УДК 633.1:631.67(477.73)

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THE ENSURING OF GRAIN PRODUCTION IN THE SOUTH OF UKRAINE THROUGH THE COMPLEX IRRIGATION SYSTEM

Statement of the problem. The leading branch of agriculture in southern Ukraine are the crop production, which the leading place occupied by cereals. The grain sector provides a wide range of essential products, and directly affects the amount of livestock production. Expansion and improvement of grain production of high quality ensures the food security of the population, the economic stability of the country. Grain production – the main source of cash income in Ukraine, but negative impact of climatic factors, insufficient provision of the industry with material-technical resources hinders its development.

Therefore, the problem of improving the efficiency of grain production is extremely urgent and requires immediate resolution. Before agrarians ' task is to gradually increase the production of grain. An important reserve for achieving this goal is the introduction of irrigation.

Analysis of recent research and publications. The problem of improving the theoretical aspects and rationale the applied directions to improving the efficiency of grain production dedicated the works of many scientists. So, O. Boguckyi and M. Kulish main focus of solving problems considered intensification of agriculture and the selection of high-quality varieties, S. Chmyr emphasizes the need for the observance of rotation [1, 2, 3]. The problems of implementation and rational use irrigation investigated: I. Andrusenko, S. Baluk, M. Romashchenko and al. The economic rationale for irrigation in southern Ukraine engaged in such scholars as Vozhehova R., Maliarchuk M., Nikishenko V., A. Pidruchna [4], etc.

However , the topic of the use of the complex system of irrigation in the current economic conditions at the level of individual economic subject still poorly investigated .

Statement of the problem. The aim of the paper is: to determine the prospects of grain production and improve the economic efficiency of the industry through the introduction of an integrated irrigation.

Statement of the basic material of research. In recent years, before science faces new tasks, related to global climate change, which led to greater aridity Steppe of Ukraine , including most farms Mykolaiv region. The solve the problem, at least in part, may irrigation. Failure to use of irrigated land leads to an annual shortfall of the crop, and the loss of state the totaled 950-970 million [5].

Southern Steppe is the separate specific zones of arable land with a total area of more than 5,3 million hectares, of which 1,69 million hectares are irrigated , which became the gold reserves of the region and led to stabilization of production in all weather conditions [6]. Only irrigation would allow to dry years , to receive high yields of all cereals, 2-4 times higher than those without irrigation (Fig. 1) [7].

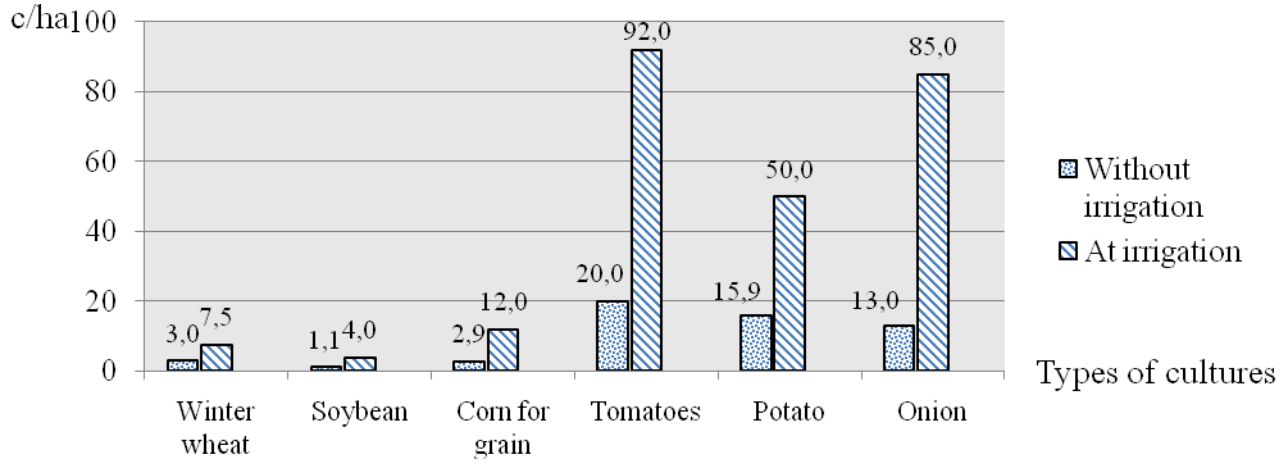

Figure 1. Yields of major crops under irrigation and without irrigation in Southern Ukraine
Source: *constructed using [7].*

However, the opportunities, what give by the irrigation for grain production unfortunately, used in farms not completely.

It should be noted that the state recognizes the importance of irrigation farming. State target program of development of Ukrainian village until 2015 provides for the rehabilitation and reconstruction of irrigation systems in the area of 2 million hectares. In particular, in the Mykolaiv region is planned to construct and

reconstruct about 3 thousands of hectares of irrigation is not state property, in accordance with the Program of economic and social development of Mykolayiv region 2011-2014 years [8].

Irrigation in the South of Ukraine enhances the productivity of crops in 1,7-3,4 times, depending on the culture and variety (Table 1).

Table 1

Effectiveness of irrigation in growing grains and legumes in the South of Ukraine

Culture		Approximate rate of irrigation, $м^3$/ha	Yield capacity, h/ha		Yield increase from irrigation, c/ha	Index irrigation
			under irrigation	with irrigation		
winter wheat		2100	70,4	29,9	40,5	2,4
winter barley		1600	61,3	35,6	25,7	1,7
corn of grain		2210	95,7	28,6	67,1	3,4
soybean		2450	29,4	10,7	18,7	2,7
post-harvesting	soybean	1200	21,3	-	-	-
	buckwheat	1200	15,7	-	-	-

Source: *calculated using [5].*

Coefficient of efficiency of irrigation under winter wheat is 2,4, maize for grain – 3,4, soy – 2,7 . Production on irrigated lands must be a guarantor of food security of the southern region and the country in general.

Grain production on irrigated land occupies a significant place in the economy of the agrarian enterprises of Mykolayiv region and is necessary.

Since the 60-ies in the region began large-scale construction of irrigation systems. State systems provide the water supply on the area 157,8 thousand hectares, local irrigation - 32,5 thousand hectares. For today there are 22 state irrigation systems. The biggest are: Yavkinska IS – 50,3 thousand hectares, Inguletska IS – 42,7 thousand ha, South bug IS – 12,1 thousand ha, Spasskaya IS – 10,4 thousand hectares, the total area of irrigated lands in the region, as at the end of 2012, is 190,3 thousand hectares, which is 10 % of the total farmland area [5].

However, every year the number of companies seeking to apply irrigation, increase, because of global climate changes has led to the further desiccation of farmland Mykolayiv region.

Consider the potential opportunities of grain production by the implementation of the irrigation system in one of the best farms of the district - in the Peasant Union of private shares of «Kuibysheva» (hereinafter - the PUPS «Kuibysheva») Mykolayiv region.

PUPS «Kuibysheva» is located in the village Novomaryanivka in Bratskiy district, has a form of private property. The statutory Fund amounts to 2,118 thousand USD. Agriculture is one of the largest leading for growing crops.

But, in connection with climate changes, namely due to a significant warming, the crop yield in 2012 sharply decreased. The highest crop yield was in 2011, which has moderate indicators of climatic conditions (Fig. 2).

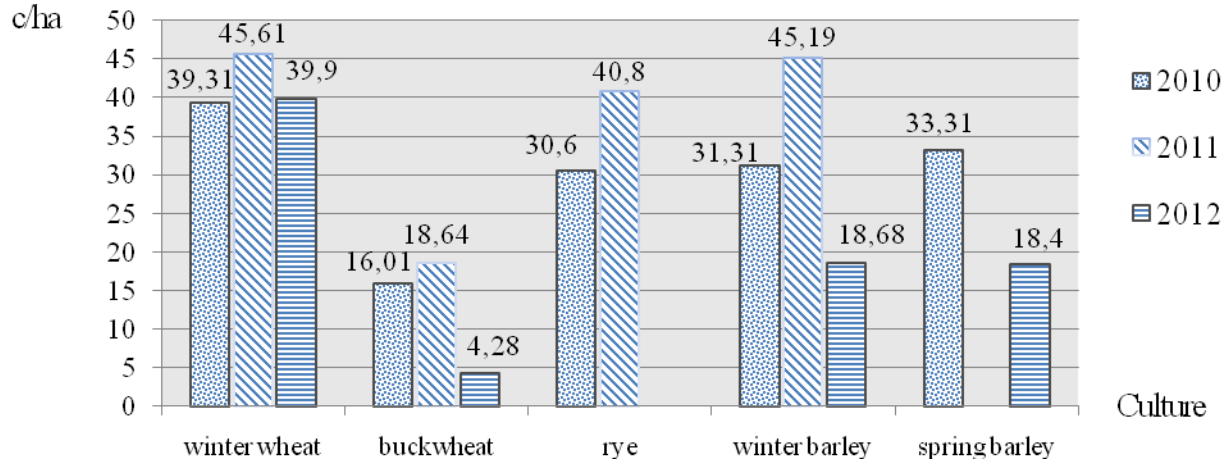

Fig. 2. Dynamics of yield of grain crops in the PUPS «Kuibysheva» Brotherly district

Source: *built according to the statistical reports of enterprises*

The implementing complex system irrigation will allow the enterprise to keep a record high position 2011.

Economic efficiency of grain production in the PUPS «Kuibysheva» presents a number of indicators, which in 2012 significantly decreased (table. 2).

Grain yield over the last two years has decreased by 31%, while the cost of 1 centner of produced and sold products rose by almost 2 times, profit per 1 centner implemented grain decreased by 61 %, and on 1 ha of crops is almost 67 %. The profitability level fell by 83,77 p.p.

Table 2

Economic efficiency of grain production in the PUPS «Kuibysheva» Brotherly rayon Mykolayiv region

Indicators	2010	2011	2012	2012 у % до 2011
Yield, centner from 1 hectare	34,72	40,87	28,22	69,1
The cost of 1 centner, UAN : - production	53,77	66,06	119,48	180,9
- sold products	57,43	71,28	144,49	202,7
The sale price for 1 centner , UAH	106,09	145,10	173,10	119,3
Profit, UAH, based on: - 1 centner implemented grain	48,67	73,82	28,61	38,8
- 1 ha of grain crops	1310,51	2565,2	858,69	33,5
- 1 UAH production costs	0,70	0,95	0,25	26,3
The level of profitability, %	84,74	103,57	19,80	-83,77

Source: *calculated by the data of statistical reports of enterprises*

Implementation of evidencebased effective of irrigation system based on compliance with certain requirements. On this basis, we have developed an integrated system of implementation of irrigation (figure 3).

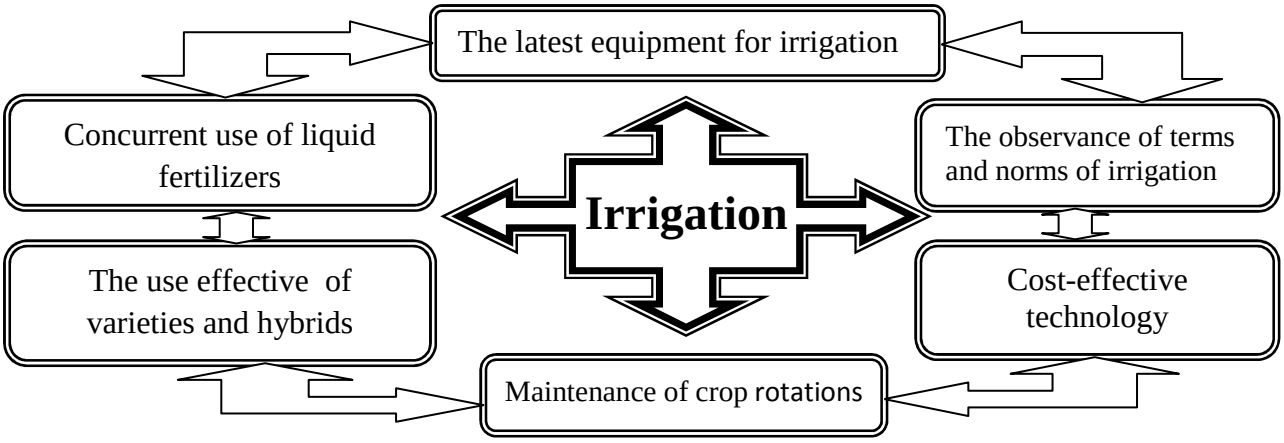

Fig. 3. Integrated system of implementation of irrigation

Source: *developed by the author*

Thus, in the investigated enterprise will be created of the zone of guaranteed production of quality grain on irrigated lands.

Receive the planned harvest of grain crops on irrigated lands, according to most experts, it is possible to achieve when implementing a consistent system of fertilizers. Today, more and more farmers recognize that further increase the use of chemicals and mineral fertilizers do not lead to adequate result. Costs for fertilizer grow, chemical substance accumulates in the soil and the crop yield decreases. The main reason of such situation is the depletion of the soil. And only biohumus is the natural means of recovery of soil fertility, he restores their structure.

Aidar is a universal liquid organic fertilizer from biohumus intended for plants, is the result of activity of technological lines of an earthworm Vladimir hybrid «Staratel ™». The complex is composed of natural ecologically clean and safe nutritious elements, humus substances, stimulators of growth and development of plants. The fertilizer can be used in all climatic zones of agriculture in the production of various agricultural crops. Manufacturer of fertilizers is a Ukrainian LLC “Ecochudo” in Lugansk). In 2013, the average purchase price for a liter is 27 UAH. Seed processing must be carried out before planting in a dose of 1 liter/ton (the

concentration of working solution 1:20). Next two treatment (showering) at the phase of intensive growth – 3 l/ha. Maximum yield increase at the full range of 4-8 c/ha.

The use of «Aydar» will: - improve the germination energy of seeds; to reduce the time of ripening for 10-15 days; improve resistance to disease; significantly reduce the nitrate content in products; increase content of vitamins and proteins; get rid of the negative action of pathogenic microflora, and also to reduce the cost of applying mineral fertilizers.

We have proved that the production of winter wheat on irrigated lands with using biofertilizer «Aydar is economically beneficial for the studied farm (table 3). Thus, the yield of wheat will rise by 26,6 centner from 1 hectare, while under irrigation (without fertilizers), the increase will amount to almost 21 centners from 1 hectare. This will help reduce the production cost of 1 kg of winter wheat at UAH 5, and the cost of sales of 1 centner of wheat by nearly 6 UAH, while the implementation of the irrigated system will allow to reduce production cost of 1 centner of product for 2 USD, and the cost of sales 1 centner – 2,50 UAH.

Table 3

The calculation of economic efficiency of production of winter wheat on irrigated land using biofertilizer «Aydar» in the PUPS «Kuibyshev» in Bratskiy district

Indicators	On average for 2010-2012	Plan	
		Irrigation	Irrigation + «Aydar»
Yield , centner from 1 hectare	41,8	62,7	68,4
The yield increase due to irrigation and at the expense of fertilizers on irrigated lands, centner from 1 hectare	X	20,9	26,6
Production costs per 1 ha, UAH	2993,86	2993,86	4549,86
including the additional costs related to irrigation and new fertilizer, UAH	X	1367,0	1556,0
The cost of production of 1centner, UAH	71,66	69,55	66,52
The cost of sales 1centner, UAH	82,84	80,35	77,04
The sale price for 1 centner, UAH	134,05	134,05	134,05
Profit from sales of products, UAH in the calculation : - 1 centner products	43,75	53,7	57,01
- 1 ha of sown area	1624,78	3366,99	3899,48
Additional income per 1 ha of crops, UAH	X	1742,21	2274,70
The level of profitability, %	48,5	66,8	74,0

Source: *results of own investigations*

At constant price, which developed in the farm, the profit from the sale 1 centner of products using organic fertilizer on irrigated lands will increase by 30%, and profit from 1 ha of sown area will increase by almost 2,5 times. As a result, the farm will receive additional profit per 1 ha of crops in the amount of 2274,70 UAH, bringing the level of profitability will grow by almost 26 p.p. While implementing only the irrigated system will provide additional income per 1 ha of crops in the amount of 1742,21 UAH, and the level of profitability will grow by only 18 p.p.

The conclusions and further research. Using complex integrated system of irrigation will solve the task of raising productivity and the economic efficiency of grain production. Implementation of the system requires additional financial costs, but in a result this approach will allow farmers to significantly improve product quality, in dynamics reduced the production cost, get a high income and to achieve a high level of profitability in general. At the same time, the use of «Aydar» will allow: to increase the yield of 5.6 centner from 1 hectare; to improve grain quality; to reduce the time of ripening for 10-15 days; improve resistance to disease; significantly reduce the nitrate content in products as well as reduce costs for the use of mineral fertilizers.

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Annotation

Kotykova O.I., Tesliar V.O. **THE ENSURING OF GRAIN PRODUCTION IN THE SOUTH OF UKRAINE THROUGH THE COMPLEX IRRIGATION SYSTEM**

Purpose. The aim of this article is the determine of prospects of development of grain production and increasing economic efficiency in the branch through the inculcation the system of complex irrigation.

Methodology of research. Theoretical and methodological basis is the works of economists – agronomists in the sphere of economy and accounting of grain production and the analysis of its economic effectiveness. During the fulfilment of the tasks in the article used the range of methods, including: abstract – logical method (when the generalizing and formulate the conclusions), economics - statistical (during the calculating the economic efficiency of the inculcation of an integrated irrigation system and the use of bio-fertilizer), a graphical (during the reflection of the change values of economic indicators), monographical method (for all-round and detailed study of economic efficiency of grain production and the identify of cause - effect relationship of its development), the method of comparisons and etc.

Findings. The study proved the importance and significance of the grain industry and the need for its development. According to the calculation, the production of winter wheat on irrigated lands using biofertilizers "Aydar" is economically advantageous for the farm. Using a complex, integrated irrigation system will solve the problem of raising productivity and the economic efficiency of grain production. At the same time, the use of bio-fertilizer will: improve the quality of grain; reduce ripening for 10-15 days; increase resistance to disease, significantly reduce the nitrate content in the product, as well as reduce the cost of fertilizer application.

Originality. Developed an integrated system of implementation of irrigation which provides for: the existence of new equipment for irrigation ; the observance of terms and norms of irrigation; maintenance of crop rotations; concurrent use of liquid fertilizers and other. On the basis of which are created zone of guaranteed production of quality grain on irrigated lands.

Practical value. Proposals to improve the efficiency of grain production, in particular : the introduction of an integrated irrigation system and applying liquid organic biofertilizers "Aydar " are of great practical value. The results of the research have been accepted by the guide for the implementation in the PUPS "Kuibysheva" in Bratskiy region .

Keywords: grain production, integrated irrigation system, liquid bio-fertilizer, economic efficiency.