plan notes the region is susceptible to droughts, pests and diseases, adverse health conditions including AIDS, inadequate irrigation and poor transportation infrastructure. It also notes that women, who are major players in the agricultural sector, have limited access to and control of resources. As a result, the rich genetic resources in the region are poorly conserved and underutilized.

Many of the wild plant species in the region are closely related to crops that sustain food security. These CWR are sources of traits that are beneficial to crops such as pest and disease resistance, high yields, drought tolerance and salt tolerance. They

may also contain genes that can be useful for coping with changes in climate and the environment that adversely affect the region.

Globally, CWR diversity is increasingly used in breeding programs, especially in the development of new cultivars. However, use by breeders is limited by access to CWR, as they are poorly represented in gene banks and often poorly documented in the wild.

Moreover, inadequate access and benefit-sharing policies limit their use. Local farmers can play a vital role in maintaining CWR populations but need greater incentives.

An estimated 130 million people in the SADC could benefit from systematic conservation and sustainable use of CWR.

## Crop Wild Relatives in SADC

- ✓ **1,900 species** of wild relatives of several crops of regional and global importance, including coffee, cucurbits, eggplant, lettuce, millets, okra, pulses, rice, sorghum and watermelon
- ✓ **745 CWR** are related to **64 priority food** and **beverage crops** for the region
- ✓ **100** need urgent conservation
- ✓ The highest CWR richness is found in Eswatini, Malawi, Mozambique, South Africa, Tanzania and Zimbabwe
- ✓ A recent study identified **271 priority areas** in 13 SADC countries for the in situ conservation of CWR that could launch the regional SADC Network for In Situ Conservation of CWR with national priority sites for conservation

## The need for a network

In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment Report on Biodiversity and Ecosystem Services stated that nature is declining globally at unprecedented rates in human history. Some 1 million species are threatened with extinction including many CWR. The report recognizes that CWR are essential to long-term food security and that their loss makes agroecosystems less resilient. Because many CWR can persist under climate extremes, protecting them to understand and utilize their genetic traits for resistance is essential to future food security.

The Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) have called for greater protection and in situ conservation of plant genetic resources through CWR conservation in protected area networks. The United Nations' Food and Agriculture Organization (FAO) also called for a global network of "genetic reserves" within CWR hotspots to ensure their conservation and

sustainable use. In the ongoing negotiation of the post-2020 Global Biodiversity framework of the CBD, maintaining genetic diversity is a high priority and a specific target on wild relatives of domesticated animals and cultivated plants is proposed.

Awareness of the importance of plant genetic resources and their wild relatives in the SADC region dates to the 1980s when the SADC Plant Genetic Resources Centre (SPGRC) was established to protect and sustainably use plant genetic resources for food and agriculture (PGRFA) in the region. One SPGRC activity is to provide technical support and capacity building to Member States on international agreements and conventions for the management of PGRFA. Most of the activities of SPGRC have been to encourage the collection of priority PGRFA, primarily traditional crop landraces, and their ex situ conservation in national gene banks and the SADC regional collection in Lusaka, Zambia.

However, the conservation of PGRFA in gene banks is only part of the solution for crop improvement

in the face of climate change. Greater diversity of regional genetic resources is needed. This can only be achieved by conserving diversity in situ as well. This policy brief recommends a SADC network of in situ conservation sites for CWR in the region. It also outlines the justification for the establishment of the network, its aim and objectives, who would be involved, the benefits of membership, and how it would operate.

## Aim of the SADC CWR Network

The SADC CWR Network for In Situ Conservation of CWR will increase the conservation and sustainable use of CWR diversity by fostering complementary connections between the in situ network and the ex situ conservation network of national gene banks and the SPGRC.

## Justification

### What is the SADC Network for In Situ Conservation of CWR?

The SADC network will connect priority sites rich in CWR and their managers with other stakeholders such as researchers, gene bank curators, breeders, conservationists and farmers. The network will promote effective conservation and use of CWR by enhancing communication among network stakeholders, and by sharing experiences, information, guidelines, protocols, best practices and standards for conservation and use of CWR genetic resources.

### Why is a SADC CWR Network needed now?

Africa is the most food-insecure continent with the highest levels of malnourishment and poverty. It is also likely to be the most impacted by climate change. Resilience is linked to the diversity of genetic resources and CWR are highly diverse genetic resources. Yet there is no active conservation of CWR in their natural habitats (in situ) and CWR diversity is under-represented in gene bank (ex situ) collections.

Improving in situ management of protected areas, where important CWR diversity occurs, is a relatively

affordable method of conserving these resources. Establishing a SADC network of CWR-rich sites will potentially double the conserved CWR available to breeders for use in crop improvement. With minimal investment, we could greatly contribute to advance the development of climate-smart crop varieties.

### What are the functions of the network?

Stakeholder engagement will be carried out before the establishment of the network to review, agree and endorse its function to ensure ownership and sustainability. To guarantee efficiency and avoid duplication of efforts, the network will focus on activities not being already undertaken by agencies or other networks in the region. The closest related network is that of the SPGRC, which focuses on the ex situ conservation of PGRFA. The proposed CWR network will be hosted by the SADC Secretariat and complement the existing ex situ network. The functioning of the network must also be aligned with relevant global, regional and national targets.



Photo: Malawi Plant Genetic Resources.

# The five benefits of the SADC network

## 1 Enhanced conservation and sustainable use of CWR

The network will promote more systematic in situ conservation of CWR to better safeguard the diversity native to the region and ensure its availability for farmers, local communities and plant breeders to strengthen regional food and nutrition security.

## 2 Facilitated coordination

The network will facilitate coordination between protected area managers and PGRFA conservation agencies such as National Plant Genetic Resources Centers and regional SADC Plant Genetic Resources Centre. It will also promote coordination among protected area managers to improve the overall effectiveness of in situ CWR conservation by sharing experiences and information.

## 3 Enhanced partnerships

The network will foster stronger partnerships between (a) national, regional and global in situ conservation activities; (b) PGRFA and biodiversity conservation communities; (c) in situ and ex situ PGRFA conservation communities; (d) in situ/on-farm conservation activities and germplasm users; and (e) conservationists, land managers, farmers and local communities.

## 4 Facilitated access to and exchange of information

The Network will improve data exchange and standardization and address Access and Benefit Sharing (ABS) policies to facilitate access to in situ conserved materials and benefit sharing governed by the Nagoya Protocol and the ITPGRFA.

## 5 Benefits to local communities

The network will help achieve positive country- and site-level PGRFA conservation while demonstrating benefits to the ultimate custodians of these resources, the local communities who live in and around protected areas and reserves, and farmers and farming communities who are involved in the day-to-day management of CWR diversity.



*Ipomoea bathycapos* plants / Livhu Sanbi.

# How does the network contribute to the SADC Regional Indicative Strategic Development Plan?

The SADC RISDP provides the strategic directions for SADC programs and activities and aligns the strategic objectives and priorities of the SADC for achieving its long-term goals and regional integration. The SADC Network for In Situ Conservation of CWR can specifically support the RISDP priority intervention of sustainable food security.

## Network of protected areas, gene banks and breeding institutions

The network will consist of sites that are rich in CWR diversity (both protected areas and sites outside protected areas, like farms), gene banks that conserve CWR, and breeding institutions that routinely use the CWR genetic materials. The countries in the SADC community will gain economically in population health and well-being from a strong collaboration among four principal actors: conservationists, gene bank curators, breeders and agriculturists.

## Network membership

To manage these important genetic resources effectively, a cross-sector, multi-actor collaboration led by the SADC Secretariat is needed. This means that the Network would involve:

- Managers of sites with CWRs—farmers, gardeners, communities, private and public protected area managers, local government and other land managers, private and public seed and gene bank curators, including orchards, community seed banks, field gene banks and botanic gardens.
- The direct and indirect users of CWR and other plant genetic resources, including farmers, gardeners, local communities, researchers, and the public and private plant breeding and seed sectors.
- Other actors with an interest in conservation and sustainable use of CWR and plant genetic resources, including researchers, policymakers, educators and other interested groups.

The members of the network may include the following:

- ☑ National protected areas managers
- ☑ National gene banks part of the SADC network
- ☑ Individual landowners
- ☑ Communities with in situ CWR populations
- ☑ Local associations or cooperatives with CWR populations on communal lands
- ☑ Plant breeders from national organizations
- ☑ Private sector plant breeders using CWR trait diversity
- ☑ Regional and international research centers
- ☑ Botanists, herbaria and universities

## Benefits of joining the Network

**National protected areas managers, farmers and landowners** are key players as they are responsible for managing protected areas where CWR populations occur. All these stakeholders will benefit in getting support and information from the Network about local CWR species, tools and techniques for their in situ conservation. They will contribute to facilitating the use of CWR, thereby adding value to the biological resources under their jurisdiction.

National **gene bank curators** and plant **genetic resource centers** have the responsibility to ensure the plant genetic resources are effectively conserved ex situ for the long term but a recent study by the Darwin SADC-CWR project showed that 51% of the 113 priority CWR in the SADC region are not represented in ex situ collections. The network will enable stronger collaboration with protected areas managers to facilitate greater collection of CWR samples for conservation, using scientifically sound protocols that will not endanger wild CWR populations. The acquisition of more CWR will increase the diversity of their gene banks and makes them available to breeders and other users.

**Breeders** are among the key end-users of CWR in crop improvement programs. A recent analysis of the use of CWR by breeders in the SADC region by the Darwin Initiative SADC CWR project revealed that breeders acknowledge the value of CWR diversity in crop improvement and about 50% of them regularly use CWR in their breeding programs. However, they

identified several challenges in the use of CWR related to funding, equipment and expertise. The network will help address some of these challenges and help breeders gain greater access to previously unavailable CWR germplasm under agreed access and benefit-sharing mechanisms. They will be empowered to deliver new varieties that are more adaptable to local environments, resistant to diseases and pests, and produce more nutritious food, and greater yields in the face of climate change.

**Farmers and consumers** are the ultimate beneficiaries of the conservation and use of CWR through the network. Farmers face the effects of climate change, pests and diseases and they need access to new, adapted seeds for sustainable, cost-effective agricultural production, which is often only possible using CWR.

## Governance and funding

### How will the Network operate?

The network will be governed by the SADC Secretariat, Food, Agriculture and Natural Resources (FANR) Directorate. It will need a dedicated Network Operation Unit composed of a coordinator and supporting staff. It is proposed that the interim Network Operation Unit be hosted by SPGRC in Lusaka, Zambia and that the Senior Program Officer of SPGRC serves as the interim network coordinator until secure funding is obtained.

### Technical Guidance

The CWR Network Operation Unit will receive additional guidance from a regional technical committee composed of a member from each of the SADC Member States. International organizations that can support the Network will also be ex officio members of the technical committee.

### Network funding

Limited resources would be required by the SADC Secretariat to sustain the coordination unit of the network with two or three permanent staff. An initial injection of funds would be required to strengthen the in situ conservation program. Additionally, the leaders of the present Darwin Initiative project hope

to raise funds for the establishment of the network and are working with FAO to prepare a funding proposal through the Global Environment Fund (GEF) for the network. Other funding proposals can be developed with the help of the Alliance of Bioversity International and CIAT and other international organizations.



*S. violaceum* fruit / Aishah Tegally.



*S. violaceum* flower / Aishah Tegally.

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*Oryza* spp. from Zambia Kafue National Park / (ZARI).



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