REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	**Project title:**
	Study of soil water-salt regime and ecological reclamation processes management on background of existing irrigation-drainage network within northern zone of Karakalpakstan

B	**Topic n° :** 2	Sub-topic n°: 2
1)	2	Technical field n°: 2

C	**Project location**		
	Kegeily and Chimbay districts of Karakalpakstan		
	Country: Republic of Uzbekistan	Area:	26.5 th.ha
	Precise details if possible		
	Country(ies):	Locality(ies):	
	City(ies):	Others(s):	

D	**Duration of the project:**	
	Year in which the project was started 1970	Project completed: 1990 Expected completion date: 1975, 1982

E	**Organizations and technical staff involved**	
1	Supervisor/project coordinator (SURNAME, First name): Kurbanbayev Yerejep	100 %
	Organization: SANIIRI Address: 11, Karasu-4, Tashkent telephone: 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:

Development of the set of ecological water saving measures for creation of optimal soil water-salt regime on irrigated lands of Karakalpakstan.

Objective: Improvement of economic situation and irrigated lands productivity in northern districts of Karakalpakstan by means of soil water-salt regime management.

2 Scientific and technical approach:

Irrigated lands ecologic-reclamation situation improvement by means of water recourses rational use and collector-drainage systems workability increase; optimal reclamation regime selection providing high yield under water saving.

Meaning: Development of ecological-reclamation measures on water and land recourses efficiency increase.

3 Environment characteristics:

Climate is sharply continental, summer is hot, winter is cold. Temperature variation is 50-60 ^{0}C. Average annual temperature is 12 ^{0}C. High evaporativity (1200-1300 mm) under negligible precipitation (100 mm) requires big mass of water for crop cultivation.

Geomorphology and lithology: Alluvial quaternary sediments with slope 0.0003-0.0004. Cover sediments permeability coefficient is 0.05-1.5 m/day, for aquifer - 1.0-18 m/day.

Groundwater level within growing period is 1.2-1.3 m. Water salinity is 4-25 g/l. Soils are subjected to salinization and 70-75 % of lands are strongly salinizated.

Cotton yield is 1.5-1.8 t/ha, rice 3.5-3.7 t/ha.

4 Parameters of Pilot Projects and Technical Solutions:

Given area is 500 th. ha. Main crops are cotton and rice. Irrigation canals have earthen, channel efficiency is 0.56, efficiency of in-farm system - 0.65, for inter-farm system - 0.85-0.92.

Collector-drainage open system does not provide necessary groundwater removal. Its specific extent is 30-32 m/ha.

Inter-farm collectors' depth is 2.5-3.5 m, in-farm - 1.8-2.0 m. Water supply varies within 0.75-0.9 and land use efficiency is 0.45-0.55 for cotton and 0.75 for rice fields.

5 Methodology:

Field investigations were carried out according to standard methodology. Water discharge measurement in canals, salt survey and soil sampling were executed.

6 Results:

Wide-scale development of lands was started in 1970. Irrigated area increased within 1970-1990 from 160-180 to 500 th.ha. Land use efficiency increased from 0.35 to 0.45-0.5, water supply increased from 4830 mln.cu.m (1968) to 11000-12445 mln.cu.m (1980-1984).

Drainage outflow increased from 680 to 2931 mln.cu.m. Maximum water supply was within 1970-1980 when its value was 33-36 th.cu.m/ha under drainage outflow 5.5-8.2 th.cu.m/ha.

Since 1983-1984 after limited water use introduction these values significantly decreased. Since 1985 specific water supply does not exceed 14-16 th.cu.m/ha.

Before 1975 under poor drainage performance and low natural drainability gradual groundwater level growth was noted. Its speed was 0.3-0.5 m per year. In 1976 level was stabilized on depth 1.6-2.0 m within vegetation and 1 m within winter-spring period.

Before 1975-1976 groundwater salinity was arising at expense of salt removal from unsaturated zone and then it was decreasing to 3-5 g/l. Since 1980 salinity was stabilized at the level of 3-5 g/l. Drainage effluent salinity was lower and varied within 2.5-4.2 g/l.

Soil salt regime. Within winter-spring leaching (5-6 th.cu.m/ha) salts were removed into groundwater but to the end of vegetation period secondary salinization was fixed. Season salt accumulation coefficient varied within 0.75-0.9.

Irrigated area water-salt balance was positive. Until 1986-1987 salt accumulation rate was 7.3-25.7 t/ha. Main source of salt influx was irrigation water. Maximum salt influx occurred within 1976-1980 (40-42 t/ha) under its removal by collector-drainage system (25-29.6 t/ha). Since 1985-1986 water-salt balance was negative (2-5 t/ha) although within unsaturated zone it did not change.

Strongly and middle salinizated lands occupied 55-62 % of area. Water supply plus precipitation to

total evaporation ratio was from 0.44-0.6 to 1.25-1.4. Low values of this ratio could be explained by high intensity of total evaporation under shallow groundwater. Total evaporation achieved 8-9.5 th.cu.m/ha.
Land and water productivity directly depends on water supply. High yield (cotton 2.7-3.1 t/ha, rice - to 4.7 t/ha) occurred within 1978-1981 and low yield (cotton 1.8-2.2 t/ha, rice 3.2-3.5 t/ha) within 1993-1996.
Highest water expense per product unit is in Karakalpakstan (8000-9000 cu.m/t) against 2500-4000 cu.m/t in other regions of Uzbekistan.

H	**Suggested key-words**		
1	Water-salt regime	4	Water-salt balance
2	Reclamation process	5	Drainage outflow
3	Soil salinization	6	Water-salt exchange

I	**Most recent publications (maximum 3)**			
1	*Author(s):* Kh.Yakubov, E.Kurbanbayev			
	Title: Soil water-salt regime in northern zone of Karakalpakstan and ways of its regulation			
	Publication details: Irrigated lands modern reclamation state, irrigation-drainage system workability and ecological-reclamation processes tendency assessment. Land and water productivity deterioration main causes determined on base of water-salt regime and balances formation analysis. Measures on irrigated lands state improvement.			
	Year of publication: 1985	free access [x]	restricted [ ]	confidential [ ]