

# Biosphere Reserves as Observatories for Climate Change Adaptation in Southern Africa



Be  
**Resilient**  
BIOSPHERE RESERVES  
CLIMATE CHANGE OBSERVATORIES



United Nations  
Educational, Scientific and  
Cultural Organization





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## The Context

Climate change impacts are being observed across the Southern African region, with water-related hazards causing massive flooding, landslides and severe droughts, significantly affecting natural resources and posing a direct threat to human security. While climate change is driven by global processes, the solutions to offset the negative effects of climate risks are particularly dependent on local conditions. In this respect, UNESCO Biosphere Reserves (BRs) have the potential to become global observatories for climate change adaptation and mitigation. The BE RESILIENT project aims to strengthen BRs and their communities to address climate change challenges and associated water-related hazards. The project will engage a set of established and proposed BRs in the region to pilot effective pathways towards climate change adaptation, using a multidisciplinary approach around four main components.



## Project Objectives

The project objective is to strengthen the role of Biosphere Reserves in Southern Africa as Observatories for Climate Change Adaptation and to act as drivers of change and demonstration learning sites for sustainable development and disaster risk reduction.



# Lines of Action

THE PROJECT WILL BE IMPLEMENTED ALONG FOUR DIFFERENT BUT COMPLEMENTARY LINES OF ACTION:

## Climate Change Impact Assessment

For Biosphere Reserves to become 'real-life observatories for climate change mitigation and adaptation', several steps are required. First, their vulnerability to climate change needs to be identified. The project will adopt several activities to derive the vulnerability of the BRs present in the region.

A climate change impact assessment will be developed in a two-tiered approach. In the first step, a global analysis will be performed on the impacts of climate change on the Southern African region, with a focus on the identification of vulnerable BRs. In the second step, the selected BRs will be used to run a full Climate Risk Informed Decision Analysis (CRIDA).

A second activity will focus on identifying one or more climate change indicators for each Biosphere Reserve in the region. This will allow to effectively use the BRs as global change observatories, while recognizing the variability of their environmental functions. This will combine biodiversity monitoring and identification of species present in the BRs as well as the information obtained from remote sensing by satellites and the environmental parameters measured.

## Tool development for Disaster Risk Reduction (DRR)

This component of the project focusses on the development and application of innovative climate

services, through applied research and technology transfer, and adjustments from recent, successfully developed services in other parts of the world. The first one addresses the link between drought risk and food security, providing pathways for local farmer communities to benefit from the foresight of climate science and remote sensing products to reduce their vulnerability to water scarcity and unexpected crop failure. The second line of work addresses the lack of a fully operational flood monitoring and early warning system (MEWS) that can provide crucial information on potential risks at the short term. A third line of work focusses on the threat of landslides that have generated significant damage and loss of life in Biosphere Reserves.

## Education for Sustainable Development and Citizen Science

To ensure that the lessons learnt from the Biosphere Reserves find their ways into the classroom for further dissemination, Education for Sustainable Development (ESD) and Disaster Risk Reduction (DRR) will be further strengthened. This entails the development of teacher materials that are aligned with the curricula of primary and secondary teaching, but that integrate elements of ecosystemic thinking using local biosphere elements. Additionally, the concepts on DRR will be integrated into the teachers' knowledge base.

The project will also focus on an active engagement of communities in the BRs to bring the Citizen Science concept into maturity. The approach taken by the project is to build further on the educational component of the project, to engage school communities as drivers



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of Citizen Science. By engaging local communities through their school environment, more localized information can be collected that benefits the accuracy of forecasts for disaster risk reduction. This will allow to pilot the blending of Citizen Science information with regular meteorological station networks and remote sensing data into calibrated, bias-corrected input fields for drought and flood monitoring and early warning applications.

## A strengthened Man and Biosphere Programme

The project activities are expected to strengthen the role of BRs in Southern Africa, using potential BR sites to provide pathways for expansion of the project impact as well as upscaling of the project in later phases. The project will

organize dedicated activities to allow exchange of experiences and lessons learnt between stakeholders in the potential transboundary BRs in order to facilitate their creation.

## Project Outputs

- Climate change indicators in BRs identified
- CRIDA pilot case studies developed
- Innovative tools for DRR piloted in BRs
- Schools in BRs integrate concepts of ESD and DRR
- Citizen science activities support data collection for DRR
- Regional and transboundary exchange of lessons learnt in BRs



## Target Project Sites

BIOSPHERE RESERVES	COUNTRY	OTHER SITES	COUNTRY
Kogelberg	South Africa	Drakensberg	Lesotho
Mount Mulanje	Malawi	Chimanimani	Mozambique/ Zimbabwe
Cape West Coast	South Africa	Milange	Mozambique/ Zimbabwe
Waterberg	South Africa	Honde Valley	Zimbabwe
Kruger to Canyons	South Africa	Harare Wetlands	Zimbabwe
Lake Chilwa Wetland	Malawi	Tsehlanyane-Bokong	Lesotho
Cape Winelands	South Africa	Lower Zambezi Escarpment	Zambia
Vhembe	South Africa	Lochinvar and Blue Lagoon	Zambia
Middle Zambezi	Zimbabwe	Makgadikgadi Wetlands	Botswana
Goritz Cluster	South Africa	Okavango Delta	Botswana
Magaliesberg	South Africa	Greater Sossusvlei-Namibi Landscape	Namibia
Garden Route	South Africa	Waterberg	Namibia
Quirimbas	Mozambique		
Groot Marico	South Africa		
Lubombo	eSwatini		



## Partners & Beneficiaries

- **UNESCO National Commissions and IHP and MAB Committees** will support implementation of the project
- **Flemish Institute for Technological Research (VITO)** will develop the Drought and Crop Yield Monitoring Application
- **Princeton University / Princeton Climate Analytics** will develop the Flood Monitoring and Early Warning Application
- **Catholic University of Leuven (KULeuven)** will develop the Climate Change Assessment and Landslide Assessment
- **Alliance for Global Water Adaptation (AGWA)** will support the Climate Risk Informed Decision Analysis (CRIDA) in Biosphere Reserves
- **Deltares** will support the development of Adaptation Pathways in Biosphere Reserves
- **US Army Corps of Engineers** will support and co-fund the Climate Risk Informed Decision Analysis (CRIDA) in Biosphere Reserves through Shared Vision Planning
- **German National Commission** will support regional MAB activities via co-funding of activities and meetings
- **USAID Resilient Waters Programme** will co-organize activities on Climate Change Adaptation in selected Biosphere Reserves
- **Targeted communities** exposed to drought and flood risks will benefit from the tools developed to reduce vulnerability and improve resilience to climate variability in BRs.



# Be Resilient

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## Project Contact Details

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