**Technology Fact Sheet for Adaptation**
**B.3. Technology: Water Harvesting (Earth Dam)** [i]
**Sector: Water Resources**
**Subsector: Seasonal Water Resources**

## B.3.1 Introduction

Water harvesting is the capture, diversion, and storage of rain water for different uses, mainly for drinking and in irrigation where water becomes available to crops and thereby permits economic agricultural production. In rural areas all over Sudan, people living in villages or those living a nomadic life, suffer from drinking water shortage for themselves and their livestock. They get their water during the rainy season only. Thereafter, they lack water due to the absence of water storage facilities. Rain-fed farmers need drinking water at their farms during the harvest time which usually occurs during the dry season. Lack of water very much affects the socio-economic life of the rural people and compels many of them to migrate to urban centers.

## B.3.2 Technology Characteristics

- A Wadi is a seasonal rain drainage (fig. 2). It is a system wherein the catchment is many square kilometers in area. Runoff flows through a major stream of Wadi and complex hydraulic structures are needed (dams, distribution network etc.) to harness the rain water.
- The concept of a small dam is to construct a dam across the course of a Khor (seasonal small drainage) or natural stream at a suitable location which suits topographical, foundation, and hydrological requirements.
- The dam reservoir capacity is governed by catchment areas of the stream, evaporation and releases.

## B.3.3 Country Specific Applicability and Potential

In the rain-fed areas water harvesting structures like earth dams, *haffirs* and depression reservoirs are vitally needed for drinking water and to some extent for irrigated agriculture.

This technology can be successfully applied in Sudan if the following requirements are set:

- Construction of small earth dams and their management requires skills and institutional organization.
- Consultancy in design of the dam and its implementations.
- Operation of sluice gate and spillway, etc.
- Training and skills development of state staff and local communities for operation and maintenance of the water harvesting projects is a core requisite for sustainably.

## B.3.4 Status of Technology in the Country

Earth dams are found in many areas of Sudan, are implemented in large scale and serve numbers of villages. Rain water harvesting is one of the priority programs for rural socio-economic development in the country. Rain water is not only important for drinking, it is also important for agriculture and pasture as most of the livelihood of the rural people depends on farming and animal rearing. Compared to other means of development, rain water harvesting is cheap to develop with high socio-economic returns. After thorough investigations, technical experts in the country have come to the conclusion that many water harvesting techniques can be used to avail water for drinking and farming on small scale all over the targeted area. Small dams, *haffirs*, reservoirs in natural depressions and contour bunds, inter alia, can be used. Priority regions that are targeted for establishing the earth dam are:

(i) Southern parts of Sudan;

(ii) Regions with known history of competition over natural resources, particularly water and land, that lead to or have potential to develop into conflict, and

(iii) Regions that received little or no water harvesting projects. The targeted rural communities are of course pastoralists and sedentary farmers.

### B.3.5 Opportunities and Barriers

Financing constraints constitute a major impediment to socio-economic development in the country. This is particularly the case for rainwater harvesting development. Despite the difficulties facing Sudan's economy in the short run, the economy will improve gradually in the long run. Improvement of the economy will lead to better livelihood prospects and services for the people of Sudan and in particular water supply. Many barriers may face the implementation of this technology:

- Rainfall is a most unpredictable variable.
- This method has high costs compared with *haffir*.
- Inadequate funding
- Lack of basic information
- Weak infrastructures
- Lack of security in certain regions

### B.3.6 Benefits to Economic/Social and Environmental Development

**Economic Benefits:**

- Increases the income of farmers.
- Increases food and livestock production and productivity generally

**Social Benefits:**

- Enhances availability and access to water
- Improves living conditions of both pastoralists and farmers
- Promotes peace and stability

**Environmental Benefits**

- Strengthens the resilience of the local communities to climate change
- Enhances settlement of local people,
- Alleviates the competition between farmers and pastoralists

### B.3.7 Climate Change Adaptation Benefits

- Fits well, both for present and expected climate change
- Strengthens the resilience of the local communities to climate change

### B.3.8 Financial Requirements and Costs

An average dam cost 6 Million Sudanese Pounds (3 Million USD). The water stored in the reservoirs needs to be treated if the water is used for human consumption. Therefore, slow sand filtration techniques should be adopted for the earth dams. Additional costs are hence needed (0.5 million USD) as well as maintenance costs of the earth dams.

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[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment for Climate Change Adaptation - Sudan. You can access the complete report from the TNA project website http://tech-action.org/**