

REGISTER OF RESEARCH ON IRRIGATION AND DRAINAGE

QUESTIONNAIRE

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| A | Project title: Study of in -soil irrigation system (ISIS) efficiency and design elements. |
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| B | Topic n° :1 | Sub-topic n°: 4 |
| 1) | 4 | Technical field n°: 4 |
| 2) | Category n°: 01 | |

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| C | Project location: | | |
| | Country: Republic of Uzbekistan | Area: 110 ha | |
| | SyrDarya province, state farm 10 a | | |

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| D | Duration of the project | | |
| | Year in which the project was started: 1974 | Project completed: 1976 | |
| | | Dates of Expertise: 1976, 1977 | |

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| E | Organizations and technical staff involved | | | |
| 1 | Supervisor/project coordinator: Gulyayev Mikhail Organization: Uzgipromelivodhoz Address: 44, Navaiy str. Tashkent telephone: 7 (3712) 422984 E-mail: _____ fax: 7 (3712) 422985 | | | % |
| | | | | Staff resources 100 |
| | Other counterparts: | Organizations | Surname | First name |
| 1 | | | | % |
| 2 | | | | % |
| 3 | | | | % |
| 4 | | | | % |
| | Other collaborators: _____ | | | man-years |

| | | |
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| F | Funding agencies | |
| | Full name or acronym | Percentage of project finance provided |
| 1 | Ministry for Land Reclamation and Water Management | 100% |
| 2 | | % |
| 3 | | % |

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| G | Summary of research project |
| <p>1 Objective and technical fields: Reduction of unproductive water losses and labour productivity increase during irrigation. Favorable water-air soil regime creation on basis of ISIS. Objectives: Perfection of ISIS design elements, irrigation automation.</p> | |
| <p>2 Scientific and technical approaches: - determination of optimal hydraulic parameters of ISIS; -presicing of absorbtion regularity under ISIS; - development of irrigation optimal regimes under ISIS; - experimental design and construction of ISIS, its efficiency verification.</p> | |
| <p>3 Environment characteristics: Climate is sharply continental. Sum of effective temperatures is 4204 0C. Absolute maximum is 43 0C, minimum -20-25 0C. Duration of growing season is 210-220 days. Precipitation is 280-300mm with its maximum in March-April. Relative air humidity is 50% within growing season and 30-35% in July-August. Evaporativity with regard to the coefficient 0,8 is 1081-1509 mm; average is 1232mm. Annual humidity deficit is 1050 mm. Wind velocity is 3-3,5 m/sec. Soils: serozems with different depth of groundwater salinity is 10-20 g/l and more. Soil-forming rock are loess loam. Water -physical soil properties are the following: specific weight is 2,58-2,66 g/cu.m, volume weight is 1,3-1,43 g/cu.m , minimum moisture is 17,7-26% of volume: porosity under minimum moisture is 18,8-31,9%.</p> | |
| <p>4 Projects and Technical Solutions: Experimental site in state farm 10 was a base for ISIS investigations. Performed polyethylene tubes were used with diameter 20,16 and 12,5 mm laid at depth 0,45m with inclination 0,001. Distance between tubes was 1,2m, length was 100,60 and 40 m. Water was supplied through the settling basin.</p> | |
| <p>5 Methodology: Field observation and investigations of ISIS design elements and soil water-salt regime. Study of absorbtion under different diameters of tubes, prevention of siltation and vegetation. Study of irrigation technique elements changes: speed of flow front movement, distribution of discharges and heads along the tubes. Study of ISIS hydraulics: system filling time, head changes along tubes, moistening uniformity. Determination of cotton field water-salt regime.</p> | |
| <p>6 Results: Results of investigations allow to come to the following conclusions: Water absorbtion is strictly determined by soil permeability coefficient and hydraulic head inside network. Absorbtion does not depend on total evaporation, initial moisture and irrigation duration. Tests showed that glass-tissue filters significantly reduce absorbtion. During few first years due to low soil density absorbtion was very high it provokes big discharges inside the network and uniformity of watering. To avoid this phenomena deep</p> | |

soil loosening in used.

Time of filling up the tubes is 5-20 mm. It is negligibly small comparing with watering duration and is not taken into account in ISIS design.

Under ISIS design for uninterrupted irrigation during growing season calculations of network can be made as for stable flow.

On experimental ISIS site during 1974-1976 2-3 irrigation were performed. Irrigation norm was 7075 cu.m/ha (1974); 4358 cu.m/ha (1975) 4525 cu.m/ha (1976). Groundwater depth before growing season was 2,5-2,0 m, within vegetation its depletion occurred on 0,5-1,5 m.

Coefficient of irrigation uniformity was 0,158. Irrigation norm was on average on 25% lower comparing with furrow irrigation. Under irrigation norm 4369 cu.m/ha in 1975 total evaporation was 7,6 th.cu.m/ha, overflow from groundwater was 1,5-3,0 th.cu.m/ha. Moisture regime was favorable for cotton growth and development in 1974-1976.

Cotton yield was 2,85; 3,69 and 3,64 t/ha.

It was on 10-15% higher to compare with furrow irrigation.

Total evaporation in 1974-1976 was 6,8-7,6 th.cu.m/ha during growing season and 3,3-2,8 th.cu.m/ha exceeded water supply. It was a cause for salt accumulation within topsoils.

| H | Suggested key-words | | |
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| 1 | in-soil irrigation | 4 | |
| 2 | perforated tubes | 5 | |
| 3 | Irrigation experimental design | 6 | |

| I | Most recent publications (maximum 3) | | | |
|---|--|---|-------------------------------------|---------------------------------------|
| 1 | Author(s): G. Pavlov, V. Ryabov | | | |
| | Title: Study of ISIS efficiency and design elements. | | | |
| | Publication details: Optimal parameters of design elements and efficiency of ISIS. | | | |
| | Year of publication: 1977 | 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 type="checkbox"/> | restricted <input type="checkbox"/> | confidential <input type="checkbox"/> |
| 3 | Author(s): | | | |
| | Title: | | | |
| | Publication details: | | | |
| | Year of publication: | free access <input type="checkbox"/> | restricted <input type="checkbox"/> | confidential <input type="checkbox"/> |