Sand storage dams: Innovating water management

In Somalia, after civil unrest and severe drought, an intervention cofunded by IFAD and the Belgian Fund for Food Security (BFFS) helps provide much-needed access to water during the driest seasons of the year.

In the semi-arid and arid regions of Somalia, an IFAD- and BFFS-supported project has constructed sand storage dams to ensure that smallholder farmers have access to water year-round. This innovative mechanism has improved crop and livestock production and farmers' incomes. Sand dams are built into seasonal rivers so that the sand upstream of the dam accumulates and the groundwater storage capacity of riverbeds and river banks increases. During the wet season, the reservoir fills up and prevents valuable rainwater from running off from the catchment beyond the reach of the community. The quality of water is protected against evaporation and contamination, and is improved through natural filtration in the soil. Through sand storage dams, water availability is prolonged during dry seasons ensuring that communities have permanent access to water for domestic, crop and livestock use.

Country: Somalia

Direct Beneficiaries:
Women and agropastoral and nomadic poor rural people in rainfed areas and irrigated farms.

Results:

- The construction of nine sand storage dams in nine different communities in the Awdal and Maroodi-Jeex Regions has increased the availability of water for domestic, crop and livestock use, benefiting more than 3 600 households.
- The number of irrigated farms in the programme area has increased, and farms that had previously been abandoned for more than 10 years due to water scarcity have become productive again.
- Project investment in improved water facilities, with participatory planning and implementation, has also assisted women and children more generally as they are responsible for water collection. The time they save by having water sources nearby can be invested in schooling, domestic work, income generation and other productive activities.

Main Lessons:

- The cost-efficiency of sand storage (on average 30 cents per cubic metre) is 10 times higher than that of surface water storage.
- The minimal evaporation loss makes sand storage at least three times more effective in holding water than surface storage.
- Water quality is superior as there is no contamination by livestock or humans in the stored water supply.
- By providing water for irrigation, sand storage dams allow farmers to cultivate the most fertile soils on the adjacent river banks and therefore achieve high yields from irrigated farming.

BASIC INFO

Sources:
Somalia: North-western Integrated Community Development Programme – Phase 2 – Working Paper No. I, Sustainable Agriculture and Livestock Improvement (2008) *and North-western Integrated Community Development Programme – Phase 2 – Impact assessment* (2012)

Project Name:
North-western Integrated Community Development Programme

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WEB PAGES

IFAD Operations Near East, North Africa and Europe:
http://www.ifad.org/operations/projects/regions/pn/index.htm
IFAD operations in Somalia:
http://operations.ifad.org/web/ifad/operations/country/home/tags/somalia
IFAD country programme in Somalia – Knowledge in action:
http://operations.ifad.org/web/ifad/operations/country/km/tags/somalia

Background

Between 1986 and 1991, Somalia was in a state of civil war and disorder. Eighteen years of conflict made Somalia one of the worst humanitarian catastrophes in the world. The severe drought that has hit the Horn of Africa in recent years together with the global financial crisis has worsened the food security situation of millions of smallholders.

Scarcity of water during the dry season is a major problem affecting millions of Somali households, particularly agropastoral and nomadic poor people. North-western Somalia has proved to be the most stable zone for the implementation of humanitarian initiatives. Here, land is mainly used for pastoralism and agropastoralism with mixed farming systems. Rainfed agriculture is the main farming system, widely practised throughout this area. The hot climate and highly variable rainfall make existing water supplies insufficient for domestic, crop and livestock use. Rainwater supply cannot be guaranteed from April to June and from September to November. To address the problem of water scarcity, IFAD launched the North-western Integrated Community Development Programme in Awdal and Maroodi-Jeex. The programme has improved people's access to safe drinking water and water for crop and livestock use.

A structure and a strategy

The water table throughout Somalia goes down during the dry season. Most of the shallow wells on which communities in Awdal and Maroodi-Jeex depend are dug into the banks of seasonal rivers and run dry during the dry season. Many irrigated farms adjacent to these riverbeds had long since been abandoned because of the shortage of water for production and the increase in salinity. When the rains begin, they can last for several hours. This prolonged rainfall often results in flash floods that run along the moisture-starved riverbeds at a relatively high speed. If harvested properly, this water can be stored naturally and used at any time of the year for household and agricultural purposes. Between one and three flushes of rainwater can result in 4 800 cubic metres of stored water beneath the deposited sands and along the banks of the dry riverbeds. Sand storage dams have been constructed to address water shortages in the communities through water and soil conservation, and water-harvesting techniques.

Built into the riverbed of seasonal rivers, sand storage dams are small dams whose functioning is based on sedimentation of coarse sand upstream of the structure by which the natural storage capacity of the riverbed aquifer is enlarged. During the rainy season, the aquifer fills with water due to surface run-off and groundwater recharge. It can take up to two large rainfalls to fill up the riverbed aquifer. The river starts to flow as it does in the absence of the dam but the groundwater flow through the riverbed is obstructed by the sand storage dam. This creates additional groundwater storage, which local communities use for domestic and crop and livestock production purposes.

The initiative involves the community at every critical level, and beneficiaries are consulted on multiple issues in the decision-making process. Sand storage dams are community-owned as the local population has participated in the construction in terms of buying local materials, providing labour for trench work and building the structure.

The programme supported the construction of nine small dams – four in Awdal and five in Maroodi-Jeex– benefiting more than 3 600 households. The construction of sand dams is a highly innovative mechanism to store water during the rainy season for the dry season. It has a number of benefits: in addition to increased water availability, water quality is improved through natural filtration in the soil. This has a direct impact on people's health by providing them a clean, secure and local year-round water supply. As a result of more water being available during the dry season, farmers have increased their land acreage. Crop and livestock production has improved considerably in the programme area as more and better produce and livestock can be sold by farmers and pastoralists who are now able to earn higher incomes and improve their food security situation.

Replication and scaling up

Sand storage dams have proved to be a very effective method for dealing with water shortages in arid and semi-arid areas such as Somalia. The IFAD/BFSS programme will construct six additional sand storage dams over the next two years. There is a great deal of community interest in and demand for this innovation. Farmers' organizations have built three sand storage dams using their own resources, and both the Ministry of Agriculture and the Ministry of Water and Minerals have taken up the idea. Appreciation for this type of construction has also come from international agencies, particularly the United Nations Children's Fund, which has shown interest in replicating the programme. The programme is now modifying the basic structure of sand storage dams in order to spread water in the low rainfall areas of eastern Somalia. This will benefit fodder production and help sustain livelihoods in terms of food security. The programme is also extending the concept of sand storage to the eastern arid pastoral zone of Djibouti, where water resources are scarce.

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