# Water-Saving Methods Used on Project Demonstration Sites

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One of the IWRM principles is the introduction of water-saving methods under using irrigation water. Initially, project specialists were planning to introduce water-saving technologies for solving the problems of raising the irrigation water productivity. The methodology of irrigation management in itself contains the elements of economical use of irrigation water in the field. First of all, we would like to show how the methodology developed by the regional group solves water-saving issues. A key indicator of saving water resources is the information on volumes of water withdrawal. Without information about how much irrigation water is delivered into a field it is difficult to plan economical use of irrigation water. At the same time, the lack of knowledge on real timing and rates of water applications that take into consideration the soil and climatic conditions also does not allow us to evaluate the extent, within which we can save irrigation water in the field.

In 2002, the system of water measurement and record keeping was established in each pilot farm and on its demonstration fields by the beginning of the growing season. Information on irrigation water supply and surface runoff, which was being transmitted from each demonstration field allowed us to evaluate the baselessness and nonuniformity of irrigation water delivery during the growing season. Irrigation by overrated norms at the initial stage of plant growth under providing water application for land preparation took place in farms.

Assessment of the existing practice of irrigation water use in 2002 in comparing with the computer-simulated irrigation schedules prepared for each demonstration site based on field investigations of their soil and climatic conditions allowed us to determine the potential opportunities for saving irrigation water. A size of excessive irrigation water supply against the normative amounts was determined for each field. Apart from studying irrigation rates, shortcomings in organization of water applications were specified; for example, use of too long furrows with a high inflow rate results in considerable losses of irrigation water due to deep percolation and large tailwater runoff from a field. The individual furrow irrigation systems that allow to provide efficient management of water application and to use irrigation water rationally were elaborated for demonstration fields in private farms “Khojalkhon-ona-Khoji”, “Nozima”, and “Turdialy.” In 2003 and 2004, after introducing the recommended furrow irrigation systems, the farms have reduced the volumes of irrigation water use: by 33 to 45% in the farm “Khojalkhon-ona-Khoji”; by 15 to 18% in the farm “Turdialy”; and by 33 to 48% in the farm “Nozima.” Apart from a new furrow irrigation system, the farm “Turdialy” has used the water-saving technology that allows taking into account the upward feeding of the aeration zone by groundwater.

The furrow irrigation systems were upgraded in the farms “Sayed”, “Bakhoriston” and “Sandyk.” Although, the existing furrow irrigation systems in these farms had an optimal length of furrows, but, as a whole, they were arranged without detailed considering the soil pattern and slopes of irrigated fields resulting in considerable losses of irrigation water due to deep percolation and tailwater runoff from fields. As a result, water application rates were, first of all, fixed in these farms; and the uniform wetting of soils was provided by organizing water applications on the irrigated units that were specified taking into account the soil pattern and slopes. At that, the following saving of irrigation water was reached: in the farm “Sayed” - 2% in 2003 and 19% in 2004; in the farm “Bokhoriston” – 41% in 2003 and 32% in 2004 “Sandyk” – 8% in 2003 and 17% in 2004 (Table 5.35). In the farm “Sandyk”, we asked the farmer to put special attention to the difference in soil infiltration rates in the upper part of his field with thick topsoil and in the middle part of the field where outcrops of pebble take place. It was necessary to separate out these plots and to irrigate them separately. Prior to adjusting management of water applications, the farmer used furrows 70 to 100 m long but did not take into account the difference in a texture of soils in upper and middle parts of the field; as a result, overwetting of soil and overgrowth of cotton in the upper part and deficit of soil water content and backwardness of cotton in the middle part were observed.

Management of the farm “Tolibjon”, having the experience of using the efficient method of water applications on local irrigated units, did not pay attention to economical use of irrigation water. The project has supplemented the furrow irrigation system employed by the farmer with the system of water measurements and record keeping and setting of irrigation water rates. Project specialists consider that this technology has the great potential for rational and efficient use of irrigated water, which was seldom applied in the region and requires certain experience and skill for its use. A backbone of this technology consists in the subdivision of a field into small irrigated units by arranging longitudinal and lateral irrigation ditches and in conducting subsequent water applications only on those parts of the field where the need of plants in water arises, independently from their location. The first water application is conducted according to the method widespread among the experienced farmers and irrigators in this region. This method allows reducing flow rates due to redistribution of irrigation water between an upper irrigated unit and a next irrigated unit, and owing to managing of water application within each irrigated unit.

**Table 5.35 Basic Indicators of the Water Saving Practice on Project Demonstration Sites**

| Farm | Nitrogen fertilizers (kg/ha of AN) | | | | Phosphate fertilizers (kg/ha of AN) | | | | Potash fertilizers (kg/ha of AN) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Recommended rate | 2002 | 2003 | 2004 | Recommended rate | 2002 | 2003 | 2004 | Recommended rate | 2002 | 2003 | 2004 |
| **«Turdaily»** | 220 | 190 | 280 | 225 | 170 | 0,0 | 60 | 100 | 30 | 25 | 0.0 | 25 |
| **«Talibjon»** | 220 | 230 | 156 | 350 | 170 | 0,0 | 125 | 50 | 30 | 0.0 | 0.0 | 0.0 |
| **«Nozima»** | 220 | 140 | 131 | 145 | 170 | 25 | 30 | 160 | 30 | 0.0 | 0.0 | 0.0 |
| **«Khojalkhon-ona-Khoji»** | 230 | 195 | 230 | 220 | 180 | 65 | 230 | 100 | 50 | 0.0 | 100 | 40 |
| **«Samatov»** | 200 | 160 | 170 | 250 | 180 | 125 | 210 | 240 | 50 | 0.0 | 0.0 | 21 |
| **«Sayed»** | 200 | 162 | 146 | 185 | 180 | 0,0 | 220 | 180 | 50 | 0.0 | 0.0 | 0.0 |
| **«Bakhoriston»** | 200 | 165 | 140 | 175 | 180 | 35 | 175 | 250 | 50 | 0.0 | 45 | 18 |
| **«Sandyk»** | 200 | 130 | 170 | 150 | 180 | 0,0 | 180 | 200 | 50 | 0.0 | 0.0 | 0.0 |
| **«Toloykon»** | 140 | 100 | 106 | 145 | 140 | 0,0 | 160 | 60 | 30 | 0.0 | 0.0 | 0.0 |
| **«Nyrsultan-Aly»** | 140 | 50 | 83 | 50 | 140 | 0,0 | 160 | 140 | 30 | 0.0 | 0.0 | 0.0 |