

Economic Efficacy of Irrigation Technology for Cultivation of Cotton-Plant Varieties With Mineralized Water in the Condition of Water Deficiency

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Abstract: *In this article the data was presented about the impact of optimal irrigation regime of cotton-plant on 70–70–60% humidity capacity limited fields, on cotton productivity, economic efficacy and profitability in the study of field requirement for humidity through implementing “Andijan-36” cotton-plant variety with mineral fertilizer in annual norm of N-200, P-140, K-100 kg/ha in soil conditions inclined to salinization with ground water of 2,0 meters depth and in good meadow soil conditions of Kokand in Fergana region.*

Keywords: relative to BFD, the depth of sewage waters, ground water level, growth, development, cotton productivity, economic efficiency, profitability level

1. Introduction

Nowadays water resources are not unlimited and keeping them as constant source is a global issue. In most countries various devices and technics are used to utilize ground water rationally which occur for agricultural needs. In India 66% of all irrigated lands take water from wells. In Saudi Arabia and Lebanon ground waters are utilized as a source of irrigation. In Italy ten thousand hectares lands are irrigated by ground waters.

In leading countries of the world, such as the USA, Canada, Russia, Germany, India, China and other developed countries the use of resource-saving techniques and technologies have an essential significance in agriculture and water resources sphere. The perspective reforms of water economy intend rational utilization of water resources on the basis of adopting market principles and mechanisms of water utilization, supplying water to consumers regularly and timely by using advanced technologies, developing scientific basis of technologies for irrigating ground surface with collector-drainage waters.

Today considerable irrigation and melioration measures are being carried out on improvement of meliorative state of irrigated lands of the republic, increasing soil fertility, rational utilization of water resources in the conditions of water deficiency and developing additional water resources. As a result of these measures, different irrigation methods have been created and implemented in recent years, such as drop-irrigation in 13,2 thousand ha areas, film covering method in 18,0 thousand ha and irrigation with movable flexible pipes in 16,8 thousand ha lands in place of main brooks and canals, meliorative state of 1 mln 200 thousand ha lands were ameliorated, strong and medium saline soil areas were decreased to 149,4 thousand hectares, the lands with close ground water depth were reduced to 302,9

thousand hectares, water supply of 1 mln 300 thousand ha lands was improved, cotton-plant productivity in meliorated lands increased to 3-4 c/ha and wheat productivity also rose to 4-5 c/ha. That's why, scientific researches have prior significance on saving irrigation waters and improving meliorative state of lands through developing water-saving technologies in the irrigation of cotton-plant with mineralized waters in our republic [1, 2, 3, 4].

2. Materials and Methods of Research

In order to adopt each agrotechnical measures of cultivated cotton-plant varieties, it is necessary to define economic efficacy and to select the optimal one. Economic efficacy of used agrotechnics in our investigations has been calculated on the basis of measurement standards of the farm. Here, the expenses, costs, incomes and profits of 2017 were considered. So, for the cultivation of cotton in the field experiment the costs are calculated for labour, harvesting, fertilizing, transports, for seed, irrigation, soil processing (cotton-plant interrows in autumn), for pest control and for other techniques.

Resource prices in cotton-plant growing and purchase prices have been considered on the basis of current indications of 2017. In fixing cost price of cotton a real cost price of 2017 was chosen as a base from farms of Dangara district in Fergana region.

The sale profit has been calculated by multiplying purchase prices by productivity on industrial varieties in cotton-picking time in the experiment. Due to sameness of agrotechnical measures in experimental variants, other costs for irrigation technologies, harvesting and transporting additional yield and the costs on quantity of irrigation were added to the total costs. Other costs were calculated as the same.

For evaluation of contingent profit, total costs were subtracted from the sale profit. Profitability on experimental variants was calculated by dividing contingent profit into total costs and multiplied by 100.

3. Results and Discussion

In the 1st variant where were C-6524 Andijan-35 and Andijan-36 of cotton-plant varieties planted, the agreed seasonal irrigation norm made 3300 m³/ha in 1-1-1 irrigating system in order to keep pre-irrigation soil moisture in 70-70-60% in relation BFD, while in the 2nd variant furrow

irrigation made 3100 m³/ha in 1-1-1 irrigating system in order to keep pre-irrigation soil moisture in 70-70-60% in relation BFD, and in the 3rd variant furrow irrigation made 2900 m³/ha in 1-1-1 irrigating system in order to keep pre-irrigation soil moisture in 70-70-60% in relation BFD. And the highest cotton yield was observed in C-6524 Andijan-35 and Andijan-36 of cotton-plant varieties when used furrow irrigation with soil moisture in 70-70-60% in relation BFD and applied mineral fertilizers in norm N-200, P-140, K-100 kg/ha. Their yield made 28,0 c/ha, 29,7 c/ha, 31,3 c/ha relatively and 1,6-3,3 centner extra cotton yield was harvested due to changes in irrigation system.

Table: Economic efficacy of irrigation procedure and technologies for cotton-plant with mineralized water

Var.	Cotton-plant variety	Average yield in 3 years, c/ha	Additio-nal yield, c/ha	Income after sale, sums/ha	Total costs, sums/ha	Costs of harvesting additional yield, sums/ha	Contin-gent net profit, sums/ha	Profit-ability, %
1	C-6524	22,4	-	3993248	3856992		136256	3,4
2		24,5	2,1	4367615	3981992	125000	385623	8,8
3		28,0	5,6	4991560	4315742	125000	675818	13,5
4	Andijan-35	25,4	-	4528058	3856992		671066	14,8
5		26,9	1,5	4795463	3981992	125000	813471	17,0
6		29,7	4,3	5294619	4315742	125000	978877	18,5
7	Andijan-36	28,0	-	4991560	3856992		1134568	22,7
8		29,2	1,2	5205484	3981992	125000	1223492	22,7
9		31,3	3,3	5579852	4315742	125000	1264109	23,5

Table presents the data on economic efficacy of applied agrotechnic measures. The lowest profitability was indicated in C-6524 cotton-plant variety that was irrigated by 1-1-1 irrigation regime, mineral fertilizers N-200 P-140 K-100 were applied. In this variant average cotton yield made 22,4 per ha within 3 years, cotton realization cost made 3993248 sums per ha, and costs were 3856992 sums, contingent net profit of this variant showed 136256 sums per ha, profitability - 3,4 %. The same variety showed contingent net profit of 4367615 sums when implemented furrow irrigation in 1-1-1 system, profitability increased to 8,8 % . In C-6524 variety the highest economic efficacy was indicated in furrow irrigation of 1-1-1 system variant with application of 200 kgs nitrogen, 140 kgs phosphor and 100 kgs kalium per ha, contingent net profit was 675818 sums, profitability made 13,5 percentage, similarly in the variant of Andijan - 35 variety that was irrigated by 1-1-1 system of furrow irrigation, soil moisture of 70-70-60% against BFD, application of 200 kgs nitrogen, 140 kgs phosphor and 100 kgs kalium per ha, contingent net profit consisted 978877 sums; profitability-18,5%, in the variant of Andijan - 36 variety 1264109; 22,7%. Comparing to C-6524 cotton-plant variety in Andijan - 35 and Andijan - 36 varieties contingent net profit was higher from 303059 sums to 588291 sums and profitability was 5% - 9,2% more.

4. Conclusions

For production of high and qualitative yield of cotton per ha from C-6524, Andijan-35 and Andijan-36 cotton-plant varieties in the conditions of irrigated lands, salinization inclined soils and in soil meadows with ground water of 2,0 meters depth in Fergana region, it is suggested to apply mineral fertilizer in the form of N-200, P₂O-140, K₂O-100 kg/ha per ha, to use furrow irrigation keeping pre-irrigation soil moisture in 70-70-60% against BFD. When the cotton-plant is irrigated during its vegetation period 3 times in 1-1-1

system of irrigating regime: flowering stage in 800 m³/ha, harvest accumulation stage in 1100 m³/ha and mature period 1000 m³/ha, in seasonal irrigation period total water consumption makes 2900 m³/ha and when waters of mineralization level 3 g/l are utilized to irrigate Andijan-35 variety, then profit is 978877 sums and profitability makes 18,5 %, in Andijan-36 variety the same indications are 1264109; 22,7 or in other words comparing to C-6524 variety of cotton-plant in Andijan-35 and Andijan-36 varieties from 303059 sums to 588291 sums more profit and from 5 % to 9,2 % more profitability can be achieved.

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