

G	Summary of research project
<p>1 <i>Objective and technical fields:</i> Irrigation water saving. Water and land efficiency increase. Prevention of subsidence. Furrow irrigation technique and technology development. Water and land resources productivity increase, ecological situation improvement.</p>	
<p>2 <i>Scientific and technical approaches:</i> Agrotechnical methods and technologies of furrow irrigation. Alternatives of irrigation development. Experiment's meaning is elaboration of measures to prevent suffosion and subsidence under irrigation.</p>	
<p>3. <i>Environment characteristics</i> Climate is sharply continental. Average annual air temperature is 16.2⁰ C, in June - 40.3⁰ C. Precipitation is 179 mm., evaporativity is 1200 mm., wind velocity is 7-28 m/sec. Pilot plot locates within loess plain with slope 0.005-2. Lithology: loess loam (20-45 m). Volumetric mass of soil is 0.76 -1.3 g/cu.cm., porosity - 47-52 %, moisture capacity - 16.4-19.2 %. Soil are poor for nutrient elements. Due to soil subsidence its surface is deformed on 0.2 - 2.4 m.</p>	
<p>4. <i>Parameters of Pilot Projects and Technical Solutions:</i> Total area of subsident soils is 7.5 th. ha. Pilot site's area is 120 ha (105 ha net). Main crop is cotton. Irrigation network consists of concrete flumes with efficiency 0.9. Irrigation technique efficiency before land development was 0.32 - 0.45 , after development 0.47 - 0.65. Irrigation regime was 60-60-60 % according to growth phases; irrigation scheme was 2-3-3 on strongly subsident soils and 1-2-1 on slightly and middle subsident soils. Irrigation norms were 15-24 th. cu.m/ha, yield was 1.2-1.83 th/ha. Furrow were 25 cm. in depth, distance between furrows - 0.9 m, density was 67-125 m/ha, watering hoses density was 23-67 m/ha.</p>	
<p>5 <i>Methodology:</i> Field investigations on middle and strongly subsident soils; furrow compaction on slightly subsident soils. Study of cotton irrigation regime on soil moisture before irrigations according to plant germination phases. Different soil moisture before irrigations were undertaken and considered according to the irrigation regime alternatives on the fields 350-1050 sq. m. three time repeated. Irrigation technique elements were measured on irrigation time, irrigation norms, run off and filtration. Experimental field was equipped by all measuring devices. More detailed were measurements of hydraulic characteristics of in-soil, drip and hose technique of irrigation. Plants' growth and germination and yield were observed.</p>	
<p>6 <i>Results:</i> Farm № 52 was established in 1988. Wide scale land development led to soil subsidence., which, in turn, led to water expenses of 15 -24 th. cu. m/ha. Irrigation technique efficiency increased during 3 years only from 0.32 - 0.45 to 0.47 -0.65. To avoid annual grading decision was made to provoke artificial soil subsidence within the first year of land development. It has been done by deep mellowing of soil to 0.9 m., ploughing to 0.4 m. and irrigation by norm of 2700-3500 cu.m./ha that allowed: - to avoid soil subsidence for 2 -4 years of land development.</p>	

- to use soil water stock within the sowing and growing period.
- on slightly subsident soils it was enough to compact furrows by tractor;
- to reduce irrigation time from 2-3 days to 6-32 hours;
- to exclude water losses for filtration in ditches from 2- 4 to 0.2 -0.5 th. cu.m/ha; hoses' use helped to avoid even these losses.
- to cut down water expenses from 15-24 to 8-12 th. cu.m/ha.

For water saving alternatives irrigation methods were used in-soil, drip from hoses. Optimal irrigation regime was obtained according to sheme 1-4-1 with soil moisture between irrigation's 65-70-80 %.

Results of irrigation on alternatives were the following:

- in-soil irrigation with settling of 7 t/ha by irrigation norm 6698 cu.m/ha gave yield 4.7 - 7 t/ha, water expenses according to water balance were 1410 cu.m/t;
- drip irrigation in ditches 0.45 m. by norm of 5720 cu. m/ha gave yield 4.38 t/ha; water expenses were 1300 cu.m/t;
- control field with irrigation in furrows by norm of 8585 cu.m/ha gave 2.75 t/ha, water expenses were 2480 cu.m/t ;
- settling observations showed that 7 t/ha gives additional yield 0.41 t/ha;
- irrigation technique efficiency increased to 0.85-0.87;
- irrigation capacity increased from 0.35-0.55 ha for 6 hours to 6-8 ha;
- simultaneous irrigation front width achieves 177 furrows;
- irrigation technical means do not prevent tractor operation within the growing period.

Above mentioned technologies imbedding allowed to increase cotton yield from 1.2-1.7 to 2.9-3.1 t/ha.

H Suggested key-words			
1	Soil subsidence	4	Soil productivity
2	Field preparation technology (tillage)	5	Water saving
3	Irrigation technology	6	Labour efficiency

I Most recent publications (maximum 3)			
1	Author(s): B. Kambarov		
	Title: Irrigation technique and technology		
	Publication details: Results of field investigations of irrigation methods within premountain zone.		
	Year of publication: 1988	free access <input checked="" 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:	free access <input type="checkbox"/>	restricted <input type="checkbox"/>	confidential <input type="checkbox"/>