



Climate Resilient Development Pathways (CRDP): Evidence Base

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Quality Assurance Checklist

In preparing this document CRIDF can confirm that it has followed CRIDF's internal general procedures, including appropriate CRIDF generic scope of work and that it has undergone appropriate quality assurance (QA) and quality control (QC) procedures as detailed in CRIDF's QA manual. Furthermore, CRIDF can confirm the applicable specific internal process and procedures have been followed including:

- CRIDF's Cost Benefit Assessments (CBAs) guideline have been applied as appropriate;
- CRIDF's Gender Equality and Social Inclusion (GESI) guidelines have been applied as appropriate;
- CRIDF's Climate vulnerability mapping methodology has been applied as appropriate;
- CRIDF's Climate Change Risk Assessment (CCRA) protocol have been applied as appropriate;
- CRIDF's Procurement guidelines have been followed as appropriate;
- CRIDF's Screens as appropriate.

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Disclaimer

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Vulnerability and Adaptive Capacity in the Cubango-Okavango River Basin (CORB)

Changing Climate in Southern African

Since 2000, countries in Southern Africa have experienced an increase in the frequency, magnitude and impact of drought and flood events. Climate change is expected to significantly affect the region and increase risks related to water resources, wildfires, and agriculture and food security. (SADC 2012). A changing climate impacts not just individual sectors, but multiple, interlinked sectors in the Cubango-Okavango River Basin (CORB). For instance, the annual floods of 2009, 2010 and 2011 all reached extents last seen decades ago. These caused deaths, flooded villages and houses, blocked and destroyed infrastructure and interrupted water and electricity (FAO, 2014).

Vulnerability to Climate in the Cubango-Okavango Basin

Vulnerability to climate change is generally understood to be a function of a system's *exposure* to climate change impacts, *sensitivity* to these impacts, and its *adaptive capacity*—or the ability of a system to adjust to change, to moderate potential damage, to take advantage of opportunities, or to cope with the consequences (see Figure 1). As such, the vulnerability of the Okavango Basin to climate change is determined by a combination of climatic and non-climatic factors, and both need to be taken into consideration when developing climate resilient development pathways.

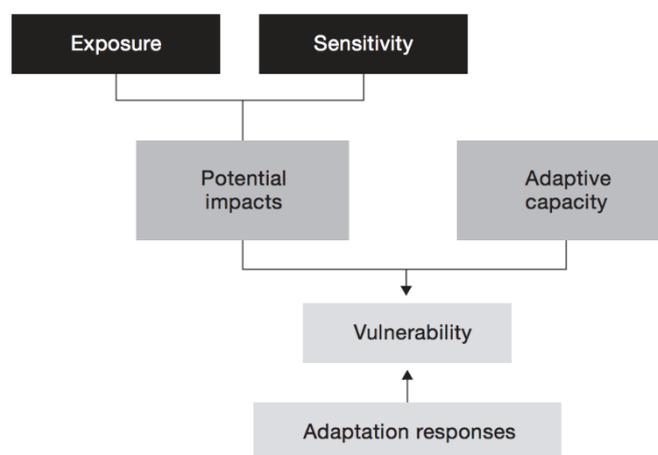


Figure 1: Representation of the components of vulnerability to climate change and their interlinkages (Allen Consulting reported in Bizikova et al. 2009)

Table 1 Past and current vulnerability in key sectors within the Cubango-Okavango River Basin (illustrative)

Sector	Potential impacts of climate change
Water (quantity and quality)	<ul style="list-style-type: none"> • Observed long-term declines in total annual precipitation, affects water use particularly in the arid regions of Botswana and Namibia. • Changing sedimentation dynamics have had impacts on the delta ecosystem and ecosystems services.
Agriculture (communal and commercial)	<ul style="list-style-type: none"> • Drier conditions are resulting in decline in production of maize, mahango and potential for rice. • Shifts in the growing season • Increasing exposure to pests, diseases and invasive species such as armyworms are already impacting regional food security and trade.
Economy	<ul style="list-style-type: none"> • Lower crop yields impacts on crop prices and food security • Increasing pressures on relief programs (flood/drought compensation) • Infrastructure stress and damage particularly in extreme events impact economic resources • Conflict between formal and informal economies such as in the case of increasing tourism as agricultural production declines
Wildlife and biodiversity	<ul style="list-style-type: none"> • Changes in wildlife population with positive and negative ecological and socio-economic impacts • Increasing human-wildlife conflicts, especially near permanent river water courses
Tourism	<ul style="list-style-type: none"> • Extreme events increase operating costs due to infrastructure damage • The Okavango delta and its biodiversity is most sensitive to climatic variability and underpins the region's thriving tourism industry.
Social equity and justice	<ul style="list-style-type: none"> • Existing inequity between and within riparians • Development investment between formal and informal sectors
Forestry, resource harvesting	<ul style="list-style-type: none"> • Change in wildland fire dynamics • Reduced inflow to the delta could lead to the drying of wetlands and changes to ecosystems and ecosystem services; • Resource related conflicts between informal and formal sectors
Fishing	<ul style="list-style-type: none"> • Increased variability in fish population under increasingly climate variability
Livestock	<ul style="list-style-type: none"> • Decreased availability of forage under hotter and drier conditions and greater risk of over grazing • Need to consider the composition of livestock herds

Infrastructure	<ul style="list-style-type: none"> • Greater cost of damage to infrastructure as flood events become more frequent • Low levels of infrastructure impede development efforts
Governance	<ul style="list-style-type: none"> • Slow integration of basin-wide systems in national planning and decision-making
Health	<ul style="list-style-type: none"> • Increased risk of malaria and other diseases
Water-energy-food nexus	<ul style="list-style-type: none"> • Changing hydrology impacting multiple interlinked sectors and systems • Increased emphasis on agriculture, for example, leading to an increased need for irrigation (water and energy) and needs for energy and infrastructure for processing.

Adaptive Capacity in the Cubango-Okavango Basin

Adaptive capacity in turn is determined by six main factors as described by the IPCC (2001). A brief, illustrative summary of key aspects of existing adaptive capacity are provided in Table 2 below.

Table 2 Past and current adaptive capacity within the Cubango-Okavango River Basin (illustrative)

Adaptive Capacity Component	Existing elements in the Okavango Basin
Economic resources	<ul style="list-style-type: none"> • Development assistance from World Bank and other agencies • Extractives based economies without adequate diversity. • Government subsidies, insurance programs and support in parts of the basin.
Technology	<ul style="list-style-type: none"> • Water conservation, recycling, desalination etc. in arid parts of CORB • Improvements in flood early warning systems
Information and Skills	<ul style="list-style-type: none"> • Accessible, long-term consistent data on climate, water, land and related socio-economic systems a barrier to understanding trends and responding in best possible way.
Infrastructure	<ul style="list-style-type: none"> • Acknowledgement of role of natural infrastructure but significant ongoing threats • Lacking built infrastructure (such as roads) in highly rural settings causing difficulties with access to markets.
Institutions	<ul style="list-style-type: none"> • OKACOM providing forum for reconciling development and basin management needs. • All riparians have created national action plans based on Basin SAP.

	<ul style="list-style-type: none">• Some history of tensions and lack of clear authority structures between government, communities, and traditional authorities.
Equity	<ul style="list-style-type: none">• Inequity pronounced in all three riparian countries, especially in terms of large levels of unemployment/underemployment.• Insecurity of tenure arrangements in parts of the basin.• Inequity between groups in access to natural resources.

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