CHAPTER 1. CROP WATER CONSUMPTION RATES AND IRRIGATION REGIME

Introduction

In May 1997 a contract on "Evaluation of previous pilot projects on irrigation and drainage in Central Asia" between the World Bank of Reconstruction and Development and the Executive Committee of International Fund for the Aral Sea Saving was signed.

The project was developed by SIC ICWC through the contract with Executive Committee of International Fund for the Aral Sea Saving.

Objective of the evaluation of previous pilot studies on irrigation and drainage is to develop system of institutional-technical water saving and protection measures to increase water and irrigated land productivity as well as to manage environmental and reclamation processes under different natural and economic conditions in the Aral Sea Basin. The main tasks to be solved are the following:

- improvement of water use at inter-farm and on-farm level by specifying irrigation regime and leaching requirements;
- environmental and reclamation processes management on irrigated lands to meet environmental requirements - minimization of salt disposal and drainage outflow through reclamation regime optimization;
- increase of irrigated lands and irrigation water productivity by application of advanced irrigation methods;
- improvement of effluent's water-salt regime through salt disposal minimization and waste water treatment.

In general 15 research and design institutes submitted information on 250 plots to participate in tender. In the result 143 pilot projects were selected, including 25 ones referred to 1st direction - "Improvement of water use at inter- and on-farm levels by specifying irrigation regime and leaching requirements" (Appendix 1).

Within this direction the submitted information has included studies of irrigation regime and water consumption rates for the following crops:

Cotton - 4 plots in Uzbekistan and 3 plots in Tadjikistan;
Winter wheat - 4 plots, including 2 ones in Uzbekistan and 2 ones in Tadjikistan;
Winter barley - 1 plot in Tadjikistan;
Grain maize - 1 plot in Uzbekistan and 1 plot in Tadjikistan;
Silage maize - 1 plot in Uzbekistan and 1 plot in Tadjikistan;
Mangel - Tadjikistan;
Tomatoes and onion - Turkmenistan;
Rice - 10 plots, including 8 ones in Kazakhstan and 2 ones in Uzbekistan;
Alfalfa - 3 plots in Kazakhstan.

For Kyrgyz Republic results of the studies on water consumption rates on maize for grain and silage, winter cereals, perennial grass and vegetables are included into one register.

It should be noted, that information from several plots does not meet requirements and criteria of the tender. The main disadvantage of submitted data is that research of irrigation regime did not follow common standards. Therefore, obtained results sometimes have contradictory character. This complicates development of general recommendations though each experience taken separately is of particular concern.

Pilot plots for irrigation regime and water consumption studies are located in the Aral Sea basin and distributed with different density in water related regions. Most plots are located in the Syrdarya river basin, the least in the Amudarya river basin. Only one pilot plot is presented from the Amudarya lower reaches, though pilot studies on rice crops irrigation regime were carried out in this area as well.

Thus, research results on irrigation regime from other research institutes were used as well as materials of UzNIHI and KKNIIZ branch offices. Results obtained from pilot plots were compared with control variants, materials of water enterprises and with FAO recommendations on water consumption rates and criteria of irrigation water rational use.

Information, given in tables and graphs, show, that during long period of time considerably better results were obtained almost from all the plots in respect to irrigation water rational use and water and irrigated land productivity increase. In 80-85% of pilot plots water expenditures per yield unit are 1-1.5 times less against control plots. The same figures in control production plots are 1,5 times less than those given in FAO materials.

Thus, it can be concluded, that while achieving appropriate technical level and keeping regimes of irrigation-drainage system operation, it is possible to increase to some extent the irrigated land productivity and to save irrigation water.

At the same time, submitted data on 1st direction, i.e. on irrigation regime and water consumption rate, sharply differ from each other by original materials level. This is accounted for absence of common procedure for experiments organization.

Such situation with submitted information slightly complicated preparation of an analysis. The information analysis is given below.