

REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	Project title: Cotton drip irrigation technique on lands of south-west zone of Uzbekistan.
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B	Topic n° :1	Sub-topic n°: 4
1)		Technical field n°: 4
2)	Category n°: 01	

C	Project location:		
	Country: Republic of Uzbekistan	Area: ha	
	Bukhara province, Bukhara district, experimental station of UZNIIVH		

D	Duration of the project		
	Year in which the project was started: 1993	Project completed: 1996	
		Dates of Expertise: 1997	

E	Organizations and technical staff involved			
1	Supervisor/project coordinator: Mollayev Boris Organization: SANIIRI Address: 11, Karasu - 4, Tashkent telephone: E-mail:	fax:		%
				Staff resources 100
	Other counterparts:	Organizations	Surname	First name
1				%
2				%
3				%
4				%
	Other collaborators:		man-years	

F	Funding agencies	
	Full name or acronym	Percentage of project finance provided
1	State Committee for Science and Technique	100%
2		%
3		%

G	Summary of research project
	<p>1 Objective and technical fields: Field investigations on experimental system of cotton drip irrigation . Soil reclamation conditions of the system location correspond to 40% of irrigated lands of the province. Objective: Study and development of cotton drip irrigation elements on the basis of long-term experiments.</p>
	<p>2 Scientific and technical approaches: Field investigations of cotton drip irrigation system, assessment of new technology influence on cotton growth and development, land and water productivity. Preparation of practical recommendations on this technology application in Bukhara province.</p>
	<p>3 Environment characteristics: Climate is sharply continental and is attributed to zone of Central Asian deserts and is characterized by high average annual temperature (+15 °C), hot and dray summer, relatively cold and unstable weather in winter. Average temperature in July is 31,1 °C, in January - 2,8 °C . Annual precipitation is 125-145 mm. Winds have east and north -east direction. Wind speed is 3,5 m/sec, sometimes - 19-20 m/sec. Relative air humidity and its deficit are as follows: in winter -77,5% and 1,7 mm; in spring -56,0 % and 8,4mm ; in summer - 40,5 % and 18,7 mm; in autumn -56,6% and 9,7 mm . Evaporativity is 1209 -1470 mm/year. Growing period duration is 220-225 days . Relief is flat with slop of 0,0008-0,002. Soils: Light loam (0-50 cm layer, particles by diameter < 0,01mm portion is 14,5%), with gypsum interlayers. Water permeability is satisfactory: 31,0-41,0mm; permeability coefficient is 0,4-0,56 m/day; volume mass is 2,96 g/cu.cm; porosity is 51%. Limit field moisture capacity is 15,1 % to the soil weight. Soils are slightly salinized with chlorine-ion consistent 0,033% and solid residue 0,48%. Groundwater depth is 1,4-2,0 m (1993-1995), its salinity is 4,2 g/l . Capillary height is 90-100 cm.</p>
	<p>4 Parameters of Pilot Projects and Technical Solutions: Experimental plot of drip irrigation in Bukhara province was established in 1992 -1993. Total irrigated area is 350 ha, including grain and vegetables - 30ha, garden - 6 ha. Irrigation-drainage network is represented by concrete (on the border of the plot) and earthen canals and open drains. Water is supplied from Shakhrud canal. Plot is equipped observation wells. Irrigation technique efficiency is 0,98-1,0.</p>
	<p>5 Methodology: Applied technology is based on «Methodology of field and vegetative tests of cotton irrigation». Pilot plot meets following requirements: - every alternative of field tests is provided by autonomous system of water supply and accounting; - alternative with furrow irrigation (control) was located within the test pilot; - test field parameters were typical for Bukhara province conditions: furrow length was 100 m, distance between rows 60 cm. Total area of the pilot plot was 125x80 m. Five testing alternatives were foreseen with 3 repetitions, including 4 alternatives of drip irrigation and one alternative of furrow irrigation. Under drip irrigation watering hoses (d-16mm) were located in each row and distance between drippers was 60 and 100 cm. Irrigation norms were determined by calculations of soil moisture deficit recharge within 1 m layer taking into account local moistening under drip irrigation. Pre-irrigation moisture was equal to 0,7 of limit field capacity. This moisture was kept within all growing.</p>
	<p>6 Results:</p>

Field investigations during 1993-1996 led to the practical results:

1. Transpiration constitutes 98-151 % of irrigation norm and is recharged at expense of soil moisture stock.
Physical evaporation is 17-55% depending on irrigation norm;
2. Vegetation waterings duration is shortened (68-74 days) due to spring leaching by rate 2500-3000 cu.m/ha, close groundwater level and inflow from groundwater. Irrigation's number was 15-23 with irrigation interval 3-4 days. The first irrigation occurred at the beginning of July, last irrigation - at the beginning of September.
3. One irrigation duration was 2-15 hours, water depth is 100-230 cu.m/ha; irrigation norm was 2200-3200 cu.m/ha.
4. Under furrow irrigation 5 water gifts were performed by depth 700- 1220 cu.m/ha depending of cotton development phase; irrigation intervals were 11-20 days. Jet flow in furrows was 0,24-0,66 l/sec; irrigation norm was 4200-5550cu.m/ha. Thus drip irrigation gave water saving of 37-47%.
5. Moistening uniformity along the hoses and between them was 0,85-0,95.
6. Soil permeability after drip irrigation was 3-3,5 time higher compared with furrow one.
7. Average cotton yield under drip irrigation was 3,2-4,3 t/ha, under furrow one - 2,9-3,7 t/ha; Irrigation water per unit expense was 500-900 cu.m/t under drip irrigation and 1070-1500 cu.m/t under furrow one, i. e. 1,7-2,2 times lower.
8. Due to soil moisture of 72-92% within non-irrigated space between rows and 77-107% within irrigated space between rows there is better water- air regime of root zone which provokes higher cotton yield after the first harvesting (about 90%).
9. Groundwater level depth during vegetative irrigations is 1,4-1,8 m. Because of capillary height on average 1 m groundwaters become complementary source of water for root zone
10. Some salt accumulation to the end of vegetation is observed within all test alternatives including furrow irrigation, but soil still remains slightly salinized.
11. Field investigations' results were taken as basis for system of drip irrigation design is construction over area of 50 ha.

H Suggested key-words			
1	Drip irrigation	4	Number of irrigations
2	Irrigation interval	5	Irrigation norm
3	Watering duration	6	Watering depth (gift)

I Most recent publications (maximum 3)			
1	Author(s): B. Mall ayiev, E. Mallayiev		
	Title: Moistening contour under drip irrigation.		
	Publication details: Soil moistening contour within the zone of drippers location under different distances between them, water discharge and operation duration for light loam was observed and measured.		
	Year of publication:	free access <input type="checkbox"/>	restricted <input type="checkbox"/>
2	Author(s):		
	Title:		
	Publication details:		
	Year of publication:	free access <input type="checkbox"/>	restricted <input type="checkbox"/>
3	Author(s):		

Title:

Publication details:

Year of publication:

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