

Spate irrigation in Tunisia

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Spate irrigation is mostly used in central Tunisia—an area of 10 000 ha at Sidi Bouzid, Kasserine, Kairouan and Gofra—which represents 4 percent of the total irrigated area. Its average annual rainfall is 200-300 mm.

Spate irrigation is generally co-ordinated with well irrigation. This permits complementary irrigation for areas not irrigated by wells, and it also improves the production of groundwater. Spate irrigation helps to decrease the losses of water in "sebkhas" and to reduce flood hazards in downstream areas. Also it ameliorates the quality of the soil by leaching it with spate water of good quality.

1. Traditional spate irrigation

Usually, spate irrigation is practised by deflecting part of the wadi by means of a channel (called M'Goud in Tunisia) with an embankment on one side composed of materials left by the wadi, with the wadi embankment constituting the second bank of the channel.

This channel conducts water to the irrigated area favoured by a reduced slope and by the small earth barriers in the wadi, which raise the water in the secondary channels, conducting the water to areas where it is needed. In big floods, however, these structures are frequently destroyed.

2. Modern spate irrigation

New methods based on theoretical and practical calculations, and recently applied to the spate irrigation of Fekka Wadi, have ameliorated the operating system.

The new constructions can:

- resist large floods, which makes for less maintenance;
- make use of a greater proportion of the floods; and
- increase underground water storage.

The essential difference from the traditional structures is the use of concrete thresholds and channels.

3. The project

Tunisia's most successful irrigation project has been at Fekka Wadi in Sidi Bouzid plain, in the centre of Tunisia.

In an area of 4250 ha four diversion weirs located upstream of the irrigation areas have been built, and a system of channels conducting water to these areas has been con-

structed. Outlet channels to dispose of excess water have also been built.

The flow in the channels is 6-10 m³/s. Over six years there have been only 27 floods with a maximum flow greater than 30 m³/s. The total volume of water derived by the project each year is 20 million m³. Of this, 9 million m³ is used for crop production and 11 million m³ is stored as ground water. The cost for the spate development in Sidi Bouzid came to almost \$2000 per ha.

Other projects are planned, among them one in Kasseim (west central Tunisia), where 5000 ha of spate irrigation development is planned for an approximate cost of \$8000/ha.

It is believed in Tunisia that many more spate irrigation projects will need to be realized in order to promote agricultural development, to ensure food security and to maintain regional employment.