REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	**Project title:**
Close horizontal drainage experimental site in collective farm «Uzbekistan»	

B	**Topic n^o : 2**	Sub-topic n^o: .2
1)	1	Technical field n^o 2
2)	Category n^o: 01	

C	**Project location**		
	Country: Republic of Uzbekistan	Area:129.6 ha (net)	
Horezm province, Hanky district, collective farm «Uzbekistan»			

D	**Duration of the project:**		
	Year in which the project was started: 1990	Project completed:	1993
		Dates of Expertise:	1993

E	**Organizations and technical staff involved**	
1	Supervisor/project coordinator: V. Nasonov	%
	Organization: SANIIRI Address: 11, Karasu -4, Tashkent telephone: 65 18 52 fax: E-mail:	Staff resources 30
Other counterparts:	Organizations Surname First name	
1	Eshchanov Odilbek, SANIIRI	70 %
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

1 *Objective and technical fields*:

Prevention of irrigated land salinization on the base of artificial drainability increase by close horizontal drainage construction and leaching regime irrigation. Water -salt regime management.

2 *Scientific and technical approaches:*

Salinizated lands drainability increase within the old and new AmuDarya delta by means of close horizontal drainage construction with depth restriction due to low gradient of surface and low stability of collectors' slopes. Solution is to change depth and make differential norm of drainage with regard to water -physical properties of soil.

3 *Environment characteristics:*

Climate is sharply continental. Temperature difference is 70 -75 ^{0}C (43 ^{0} C in July, 32 ^{0} C in January). Average annual temperature is 12.5 ^{0} C, relative air humidity is 59 %. Rainfall mostly in winter -spring time is 96 -105 mm.

Landscape: ancient delta of AmuDarya, slightly corrugated plain with slope 0.0004 -0.0005 to the north -west.

Lithology: cover loam (3 -10 m, permeability Kp =0.24 -0.3 m/day) is underlaid by sand (Kp= 3 -5 m/day, water conductivity is 200 -300 sq.m/day). Volume mass of loam is 128 -165, specific mass 8.7 g/cu.cm. Before VDS construction groundwater depth was 0.9 -1.2 m, its salinity was 4.71 g/l; areas of middle salinization 73 %, strongly salinizated 13 % (on solid residue).

4. Parameters of Pilot Projects and Technical Solutions:

Pilot site's area is 129.6 ha. Close horizontal drainage extent is 9240 m. Drainage tubes are fabricated from plastic with screen of tissue and sand filling. Drain depth is 1.8 m, distance between drains is 100 m and slope is 0.0005. Irrigation network is presented by flumes with efficiency 0.86. Leaching rate is 2500 cu.m/ha (net). Main crop is cotton. Irrigation norm within growing season 5000 cu.m/ha (net). Cotton yield is 2.6 -2.8 t/ha against potential 4.0 -4.5 t/ha.

5 *Methodology:*

Field observations on water and salt movement, all water -salt balance elements: unsaturated zone, groundwater, its salinity change dynamics, soil moisture content, drainage outflow. Pilot site was equipped by all necessary devices for accounting and measurements, which were carried out within three years.

6. Results:

Study of water and salt dynamics, irrigation and leaching regime allowed to determine: Within the observation period middle and strongly salinizated lands are decreased on 18 %, slightly and non-salinizated lands increased by 2.5 times. Water -salt balance of unsaturated zone is negative. Salt removal rate is 7.8 -12.9 t/ha under initial salt stock 144.2 t/ha; within all period 32.8 t/ha were removed. Analysis of in-year salt regime dynamics shows that maximum salinization occurs within the first ten-days of July that is harmful for crop yield; groundwater level depth changed within 1.31 -1.37 m under depletion velocity after irrigation 3 -4 cm/day; maximum level position occurs 2 times a year: within leaching (0.66 -1.26 m) and within growing season (0.66 -2.28 m). Groundwater salinity gradually decreased from 4.7 to 3.1 g/l. Analysis of root zone moisture content regime shows that soil moisture before irrigation was more than 0.7 FFMC and decreased only due to delay of the first irrigation to 0.56 -0.6 FFMC. Irrigation norm within growing period was 3760 - 4600 cu.m/ha, leaching rate was 3600 -4470 cu.m/ha under total evaporation was 8500 -9100 cu.m/ha. Drainage outflow varied within 3700 -5000 cu.m/ha. Drainage effluent salinity was 3.1 - 4.06 g/l, leaching rate was 3.26 -4.4 t.cu.m/ha, removal volume was 17 -20 % of leaching. Filtration

losses from irrigation network are 12.8 -13.7 th.cu.m/ha. From data obtained is evident that desalinization is slow in spite of salt removal to 15 t/ha. After water -salt balance of unsaturated zone, there is very weak leaching regime and within separate year it is non-leaching. For example, in 1993 irrigation norm plus rainfall was 7300 cu.m/ha while total evaporation was 8520 cu.m/ha. Non-leaching regime was observed within growing season.

Forecast calculations for water -salt regime and balance show, that leaching regime of irrigation could be established if no delay would be admitted for the first irrigation.

Constructed drains from plastic tubes with artificial tissue have low resistance to filtration and high water permeability.

H	**Suggested key-words**		
1	Horizontal drainage	4	Soil salinization
2	Water -salt balance	5	Groundwater regime
3	Leaching regime	6	Groundwater salinity

I	**Most recent publications (maximum 3)**			
1	Author(s): O. Eshchanov			
	Title: Soil water -salt balance formation under influence of close horizontal drainage in Horezm province.			
	Publication details:.			
	Year of publication: 1994	free access [•]	restricted [ ]	confidential [ ]
2	Author(s): V. Dukhovny, T. Djalalov, O. Eshchanov			
	Title: Certain directions in perfection of land reclamation in Horezm.			
	Publication details:			
	Year of publication: 1994	free access [•]	restricted [ ]	confidential [ ]
3	Author(s):			
	Title:			
	Publication details:			
	Year of publication:	free access [ ]	restricted [ ]	confidential [ ]