



**USAID**  
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**RESILIENT WATERS PROGRAM**

**EXECUTIVE BRIEF:**  
**CYCLONE IDAI IN THE BUPUSA TRANSBOUNDARY  
BASINS OF MOZAMBIQUE AND ZIMBABWE:**  
**Building community resilience**

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**Prepared by the Centre for Applied Research with Hatfield  
Consultants Africa**

**for Resilient Waters Program**



**Hatfield**

# 1 The impacts of Cyclone Idai<sup>1</sup>

Cyclone Idai struck Mozambique, Zimbabwe and Malawi in March 2019, and caused significant loss of life and livelihoods, injuries as well as extensive damage to infrastructure, houses, building etc. The USAID Resilient Waters Program commissioned the Centre of Applied Research (CAR) and Hatfield Africa Consultants (HCA) to assess the impacts of Cyclone Idai at community level in Mozambique and Zimbabwe and to identify lessons for strengthening of community resilience against cyclones.

The impacts of Cyclone Idai has been huge and diverse. The cyclone hit the Buzi, Pungwe and Save transboundary river basins (BuPuSa) hard, but its impacts went well beyond the three basins:

- ✓ Total affected area is estimated to be around 380,000 km<sup>2</sup> of land area; some 290,000 km<sup>2</sup> in Mozambique and around 90,000 km<sup>2</sup> in Zimbabwe.
- ✓ The total affected area in BuPuSa is around 166,000 km<sup>2</sup>; around 104,000 km<sup>2</sup> in Mozambique and 62,000 km<sup>2</sup> in Zimbabwe; and
- ✓ Heavy rain affected around 38,000 km<sup>2</sup> of the BuPuSa area. Mozambique experienced the heaviest rainfall in Manica and Sofala Provinces. In Zimbabwe, Chimanimani and Chipinge Districts were most affected.

## Damage assessment with high resolution imagery for 2 heavily affected areas

Two heavily damaged areas (Chimanimani and Beira) were investigated with high resolution imagery:

- ✓ Chimanimani suffered damage to residential buildings in lower lying areas close to streams and riverbeds. There was visible destruction of bridges and motorways due to landslides and massive slope failures. In Beira damage was concentrated on buildings, with no damage observed to motorways. There was visibly more damage observed in Beira. Chimanimani recorded more localized damage around landslides and flooding while Beira experienced more widespread damage caused by high velocity winds;
- ✓ Flooding was extensive in both areas, but the settlements in Beira were largely spared mass flooding; Chimanimani was more significantly impacted by landslides, with severe damage concentrated around the landslide paths. Furthermore, damage patterns in Beira were varied and seemed to be driven more by selected the building materials used, and level of exposure (lack of shelter from wind caused by removal of trees) than flooding *per se*.

## Medium resolution imagery assessment for the Buzi,Puingwe and Save basins (BuPuSa)

- ✓ Tree cover losses were mostly observed in Sofala and Manica provinces. Some tree loss may have been due to an increased need for firewood while power supply was interrupted and possibly to build temporary shelter and to landslides, especially in areas where deforestation was observed prior to the cyclone event;
- ✓ Basin-scale landcover change analysis showed that in both Zimbabwe and Mozambique there is a lot more agricultural activity than what is recorded in any national database. Of interest were the number of small farm holdings that were affected as well as large scale farms that provide jobs to

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hundreds of people in their surrounding communities. The land cover category ‘water’ increased substantially, mostly in Sofala Province.

A repository with all imagery and analysis has been provided to Resilient Waters.

#### Overall economic costs of Idai:

The total damages and losses are estimated at US\$3.4 billion (GoM, 2019 and GoZ, *et.al.*, 2019):

- a. Mozambique: US\$2.8 billion or 18.9 % of the gross domestic product (GDP); and
- b. Zimbabwe: US\$0.6 billion or 3.6 % of GDP.

The estimated recovery costs are US\$3 billion for Mozambique and US\$0.5 billion for Zimbabwe. The opportunity costs of Idai relief efforts were high. Financial and human resources as well as institutional capacities were diverted towards Idai relief, reducing the support for other development areas.

#### People’s lives and livelihoods

People’s lives were seriously affected in multiple ways. Lives were lost and people were injured and/or displaced. Moreover, people’s health was affected as well as their access to water and sanitary facilities:

- ✓ A total of 1.8 million people were directly affected: over 1.5 million people in Mozambique and around 270,000 people in Zimbabwe;
- ✓ Almost 140,000 people were displaced, 3,200 injured and around 1,000 people lost their lives;
- ✓ Some displaced persons were housed in temporary camps, but most stayed with other families;
- ✓ Small outbreaks of cholera and malaria occurred in Mozambique. In Zimbabwe, some cases of malaria, dysentery and diarrhea were reported by the end of April 2019; and
- ✓ 31 settlements received more than 400 mm of rainfall, including Chimanimani and Chipinge in Zimbabwe; three settlements in Mozambique received more than 600 mm.

The livelihood impacts of Idai have been dramatic through the loss of income, harvest, and assets. These impacts were aggravated by the agricultural dependency of most households, lack of economic diversification, poverty and pre-Idai livelihood stress.

Rough estimates were made of the impact on average household and per capita (p.c.) income:

- ✓ Zimbabwe:
  - Using RINA figures and with some assumptions, the Idai impacts could amount to a loss of US\$4,592 per household. This exceeds the average annual household income in 2017 and is more than double the average rural household income in 2017;
  - Using RINA figures and some assumptions, the per capita costs would be US\$ 1,275 or 33 % higher than the average p.c. annual income.
- ✓ Mozambique: Based on the PDNA, per capita damage and losses are estimated to be at least around US\$ 840, 42 % higher than the average p.c. income of US\$ 590.

#### Private assets

- ✓ Houses: around 250,000 to 300,000 houses were destroyed or damaged;
- ✓ In Zimbabwe, Cyclone Idai damaged irrigation infrastructure, plantations of tea, sugar cane, fruit trees and forest plantations;

- ✓ In Mozambique, Idai affected over 400 private enterprises with over 15,000 jobs.
- ✓ The private sector also incurred damage to private educational and health facilities.

#### Impact on agriculture

The agricultural sector was heavily affected through lost harvest, income and damage to infrastructure. The cyclone's impact on crop production was most serious. Livestock production, fisheries and forestry were less affected. Regarding dryland crop production, in Mozambique (GoM, 2019), over 700,000 ha of cultivated land were flooded, affecting over 433,000 households. Production losses were estimated at 2.2 million MT. In Zimbabwe, over 600,000 ha of dryland farming land had possible flooding damage (GoZ *et.al.*, 2019, p.19), with production losses estimated around 580,000 MT. The impact on the irrigation sector has been smaller than that on dryland farming. In Mozambique, over 4,300 ha of irrigated land and associated infrastructure were damaged or destroyed; in Zimbabwe, the impact on the irrigation sector was larger.

#### Impact on public infrastructure

- ✓ Health facilities: many health facilities were damaged and in December 2019 a significant number was not yet repaired or rebuild;
- ✓ Educational facilities: many facilities were damaged and were not yet repaired in December 2019;
- ✓ Road infrastructure was damaged, mostly regional and local in Zimbabwe but also national roads in Mozambique;
- ✓ WASH: The water and sanitation infrastructure were damaged or could not operate because of power cuts. Electricity infrastructure was seriously damaged in Mozambique; same in Zimbabwe was limited.

#### Social impacts

No dedicated social impact assessment of the cyclone was carried out. It is known, however, that Cyclone Idai caused a wide range of social impacts, including disruption of community and family relationships, displacement of persons and families and resettlements, loss of breadwinners and jobs and increased hardships due to livelihood losses, increased gender-based violence, and in the worst affected areas, people also suffered post-traumatic disorders.

Vulnerable groups were disproportionately affected as their adaptive capability is low, they live in high-risk areas, have poor houses and/or live in informal settlements with limited access to public services. Vulnerable group include children, the elderly, people with disabilities (PWD), people living with HIV, internally displaced persons (IDP) and women.

#### Environmental impacts

No dedicated environmental impact assessment of Cyclone Idai has been conducted; however, the PDNA and RINA contain some qualitative environmental assessments. The BuPuSa region is relatively rich in terrestrial and aquatic biodiversity. In Zimbabwe, it includes mountainous terrain stretching into Mozambique where it ends at the coast with estuaries and mangrove forests. The cyclone affected:

- a. Protected Areas with adverse impacts on biodiversity and local livelihoods;
- b. Forest areas with adverse impacts on land resources and livelihoods;

- c. Mangrove forests, affecting their ecosystem services (e.g., for fish, coastal protection etc.) and adversely affecting local livelihoods (e.g., lost timber, fuel and food);
- d. Land/ soil erosion: landslides, soil erosion and serious land degradation; and
- e. Hydrological monitoring stations in Zimbabwe along the rivers

## 2 Idai response, recovery & mitigation and preparedness for the next disaster

### Response & relief

Response and relief efforts started with needs assessment (PDNA and RINA) and rapid interventions. Both countries lacked the capacity and financial means to offer the necessary relief. Fortunately, many ICPs supported the relief and response efforts with financial and technical means. Based on the UNCCD data base ([www.fts.unocha.org](http://www.fts.unocha.org)), an estimated US\$ 500 extra humanitarian aid was sent to Mozambique and Zimbabwe. This is a significant amount, but it fell short of the identified immediate needs. As a result, relief and response efforts are not yet complete (November 2020); consultations revealed that international relief efforts were scaled down and Covid-19 interventions diverted domestic financial and human resources away from Idai interventions.

### Recovery and rebuilding

Government together with ICPs have launched several recovery and rebuilding projects. These include:

- ✓ Mozambique: repair and reconstruction of houses (targeted to vulnerable groups and building back better); repair and reconstruction of critical local infrastructure, private sector support and livelihood/ income and employment support;
- ✓ Zimbabwe: livelihood restoration (cash transfers and food aid to vulnerable groups), restoration of the agricultural sector, restoration of basic health services, combatting gender-based violence and child protection, repair of hydrological stations and rehabilitation of critical community infrastructure.

The common view during consultations was that many communities are not yet fully recovered, and that recovery may take up to ten years up may take, also depending on the macro-economic and general development challenges that the countries face.

### Mitigation and prevention

Some mitigation and prevention efforts have been built in the countries' recovery programs:

- ✓ Mozambique: In Mozambique, building resilience are concentrated in the Beira area by strengthening coastal protection with a potential for nature-based solutions and further rehabilitation of the drainage system to reduce flooding in vulnerable parts of the city.
- ✓ Zimbabwe: support rehabilitation of critical community infrastructure, and support community level structural risk reduction and mitigation efforts.

Both countries intend to resettle affected population from high-risk to lower-risk areas. Resettlement is a sensitive and challenging issue, and the progress with resettlement is unclear. Some households decided to move back to their old homes, exposing them to the same risks as before; others are still in temporary

accommodation. New settlements need to be identified, carefully planned and have basic infrastructure as well as income generating opportunities to improve livelihoods. The local population needs to be actively involved and consulted.

Future mitigation and prevention also require the integration of disaster risk management in land use and settlement planning, building of more resilient infrastructure, house building and WASH facilities as well as strengthening of EWS. These measures require additional financing but reduce damage and loss costs.

### Preparedness

Disasters are recurrent and require preparedness: *“As we know, after the event is before the next event”* (Norton *et.al.*, 2020). In short, after each activity activities need to be undertaken to be better prepared for the next event (e.g., Cyclone Eloise in January 2021). Generally, support efforts still emphasize relief and reconstruction and pay insufficient attention to long-term strengthening of prevention and preparedness.

Countries’ preparedness has improved over time due to better meteorological and hydrological data and models, better DRM institutional structures and early warning systems. Existing food and WASH programs in both countries allowed rapid responses and, in a way, ‘prepared’ the countries.

The following areas emerged as critical for preparedness:

- ✓ Institutional structures and capacities:
  - Both countries have established DRM lead institutions (INGC and DCP) that work closely with other government departments (e.g., climate change, water resource management, environment and meteorological services) and non-government institutions (ICPs, NGOs, private sector);
  - Capacity, funding, and equipment constraints occur, particularly at the district and local levels, hampering interventions;
  - Mozambique benefited from the established local disaster reduction management committees; Zimbabwe does not yet have local DRM structures; and
  - Both countries have a DRM Fund, but these experience finance and capacity constraints.
  - Community preparedness and support: local DRMCs in Mozambique contribute to local DRM efforts, but they focused mostly on relief and response, and need to be more proactive to strengthen local preparedness. They also experience capacity constraints (e.g., equipment, financial and human resources).
- ✓ Policy environment:
  - The DRR Act in Zimbabwe is dated and the new one has not yet been adopted;
  - DRM and CCA are not yet fully integrated in land use and development planning; and
  - Idai interventions are undertaken within each country; there is no transboundary DRM strategy.
- ✓ EWS:
  - Meteorological and hydrological data & forecasting have improved and facilitated better early warning;
  - Early warnings were sometimes delayed and insufficiently action oriented. Use of local languages and different communication means could have made early warnings more effective; and

- EWS require effective and rapid exchange of inputs and outputs between the local, provincial and national levels.

Countries do not yet fully integrate DRR and CCA in development and land use planning;

### 3 Recommendations

Given the countries' situation, it is unrealistic to address all challenges and areas for improvement immediately. Governments together with non-state actors (e.g., private sector, communities, and NGOs), need to prioritize interventions that can be implemented with the available capacities and abilities. It is recommended that the countries and BuPuSa adopt a **focused, prioritized, do-able** and **incremental** approach led by the lead DRM institutions (INGC and DCP) with active participation of all stakeholders and focused on **strengthening community resilience**.

Below, we suggest which institutions could follow up the recommendations that are made. Clearly, the decisions regarding the recommendations and the institutions responsible for their implementation must be made by the countries themselves, BuPuSa and the collaborating ICPs. Given their mandates, the INGC and DCP will be 'lead' institutions and we suggest that they work closely with the Department of International Rivers (DNGRH) in Mozambique and the Department of Water Resource Planning and Management, Ministry of Lands, Agriculture, Water and Rural Resettlement in Zimbabwe, and liaise with other ministries or departments such as Environment, Meteorology, development planning, agriculture, and rural development. The recommendations are structured under ten key issues discussed below:

#### 1 Strengthening the national DRM capacity

Therefore, the DRM institutions need to be prepared for droughts (most common) as well as floods and cyclones. Countries' DRM capacity is determined by the institutional structures involved as well as their technical and financial capabilities.

Both countries have strong DRM lead institutions. Zimbabwe has the DCP and a national multi-stakeholder National Civil Protection Committee (NCPC), but DRM resources need to be decentralized, and the draft DRM Act needs to be finalized and approved (NCPC and DCP to consider for action). Effectively linked DRM institutions at the national-provincial and local level are essential (INGCC and NCPC/ DCP to consider for action). Consultations showed that there is need to build more capacity particularly at the local and provincial levels.

Both countries have a DRM Fund, but the funds need to be increased and ringfenced (Ministries of Finance, DCP and INGC to consider for action). The DRM Fund should also cover mitigation, prevention, and preparedness, and ICPs could contribute to the national DRM Funds (ICPs to consider for action). The feasibility of a SADC DRM Fund, particularly for transboundary resource management initiatives, needs to be assessed (SADC Secretariat and member states to consider for action).

Local DRM structures need to be established, and where they already exist -as in many Mozambican villages- strengthened. It is recommended that Zimbabwe reviews the best way to establish local DRM structures (DCP and CPUs to consider for action). DRM capacities can also be strengthened at the SADC level, e.g., through the establishment of a rapid SADC DRM 'force' to support disaster struck SADC

countries. RBOs need to include DRM in their strategic development plans for their basins (SADC RBOs to consider for action).

## 2 Integration of DRR and CCA in development planning

Disasters and climate change are 'facts of life' that need to be recognized and considered in development planning. Given the links between DRM and CCA and the limited institutional capacities, it is important to fully harmonize DRM and CCA, and to incorporate both in national and provincial development and land use plans. Disasters and climate change need to be fully integrated in environmental assessments and in transboundary water resource management (TWM). These actions need to be considered by DCP, INGC and the Ministries responsible for climate change adaptations and targeted to the Ministries of Development Planning and responsible for environmental assessments.

## 3 Identification, (re-)building and maintenance of critical infrastructure

Critical infrastructure may refer to infrastructure from the public sector, communities and the private sector. The project showed that different types of infrastructure are interlinked and, failure of one component can lead to failure of others. Gaps and weaknesses of critical infrastructure need to be identified to increase the resilience and performance of the package of critical infrastructure, which then leads to building back better (for rehabilitation) and building better (for new infrastructure).

The following is recommended (to be considered for action by the responsible ministries with the INGC and DCP as catalysts):

- a. Avoid rebuilding and building of critical infrastructure in high-risk areas;
- b. Rebuild climate smart and resilient agricultural infrastructure;
- c. Rebuild and build climate smart and resilient water sector infrastructure;
- d. Harmonize dam operating guidelines to ensure environmental flows, development benefits and flood avoidance;
- e. Review the potential of nature-based adaptations; and
- f. Prioritize maintenance of critical infrastructure. When maintenance funds are inadequate, critical infrastructure should be prioritized.

## 4 Building community resilience through DRM structures and livelihood diversification

Community resilience can be strengthened by the establishment of local DRM structures, by strengthening and diversifying livelihoods and by special attention for vulnerable groups. Local DRMCs have benefited DRM in Mozambique. This system can be expanded to more settlements in disaster prone areas in Mozambique and to Zimbabwe. Existing local DRMCs need strengthening to:

- a. Become more pro-active and mitigate, prevent, and be prepared for future disasters;
- b. Acquire and maintain community-based DRM facilities and equipment. Standardization of equipment is essential to enhance the effectiveness of support; and
- c. Raise awareness about disasters and 'best responses' (short and longer term).



The DCP, INGC as well as NGOs such as the national Red Cross organizations and ICPs could spearhead these efforts. They could also support the involvement of local DRMCs in EWS, including providing feedback about the early warnings after each event to improve EWS effectiveness.

Improved and diversified livelihoods will make households more resilient. DRM should be linked to rural development planning and poverty reduction. Reduction of agricultural dependency, agricultural diversification and economic diversification are essential to realize more secure livelihoods. DRM efforts need to pay special attention to vulnerable groups to ensure that these groups are better prepared for disasters and are fully covered by relief and resilience building efforts. Development ministries, ICPs and NGOs should support economic and livelihood diversification and protection of the vulnerable groups.

## 5 Development of TWM DRM strategies

The project showed that a basin-wide DRM strategy is needed, either separately as a DRM strategy or through DRM and CCA integration in basin development, investment and land use plans as well as EIA/SEA requirements. The following interventions should be considered:

- i. (Re)Building of meteorological, hydrological and livelihood monitoring networks in the basins;
- ii. Modelling and forecasting of hydrological conditions and floods and their use in EWS;
- iii. Development of an integrated flood risk management framework;
- iv. Mapping of high-risk areas in terms of rainfall, cyclone frequency and flooding;
- v. Establishment of effective flood resilient basin-wide communication networks; and
- vi. Basin-wide water infrastructure and ecosystem-based interventions to manage water resources for development and flood control.

Cyclone Idai demonstrated that the scale of disasters may exceed national boundaries and capacities. While ICPs are instrumental in providing financial and technical assistance, it is important that SADC as a regional organization gets involved in DRR and DRM by pooling technical and financial resources. Possible SADC interventions would be the establishment of a SADC DRM Fund, the establishment of a Rapid Disaster Relief and Rebuilding team, mapping of regional high-risk and flood prone areas to assist RBOs and SADC countries; and establishment of a SADC RBO DRM lessons and best practice data base covering the four DRM cycle phases. It is important that SADC DRM efforts are not confined to relief but also improve preparedness and resilience.

## 6 Effective DRM partnerships

DRM is not just a matter of governments or the directly affected households. A host of non-state actors, communities and the private sector have contributed to Idai relief and reconstruction. Zimbabwe has a Civil Protection Platform with representatives from all relevant institutions in and outside government. Mozambique may establish a similar platform (INGC & CCGC to consider for action).

The current UN-cluster approach is useful in coordinating relief efforts. The cluster approach needs to expand to include new clusters for disaster mitigation, prevention, and preparedness. This will coordinate efforts to build longer term resilience. The UN and other multilateral and bilateral agencies together with national governments (led by the INGC and DCP) should consider this for action.

ICPs offer indispensable technical and financial support. It is recommended that ICPs match short-term relief and response funding with longer term DRM support aimed at resilience building. Moreover, where possible local equipment, material and expertise should be used to support economic recovery and livelihoods. It is important to -where possible- standardize support equipment and select the most effective type of equipment, and to limit the number of different brands to facilitate efficient maintenance.

## 7 Balancing short- and long-term DRM interventions

As disasters and their intensity increase, DRM requires more human and financial resources. As prevention is cheaper than relief and responses, more resources are needed for prevention and preparedness. Global assistance for human relief needs to continue but greater contributions are needed for mitigation, prevention, and preparedness. This can be promoted through the recommended establishment of additional DRM resilience clusters and by channeling some international DRM resilience funding through the national DRM Funds.

## 8 Rapid needs assessments and follow ups

Rapid needs assessments are essential to quickly assess the damage and relief and reconstruction needs. National governments need to lead this process, where necessary assisted by ICPs. Post disaster needs assessments are essential but it is recommended that:

- ✓ The impacts on the private sector and people's livelihoods are assessed in more detail; and
- ✓ Stakeholders and the directly affected population are consulted.

The rapid assessments should contribute to the development of medium to long-term plans, and include specific interventions towards mitigation, prevention, and preparedness. It is recommended that Post Event Response Capability (PERC) studies are carried out at least twice (after 1 year, 3 years, ...) to learn lessons from the relief and recovery efforts and to assess the progress with resilience building. The project clearly showed that relief and rebuilding take time and need to continue for a considerable period. National governments (with INGC and DCP as catalysts) together with ICPs need to support the incorporation of these aspects in rapid assessments, DRM, CCA and development planning.

## 9 Info/data & info/data base, forecasting and info/data (base) access

DRM and EWS require adequate data and monitoring networks, covering meteorology, hydrology, social, livelihoods/ development and environmental data. Moreover, regular mapping of high-risk areas, floods, rainfall, settlements, livelihood zones, land use etc. is essential. Data should be integrated into a Data & Info System that should be accessible to stimulate more research (e.g., open access data sharing platform), and further improve the understanding of the risks of cyclones and droughts. Easy and quick info/data availability is essential to improve community resilience. It is equally important that the info/data inform development and land use planning, for example to identify high risk areas and avoid further developments in such areas.

It is also important to initiate a data base for cyclone DRM experiences with details about the nature of the cyclone, the impacts and damage caused, and the DRM efforts as per DRM cycle stage in terms of nature of the interventions, institutions involved, level of efforts (human and financial resources) as well as lessons learned (INGC and DCP to consider for action with support of multilateral ICPs).

Member states may have their 'own' data collection systems and data base. It is recommended that data collection systems and national data base are standardized as much as possible to facilitate upscaling to the basin level (INGC, DCP and RBO member states to consider for action).

## 10 Environment

Environmental rehabilitation and nature-based solutions (NBS) have the potential to increase resilience. There is need for slope stabilization to prevent future landslides, restoration of riverbeds damaged by gold mining, and rehabilitation of mangrove forests to maintain their essential functions. There is also need for land rehabilitation and re-forestation in the worst affected forests and PAs.

NBS that improve resilience need to be identified and their feasibility assessed. These include development of green areas in settlements and coastal revegetation. Another NBS is to create more space for rivers by reducing encroachment into the river plains. This would reduce exposure of people to floods.

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