REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	**Project title:**
	Set of institutional-technical measures on prevention of surface water pollution by agricultural chemicals from drainage effluent from irrigated fields of Shuruzyak scheme Golodnaya Steppe

B	**Topic n° : 2**	Sub-topic n°: 06
1)	02	Technical field n°:

C	**Project location** Sirdrya province		
	Country: Republic of Uzbekistan	Area:	
	Precise details if possible Country(ies): City(ies):	Locality(ies): Others(s):	

D	**Duration of the project:**	
	Year in which the project was started 1986	Project completed: 1992 Expected completion date: 1992

E	**Organizations and technical staff involved**	
1	Supervisor/project coordinator (SURNAME, First name): Yakubov Khaldar	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:

Prevention of collector-drainage effluent and river water from pollution by deferent pollutants removed from irrigated field.

Objectives: Ground of possibility of hydrobotanic technology application for drainage effluent treatment to use it for irrigation.

2 Scientific and technical approach:

Development of recommendations on water protection measures to prevent surface water pollution by chemicals.

3 Environment characteristics:

Climate is continental. Average annual temperature is 12.5-13.0^0 C. Period without freezing is 170-200 days. Sum of positive temperatures is 4000-4100^0 C. Annual rainfall is 250-350 mm, evaporativity is 1120-1280 mm. Relative air humidity is 55-60 %, in summer it decreases to 25-30 %.

Geomorphology: alluvial plain of Sir Darya river. Relief: slightly corrugated, slope is 0.0003-0.0005. Lithology: quaternary depositions - cover loam (15-25 m, permeability coefficient Kp=0.1-0.15 m/day), small and fine-grained sands (25-100 m, Kp=20 - 30 m/day), loam resistance coefficient F=150-250 days, overflow coefficient B=200-250 sq.m under its intensity w=0.02-0.3 m/day.

Before land development groundwater level was 10-15 m, at present time it is 1.0-1.5 m (in spring) and 2.5 m (in autumn), groundwater salinity varies widely from 5-7 to 10 g/l and more. Underground inflow is 500-1000 cu.m/ha. Groundwater salinity is 4,05 g/l, its type is sulfate-chloride. Water is suitable for irrigation as a mixt are with river water in 1:2, 1:3 ratio. Collector Shuruzyak water chemical composition: salinity – 2.5 g/l; total hardness 15-25 mg. ekv/l; nitrogen – 0.3 – 1.4 mg/l; oil products 0.06-1.0 mg/l; phenols 0.004-0.03 mg/l; GHZG 0,016-0,133 mg/l.

As it could be seen from above description collector water quality does not meet requirements for permitted concentrations (for fisheries, irrigation, etc).

Soils: sandy loam, light and middle loam, soils of unsaturated zones permeability coefficient is 0.15-0.3 m/day. Soils initially are desalinizated to 1.5-2.0 m; downward they are salinizated to 0.7-1.5 %. Under irrigation salts re-distribution occurred up to 2.0-2.5 m. Soils are polluted by chemicals residues: GHZG – 0.3-0.6 mg/kg which exceeds permitted concentration 6 times. The same could be said about rogor, lindan, etc. Total area of land subjected to salinization is more than 50 %.

4 Parameters of Pilot Projects and Technical Solutions:

Irrigated area is 68 th. ha (gross) or 63.8 th. ha (net). Land use efficiency is 0.85.
Main crop is cotton.
Water supply is performed from irrigation canals. Canals efficiency is 0.94, system's one is 0.7-0.75. Water removal is performed by Shuruzyak collector to Sir Darya river.
Experimental canal parallel to collector with length 100 m was constructed and pump was installed to pump water from collector to canal. This canal was divided into 5 parts with different depths with regard to specific features of different aquatic plants.

5 Methodology:

Field investigations of water movement through aquatic plants, salt and chemical movement, water temperature and electric conductivity.

Observations on water quality changes under aquatic macrophites influence, by device HORIBA for definition of pH, temperature, 0_2, electric conductivity and turbidlity.

Water sampling was performed for analysis by chromatograph according to scheme: "Water-plants-bed settling".

Systems analysis was used for date processing.

6 Results:

Sir Darya water resources are practically fully used for irrigation, industrial and domestic use.

Water resources deficit is accompanied by river water quality deterioration and pollution. In spite of the fact the river has interstate meaning there is no responsible body for water quality protection. It is worth to note, that all wastes within upper and middle reaches negatively influence on water quality within lower reaches.

Experiment was performed on drainage effluent (collector ГПК-4ГС). Irrigated area is 31.67 th.ha, total water intake 304.75 mln.cu.m; discharge is 1.5 cu.m/sec. Initially collector water pollution was studied with regard to seasonal changes (spring – summer – autumn). As analysis showed chemicals, heavy metals, etc. Concentrations exceeded allowed concentration by 1.6 times.

After bioplateou construction on the collector pollutants' concentration was decreased to allowed concentration and lower. It was shown that water after treatment can be released to the river and used for agriculture, fisheries, etc.

Annual drainage outflow is 15 mln.cu.m. For bioplateou construction 15.000 roubles were needed. Calculations showed that for 1 cu.m water treatment 0.5 kopeks are necessary. Annual economic effect was 500.000 rouble (price of 1984). High efficiency of aquatic plants and good level of water treatment were proved in laboratory and field.

Method of drainage effluent treatment by highest aquatic plants was developed. Proposed calculation formula for main bioplateou parameters (size, water flow rate, plants density etc.) provid necessary intensity and hidrobotanic treatment level.

Method developed by SANIIRI gives opportunity to cut down drainage effluent pollution, surface water quality regulation.

This method will positively influence on river lower reaches ecological situation recovery (population health and sanitary situation improvement).

H	**Suggested key-words**		
1	Ecology	4	Bio-treatment
2	Water quality	5	
3	Drainage effluent quality change	6	

I	**Most recent publications (maximum 3)**			
1	Author(s): Ruziyev Iskander			
	Title: Bioplateou utilization for drainage effluent treatment from chemical and other pollutants.			
	Publication details: Results of field investigations, laboratory and productive experiments on drainage effluent quality changes by means of bioplateou are considered. Drainage effluent quality change along the experimental canal with availability of aquatic plants is shown.			
	Year of publication: 1991	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 [ ]