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SUPPORT FOR STRENGTHENING CLIMATE CHANGE ADAPTATION PLANNING FOR SOMALIA PROJECT

CLIMATE CHANGE ADAPTION (CCA): RAINWATER HARVESTING, STORAGE AND MANAGEMENT CLIMATE CHANGE KNOWLEDGE

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March , 2024

1. INTRODUCTION: RAINWATER HARVESTING & MANAGEMENT.

Water harvesting entails the collecting and storage of naturally occurring / flowing water from various sources, such as rainfall and floodwater to meet societal needs.

Rainwater harvesting refers to the collection of rainfall runoff from surfaces like roofs and storing. In Somalia, rain water is harnessed / channeled from roofs and ground surface runoff to plastic and concrete water tanks, berkad, and earth dams. Such collected water is used by communities and households during the lean / dry periods for domestic use, small scale irrigation and watering animals. Rain Water Harvesting also includes the storage of water within the soil profile in what is known as "green water." Due to water scarcity and low rainfall, rain water harvesting plays a crucial role in Somalia where it provides a lifeline to nomadic pastoralists and agro pastoralist communities especially in rural areas. In urban areas, rain water harvesting through berkads plays an important role in providing access to fresh non saline drinking water for domestic use. By implementing runoff farming techniques, water harvesting and soil and water conservation methods in alluvial valleys, Somali farmers mitigate the risks associated with dryland farming and improve agricultural productivity besides extending availability of pasture and fodder for their animals. Combined with other climate smart agro-pastoralism skills, water harvesting is an essential practice that helps address water scarcity and supports sustainable agro-pastoral development.

Somalia rainfall data

Over the past decade, Somalia has witnessed significant fluctuations in rainfall patterns, with an average annual rainfall ranging from 200mm to 600mm. The country experiences two main rainy seasons: the Gu season from April to June and the Deyr season from October to December, with the Gu season contributing to the majority of annual rainfall. Regional variations are observed, with coastal and northern regions receiving higher amounts of rainfall compared to the central and southern regions (SWALIM, 2023) These variations emphasize the importance of rainwater harvesting in Somalia; limited access to clean water sources and frequent droughts make rainwater a crucial resource. Rainwater harvesting not only ensures a sustainable supply of clean water for domestic use, agriculture and livestock but also increases food security and supports livestock rearing. To maximize the benefits, it is recommended to focus on collecting rainwater during the Gu season, which provides the highest rainfall. Adequate infrastructure and storage facilities, such as rainwater tanks and dams, are necessary for efficient collection, storage, and distribution of harvested rainwater. This ultimately addresses water challenges and promoting sustainable development for rural and urban Somali communities and households in the country.

2. PRINCIPLES OF RAINWATER HARVESTING AND CONSERVATION

Key principles on effective water management are:

I. **Optimal Utilization and Capture of Rainwater:** In Somalia, which is dry-climate country, rainfalls distributed unevenly in intense downpours that cannot be readily used by a crop, human or livestock consumption. Storage techniques (such as external catchments or rooftop collection) increase the availability of water in the drier seasons. Practice prudent water usage by avoiding unnecessary wastage.

II. **Effective Use of Soil Water Reserves:** soil serves as natural reservoirs / sinks for rainwater. The amount of water available depends on factors like soil type and the rooting system of crops. Also keep in mind that water discharge in soil is crucial; cover crops serve to reduce / minimize water discharge through runoff as well as loss through surface evaporation whilst at the same time serving to attract and trap atmospheric moisture.

III. **Appropriate Selection of Catchment and Channeling Surfaces:** Use non-toxic and clean catchment surfaces such as roofs made of galvanized iron, tiles, or other materials that do not introduce contaminants into the harvested rainwater. For ground surface run off harvesting, efforts must be made to minimize siltation as silting reduces storage efficiency and capacity for earth dams. Check Dams and Soil banding is one key strategy that reduces siltation in earth dams; when complemented with regular maintenance and desilting, they enhance optimal storage of the harvested water. Animals should also be kept from accessing the water storage structures; this will not only prevent animal deaths but also prevent the contamination of the stored water and ensure its cleanliness and safety for domestic use.

IV. **Minimize water loss through surface evaporation:** Where feasible, continuous ground cover over the water storage structure minimizes surface water loss. Furthermore, having windbreakers around earth dams or their location in non-windy places reduces surface evaporation; ultimately, earth dams should be surrounded by natural vegetation which not only increases the soil's water retention capacity but also reduces wind and the associated surface evaporation besides providing a cooling effect around the earth dams thus further reducing surface evaporation. Applying mulch significantly reduces evaporation. Choose for drip irrigation and water in the evening to minimize water loss through evaporation.

V. **Take measures to avoid run off:** Run off is where water is not absorbed by the soil but runs across the surface away from where the crop can use it. Structures such as contour schemes, terracing, pits and bunds can reduce run-off. Cover crops are also effective mechanisms for minimizing surface water runoff.

VI. **Plan water harvesting consumption:** by assessing the water needs, including calculating the water requirements for animals, humans, and plants, as well as determining the frequency. Establish a watering schedule that aligns with the specific needs of livestock and crops. For instance, certain crops may require irrigation at specific growth stages, and livestock may have distinct daily water requirements.

3. RAIN WATER HARVESTING SYSTEMS AND DESIGNING

Based on sources of runoff, Rainwater Harvesting systems basically fall under three main categories: *Surface water collection*, *ground water collection* & *augmentation of ground water recharge***.**

Based on storage methods, three broad categories of rainwater storage facilities are: -

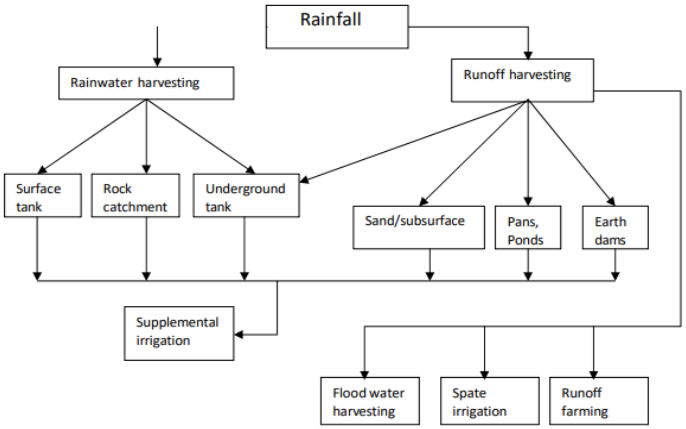

Figure I: An Overview of the Types of Rainwater Harvesting Storage Systems

- Surface tanks or above ground tanks;
- Sub-surface tanks or underground tanks.
- Dammed reservoirs and ponds

Generally, the most commonly used structures for storage of harvested rainwater include the following:

- Underground tanks
- Surface/above ground tanks
- Ponds and pans
- Earth dams,
- Small weirs
- Subsurface dams
- Sand dams,
- Rock catchments
- RWH for recharging ground water

Figure II: Earth Dam

Figure III: Concrete Rain Water Storage Tank

4. **Major Challenges for Rainwater Harvesting and Storage in Somalia.**
    - **Cost:** Rainwater harvesting storage and auxiliary works can be expensive, requiring high initial set up costs in terms of: (i) professional design fees by engineers, (ii) purchase of materials and construction costs especially in community scale projects, or where concrete and other materials have to be purchased.
    - **High evaporation losses:** affect many RWH storage structures especially open pans, tanks and dams. This is particularly a problem since most RWH storages in Somalia are located in hot areas.
    - **Limited Technical Capacity:** of the personnel, artisans and communities in Somalia in implementing RWH projects
    - **Limited Awareness and Education:** Lack of awareness and education about the benefits and techniques of rainwater harvesting may contribute to a low adoption rate.
    - **Conflict and Insecurity:** Ongoing conflict and insecurity in certain regions of Somalia may disrupt efforts to implement and maintain rainwater harvesting systems. This poses a significant challenge to sustainable water management.

5. **Recommendations for both policy makers and communities.**
    - **RWH Awareness Promotion:** The government should develop and implement awareness campaigns to educate communities about the benefits and techniques of rainwater harvesting.
    - **Research and Development:** The government should allocate funds to research, and development initiatives aimed at exploring innovative and cost-effective rainwater harvesting technologies specifically designed for household-level use in both urban and rural areas including villages.
    - **Indigenous RWH Knowledge and Practice:** Promote traditional rainwater harvesting methods that may already be in use in local communities.
    - **Innovative Utilization of Locally Available Construction Materials:** Communities should use locally available materials and skills for constructing rainwater harvesting systems.
    - **Community Driven / Owner RWH Instructure:** Communities should establish savings or microfinance initiatives to fund the construction and maintenance of rainwater harvesting infrastructure.

REFERENCE.

Somali Water and Land Information Management (SWALIM). (2023). Annual Rainfall. Retrieved from https://www.swalim.org/annual-rainfall