EFFICIENCY ASSESSMENT FOR THE MAIN DIRECTIONS OF PROPOSED STATE POLICY TO INCREASE THE COMPETITIVENESS OF AGRICULTURE IN THE REPUBLIC OF ARMENIA

Ashot VOSKANYAN
Ph.D. in Economics, Associate Professor
Head of the research center "Agrarian Policy and Economics"
National Agrarian University of Armenia

Lusine TSPNETSYAN
Ph.D. applicant, Chair of agribusiness management and policy
National Agrarian University of Armenia

Key words: agriculture, competitiveness, efficiency, productivity, indicators, acreage, yield, milk commodity, subsidy, costs, producer price, drones, weather stations

Introduction The implementation of an effective state policy of increasing the competitiveness of the agriculture of the Republic of Armenia requires not only clarifying the main problems of this policy and proposing directions for their solution, but also evaluating the efficiency of their implementation. We focus at the evaluation of the effectiveness of the implementation of the main ones from those directions with the presentation of specific calculation justifications. The purpose of the article is to evaluate the effectiveness of the proposed main directions of the agricultural competitiveness of the Republic of Armenia. The tasks of the article are to clarify the range of indicators for evaluating the effectiveness of the above-mentioned main directions of the policy and to justify the effectiveness of these directions with appropriate calculations, as well as to present predictive estimates of the expected results.

Methodology The article uses dialectics, scientific abstraction, comparative analysis and statistical methods. The application of the dialectic method is clearly seen in the research in the interrelated study of the indicators necessary for the evaluation of the effectiveness of the main directions of the state policy of increasing the competitiveness of the agriculture of the Republic of Armenia. The application of the scientific abstraction method refers to the entire research, as the scope of the latter is limited to individual products, bearing in mind that the considered approaches are also applicable in the case of others. The application of the comparative analysis method finds its expression, especially, in the comparative evaluations of the results of the calculation of economic efficiency in the case of drip and traditional (surface) irrigation. The use of statistical methods is demonstrated in the calculations of the correlation and determination coefficients related to the volume of milk production and the level of commercialization.

Scientific novelty The effectiveness of the main directions of the proposed policy for increasing the competitiveness of RA agriculture is evaluated.

Literature review The characteristics of the competitiveness of agriculture, the factors determining it, the problems of its increase and ways of solving it have been recognized by a number of economists, including A. Borel [Borel, 2014, 4], T. Lenskaya Lenskaya, 2013, 87], K. Saubanov [Saubanov, 2010, 38-53], V. Bespyatnykh [Bespyatykh, 2000, 200], O Koryakina [Koryakina, 2017, 25], A. Voskanyan, A. Kartashyan [Voskanyan, et al., 2021, 73-87], S. Avetisyan [Avetisyan, 2002, 232-238] and others.

However, the issues of evaluating the effectiveness of the proposed ways of solving individual problems, related to the state policy of increasing the competitiveness of agriculture of the Republic of Armenia, have not been studied properly. In particular, it refers to the implementation of the drip irrigation system, the mechanism of providing targeted subsidies for the cultivation of arable land aimed at the implementation of the targeted policy of promoting the use of arable land, the implemented milk subsidy mechanisms, the use of digital technologies in agriculture, including the use of agricultural drones and the evaluation of the effectiveness of the implementation of weather stations.

Evaluation of the effectiveness of the proposed directions for solving the problems of the state policy of increasing the competitiveness of RA agriculture

Analysis Taking as a starting point the directions for solving the problems of the state policy of increasing the competitiveness of agriculture in this article, we need to consider the effectiveness of the implementation of the main ones. We present the latter with specific calculation bases.

The implementation of modern irrigation technologies in agricultural farms was one of the planned steps for the effective use of the main resources of agriculture, particularly the land resource. The most obvious is the evaluation of the effectiveness of the introduction of the drip irrigation system. Based on the calculations made by us and presented in the corresponding article for the creation of value chains for vegetables, specifically tomatoes, we have carried out an evaluation of the effectiveness of the implementation of the drip irrigation system under the given conditions.

A number of advantages of drip irrigation are evidenced by the applied experience, as well as the data of the professional literature.

"The analysis of existing multi-year experiments on drip irrigation method, as well as numerous studies and researches, shows that the advantages of this method are as follows:

- water is evenly distributed between plants, water is given slowly, directly to the roots of the plant;
- according to soil and climatic conditions, irrigation water is saved by 30-60%.
- good aeration conditions are created in the root layer of the plant,

- the yield of agricultural crops increases by 20-50%, the quality of the crop increases.

- Fertilizers are given in the soil together with water in a dissolved state, the efficiency of assimilation of fertilizer by crops reaches 80%.

- the interrow space remains dry.

- the need to fight against weeds decreases" R. V. Ghazinyan, G. R. Navoyan 7-8] etc.

Along with the mentioned and other advantages, the drip irrigation method has certain disadvantages, which are not significant compared to the advantages.

For the evaluation of the effectiveness of drip irrigation, as mentioned, the data of the costs incurred by us for tomatoes in the data of 2022, the volume of the obtained product, the income from the sale, the profit and the level of profitability were taken into account. The basis for producer prices was the data of the RA Statistics Committee.

According to our calculations, the costs for the cultivation of 1 ha of tomatoes amounted to AMD 3604.0 thousand. Among the mentioned expenses, the expenses expected to decrease in the case of switching to drip irrigation are the irrigation water fee, which was 88.0 thousand per 1 ha. AMD (8000 m3). During the growing season, the number of waterings was 13, the waterer's fee was 140,000 AMD (the first watering was 20,000 AMD, and 15,000 AMD for the remaining 12 waterings). Costs for fertilization amounted to 185.0 thousand. AMD, for medicinal products: 207.0 thousand. AMD The expenses for the city are around 160.0 thousand. AMD According to the calculations, the yield of tomatoes was 349.9 t/ha.

In the case of drip irrigation, the mentioned costs are significantly reduced. In particular, as we mentioned above, water consumption is reduced by 30-60%, that is, in the case of an average level of consumption reduction, water consumption will be 4400 m3, and the payment for irrigation water will be 48.4 thousand. AMD (economy: 39.6 thousand AMD). Fertilizer costs are reduced by about 40%, that is, the costs of the latter will amount to 111.0 thousand. AMD (economy: 74.0 thousand AMD). In case of drip irrigation, the costs for medicinal materials are saved by 20%, that is, the cost will be around 165.0 thousand. AMD (economy: AMD 42.0 thousand). The costs for Kagan in the case of drip irrigation are 64.0 thousand. AMD (economy: 96.0 thousand AMD).

Our observations show that the investments for the establishment of a drip irrigation system per 1 ha are within the range of 1.0-1.3 million drams. For calculations, we found it appropriate to accept the costs of implementing a drip irrigation system at 1.2 million drams per hectare.

In the case of drip and traditional (surface) irrigation, the calculation of economic efficiency for 1 ha of tomato cultivation is presented in Table 1.

Table 1. The results of the calculation of economic efficiency in the case of drip and traditional (surface) irrigation in the case of 1 ha of tomato cultivation

	Indicators	Measure unit	Tomato	
			Traditional (surface) irrigation	Drip irrigation
1	Irrigation system implementation costs	thousand AMD	-	1200.0
2	Irrigation system maintenance and repair costs	thousand AMD	-	60.0
3	Tomato production costs	thousand AMD	3604.0	3352.4
4	Costs during vegetation	thousand AMD	3604.0	3412.4
5	Irrigarion water costs	m^3	8000.0	4400.0
6	Expected yield from 1 ha	Ton	34.99	42.0
7	Producer price of selling 1 ton of tomatoes	thousand AMD	216	216
8	Income from the sale of tomatoes	thousand AMD	7557.8	9072.0
9	Net income	thousand AMD	3953,8	5719.6

As it can be seen, as a result of the implementation of the drip irrigation system, the increase in net income according to calculations was 1.76 million AMD, that is, there is an opportunity to fully compensate the costs of the implementation of the drip irrigation system in the first year of the implementation of the system. In this case, we planned the yield increase at the minimum possible level: 20%. In other words, the implementation of the drip irrigation system is highly effective. Based on our observations the introduction of a drip irrigation system in intensive horticulture provides the highest efficiency.

Now we need to turn to the questions of the efficiency of the mechanism of providing targeted subsidies for the cultivation of the proposed arable land promotion policy, which is considered to be the most important issue. In this case we consider an option when the subsidies are provided for the cultivation of autumn wheat, and all marzes of the republic are included in the program planned for this purpose, except for Ararat and Armavir marzes. Autumn wheat occupies a significant place in the structure of the sown areas of the mentioned marzes. According to the data of 2022, it was 29.9%, compared to 29.6% in 2020. In the previous period, 2010 and 2015. were 30.8% and 32.4%, respectively. According to the data of the RA Statistics Committee, the sowing areas of autumn wheat in the observed marzes have been significantly reduced. In 2022, the sowing area of winter wheat was 70.2% of 2010 and 53.6% of 2015.

Table 2. Summary data of the base year of the autumn wheat subsidization program and the forecasts of the results of the program implementation.

Marzes (regions)	2022 [According to the statistics committee of RA]			
	Planted area, ha	Average yield, centner/ha	Gross product, t	Gross product value, million AMD
Aragatsot	4344	20.8	9033	1589.8
Gegharkunik	9614	16.2	155811	2742.3
Lori	9361	28.7	26580	4678.1
Kotayk	3673	21.0	7701	1355.4
Shirak	12680	23.9	30162	5308.5
Syunik	9064	25.8	23313	4103.0
Vayots_Dzor	157	17.2	271	47.6
Tavush	1970	26.1	5088	895.5
Total	50863	23.1	117728	20720.2

Marzes (regions)	Forecast						
	The predicted sown area, ha	Amount of anticipated subsidy, million AMD	The predicted average yield seen, centner/ha	Anticipated gross product, t	Anticipated gross product value, million AMD	Gross product growth compared to the base, t	Gross product growth by value assessment, million AMD
Aragatsot	5213	364.9	23.9	12469	2194.5	3435.9	604.7
Gegharkunik	11537	807.6	18.6	21493	3782.8	5912.0	1040.5
Lori	11233	786.3	33.0	37075	6525.2	10495.3	1847.2
Kotayk	4408	308.5	24.2	10644	1873.4	2943.3	518.0
Shirak	15216	1065.1	27.5	41821	7360.5	11659.3	2052.0
Syunik	10877	761.4	29.7	32272	5679.8	8959.0	1576.8
Vayots_Dzor	188	13.2	19.8	373	65.6	102.0	17.9
Tavush	2364	165.5	30.0	7096	1248.8	2007.6	353.3
Total	61036	4272.5	26.8	163242	28730.7	45514.2	8010.5

We propose to accept the amount of the planned subsidy for 1 ha of cultivation in the amount of 70.0 thousand AMD, which, according to our calculations, is more than 21.0% of the cultivation of 1 hectare of wheat. It is advisable to provide the amount of the subsidy before the start of sowing, based on the relevant applications and signed tripartite agreements. The parties to the contract are the agricultural manager, the local self-government body and the state exe-cutive body coordinating the sector.

One of the most important parts of the contract should be the provisions related to the obligations of the farmer in agriculture. Among them are the return of the subsidy amount in case of non-implementation of the plantings provided for in the application and the contract, the fulfillment of the terms of cultivation of autumn wheat and the

requirements of agrotechnics, provided that a yield higher than the base year is ensured (for our calculations, we take 2022 as the base year).

The experience of similar programs and observations in our survey suggests that as a result of the implementation of similar subsidy programs, it is possible to increase the sown areas of subsidized crops by 20-35%, and to ensure a 15-25% increase in yield. In this case, we have taken the lowest (moderate) versions for efficiency evaluations, namely, the possible increase of the cultivated areas by 20%, and the yield increase by 15%. We have taken the price of wheat producers in 2022 as a starting point for cost calculations. The summary indicators characterizing the efficiency of subsidizing program for cultivating winter wheat in the observed marzes are presented in Table 2.

From the data in the Table 2, it is obvious that as a result of the implementation of the project, in a moderate version, it will be possible to increase the sowing areas of winter wheat in the observed marzes to 61.0 thousand. 50.9 thousand ha of the base. ha (an increase of 10.2 thousand ha), the gross output of autumn wheat will be 163.2 thousand ha. tons of base: 117.7 thousand. per ton (increase of 45.5 thousand tons). The amount of the subsidy required for the implementation of the project was calculated at 4272.5 million drams, in return for which the value of the additional harvest will be 8010.5 million drams, which exceeds the required amount of investment by 1.9 times. The latter was calculated with the lowest version. If we look at the increase in cultivated areas and yield in the case of the average option (increase in cultivated areas: 27.5%, increased yield: 20%), then according to the calculations, the results can be as follows. In the case of the average option, according to the calculations, it will be possible to increase the sowing areas of autumn wheat in the observed marzes to 64.9 thousand. yes 50.9 thousand of the base. ha (increase of 14.0 thousand ha), the gross output of autumn wheat will be 181.0 thousand ha. 117.7 thousand tons of base. per ton (increase of 63.3 thousand tons). The amount of the subsidy required for the implementation of the project was calculated at 4539.5 million drams, in return for which the value of the additional harvest will be 11133.4 million drams, which exceeds the amount of the required investment by about 2.5 times.

Aside from the additional harvest, the program will provide other results, in particular, the area of arable land used for the purpose will increase, in the case of the moderate version, 10.2, and in the case of the medium version, 14.0 thousand. ha, which will be 4.8 and 6.6% of the total sown areas in 2022, respectively. The quality of the harvest and the competitiveness of the farmers will increase to a certain extent.

The most important result indicator of the implementation of the project is the increase in the country's food security level, in particular, the self-sufficiency level of wheat will increase by 2.5 and 3.4 percentage points, respectively, in the case of moderate and medium options, other things being equal.

From the point of view of increasing the competitiveness of agriculture, the issues of increasing the competitiveness of animal husbandry are considered important. Our calculations for the years 2008-2022 prove that the coefficient of pairwise correlation between the volume of milk production and the level of commercialization was 0.419. The latter means that the connection is considered average and it is in the lower position of the specified level. The coefficient of determination in this case is 0.1756 or 17.6 %. The latter shows that the increase in the volume of milk production in the republic by 17.6% is due to the increase in the level of commercialization of milk, that is, the increase in the level of commercialization contributes to the increase in competitiveness. Also, the calculations made for the same observed period prove that the coefficient of pairwise correlation between the level of milk production and the price of the producer is 0.764. In fact, the connection here is average, close to the lower level of that range. As for the coefficient of determination, it is 0.5837 or 58.4%. In this case, it shows that the increase in the level of commercialization of milk in the country by 58.4% is due to the price of the milk producer. In fact, increasing the level of commercialization of milk is an important issue and the commercialization is still at a low level. Thus, according to the data of the Statistical Committee of the Republic of Armenia, it was 56.2% on average for the years 2008-2022, and the average for the last 5 years is 62.2%. The latter is also a low index, which in turn is one of the factors hindering the competitiveness of milk production. Therefore, one of the important steps to increase competitiveness can be the application of a subsidy mechanism for each kilogram of milk sold to produced and processing companies, with the aim of improving the quality indicators of milk, improving contractual relations in the field of sale and, most importantly, increasing the level of milk self-sufficiency. The application of the subsidy mechanism for the sold milk is also considered justified by the fact that there is a significant difference between the average retail price of milk and the price of the producer. Calculations based on the data of the RA Statistics Committee show that the ratio of the average retail price to the manufacturer's price was 2.73 for the 2008-2022 period, and 2.79 for the last 5 years. Based on the above, we tried to evaluate the effectiveness of the implemented milk subsidy mechanisms. The application of the mechanism, of course, requires the provision of certain requirements from milk producers, which should be fixed by contractual relations. The latter relate to the quality standards of milk, in particular: fat content, acidity, water content, temperature, freezing temperature, protein content, presence of somatic cells, etc. Therefore, not all commercial milk producers can meet the specified requirements.

According to our assessment, around 20% of milk producers will have the opportunity to be included in the implemented milk subsidy program. We consider it justified to take about 35% of the price of the current milk producer as the subsidy amount. According to the data of the RA Statistics Committee, the average selling price of milk

producers in the last 15 years was 144.7 drams, and the average of the last 3 years was 166.3 drams. Thus, the amount of the subsidy for the sale of 1 kg of milk will be around AMD 60. Our calculations indicate that the increase in the level of milk commercialization by 58.4% is due to the price of milk producers, therefore, based on the data of 2022, an increase in the level of milk commercialization is expected by 13.6 percentage points (64.5*0.584*60/166.3). For calculations, we consider the increase in the level of commercialization by 13.5 percentage points. In other words, the level of comercialization of milk will become 78.0% against the base 64.5%. Let's present the summary results expected from the application of the measure in table 3.

Table 3. Summary results of the implementation of the subsidy mechanism for the unit volume of commercial milk in the Republic of Armenia for the base year 2022[1]

milk gross production 2022 thousand t	Actual Level of commercialization, %	Volume of commodity product, thousand.t:	Commodity product value, million AMD	Volume of milk produced by the economies included in the program, thousand t	The expected level of commercialization of those included in the program, %
1	2	3	4	5	6
623.1	64.5	401.9	78772.4	124.6	78.0
The volume of expected product output of the included economies, thousand. t	The amount of the subsidy, million AMD	The value of the expected commodity product at the actual price, million AMD	The value of the expected commodity product at the subsidized price, million AMD	Additional income (revenue) at the actual price, million AMD	Additional income (revenue) in case of subsidized price, million AMD
7	8	9	10	11	12
97.2	5832.0	19051.2	24883.2	3299.3	9091.3

As a result of the implementation of the project, the following results are ensured. In the farms included in this program, the level of commercialization of milk will increase by 13.5 percentage points, the physical volume of commercial milk will increase by 16.8 thousand. in tons. The value of the expected product at subsidized prices was calculated at AMD 24,883.3 million, which is AMD 9,091.3 million higher than the income (income) received in case of non-implementation of the project. The program should be implemented with farms that have signed contracts with milk processing companies, the money should be transferred to the farmers based on the

[1] Ministry of Agriculture of RA, Food Security and Poverty, 2023. Jan.-March, 2023, 59-60, RA VC, Realization of agricultural products by households in 2022, 2023, 7.

actual volume of milk sold through the banking system. One of the most important results of the project will be the development of contractual relations with milk producers and processors, the fulfillment of bilateral contractual obligations will contribute to the increase of quality indicators of milk. As a result of the implementation of the project, the increase in income will provide an opportunity to improve the quality of production organization and increase production volumes. The most important result will be an increase in the level of food security.

We tried to evaluate the effectiveness of the use of digital technologies in agriculture. First, let's evaluate the effectiveness of using agricultural drones. Observations and the study of various sources prove that agricultural drones ensure high productivity and high quality of work both in the protection (spraying) of agricultural crops and in the process of feeding. High productivity is ensured by the speed of delivery of the working fluid, the wide working range of the drone and the high speed of the drone. The metering (dosing) system of the concrete DJI Agras T50 drone is effective, it has the ability to provide the droplet size of the working fluid in the range of 50-500 micrometers, which is an opportunity allows to ensure high quality of plant protection (spraying), save working fluid. This drone has the ability to ensure the consumption of working fluid in the amount of 24 liters in 1 minute, as a result, spraying a large area in a short time. The coverage width of this drone is 11 meters, both for spreading liquid and bulk materials.

The rate of consumption of working fluid per 1 ha is 6-15 liters. For calculations, the rate of consumption is accepted: 10 l/ha. In other words, the DJI Agras T50 drone can spray 4 hectares with one filling of working liquid (40 liters). The speed of the drone is 0-12 m/s. That is, at a speed of 6 m/s, the drone will spray an area of 66 m2 in 1 second with a coverage of 11 m, that is, it will take 2.5 minutes to spray 1 ha (10,000 m2/66 m2). It is possible to spray 4 hectares with one full tank, and it will take 10 minutes. The flight duration for such drones is usually 10-15 minutes. In other words, one charge of the batteries is sufficient for spraying 4 ha. Battery charging time is 9 minutes. In fact, with one battery, with on-site charging, 12 ha can be sprayed in one hour, and with spare batteries, it will be possible to provide 16 ha/hour productivity. Spraying carried out by drones has a number of advantages, which are:

- extremely small consumption of working fluid 40-60 times compared to spraying with traditional methods, that is, expensive preparations are saved, less amount of pesticides is released into the atmosphere,
- the high quality of spraying, which contributes to the increase in yield,
- in the case of traditional spraying, the crops are damaged by tractor wheels, in the case of spraying with drones, field damage losses are equal to 0,
- spraying can be done at night.

For example, the productivity of the OPSH-18-2500 tractor sprayer is about 7 ha/hour. The sprayer is combined with the MTZ-80/82 tractor. The recommended price of the sprayer is 727.0 thousand. Russian ruble. At the average exchange rate of 2022, 1 Russian ruble was AMD 6.48. In other words, the price of the sprayer at the manufacturer will be AMD 4711.0 thousand, including value added tax and transportation costs will amount to AMD 5905.0 million (US$13,550). The sale price of the agricultural drone in the republic will be USD 18,000. In the case of spraying agricultural crops with drones, in addition to the productivity and quality of spraying, a large economy is ensured due to the saving of pesticides, for example, in the case of spraying cereal crops, the consumption of working fluid is about 400 liters/ha, and for vegetable crops - 600 liters/ha. In this case, the cost of modern pesticides can be 50-60 thousand. drams, while in the case of the drone, taking into account the fact that the cost is 10 times less than the norm, AMD 45-54 thousand is saved. In the case of a tractor sprayer, the costs (tariff) are at least AMD 15 thousand. In this case, the number of sprays per hectare will be AMD 65-75 thousand.

According to the experts, the costs for spraying up to 100 ha with a drone are 900 rubles/ha [Zhichkin, et al., 2022. p. 3]. Calculated at the AMD exchange rate of 2022, it will be around 9850 AMD/ha (900 rubles*6.48 AMD). That is, on average, the saving in case of spraying 1 ha will be 60.2 thousand. AMD The cost of purchasing a DJI Agras T 50 drone is USD 18,000 USD, calculated at the exchange rate of 2022, it will be 7,842.1 thousand. drams, that is, in the case of spraying with a drone, compared to traditional spraying, the costs of acquiring a drone can be compensated after spraying around 130 ha (7842.0/60.2). Spraying the specified area with the considered drone is practically possible in 3 working shifts. It is worthy to note that for the calculations we have taken as a basis the capabilities of the average level of the drone, in particular, speed, capacity of the working fluid, etc. Also, in order to achieve the effectiveness of drones in the process of spraying crops, a certain professional training of the user is necessary.

We have tried to evaluate the effectiveness of the implementation of the IMETOS 3.3 weather station. The mentioned station carries out the following activities: accurate forecasting of the weather, alerts about expected frosts, heavy rains, high temperatures, modeling of the possible development of diseases of agricultural crops, continuous meteorological monitoring, monitoring of the operation of irrigation systems and soil moisture, providing information about the growth of crops and their condition. timely warning of possible floods. The mentioned weather stations can be used for 2000 ha/, but taking into account the size of the country's farms and soil conditions, we considered it appropriate to consider the weather station for 250 ha. Of course, the station will serve many farms (for example, 25-50, etc.). We conditionally accept that the area of the mentioned agricultural land is occupied by vineyards and orchards (for example, apples,

pears and apricots), vegetable crops (tomatoes, cucumbers, watermelons) and grain crops (wheat). In particular, the mentioned crop areas are as follows:

- grapes 45 ha,
- fruit 65 ha (including: apple 20, pear 12, apricot 33 ha),
- vegetables and fruits: 120 ha (including tomatoes 55 ha, cucumbers 30 ha, egg-plant 20 ha, watermelon 15 ha),
- 20 ha of wheat.

In the 250 ha agricultural land area, we have considered the expected production volumes and the value of the gross product from the perennial plantings and sowing areas with the mentioned structure with the yield indicators of 2022 and estimated the value of the gross product at the prices of the producer in 2022. In order to evaluate the effectiveness of the implementation of the weather station, we have considered what additional results we can have in case of the operation of the station. For example, in the case of early warning of adverse weather conditions, frost (high temperatures), the manager is able to implement preventive measures in time (in this case, we accept the prevention of crop loss in the amount of 7.0% of the calculated actual volume for fruit and grapes, 3% for vegetable crops and grain)).

As a result of the modeling of the possible development of diseases of agricultural crops and the organization of the effective fight against plant protection, we accept the reduction of crop losses as a moderate option, about 12.0% for fruits and grapes, and 8% for vegetables and grains. As a result of monitoring the operation of irrigation systems and soil moisture, providing information on crops and their condition, and improving water supply, the yield increase is estimated to be 6.0%, and irrigation water saving is considered to be around 15.0%.

The results of the calculation of the gross production of crops with the specified structure on the observed area and its value, the amount saved as a result of the investment of the weather station, the additional crop and the economical use of water, as well as the calculations of the maintenance costs of the station and the additional income (income) expected from the investment of the weather station as a result are presented in the 4th and in the 5th tables.

From Table 4, it is clear that the value of agricultural products with the observed structure at the producer price was AMD 1116.6 million, including AMD 193.9 million for fruits, AMD 817.0 million for vegetables and fruits, and the value of the gross grain product was 8.6 million drams.

Table 4. Calculations of the gross output of crops and its value with the specified structure of 250 ha of agricultural land (for the yield and producer's price, the actual data of the Ministry of Agriculture of the RA for 2022 were taken as a basis)

Crops	Area, ha	Yield, centner/ha	Gross product, tons	Producer price of 1 kg of food	Gross product value, thousand. AMD
Perennial plantings	110.0				
including Fruit	65.0				193868.4
of which					
Apple	20.0	82	164.0	233.2	38244.8
Pear	12.0	76	91.2	431.6	39361.9
Apricot	33.0	102	336.6	345.4	116261.6
Grape	45.0	149.3	671.9	144.6	97149.5
Vegetable garden	120.0				816991.0
including Vegetables					
of which					
Tomato	55.0	349.9	1924.5	215.9	415488.8
Cucumber	30.0	252.5	757.5	337.5	255656.3
Eggplant	20.0	356.7	713.4	146.4	104441.8
Watermelon	15.0	302	453.0	91.4	41404.2
Cereal crops	20.0				8599.5
including Wheat	20.0	24.5	49.0	175.5	8599.5
Total	250.0				1116608.3

Now it is worthy to look at the results of the calculation of the amount saved as a result of the investment of the weather station, the additional harvest and the economical use of water in the case of the moderate version, as well as the calculations of the maintenance costs of the station and the additional income (income) expected from the investment of the weather station as a result. The calculations presented in Table 5 clearly indicate that according to expert estimates, the value of loss reduction as a result of moderate assessment and frostbite prevention was AMD 102.6 million. As a result of plant disease monitoring and effective struggle for plant protection, the harvest increase was calculated at AMD 199.7 million. As for the increase in the efficiency of irrigation, according to calculations, as a result of the measures for water security as a result of the irrigation system installation, the increase in the crop was calculated in terms of value: AMD 116.6 million. The value of the saved water was calculated by the tariff and amounted to AMD 4.9 million. We have also calculated additional costs for frost prevention measures, effective organization of plant protection, as well as irrigation improvement, which respectively amounted to: AMD 10.5; 23.7 and AMD 9.0 million. Thanks to the introduction of the weather station as a result of the calculations the additional income (revenue) was calculated at AMD 126.1 million drams. We have estimated the costs of maintenance of the weather station, labor force, maintenance and advice to business owners at AMD 4.8 million (around AMD 400.0 thousand each

month). Thus, the additional income from the investment of the weather station is calculated to be AMD 121.3 million.

Table 5. results of the calculation of the amount saved as a result of the investment of the weather station, the extra harvest and the economical use of water in the case of the moderate option in the specified area of 250 ha, and the calculations of the maintenance costs of the station and the additional income (income) expected from the investment of the weather station as a result

Crops	The value estimate of loss prevention as a result of frostbite prevention, thousand. AMD	As a result of plant disease monitoring, as a result of the effective plant protection control, the addition of crops, thous.AMD	Due to the monitoring of the irrigation system, as a result of the water supply, the increase in the crop, thousand AMD	Irrigation water savings, thousand m3	Saved water value, thous. AMD	Costs of prevention of frostbite per year, thous.. AMD	Ad. costs for the organ. of eff. prot. of plants, thousand. AMD	Irrigation improvement costs, thousand. AMD	Additional income (revenue), thousand AMD
Perennial plantings									
including Fruit	13570.8	23264.2	11632.1	66.3	729.3	2275	4875	1300	304143
of which									
Apple	2677.1	4589.4	2294.7	20.4	224.4	700	1500	400	5290.9
Pear	2755.3	4723.4	2361.7	12.2	134.6	420	900	240	6293.4
Apricot	8138.3	13951.4	6975.7	33.7	370.3	1155	2475	660	18830
Grape	6800.5	11657.9	5829.0	48.6	534.6	1575	3375	900	14043
Vegetable garden	57189.4	98038.9	49019.5	153.0	1683.0	3000	7200	3000	81352
including Vegetables									
of which									
Tomato	12464.7	33239.1	24929.3	70.1	771.4	1375	3300	1375	418001
Cucumber	7669.7	20452.5	15339.4	38.3	420.8	750	1800	750	25993
Eggplant	3133.3	8355.3	6266.5	25.5	280.5	500	1200	500	10069
Watermelon	1242.1	3312.3	2484.3	19.1	210.4	375	900	375	3489.8
Cereal crops	258.0	688.0	516.0	10.8	118.8	300	500	400	264.7
including Wheat	258.0	688.0	516.0	10.8	118.8	300	500	400	264.7
Total	102586.3	199696.3	116531.9	442.5	4867.5	10450	23650	9000	126074

The costs of acquiring and moving the weather station are 4,800.0 euros (2,211.9 thousand AMD at the exchange rate of 2022), that is, the investment costs of the weather station can be compensated many times over in one year. The latter testifies to the effectiveness of the implementation of weather stations. Such reimbursement of the costs of the weather station proves that the station can be used on smaller areas, for example, in the conditions of one large economy. Thus, an attempt was made to evaluate with concrete calculations a number of important directions of the state policy of increasing the competitiveness of agriculture, in particular, the introduction of the drip irrigation

system, the use of mechanisms for providing targeted subsidies for arable land cultivation, the introduction of the realized milk subsidy mechanism, the specific newest models of digital agricultural technologies, the DJI Agras T 50 agricultural drone. and the effectiveness of the implementation of the IMETOS 3.3 weather station, the application of which can significantly contribute to increasing the competitiveness of agriculture.

Conclusions As a result of the research, the following conclusions were made:

- As a result of the implementation of the drip irrigation system, the increase in net income according to the calculations was AMD 1.76 million, that is, there is an opportunity to fully compensate the costs of the implementation of the drip irrigation system in the first year of the system implementation. In this case, we criticized the yield increase at the lowest possible level - 20%. In other words, the implementation of the drip irrigation system is highly effective. Observations show that the introduction of a drip irrigation system in intensive horticulture provides the highest efficiency.

- The subsidization program for autumn wheat sowing areas will provide other results, in particular, the area of arable land used for the purpose will increase, in the case of the moderate version, by 10.2, and in the case of the medium version by 14.0 thousand. ha, which will be 4.8 and 6.6% of the total sown areas in 2022, respectively. The quality of the harvest and the competitiveness of the farmers will increase to a certain extent.

- The increase in the volume of milk production in the republic by 17.6% is caused by the increase in the level of commercialization of milk, that is, the increase in the level of commercialization contributes to the increase in competitiveness. The calculations made for the same observed period prove that the coefficient of pairwise correlation between the level of milk production and the price of the producer is 0.764. In fact, the connection here is average, close to the lower level of that range. As for the coefficient of determination, it is 0.5837 or 58.4%. In this case, it shows that the increase in the level of commercialization of milk in the republic by 58.4% is due to the price of the milk producer.

- One of the important steps to increase the competitiveness of milk can be the application of a subsidy mechanism for each kilogram of milk sold to produced and processing companies, with the aim of improving the quality indicators of milk, improving contractual relations in the field of sale and, most importantly, increasing the level of self-sufficiency of milk. The application of the subsidy mechanism for the sold milk is also considered justified by the fact that there is a significant difference between the average retail price of milk and the price of the producer.

- As a result of the implementation of the mentioned mechanism, the following results are ensured. In the farms included in the program aimed at applying that mechanism, the level of commercialization of milk will increase by 13.5 percentage

points, the physical volume of commercial milk will increase by 16.8 thousand. in tons. The value of the expected product at subsidized prices was calculated at AMD 24,883.3 million, which is AMD 9,091.3 million higher than the income (income) received in case of non-implementation of the project.

One of the most important results of the project will be the development of contractual relations with milk producers and processors, the fulfillment of bilateral contractual obligations will contribute to the increase of quality indicators of milk. As a result of the implementation of the project, the increase in income will provide an opportunity to improve the quality of production organization and increase production volumes. The most important result will be an increase in the level of food security.

In case of spraying of agricultural crops with DJI Agras T 50 drones (taking into account their great comparative advantages), in addition to productivity, quality of spraying, great economy is ensured due to the saving of pesticides, for example, when spraying cereal crops, the consumption of working liquid is about 400 liters/ha, and for vegetable crops 600 liters/ha. In this case, the cost of temporary pesticides can be 50-60 thousand on average. AMD, in the case of a drone, taking into account the multiple of the cost norm, which is 10 times less, 45-54 thousand AMD is saved. AMD In the case of spraying with a drone, compared to traditional spraying, the cost of acquiring a drone can be compensated after about 130 ha of spraying (7842.0/60.2). Spraying the specified area with the considered drone is practically possible in 3 working shifts.

As a result of the investment of the IMETOS 3.3 weather station (taking into account their great comparative advantages), the additional income will amount to 121.3 million drams. the cost of acquiring and moving the weather station is 4,800.0 euros (2,211.9 thousand AMD at the exchange rate of 2022), that is, the investment costs of the weather station can be compensated several times within a year. The latter testifies to the effectiveness of the implementation of weather stations. Such reimbursement of the costs of the weather station proves that the station can be used on smaller areas, for example, in the conditions of one large economy.

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Ashot VOSKANYAN, Lusine TSPNETSYAN

Efficiency assessment for the main directions of proposed state policy to increase the competitiveness of agriculture in the Republic of Armenia

Key words: agriculture, competitiveness, efficiency, productivity, indicators, acreage, yield, milk commodity, subsidy, costs, producer price, drones, weather stations.

The implementation of an effective state policy of increasing the competitiveness of agriculture of the Republic of Armenia requires not only clarifying the directions of this policy, but also evaluating the effectiveness of their implementation. In this context, a number of the most important directions of the state policy of increasing the competitiveness of RA agriculture, presented in the article with specific calculations, are highlighted, in particular, the introduction of the drip irrigation system, the use of mechanisms for providing targeted subsidies for arable land cultivation, the realized milk subsidy mechanism, the newest models of digital agricultural technologies, DJI Agras T 50 agricultural evaluation of the effectiveness of the implementation of the drone and the IMETOS 3.3 weather station (taking into account their comparative advantages over others), the use of which can significantly contribute to the increase of the competitiveness of the mentioned sector.