REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	**Project title:** Study of vertical drainage systems operation regime management to stabilize ecological reclamation processes on irrigated lands.

B	**Topic n^{o} : 2**	Sub-topic n^{o}: 2
1)	02	Technical field n^{o}: 2

C	**Project location:** Chimkent province, Pakhtaaral disrict		
	Country: Kazakhstan	Area:	59661 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: 1978	Project completed:	1990
		Expected completion date:	1990

E	**Organizations and technical staff involved**	
1	Supervisor/project coordinator (SURNAME, First name): Gaipnazarov N.	60 %
	Organization: SANIIRI Address: 11, Karasu - 4, Tashkent telephone: E-mail: fax:	Staff resources
	Other counterparts: Organizations Surname First name (full name or acronym)	2)
1	SANIIRI, Ikramov R.	40 %
2		%
3		%
4		%
	Other collaborators: man-years	

F	**Funding agencies**	
	F u l l n a m e o r a c r o n y m	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:
Irrigated lands productivity increase at expense of reclamation measures improvement systems analysis of actual reclamation regime with regard to crop yield, vertical drainage system (VDS) operability and operation regime.

2 Scientific and technical approach:
Assessment of VDS operation regime, crop irrigation and leaching regime, irrigation water quality influence on ecologic-reclamation processes within large irrigated scheme (South Kazakhstan, Pakhtaaral district).

Study meaning: methodological and practical recommendations on vertical drainage system regime and reclamation regime improvement.

3 Environment characteristics:
Climate is sharply continental.

High temperature in summer (46 - 47 ^{0}C) and low temperature in winter (-35 ^{0}C). Precipitation is 260 - 300 mm.

Surface slope is 0,0007 - 0,0008.

Lithology: Alluvial-proluvial sediments (50 - 80 m) spread under cover loam. Sands with gravel and pebble (Kp=16 - 30 m/day); proluvial sediments constitute top soil.

Loess loams (Kp-0,07 - 0,12 m/day) (20 - 40 m).

Groundwater level is 2,2 - 2,5 m within growing season, 3 - 3,5 m within non- growing period.

Groundwater salinity is 1 - 5 g/l.

Soils: middle and light loams, salinizated all over the soil profile. Salinization type mainly is chloride-sulphate and chloride.

4 Parameters of Pilot and Technical Solitions:
Water supply is performed through inter-farm canals taking their start from main Kirov canal. Inter-farm network efficiency (КПД) is 0,9 - 0,95, in-farm network КПД is 0,75 - 0,80.
There are 280 vertical drains with average discharge 38/l/sec. Existing collector-drainage system serves as collector removing water pumped from wells. In-farm open drainage system due to is its low depth (2,5 m) does not drain groundwater whose level is lower than drains' botlow.

5 Methodology:
Water-salt balance calculations, wells actual discharges and specific yields measurements, their technical conditions definition.

6 *Results*
Under conditions of leaching regime of irrigation and optimal drainability middle salinizated lands constitute 7,3 % and strongly salinizated ones - 4,2 % of area. Cotton yield increased to 3,6 - 3,7 t/ha.
Data for period of 1981 - 1989 show that this period is characterized as follow:

- by vertical drainage wells operation deterioration; average discharge is 38 l/sec against planned 65 - 75 l/sec; wells screens porosity decreased on 2 - 66 %; specific yield decrease is 7 - 75 % and actual specific yield is 1,7 - 104 sec/m. Volume of pumped water decreased to 1150 - 1500 cu. m/ha against 2000 - 3600 cu. m/ha (1970-1980);
- specific water duty during growing season decreased to 3970 - 4200 against 4000 - 5000 cu. m/ha; during non- growing period 1570 - 2100 against 2000 - 2500 cu. m/ha (1970-1989);
- leaching regime efficiency was 0,95 - 0,98;
- due to water duty decrease groundwater level did not raise.

Under these conditions process of soil secondary salinization was restored. Cotton yield decreased to 2,4 - 2,7 t/ha. Salinization type from sulphate to sulphate -chloride and chloride.

Non salinizated and slightly salinizated lands share decreased from 88 % (1977) to 61 % (1989).

Total salt balance had alternative mark from - 2,6 to + 3,4 th/ha per year due to irrigation water salinity growth and insafficient leaching. On the base water-salt balance concrete recommendations are developed on reclamation regime improvement and vertical drainage system operation regime which should provide:

pumped water volume 2235 cu. m/ha;
- groundwater level regulation within growing season within limits 2,20 - 2,9 m; in spring 1,9 - 2,3 m; in autumn 3,1 - 3,4 m;
- total salt stock annual decrease on 0,13 t/ha;
- salt stock within unsaturated zone decrease on 10,9 t/ha and within root zone salinity soil within the limits of 0,,33 - 0,47 % (slightly salinizated).

These measure will allow to stabilize ecological-reclamation processes and crops yield increase.

H	**Suggested key-words**		
1	Water specific yield	4	VDS operation regime
2	Water removal	5	
3	Reclamation processes	6	

I	**Most recent publications (maximum 3)**			
1	*Author(s):* K. Yakubov, R. Ikramov			
	Title: Principles of design and VDS operation regime correction in order to accellerate reclamation efficiency.			
	Publication details: On the base of investigations large VDS common principles, calculation methodology and its regime correction are formulated.			
	Year of publication:1985	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 [ ]