Initial Environmental Issues – Cyclone Idai

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Introduction

This summary document provides key environmental issues arising from the passage of Cyclone Idai over Mozambique, Zimbabwe and Malawi. While full details of the damage from the storm are not known, sufficient information is available to project likely environmental impact and issues which may arise from relief, recovery, and reconstruction operations.

Anticipated Environmental Issues

Based on the impacts of previous cyclones in Mozambique, hurricanes and typhoons elsewhere, and information on Cyclone Idai, the following environmental issues can be anticipated by response operations.

Disaster Debris: The cyclone winds caused damage and destruction of buildings in Beria and likely elsewhere. Damage is also likely to trees and other vegetation. Clearing debris is critical to jump-starting the recovery process, and often critical to getting relief to affected areas and populations.

The debris needs to be collected and recycled, reused or repurposed. These actions provide inputs to rebuilding and opportunities for cash or food for work. Organic debris can be composed or transformed into mulch, which can be used in the recovery. Trees can be processed as timber for use in rebuilding or other commercial purposes. Guidance on debris management is available from https://www.unocha.org/sites/unocha/files/DWMG.pdf. Additional support on developing debris management programs is available upon request.

Liquid Waste: Particularly in urban areas reliant on sewage systems or septic tanks, these systems are often filled, overloaded or damaged by flooding. Programs need to be implemented to collect and safely dispose of sewage and liquids from flooded septic systems early in the response to reduce the chance of disease. If portable toilets or emergency latrines are used, well developed systems for collecting and disposing of sewage are needed.

Because of flooding and saturated soils, it is unlikely that open field disposal of sewage will be effective. Ocean disposal may provide a short-term solution if controls on water and marine life harvesting are put into place. Constructed primary treatment facilities may be a necessary near-term measure if normal sewage treatment systems are not operational or unable to handle the volume of sewage generated by a large city.

Vector Control: Poor sanitation and standing water may lead to an increase in the number of disease vectors and pests, primarily, in urban areas, but also in rural areas with long standing pools of water. While an initial response may be to use pesticides to control the vectors, integrated pest management options are more effective over the long term and avoid the loss of beneficial insects associated with the use of pesticides. Vector control can also involve cash or food for work clean-up campaigns, which can help support livelihoods. Additional resources are available upon request.

Livelihoods: The cyclone's flooding and winds are likely to have severely affected food security and livelihoods in rural and urban areas. Attention is needed to how disaster survivors replace or supplement their income, particularly as they will need additional resources to rebuild. Lessons may be learned from livelihood recovery crisis when rural households had to re-establish their lives and livelihoods, largely small-scale agriculture.

The risk is that survivors will turn to the environment to secure short-term income and natural resources, including wood (particularly mangrove poles), rocks, sand and other materials needed for rebuilding, and charcoal for fuel. This risk can be addressed by (1) maximizing the level of assets – as income or goods – transferred to survivors as part of the relief and recovery process, and (2) monitoring demand on natural resources and distributing and managing this demand over available source areas (i.e., not concentrating all resource extraction in one place, using better management practices for extraction to minimize associated damages).

Supporting livelihoods should also consider the trade-offs between local procurements and imports, as well as the impact of cash payments on the environment. Guidance is available from https://reliefweb.int/report/world/ctp-looking-through-environmental-lens-implications-and-opportunities-cash-transfer.

Road and Rail Infrastructure: Flooding is reported to have caused considerable damage to road (and likely rail) infrastructure. Rebuilding should be based on flood models which incorporate expected changes to the climate. Projected local land use, land cover conditions. Anticipated future flood risk should also be taken into account to reduce damage and associated costs of rebuilding.

Urban-Rural Displacement: The level of damage to livelihoods in Beria and other cities may cause urban residents to return to rural areas in search of food, shelter or livelihoods. Such a movement was seen in Haiti after the 2010 earthquake. Population movements should be monitored (e.g., using mobile phone use) and livelihoods activities in rural areas assessed for possible environmental damage (e.g., from increased fire/charcoal production, hunting or other activities, clearing woodland for agriculture). Where these impacts are noted, actions should be taken to shift livelihoods to less environmentally damaging ones, or programs put in place to mitigate any resulting damage. There are several protected areas north and north-west of Beira, as people may resettle there social, economic and environmental impacts of displacement/occupation should be monitored and managed.

Opportunistic commercial natural resource extraction: As transport routes reopen, law enforcement will be important to ensure that illegal extraction (e.g., timber, charcoal, wildlife) along roads is avoided. Such opportunistic illegal extraction was previously documented in Mozambique when community and government controls were weakened during reconstruction after the armed conflict in Sofala Province[1].

Wildlife Impacts: The extensive flooding is likely to cause some wildlife loss in Gorongosa National Park floodplain and other low-lying rift valley areas nearby. Gorongosa was restocked following the civil war, when wildlife populations were severely reduced. Note also that post-disaster hunting for local consumption or illegal trade may present a threat to local tourism related livelihoods.

[1] https://www.researchgate.net/publication/241204953_Biodiversity_and_War_A_Case_Study_ofMozambique

Climate-Risk Aware Rebuilding: Cyclones, flooding, high winds as well as drought are normal climate-related hazards for the areas affected by Cycline Idai. Relief and rebuilding activities need to recognize these hazards by, for instance, ensuring roofs are correctly attached for a cyclone zone or roof water is harvested to reduce vulnerability to regularly present hazards. As well, changes to weather and climate conditions need to be recognized and incorporated into relief and recovery to reduce future vulnerability and increase resilience. This includes incorporation of ecosystem services and natural infrastructure – for example, maintaining/restoring mangroves and other coastal infrastructure to reduce storm surge risk; and sound river basin management including dam management and appropriate land use to manage flood risk**.** Useful information on climate change in Mozambique is available in USAID (2019)[2]. and upon request.

Unnecessary Transport/Unnecessary Assistance: The use of helicopters and fixed wing aircraft are critical to the immediate life-saving operations. However, as soon as practical, transport operations should shift to less energy intensive modes, including ships for coastal transport and rail for inland transport. The Global Logistics Cluster is actively considering how to reduce the environmental impact of emergency transport (see https://logcluster.org/blog/treading-lightly). Part of this process focuses on eliminating the transport of materials which are not needed for relief, in particular single-use plastic. The NFI Working Group of the Global Shelter Cluster is looking at revisions to the standard shelter and NFI kit specifications that reduce the need for single-use plastics.

Local environmental experts in Mozambique:
Gorongosa National Park (NW of Beira) management is already involved in relief work for communities on the Pungue along the park boundary (http://www.gorongosa.org/cyclone_relief_fund).

In Maputo: IUCN, WWF

Key Information Sources:
Environment and Disaster Management @ WWF - http://envirodm.org/about.
EHA Connect - Connecting Environment and Humanitarian Action - https://ehaconnect.org/).

The WWF Environment and Disaster Management Help Desk is available to response to any requests for information or advise on the environment and the response to Cyclone Idai.

[2] https://www.climatelinks.org/resources/climate-change-and-health-mozambique-impacts-diarrheal-disease-and-malaria-0

Supporting Documentation

Information Sources

This Summary was compiled based on

- Media sources, including BBC, Club of Mozambique, AFP, The Weather Channel and AccuWeather, Guardian.
- Official reports, including
    - **Mozambique: Cyclone Idai & Floods Flash Update No. 4**, 18 March 2019, OCHA.
    - **MALAWI Floods: Update I Briefing Note**,19 March 2019, APAPS.
    - **Tropical Cyclone Idai: Appeal for US$40.8 Million to Provide Life-Saving Assistance**, no date, United Nations.
    - **Tropical Cyclone IDAI Impact Overview,** 18/03/2019, Emergency Response Coordination Centre (ERCC) – DG ECHO Daily Map.
- A review of remotely sensed images of the cyclone impact zone collected before the cyclone.

Event Genesis

The weather system which became Cyclone Idai originated with a low-pressure system off the coast of Mozambique near Quelimane on 4 March. The system traveled north and then west to southern Malawi during early March. The system then traveled east into the Mozambique Channel, were it strengthened to the level of an official Tropical Cyclone. Mid-channel, Cyclone Idai turned and headed west, making landfall near Beria on 14 March and passing over Harare on 16 March.

The storm had winds estimated to be in excess of 118 km/hour at landfall, with an estimated 4.4-meter storm surge on the coast near Beria. The surge is expected to have done damage to coastal areas and possibly up the Buzi river at Beira.

Reported wind damage included removal of roofs, collapsed walls, and damage to power and telecommunication systems. It is likely that high winds also damaged trees and standing crops, at the least near landfall at the coast.

The storm system caused rainfall over a large area of southern Malawi (leading to flooding the loss of lives and damage to infrastructure, crops and food supplies), over a significant part of central Mozambique and in eastern Zimbabwe. Unlike a single-passage storm, the length of time which the weather system was over or near central Mozambique and Malawi (on the order of 10 days) resulted in significant rainfall over large areas and the overloading of natural drainage systems, leading to damage from flowing water (e.g., to bridges), flooding and standing water. Roads to the city of Beira are cut. The Pungue and Buzi rivers, which reach the sea south of Beira, have burst their banks and caused widespread flooding. Residents of Beira said there were reports of dams 70 km from the city bursting, possibly Chicamba dam above Chimoio (north-west of Beira) or the Mavuzi dam (a smaller reservoir). Other dams are thought to be full to the brim and will have to open their floodgates soon.

It is likely that it will take some time for water to fully drain from some of the flatter affected areas located near the coast. The higher elevations on the Mozambique-Zimbabwe border likely resulted in increased precipitation (which may have triggered landslides) and an increase in water flowing to rivers in Mozambique, which drain to the east.