Horn of Africa Regional Environment Centre and Network- Addis Ababa University (HoA-REC&N-AAU)

Community water resilience (3R – water recharge, retention and reuse) from Horn of Africa Climate Change Programme (HoA-CCP) experience

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April 2022

Water adaptation and planning in the Horn of Africa

Horn of Africa experiences recurrent droughts and floods with severe impact on the Horn region and its populations repeatedly. Between 2008 and 2010, the Horn of Africa's was faced with one of the most severe droughts in decades that brought about severe humanitarian crisis. In most countries of the Horn, droughts and floods are cyclic and inextricably linked affecting food and water security in various ways. Communities have developed innovative ways of addressing water scarcity challenges and can be see in the following notes. See also
https://news.globallandscapesforum.org/viewpoint/assamo-landscape-in-djibouti-resilience-in-adversity/

Maroodi Jeex Landscape, Somaliland

Somaliland expereinces periods of water scarcity. The region has expereinced pronoged drought over the years. Water buffering through the 3R technique offers the right remedy to tap rainfall and run-off to retain water longer and make it available during dry periods. In line with the concept of the 3R, a number of smaller systems have been developed through the HoA-CCP interventions to store water in the landscape.

1. Soil bunds: Soil Moisture storage

To address soil moisture given the lingering impacts of climate change and the land degradation and improve farming outputs, Barwaaqo Voluntary Organization (BVO) team in Somaliland and the communities of Hared, Hagal and Haraf constructed 25,600 LM soil bunds to control soil erosion and runoff through cultivated fields. The soil bunds are constructed to reduce the slope length of the field and ultimately reduce and slow down velocity of runoff as water gets released and distributed through channels and spread to adjacent fields. It is an effective way of controlling and slowing down water flows and soil loss, retaining soil moisture and ultimately enhancing productivity of the land. This innovation has become an important water conservation and management practice in the landscape. Many farmers have resorted to using equipment (tractors) to prepare the soil bunds, when initially the technique was a

community driven action using hoes, pick axes and other light equipment to prepare the field to the required dimension.

2. Berkeds (close underground storage tanks – cisterns)

Berkads are designed to capture run-off water cascading from the surrounding hills. Run-off water is first received and stored in a silt-trap and once the first compartment is full, a cleaner water flows into the main storage compartment and this is what community use for drinking, which is purified further by putting in water-guard (water purification agent). The berkeds have also additional outlet for excess water should the main storage facility get filled. This excess water is used for growing trees and grass strips around the water infrastructure to green the surrounding of the berkeds. As the berkeds are roofed with corrugated irons, rainwater is also harvested into troughs to serve lactating animals and their calves.

HoA-CCP Coordinator testing the technology of drawing water from the Berkeds

3. Water dams for the community to serve animals.

The dams are carefully constructed to collect run-off water from the surrounding hills. They have silt-traps (compartment which receive run-off) before releasing it to the main body of the dam and outlet to release excess water into nearby streams. Grass and tree strips will be aligned around the dams to serve for water moisture storage and greening.

Water dam in Maroodi Jeex Landscape - Run-off water reservoir in Somaliland

Rehabilitation of degraded rangeland: Stone contour lines

BVO constructed soil conservation stone bunds with measurement of 3200 liner meter (Lm) stone line bunds, equivalent to approximately 50 hectares of land coverage to tackle soil erosion in the degraded rangelands. Estimated 200 beneficiaries for this sustainable land management techniques were pastoralist and agro-pastoralists. This was part of the efforts to restore the land with fodder and grasses for the pastoralist/agro-pastoralist community in the landscape in the long run. This technology was deployed to reduce water run-off, decrease soil erosion in the rangeland areas, accumulate more organic matter and sustain fodder productivity due to high moisture content. The stone contour lines is a sustainable land management practice designed to slow down flow of rain water, and allow water to filter into surrounding areas providing a good environment for fodder and grass to grow and restore the land with vegetation.

Assamo Landscape, Djibouti

Djibouti expereinces extreme levels of water scarcity. The climate in Djibouti is arid to very arid. Average rainfall varies between 100 and 200 mm a year (see baseline doc). Water buffering through the 3R technique offers the right technique to tap water from the seasonal stream, which pases through the landscape. A number of structures have been designed to tap this potential.

1. Water well on the stream bed

The water from the well is lifted into a storage tank below through solar pump as part of the climate smart agricultural intervention component.

Solar powered pumps

Water storage facility in Assamo Landscape, Djibouti

Water wells and water storage facility equipped with solar pumps, Assamo Landscape, Djibouti

2. Other water storage system include gully plugging, sand dams etc. to serve as ground water storage made available for the existing tree species in the landscape.

Gully plugs in Assamo Landscape, Djibouti

Gully plugs in Assamo Landscape

EWASO N'GIRO-LAKE NATRON – South Rift Landscape – Kenya

Basin level Planning

Deforestation and farming activities both in the Mau Forest and the Nguruman Loita forest of the Ewuaso/Natron basin are posing a lot of challenges in the Southern Rift in the last few years that have never been experienced in the recent history of the area. Climate change, seasonal variations like El Nino and the activities of people in the basin are playing a key role in building pressure on the water resources. Human pressure has been experienced mainly from growing farming activities, using irrigation, and from the main extractive industry in the area, the Magadi Soda Ash Company. This has led to a growing conflict amongst communities in the basin as the upstream communities use much of the water at the expense of those living downstream. Conflict also exists between the communities and the Magadi Soda Company, as this industry requires a constant supply of water throughout the year to run its activities while the surface water levels fluctuate.

The Ewaso N'Giro and its tributaries that descend from the Mau Forest Complex and the

Loita Hills support the South Rift communities as well as the rich and diverse ecosystems. However, the amount of water flowing from the Mau Forest has drastically decreased in recent years, mostly due to unregulated abstraction and degradation of the upper catchment coupled with insufficient rainfall. In March 2015, the Ewaso N'Giro ran dry before reaching Lake Natron (see baseline study for South Rift Landscape pp.33). Continuous shifting, shrinking and expansion of the Shompole swamp, which is a key dry season refuge for the pastoralists, have also been observed. Low velocity of river water and high sediment load seem to lead to obstructed inlets of lakes and swamps. There is now a real danger that Lake Natron, which is the most important breeding ground for the Lesser Flamingoes, will dry up and bring about an ecological catastrophe never witnessed before as the breeding sites for these birds are limited. The effects of poor water management are also a threat to the Maasai communities in the area covered by the Southern Rift Association of Land Owners (SORALO). On the one hand, this enhances droughts, and on the other hand, it leads to floods with devastating effects on settlements and farms. Lack of water retention infrastructure is also lacking, because there are hardly any operational water reservoirs in the area.

The need to try and address the water challenges through an integrated basin-wide watershed management approach to ensure a coordinated development and management of water resources along with other resources, preventing the repetitive droughts and floods situation and maximizing ecosystems services. A series of interventions are being proposed, which include both short and long term actions.

Short-term measures

- The need for rapid hydrological assessment to inform restoration strategies for the SORALO area in Kenya and the neighboring Lake Natron area in Northern Tanzania
- Establishing EWASO N'GIRO-LAKE NATRON basin-wide water monitoring system as far as this is now in existence, providing an emerging framework for monitoring the seasonal trends in water levels and quality and providing basic information to design targeted interventions among them a quick action to open the inlet to lake Natron and a plan for the annual maintenance of waterways via smart dredging that includes river training in the SORALO and Lake Natron area as well as higher up in the basin.
- Organizing a stakeholders dialogue to include the stakeholders and elicit a collective action for cost-sharing and addressing the water challenges in a more concerted way.
- Provide an overview of costs and potential financial sources to cover these costs in a sustainable way, ranging from counties to communities and companies, also assessing if the catchments and sub-catchments of the basin are big and rich enough to keep a dredging company going year round.

Expected Outcomes

- Flood mitigation strategies worked out and finance identified to prevent flooding in the Maasai SORALO area during the next rainy season

- Hydrological/ environmental restoration measures designed, cost and discussed with potential finance providers, to ensure that there is continuous water flow into Lake Natron.
- Also other sites in the Ewuaso N'giro Lake Natron basin and possibly elsewhere in Kenya visited and assessed to prepare short term and mid term plans for smart dredging and to develop a business case for annual smart dredging campaigns that can keep a dredging company in business year round.

Silted waters of Ewaso N'giro River (upstream land use practices) – Kenya

Photo@John Ajjugo

Juba Urban Landscape - South Sudan Ground water extraction

Water extraction: Khor Teena landscape, Sudan

(Ground water extraction using solar pumps)

Summary - Water adaptation needs in the Horn of Africa

A productive landscape through water management and landscape restoration

- In the more drier areas, construction of water retention infrastructure such as sand dams across seasonal rivers (transboundary) to support water infiltration and storage under sandy river beds and extracted through water wells and solar gully erosion management structures (Djibouti, Somaliland);
- In flood water prone areas, landscape restoration through flood water storage and water conservation structures (room-for-river or-room-for-flood water concepts, dykes should be explored through scaling up of water reservoirs structures) which will support water needs during drier periods;
- Basin level catchment planning and overall land use planning (some parts of Ethiopia, Kenya, South Sudan and Sudan);
- Rainfall variability within and across years have been experienced - as such adaptation should support existing community level initiatives – improve information and monitoring of water use capacity, surface and ground water mapping and monitoring; technical training at community levels in water management; support communities in deploying natural and built water storage infrastructure, as well scaling up of solar pumping systems
- Support investing in integrated water management (manage surface, groundwater, water quality and quantity; stakeholder involvement and information management; water storage infrastructure development; water and land management through catchment planning approaches etc.
- The horn experiences rainfall variability within and across years – the countries have experienced oscillations of droughts and floods; extensive displacement of

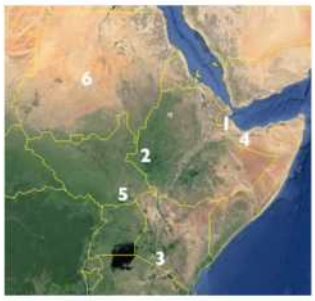
populations; disruptions of livelihoods and famine ushering in emergency support needs; drying of rivers; rising of water levels.

- The need for improve information and monitoring of water use capacity, surface and ground water mapping and monitoring; technical training at community levels; support communities in deploying natural and built water storage infrastructure, as well scaling up of solar pumping systems
- Support investing in integrated water management (manage surface, groundwater, water quality and quantity; stakeholder involvement and information management; water storage infrastructure development; water and land management through catchment planning and greening etc.
- Improved information and monitoring of water use capacity, surface and ground water mapping and monitoring; technical training at community levels in water management; Basin level catchment planning and overall land use planning capacity development (some parts of Ethiopia, Kenya, South Sudan and Sudan).

Horn of Africa Climate Change Programme - Experience

Selected landscapes

1.	Djibouti	Mount Arrey-Assamo
2.	Ethiopia	Gambella Landscape
3.	Kenya	South Rift Landscape
4.	Somalia	Maroodi Jeex Catchment
5.	South Sudan	Imatong Mountains
6.	Sudan	Shamal-Kordofan Landscape



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Funded by (DGIS-Netherlands)