

G	Summary of research project
	<p>1 Objective and technical fields: Prevention of soil salinization on base of drainability increase and leaching regime of irrigation. Objectives: Water use improvement and soil water-salt regime management. Irrigated land productivity increase on background of vertical drainage.</p>
	<p>2 Scientific and technical approaches: Prevention of soil salinization and irrigated lands productivity increase is based on territory's drainability strengthening and salt removal by means of groundwater pumping under leaching regime of irrigation. Meaning: Set of water reclamation recommendations on irrigated lands productivity increase development.</p>
	<p>3 Environment characteristics: Climate is continental. Average annual temperature is 12,5 - 13,5 °C. Precipitation is 250-350mm: evaporativity is 1200-1500 mm. Relative air humidity is 55-60%, in summer - 25-30 % Geomorphology: SyrDarya alluvial valley. Relief: slightly corrugated. Lithology: light loam and sandy loam (8-40m); downward alternative thickness of clay, sand and sandy loam (120-150 m). Cover loam permeability coefficient is 0,05-0,25 m/day; aquifer permeability 16-25 m/day. Conductivity coefficient is 350-2500 sq.m/day. Groundwater level before 1960 was on depth of 8 -10m. After land development in 1965 groundwater level increased to 1-3m below land surface. Groundwater salinity type is choride-sulphate. Artesian water head is higher than groundwater level on 0,2-0,1m Artesian water salinity is 1-8 g/l Soils: sandy loam, light and middle loam. Soil salinity is very strong and varies within 1,2 - 2,3% on solid residue and 0,2-0,4% on chorine. Under irrigation salt re-distribution occurred and in 19645 63-65% of lands were middle and strongly salinized. Before development of VDS cotton yield was 1,6-1,65 t/ha.</p>
	<p>4 Projects and Technical Solutions: Irrigated area is 5700 ha (gross) or 5350 (net). Main crop is cotton. Vertical drainage wells constructed was started in 1963 and 18 wells were completed. 7 wells were positioned parallel to Kirov canal and rest of them all over the area. Well depth is 55-75m, yield is 60-75 l/sec.</p>
	<p>5 Methodology: Field observation on water and salt movement and water-salt balance elements within unsaturated zone, groundwater and cover loam. Permanent balance sites by area of 100-250ha were singled out, where regular observations on soil water-salt regime, water-salt balance elements were executed. These balance sites were equipped by devices of water and salt accounting. System analysis was used as a main method of data processing..</p>
	<p>6 Results: Irrigation development within slightly drainable territory has led to saline groundwater arise into root zone, salt mobilization and soil secondary salinization. Till 1965-1967 all territory was subjected to secondary salinization: middle and strongly salinized lands constitute about 70% of area. Open horizontal drainage with density 8-15 m/ha and leaching on its background did not give expected results. Since 1969 till 1971 18 vertical drainage wells were put into operation.</p>

VDS operation within 3-4 years allowed:

- groundwater level regulation from 2 to 5,5 m;
- to support level within growing period on depth of 2,7-3 m;
- to create negative water-salt balance within unsaturated zone and cover loam. Salt removal from cover loam was on average 18,4 t/ha under total water supply 11-13,5 th.cu.m/ha and total evaporation 7,5-8,7 th.cu.m/ha.
- to crate within soil free volume due to groundwater level decrease to 4,0-4,5 before autumn-winter leaching and quick its lowering after leaching to 1,5-1,8 m; that permitted to make leaching by smal depth for slightly and middle salinized soils (2500-3000 cu.m/ha); for middle and strongly salinized soils 3500-6500 cu.m/ha that led to secondary salinization elimination within 2-3 years.

Drainage outflow was 2700-6500 cu.m/ha/year;

- to make leaching 15-20% higher than evapotranspiration value; desalinization discharge was 1500-3500 cu.m/ha/year;
- to achieve thin middle and strong salinized lands desalinization rate 58-60 t/ha.

Area of irregular moistening was located along the well line within the distance of 50-100m from the wells. Within this area zone of active and salt exchange had depth 100-130 m, in other places 30-35m.

VDS operation created positive reclamation background which in turn let to yield increase. Additional yield was 0,39-0,96 t/ha.

Totally yield increased from 1,6 (1968) to 2,6-2,8 (1975-1977) t/ha.

Economic efficiency was determined taking into account the following aspects:
yield growth, land use efficiency increase, irrigation water saving.

H	Suggested key-words		
1	Vertical drainage system	4	Soil leaching regime
2	Territory drainability	5	Reclamation state
3	Unsaturated zone water-salt balance	6	Soil productivity

I	Most recent publications (maximum 3)			
1	Author(s): N. Reshetkina, K Yakubov			
	Title: Vertical drainage .			
	Publication details: Field investigations of vertical drainage efficiency were undertaken. Possibility of water-salt balance and water-salt regime management is proved.			
	Year of publication: 1983	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:			
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