

REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

A	Project title:
	Precising of vineyards drip irrigation regime parameters in state farm "Communa"

B	Topic n° : 1	Sub-topic n°: 2
1)	1) 1	Technical field n°: 1
	2) Category 01	

C	Project location		
	Tashkent province, Parkent district		
	Country: Republic of Uzbekistan	Area:	23 ha (net)
	Precise details if possible		
	Country(ies):	Locality(ies):	
	City(ies):	Others(s):	

D	Duration of the project:		
	Year in which the project was started 1986	Project completed: 1990	
		Expected completion date: 1992	

E	Organizations and technical staff involved			
1	Supervisor/project coordinator (SURNAME, First name): Novikova Alla			100 %
	Organization: Uzkomuninjproekt			Staff resources
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	Other counterparts:	Organizations (full name or acronym)	Surname	First name
1				2)
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:

Elaboration of irrigation technique elements, technology and regime of vineyards drip irrigation on subsided soils. Drip irrigation impact on growth, development and yield.

Pipelines workability definition. Feasibility study for drip irrigation design, operation and maintenance in Uzbekistan

2 Scientific and technical approach:

Development of recommendations on design, construction and maintenance of drip irrigation systems (DIS) in Uzbekistan.

3 Environment characteristics:

Climate is sharply continental. average air temperature is 13.7⁰C, in July – 26.7⁰C, August – 24.5. Relative air humidity is 56%. Precipitation is 415.6 mm. Evaporativity is 1555 mm and exceeds precipitation 3.3 times. Frost-free period duration is 190-210 days. Sum of positive temperatures is 4200-4500⁰C.

Geomorphology: premountain zone of Chatkal spine, alluvial and proluvial sediments.

Soils: typical grey subsided heavy and middle loam.

Relief is corrugated with slope of 8⁰.

Groundwater is fresh, level depth is 5-20 m.

Permeability is 0.29-0.51 mm/min. Soils are non-salinized. Solid residue is 0.061-0.142% under chlorine-ion content 0.008-0.012 %. Volume weight within 1 m layer is 1.35-1.37 g/cu.cm, specific weight is 2.68-2.70 g/cu.cm, porosity is 49-50 %, full field water capacity is 22.1-22.2 %.

4 Parameters of Pilot Projects and Technical Solutions:

Site's area is 23 ha, land use efficiency is 0.93. Crop pattern: grape, vegetables, fruits. Water supply is performed from Parkent canal by pumping. Water is supplied by main pipeline with length 2300 m. Main crop is vine sort "Taify Pink" (about 40 th. bushes). Polyethilen pipes extent is 72156 m. Planting scheme is 3x2.5 m by contour. Within 3 ha area vineyards are located on terraces.

5 Methodology:

3 sites were selected for each test version (version 1-drip irrigation, 65x65x65; version 2-drip irrigation, 80x80x80; version 3-furrow irrigation 75x75x75).

Soil moisture was determined by thermostat – weight method. Phenological observations included: budding, flowering, ripening, etc. Yield per 1 bush and number of bushes per hectare were recorded. Observations on root system development were performed.

Drippers workability was studied by measurement of their discharge with regard to irrigation water turbidity. Water turbidity was determined by photo-electro-calorimeter.

6 Results:

Moisture dynamics within moistening contour. Moistening contour corresponding to 80% FFMC at the beginning of growing season penetrated to depth 40 cm and was 40 cm in diameter. To the end of growing season its parameters were: depth – 80 cm, diameter – 60 cm; moistening contour corresponding to 70 % of FFMC at the beginning of season was: depth – 100 cm, diameter – 120 cm. These contents met conditions of plant development.

Moisture before irrigation in version 1 was 67 %, in version 2-81 %, in version 3 (furrow irrigation) it was 74 %. After irrigation soil moisture was in version 1 – 94 %, version 2 – 96 %, version 3 – 100 %. Vine water requirements coefficient was for 4th year of planting: at the beginning of June – 0.63; mid – June – 0.67; at the end of June – 0.72; at the beginning of July – 0.63; mid – July – 0.90; at the end of July – 0.98; at the beginning of August – 1.02; mid - August – 0.87; at the end of August – 0.76.

Irrigation regime and irrigation technique elements. Number of drippers per 1 plant was 1; dripper's discharge – 4 l/hour (version 1) 8 l/hour (version 2); irrigation duration – 7 hours for both versions.

Watering depth: 37.88 (version 1); 80.7 (version 2); 910 cu.m/ha (version 3). Irrigation norm: 757.6 (version 1); 1614 (version 2) and 3640 cu.m/ha (version 3). Irrigations number and intervals: version 1 – 20 and 7-9 days; version 2 – 20 and 7-9 days; version 3 – 4 and 25-30 days. Water saving under drip irrigation to compare with furrow irrigation was: version 1 – 2882.4 (79.1%), version 2 – 2026.0 cu.m/ha (55,6 %).

Irrigation regime impact on growth, development and yield of 4 years settings of wine. Observations showed: phase of budding and flowering started simultanconsly for version 1 and 2. Phase of ripening started 7 days early in version 1 and 5 days early in version 2 to compare with version 3.

Shoots ripening started early in version 3. Total length of shoots was the biggest in version 3 and smallest in version 1.

Thus, in version 1 water saving was 79.1 % and yield growth was 33.44 %; in version 2 – 55.6 % and 42.6 % respectively.

Transpiration intensity within all versions was highest in day-time. Night transpiration constituted only 10 %. Under higher air temperature and lower relative air humidity transpiration is higher.

Study of vine root system showed that total length of ½ skeleton of 4-year wine settling in version 1 was 59.48 m under depth 120 cm and diameter 180 cm; in version 2 – 67.64 m, 120 cm and 180 cm respectively.

Based on results of investigations performed recommendations on design, construction and maintenance of drip irrigation system for orchards and vineyards within different soil-climate zones of Uzbekistan were established which were used for new developed lands.

H	Suggested key-words		
1	Drip irrigation system	4	Irrigation regime
2	Dripper	5	Yield
3	Soil moisture dynamics	6	Bioclimatic coefficient

I	Most recent publications (maximum 3)			
1	Author(s): A. Novikova, N.Nazarova			
	Title: Drip irrigation of orchards and vineyards on desert sands.			
	Publication details: Possibility of desert sands development by means of drip irrigation is considered. Irrigation technique elements for orchards and vineyards are developed.			
	Year of publication 1986:	free access <input checked="" type="checkbox"/>	restricted <input type="checkbox"/>	confidential <input type="checkbox"/>
2	Author(s):			
	Title:			
	Publication details:			
	Year of publication:	free access <input checked="" type="checkbox"/>	restricted <input type="checkbox"/>	confidential <input type="checkbox"/>
3	Author(s):			
	Title:			
	Publication details:			
	Year of publication:	free access <input checked="" type="checkbox"/>	restricted <input type="checkbox"/>	confidential <input type="checkbox"/>