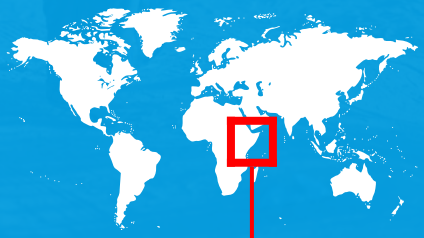
UNEP-DHI CENTRE

Project brief

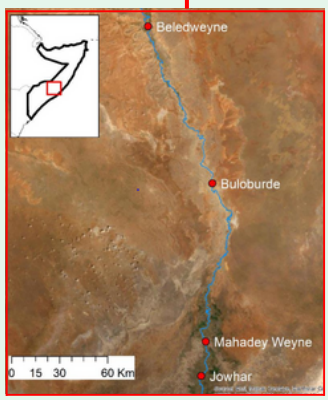
Nature-based solutions supporting climate resilience in the Shabelle River basin



Over the past decades, Somalia has been experiencing ever more frequent and severe floods. With environmental degradation being considered one of the main contributors to this change, nature-based solutions (NbS) have a high potential for mitigating flood risk in the area. Using hydrologic and hydraulic mathematical modelling to analyse options such as reforestation or sand dams, UNEP-DHI assessed this potential within the Shabelle River basin.

BACKGROUND

Many ephemeral rivers, or "wadis", in Somalia are prone to flash floods. Flooding occurs when heavy rains lead to a sudden increase in river flow, followed by a quick recession, and can cause loss of lives and property in downstream settlements. The severity and frequency of flooding from the Shabelle Rivers has been increasing in the past few decades, and it is thought that increased sediment deposition in rivers (brought about by activities such as deforestation which degrade soil structure), and subsequent raising of the riverbed, is the major contributor to this change. NbS, aimed at restoring degraded riverine ecosystems, have the potential to mitigate flooding in the area. With some of these solutions simultaneously enhancing groundwater recharge, their implementation could serve the dual purpose of flood and drought management, increasing community resilience to climate extremes.



Study area: flash flood prone wadis in the Beledweyne and Qardho areas, as well as the Shabelle River stretch flowing through key urban centres: Beledweyne, Jalalaqsi, Bulo Burde, Mahaday and Jowhar.

PARTNERS

- UNEP
- Ministry of Energy and Water Resources (MOEWR)
- FAO

KEY STAKEHOLDERS

National Flood and Drought Task Force of Somalia, representatives from Jubaland, Hirshabelle and South-West States.

SDG ACTION

PROJECT APPROACH

The study identified flood-targeting NbS already tested in the Somali context and assessed their effectiveness using hydrological and hydraulic models. For flash flood mitigation in ephemeral wadis, peak flow in response to heavy rainfall was compared between a baseline scenario and scenarios employing reforestation, terracing, or water retention structures such as sand dams and weirs.
For sediment-related riverine floods, a hydraulic river model with sediment transport components was used to assess the effectiveness of different NbS in decreasing the mass of sediment entering the river, and in decreasing incidence of flooding.

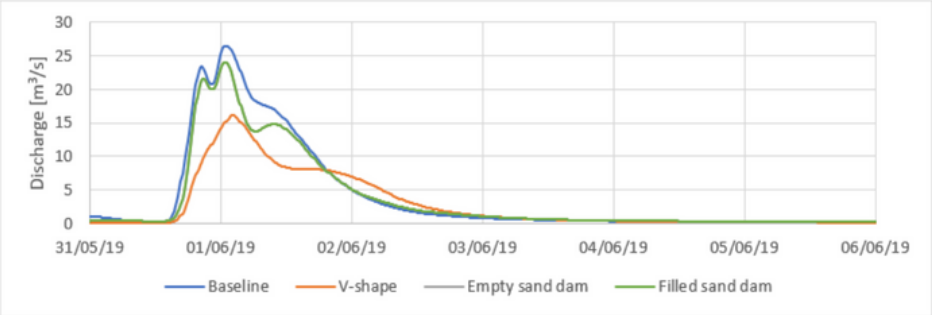


Figure showing the simulated impact of the different structure types on flood peak in Qardho. V -shaped weirs (orange line) provide highest peak flow reduction during a flash flood event.

CONCLUSIONS & RECOMMENDATIONS

A variety of NbS are applicable in Somalia. V-shaped weirs were found to be particularly promising in mitigating flash floods, whilst measures such as reforestation and sand dams were less effective, but facilitated greater groundwater recharge. Hybrid nature-based solutions thus appear as a viable way of increasing climate resilience in the area.
The study findings provide insights on the estimated differences between various NbS impact on flood mitigation. A supplementary assessment of NbS efficiency in Somalia to date provide further information on the proritization considerations and criteria.

OBJECTIVES

To research the applicability of Nature-based Solutions for flood and drought mitigation in Somalia

APPLICATIONS

Assessment results will support the National Flood and Drought Task Force of Somalia in planning future flood and drought interventions in the basin.

V-shaped/notched weirs are used in many parts of the world to control flooding and measure flow rates

KEY RESOURCES

Final Report

Online tools portal

Video: COP 26- Somalia building a climate resilient future

CONTACT

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Photo(s): Flooding in Beletweyne 2016 © AMISOM/Flck | V-shaped weirs, Aaron Volkening | Sand-dam at Dinqaal community, 2019, Lopez-Rey

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2022