

CHAPTER 4. TEST-PRODUCTION INVESTIGATIONS OF IRRIGATION OPTIMAL METHODS, TECHNIQUE AND TECHNOLOGY

Introduction

Methods of unproductive losses reduction at “farm-field” level, influencing irrigation productivity under current conditions, are limited due to widely spread over the Aral Sea basin gravity irrigation systems. This causes use of surface irrigation methods due to slight water level rise in ditches above irrigated area. As known, surface irrigation methods have several limitations for reaching high efficiency and even moistening the area.

In this context, it is important to increase effectiveness of irrigation water use through efficient water planning and management at on-farm level. At the same time, it is necessary to evaluate expediency of perfect irrigation methods use, such as drip, sprinkler and subsoil irrigation, under such natural and economic conditions, where substantial water saving would be reached.

Summary of the national working groups data describes research conducted from seventies to nineties in pilot plots (PP) located in different natural-climatic zones of the Aral Sea basin. As a whole, it reflects different specific conditions for crop irrigation and the ways of irrigation water productivity increase under influence of various factors, such as:

- saline and subjected to salinization lands;
- heavy subsident soils;
- high permeable (stony) soils;
- very low or very high slope gradients.

The plots are located in different parts of the Amudarya and the Syrdarya rivers, that determines specific irrigation conditions in each of these zones.

Upper reaches - complex relief, heavy subsident and high permeable soils.

Middle reaches - saline and subjected to salinization lands, high permeable soils.

Lower reaches - saline or subjected to salinization lands, very low slope gradients under slight water level rise in ditches above irrigated area.

Described methods range from furrow to drip irrigation.

Within direction IV national work groups have submitted 39 registers - description of research conducted in 39 PP (Appendix 4.1) .

In general, the registers can be grouped in the following way:

Republic of KAZAKHSTAN - 4 PP's:

Surface irrigation of rice rotation crops <i>by furrows, strips, checks, border irrigation</i>	1PP
Furrow irrigation <i>of clean tilled crops</i>	1PP
<i>of clean tilled crops in saline soils</i>	1PP
Drip irrigation	

<i>of clean tilled crops with vertical drainage</i>	1PP
Republic of TADJIKISTAN - 10 PP's:	
Furrow irrigation:	
<i>of clean tilled crops in slopes</i>	3 PP's
<i>of clean tilled crops under deep loosening</i>	1 PP
<i>of clean tilled crops in heavy subsident soils</i>	2 PP's
<i>of vines (from subsurface irrigation network)</i>	
<i>under high permeable soils</i>	1PP
Drip irrigation	
<i>of orchards</i>	2 PP's
<i>of clean tilled crops</i>	1 PP
TURKMENISTAN - 2 PP's	
Furrow irrigation:	
<i>of clean tilled crops by horizontally leveled irrigation plots</i>	2 PP's
Republic of UZBEKISTAN - 23 PP's:	
Furrow irrigation:	
<i>of clean tilled crops in heavy subsident soils</i>	2 PP's
<i>of clean tilled crops in high permeable soils</i>	2 PP's
<i>of clean tilled crops in gypsum bearing soils</i>	2 PP's
<i>of clean tilled crops in saline soils</i>	2 PP's
<i>of clean tilled crops by horizontally leveled irrigation plots</i>	2 PP's
Drip irrigation:	
<i>of orchards and vines</i>	3 PP's
<i>of clean tilled crops</i>	4 PP's
Sprinkling:	
<i>of clean tilled crops by long-span machine of "Kouban" type</i>	2 PP's
<i>of clean tilled crops by long-span machine of DDA100 type in saline lands with vertical drainage</i>	1 PP
Subsoil irrigation	
<i>of clean tilled crops</i>	2 PP's