Spate irrigation in Somalia

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Somalia is located in north-eastern Africa, bordered by Ethiopia and Kenya to the west and south, and the Gulf of Aden and the Indian Ocean to the north and east. The coastline is about 3 300 km long, and the land area is about 64 million ha. Topography is varied, including the hot and arid coastal plateau, rugged mountains, and plateaux and lowlands of varying fertility and rainfall. About 29.9 million ha (47 percent of the land) is classified as agricultural land, of which 28 million ha are permanent pasture and 1.1 million ha are used for crop production.

The population is 5.8 million people, and it is growing at 3.1 percent per annum. Twenty percent of the population are farmers, 20 percent are urban dwellers and the remainder are nomads. The agricultural sector—crops, livestock, forestry and fishing—contributes 50 percent of the total gross domestic product.

Spate irrigation is used in northern Somalia where, of the cultivated area of about 74 100 ha, 3 percent is under irrigation. The Somali Democratic Republic Government attaches much importance to the northern part of the country. The main constraint for agriculture is the lack of permanent irrigation. During the rainy season a huge amount of water is lost each year as a consequence of wadi run-off. The Somali government has, therefore, decided to initiate an investigation programme examining the possibilities of controlled irrigation development.

1. Irrigated agriculture

1.1 Irrigation by flood water

There are some farms—mainly along the Togs—that receive irrigation by flood water. This land is not farmed intensively because of the irregular nature of the irrigation. The river water off-takes are generally rudimentary and take only a small portion of the available discharge.

1.2 Gardens irrigated by pumping

The first gardens irrigated by pumping were started in the 1940s in the area along the Tog. The average farm in this area has pump irrigated gardens totalling around 1.2 ha. Intakes at weirs also exist in some parts of this area.

2. Water management techniques

Agriculture with controlled irrigation, as opposed to dry land farming, is not traditional in north-west Somalia, so water management techniques are not highly developed. Water retention is traditionally practised.

2.1 Open ponds and pools

Open ponds and pools are used for seasonal, naturally collected surface water and are generally unprotected. The two principal types are:

- the 'Bali': (round pond with earth wall 10 m diameter with access); and
- the 'War': (similar to 'Bali', but smaller and handmade).

2.2 Open pits and shallow wells

Water is also collected in hand dug holes, usually near a dry river bed such as Ceel Gaaban (a typical well would be round, 2 m in diameter, with a depth of at least 8 m). And in the sandy zones of rivers there are ditches, left from road construction, where water is collected during the rainy seasons. These are called 'Xurfad'.

2.3 Hand dug wells

There are also larger, more modern wells, most of which are private. They are mostly used for irrigating gardens.

More recently, large deep wells with stone walls ('Ceel-Dheer'), cone-shaped ponds, some 30-50 m in diameter ('Bali Weyn'), and machine-bore wells have been constructed, using machinery. But these methods have met with limited success.

3. Modern developments in spate irrigation

The traditional system of spate irrigation is now changing, with the introduction of modern techniques and with the help of the ongoing project to improve it.

3.1 Water catching and lifting

There is a lack of surface water in north-western Somalia. Shallow wells with depths of 20-25 m are recommended for this area as the most appropriate source of water for irrigation. Despite some agricultural development, there is still no consistent source of sufficient water at reasonable cost. In the long term, deep wells and large dams may be needed. At present, even small dams cannot be constructed because underground rock formations are unknown. The groundwater potential is also very poor—usually such ground water as there is would only be sufficient

for urgent drinking water needs.

Shallow wells of the recommended type yield up to three l/s (or even up to five l/s in some cases). They yield insufficient water for irrigation needs, but some methods for increasing the yield are:

- auxiliary wells inside the Tog bed in sand banks, underground and tightly covered;
- infiltration pipes all across the Tog bed, in stable channels, made of PVC, concrete or slotted pipes;
- underground dams, preferably on a rocky or impermeable base, with pipes as above;
- excavation of side basins and construction of side dams and adjoining wells; a useful solution when flood levels at the side are known, when there is no change in bed configuration, and where continuous silt excavation takes place; and
- intakes at weirs, which can sometimes be useful. However, they are not practical where there are large quantities of silt.

Low dams made of wooden poles provide water guidance in the 'slow down' and 'run out' stretches of the Togs. This technique of collecting water and causing it to trickle off into fields provides a simple and efficient means of irrigating crops.

3.2 Water storage

Pumped water is stored at a level allowing gravity flow into fields. For this purpose, practically any type of storage is acceptable, whether in masonry or concrete basins, earth dams, or small containers such as tin or plastic drums. It is understood that the volume of any type of reservoir adapts to water availability and demand. In north-western Somalia, storing half a day's demand is generally sufficient. All types of reservoir are designed in such a way that materials are minimal. The important quality is impermeability and, preferably, the surface of the reservoir should be covered to reduce evaporation. Open storage accounts for at least 5 percent of losses.

3.3 Water distribution

The main concern in water distribution is the reduction of water loss in open sand canals. Concrete canals, prefabricated or made on site, or pipes if affordable, can be used: also canals made of tin, of plant stems or any other suitable material. The same principle applies to distribution boxes with sluice valves. Longer-lasting earth canals, particularly in orchards and plantations, may be bordered with trees or bushes to protect them. No efforts should be spared to save water. Due to the generally low mineral content of shallow underground water, there is no danger of salt accumulation. The comparative significant permeability of most soils in the area reduces such danger even further so there is no need for drainage or similar measures.

3.4 Irrigation equipment

Motor pumps for water lifting are already very common in Somalia, but wind pumps are being introduced, and their use by farmers encouraged.