REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	**Project title:**
	Study of possibility of cotton forced irrigation on large areas without slope of Karakalpakstan.

B	**Topic n° :** 1	Sub-topic n°: 01 and 02
1)		Technical field n°: 04
2)	Category -	

C	**Project location** Karakalpakstan, Kegeily district, collective farm “Khalkhabad”		
	Country: Republic of Uzbekistan	Area:	160 ha
	Precise details if possible Country(ies): City(ies):	Locality(ies): Others(s):	

D	**Duration of the project:**	
	Year in which the project was started 1985	Project completed: 1996 Expected completion date: 1988, 1993

E	**Organizations and technical staff involved**	
1	Supervisor/project coordinator (SURNAME, First name): Kurbanbayev Erejep	100%
	Organization: SANIIRI Address: 12, Dosnararova str. Nukus telephone: +7(36122)32509 E-mail: fax:	Staff resources
Other counterparts:	Organizations (full name or acronym) / Surname / First name	2)
1		%
2		%
3		%
4		%
Other collaborators:	man-years	

F	**Funding agencies**	
	Full name or acronym	Percentage of project finance provided
1	Ministry for Land Reclamation and Water Management	100%
2		%
3		%

G	**Summary of research project (see instruction on page 1)**

1 Objective and technical fields:

Application of cotton forced irrigation on large checks without slope in Karakalpakstan.

Objective: Improvement of irrigation technique and technology on checks without inclination and increase of water resources use efficiency.

2 Scientific and technical approach:

Water saving due to forced cotton irrigations. This method saves water and reduces duration of irrigation.

Meaning: Elaboration of recommendations on forced irrigation of cotton on checks without slopes.

3 Environment characteristics:

Climate is sharply continental, dry.

Summer is long with sharp changes of temperature and low air humidity. Average annual temperature is 12^0C. Duration of frost-free period is 200-230 days. Sum of positive temperature is 4000^0C. Precipitation does not exceed 85-100 mm per year. Relative air humidity is 58-84 %. Evaporation from land surface is 12-15 times more than precipitation.

Lithology: alluvial quaternary sediments consisting of alternating sand, sandy loam, loam and clay with high content of silt particles. Cover sediments permeability coefficient is 0.08-1.5 m/day, for aquifer – 1.5-1.8 m/day. Aquifer water conductivity is 50-250 sq.m/day.

Groundwater level is 1.5-3.2 m. Salinity is 6-15 g/l.

Soils are middle salinizated – salt content within 0-60 cm layer is 2.5-4.0 % on solid residue.

Close horizontal drainage construction led to significant soils desalinization.

4 Parameters of Pilot Projects and Technical Solutions:

Field investigations on forced irrigations of cotton in Karakalpakstan. Water-metering equipment was installed, technique of irrigation elements were studied (water movement rate in furrows, width of moistening, vertical filtration, etc.)

Regular soil sampling was executed for definition of moisture, volume and specific weight.

5 Methodology:

Pilot site reconstruction was made in 1985. Four lines of close horizontal drainage and 3 lines of field irrigation ditches were built. Earthen ditches depth is 60-80 cm. Water rate in ditches is 0.8-1.1 m/sec. Difference of horizons in checks and ditches is 40-50 cm (under forced irrigation). Ditches' water discharge is 80-180 l/sec. Every check has two outlets with capacity 30-40 l/sec.

Checks' size is 200x195 m, area is 3.6-3.81 ha and they have no slope.

Furrow length is 200 m on the average. Under forced irrigation water is supplied from two sides and furrow length is cut down twice. Usually discharge in furrow is 0.85-1.5 l/sec (distance between furrows is 60 cm), but under forced irrigation it achieves 1.7 l/sec. Watering depth varies within 820-1240 cu.m/hour and irrigation norm is 1910-2260 cu.m/ha.

6 Results:

Forced irrigation application on checks without inclination allowed:

- to achieve high efficiency of irrigation water use under negligible water expenses for vertical filtration. It was reduced on 15-18 %;
- to reduce twice irrigation duration under large volume of water supply to the field. Ordinary irrigation time is 18-22 hours (furrow length is 200 m, discharge is 55-80 l/sec), under forced irrigation it was 5.4-7 hours (discharge is 130-195 l/sec);
- to reduce vertical filtration and groundwater level raise. Its intensity is 40-45 cm/day (field n10) versus 68.5 cm/day (field n 9 - control);
- to manage by groundwater lowering rate after irrigation from 36.3 cm/day (field n10) to 29.5 cm/day (field n9);
- to provide relative uniformity of soil moisture along the furrows;
- to cut down watering and irrigation norms on 12-15 %. If actual irrigation norm within field n 9

was 2130-2260 cu.m/ha, on field n 10 it was 1910-1935 cu.m/ha;

- to reduce labour expenses by 1.3-1.4 times.
- to create relatively regular reclamation background within a check. Spotted salinization was reduced on 10-12 % to compare with a control;
- to create conditions for fertilisers accumulation within root zone.

Economic effect was 250 rouble/ha in prices of 1986.

For intensive introduction of forced irrigation it is necessary:

a) to provide high quality check leveling with surface differences 3-4 cm;

b) to select optimal size of irrigated fields (distance between furrows is 90 cm) and increase furrow length up to 400 m (with regard to mechanical composition of soil);

c) to provide command position of irrigation ditches to compare with check surface and altitude difference should be 50-60 cm;

d) to provide ditches discharge at the head 450-500 l/sec to irrigate simultaneously 10-12 ha (total irrigated area is 40-45 ha);

e) to increase outlets capacity from ditches to checks; existing outlets' capacity is 100 l/sec (d=300 mm, head is 50-60 cm).

H	**Suggested key-words**		
1	Forced irrigation	4	Irrigation water saving
2	Irrigation technique	5	Irrigation norm
3	Field levelling	6	Temporary distributors

I	**Most recent publications (maximum 3)**			
1	Author(s): E. Kurbanbayev			
	Title: Recommendations on selection of irrigation method and technique			
	Publication details: Forced irrigation application in plain part of Karakalpakstan			
	Year of publication: 1993	free access [x]	restricted [ ]	confidential [ ]
2	Author(s):			
	Title:			
	Publication details:			
	Year of publication:	free access [x]	restricted [ ]	confidential [ ]
3	Author(s):			
	Title:			
	Publication details:			
	Year of publication:	free access [x]	restricted [ ]	confidential [ ]