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ANALYSIS OF THE SUNFLOWER PRODUCTION DYNAMICS IN THE REPUBLIC OF MOLDOVA BASED ON ECONOMETRIC MODELS

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Abstract

In accordance with the modern conditions, characterized by an increased complexity of socio-economic phenomena and processes, to which the restricted resources are available, the economic and social forecasts become pertinent remedies for determining the objectives of agricultural sector development. Thereby, this research is dictated by the fact that a qualitative change in the concept of regional agricultural potential is currently taking place not only for regional and national markets but also for the global market.

Sunflower is one of the main crops of oleaginous origin in the Republic of Moldova, cultivated in the northern, central and southern regions of the country. Being one of the traditional indigenous products, it is widely used in the food and industrial sectors, which helps to solve many issues of economic value. Furthermore, sunflower is characterized by a significant evolution in recent years and the world market shows a significant increase in the global crops and areas sown with it. For this reason, this article analyzes the dynamics of the sunflower production in the Republic of Moldova and forecasts are made on the projected volume of sunflower production by 2022, in order to determine the export potential of this product and to ensure the local market.

Keywords*: sunflower, analysis and harvest prognosis, export*

1. Introduction

Sunflower seeds are one of the important products for various fields, both for the food sector (production of sunflower oil, bakery products, confectionery, direct consumption, etc.) and for other spheres of human consumption (cosmetics, medicine etc.). Cultivation of sunflower has spread across continents, being brought by the Spaniards to Europe during the exploration of America.

Currently, Europe is one of the most important producers of sunflower seeds. However, market demand exceeds production, which provides suppliers in other regions with ample opportunities to penetrate the single market. This product has become a major commercial culture.

Sunflower has become a particularly important product in the Republic of Moldova. In Moldovan exports, sunflower seeds rank second in the list of exported products, their share being 8-9% in recent years.

According to recent studies, in 2017, the total volume of sunflower seed imports to Europe amounted to 3,4 million tonnes (1,4 billion euros). Since 2013, the volume of import of this

product has increased by an average of 0,7% per year, but in value expression, it has decreased by 1,8%.

At the same time, the same study finds that the import of sunflower seeds from developing countries to EU countries is increasing. The share of European imports from these countries increased by 20% annually in the period 2013-2017. The most impressive growth in the imports of this product was recorded in the period between 2015-2016, from 8,5% to 21% respectively. In 2017, the import of sunflower seedsfrom the developing countries to the European market amounted to 453 million tonnes, being in decline compared with 2016 (682 million tonnes).

However, in 2017 the Republic of Moldova was the largest supplier of sunflower seeds to the developing countries, which accountedfor 10% of the total European imports or 330 thousand tonnes [5].

At the same time, the increasing demand from Moldovan enterprises engaged in the oil sector continues to stimulate the growth of sunflower. The sector of oleaginous crops includes some 122 enterprises (vegetable and animal oils and fats), which annually process about 205,7 thousand tons of sunflower and produce about 90 thousand tons of vegetable oil, which justifies the rationality of research in this area.

Thus, taking into account those mentioned above, and given the fact that sunflower is a strategic product in Moldova's exports, this paper has focused on the development of a detailed analysis of agricultural activities aimed at harvesting this crop by describing the following indicators: share of the areas planted with sunflower, volume of sunflower production, average harvest, determination of its dependence on climatic conditions characterized by average air temperature and the amount of rainfall. The authors have proposed a number of indicators characterizing the efficiency of seeds sowing and increasing the volume of sunflower production in the Republic of Moldova [5].

2. The degree of current investigation of the problem, the purpose of research

Analysis of the dynamics and growth of export of Moldovan agro-industrial products is complex and diverse, and involves the solution of a number of economic and organizational issues, especially at the regional level. This issue has been the focus of attention of some local economics scholars in the field of agriculture and international economic relations, such as Ciochină S., Coretchi B., Stratan A. et al. At the same time, with account of all the varieties of studies on Moldovan trade in agri-food products, little attention is paid to the analysis of the planting potential, harvesting and processing of the sunflower seeds production.

Thus, the purpose of the research was to analyze the dynamics of agricultural activities in the Republic of Moldova focused on the sunflower cropsowing and harvesting and forecasting the volume of sunflower production in the subsequent years, in order to determine Moldova's export opportunities for sunflower seeds.

3. Methods and materials applied

The realization of this article started from a series of direct and indirect documentation on the knowledge of the reality regarding the cultivation and harvesting of sunflower seeds, using for this

purpose a variety of classical research methods such as: observation, analysis (quantitative, exploratory), synthesis, induction and deduction, respectively the use of graphical methods, figures and tables in the full and complex exposure and reproduction of the studied phenomena and processes.

Comparative research on the dynamics of the sunflower production in the Republic of Moldova included a comprehensive, fairly detailed, documentation from sources of information such as: various analytical materials and EUROSTAT databases; data bank of the National Bureau of Statistics (NBS), as well as statistical data by areas taken from various NBS sources; information resources of the Food and Agriculture Organization of the United Nations. The collected information has been subjected to appropriate analyzes, which allowed the development of econometric forecasting methods.

4. Results and discussions

According to an analysis of the sunflower market, this is one of the most important agricultural crops in the Republic of Moldova [8]. Thus, in 2018, the sunflower plantedareas accounted for about 23,58% of the total areasown, and the dynamics of the share of sunflower sown areas, for a sufficiently long period (1980-2018), recorded fluctuations of different intensity approaching the exponential analytical form (Figure1).

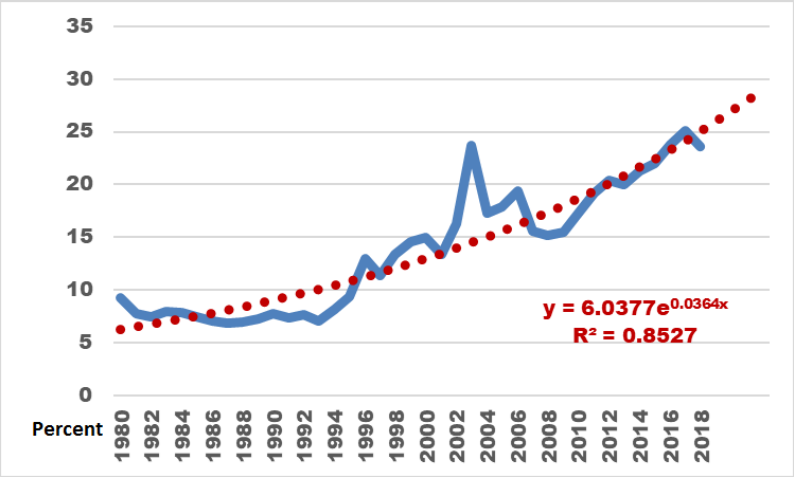

Figure 1. The share of the sunflower sown areas in the Republic of Moldova for 1980-2018 (%)

Source: based on statistical data [1]

Consequently, without any further implications, relying solely on inertial aspects, *the potential for planting sunflower has some reservations that by 2022 it could exceed ¼ of the total agricultural areasown.*

During the reference period (1980-2018), which seeks to identify a long-term tendency of the sunflower harvest, the physical volume of the production recorded a more pronounced variation than the variation of the areas for this crop, showing a moderately favorable trend (growth), and the overall dynamics can be characterized by a linear function, with an annual average absolute increase of about 7,35 thousand tons, and an average annual rate of about 2,74% (Table1, Figure 2).

Although the dynamics of sunflower production is rather uneven, of the several trend models analyzed, the most plausible trend model, characterized by the most favorable creditworthiness parameters, proved to be the linear one. Thus, the legality of the long-term evolution of agricultural production is identified by the linear trend of about 50% (R^2=0,499), with a sufficiently high significance for the parameter estimators ($\hat{b}_0$ and $\hat{b}_1$ – the area in the table hatched in yellow) and a quite significant quality of the model (blue hatched area), evaluated based on the Fisher test.

Table1. The results of the sunflower production volume adjustment (linear model)

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.706675							
R Square	0.499389							
Adjusted R Square	0.485859							
Standard Error	116.2303							
Observations	39							
ANOVA								
	df	**SS**	**MS**	**F**	**Significance F**			
Regression	1	498630.8	498630.8	36.90971	4.96E-07			
Residual	37	499850.6	13509.48					
Total	38	998481.4						
	Coefficients	**Standard Error**	**t Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 99.0%**	**Upper 99.0%**
Intercept	117.475	37.95104	3.095436	0.003735	40.57892	194.3711	14.42244	220.5276
X Variable 1	10.04676	1.653696	6.075336	4.96E-07	6.696054	13.39747	5.556299	14.53722

Source: calculations based on statistical data [1]

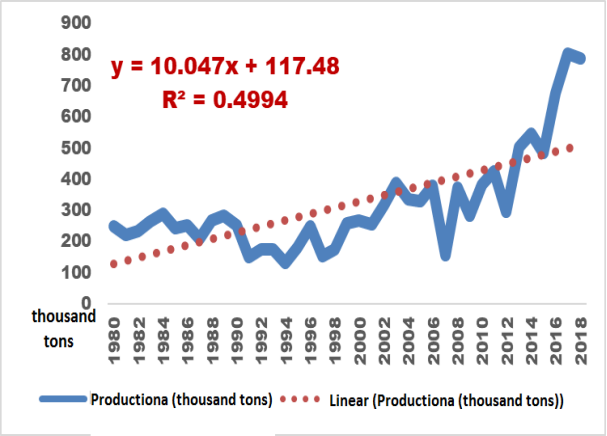

Figure 2a. The volume of sunflower production in the Republic of Moldova in 1980-2018

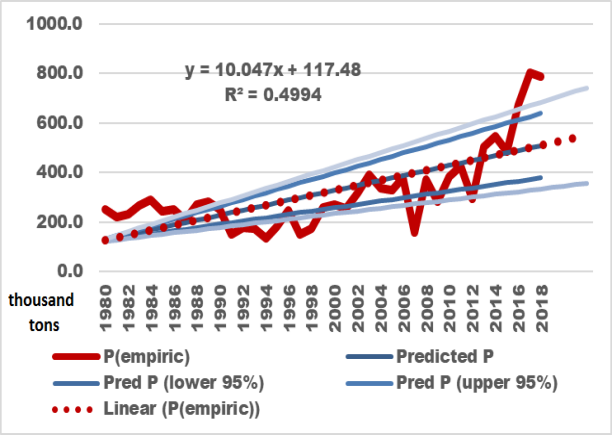

Figure 2b. The projected volume of sunflower production in the Republic of Moldova until 2022

Source: based on statistical data [2]

From the model test results, it is possible to deduce the estimative trajectories of the specified model:

$$\hat{P} = \hat{b}_0 + \hat{b}_1 \cdot t = 117.475 + 10.047 \cdot t \quad (1)$$

where:

$\hat{P}$ – adjusted/theoretical values of sunflower production;

$\hat{b}_0$ *and* $\hat{b}_1$ – the estimators of the trend model parameters, where $\hat{b}_0$ is the value (cost) of the production in the initial phase of analysis, and $\hat{b}_1$ is the average annual modification in the sunflower production over the analyzed period;

t – the time variable, according to which the sunflower production was adjusted.

A decrease of the retrospective analysis period, until the year 2008, in order to astonish the harvest technological conditions to the current period, significantly changes the trend model, and by extension the predictive values of sunflower production. Therefore, the trend model for the 11-year period (2008-2018) will have the following analytical form:

$$\hat{P} = \hat{b}_0 + \hat{b}_1 \cdot t = 210.75 + 49.25 \cdot t \quad (2).$$

The forecasted values based on this model will move to another qualitative level, that for the horizon 2022, a volume of about 949.56 thousand tons of sunflower is expected, and the confidence limits for a probability of 95% will fall between 671,60 and 1227.53 thousand tons of sunflower (Figure 2c).

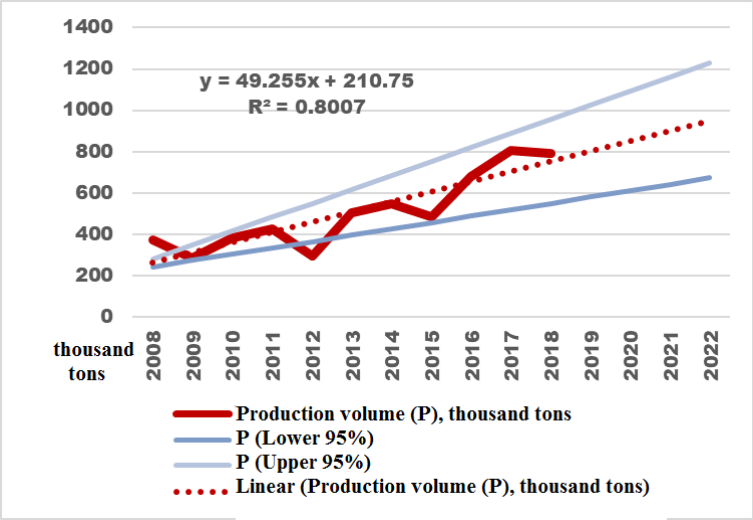

Figure 2c. Harvested volume of sunflower production in the Republic of Moldova (2008-2018), and the forecast until 2022

Source: authors' calculations based on statistical data [2]

Therefore, under the conditions described, it is likely that the trend of growth in the volume of sunflower production will increase in the future due to an increase in the intensity of sunflower production.

An indicator designed to combine the two previously treated elements (area and production) and to highlight the intensity of sunflower production, from the point of view of the area, will be the productivity indicator - the average harvest of sunflower per hectare. Naturally, the increase in the average harvest will be achieved in the event of an increase in the production under conditions of area reduction, or under conditions when an increase in the production will outweigh the expansion of the areas sown with sunflower. In the reference period (1980-2018), with a relatively

stable evolution of sunflower sown areas [7] and uneven development of production, the average sunflower harvest per hectare has evolved close to a second order polynomial, from higher values in the first phase of the analyzed period andfrom lower values in the intermediate phase to high values in the last phase, close to the presentperiod (Figure 3).

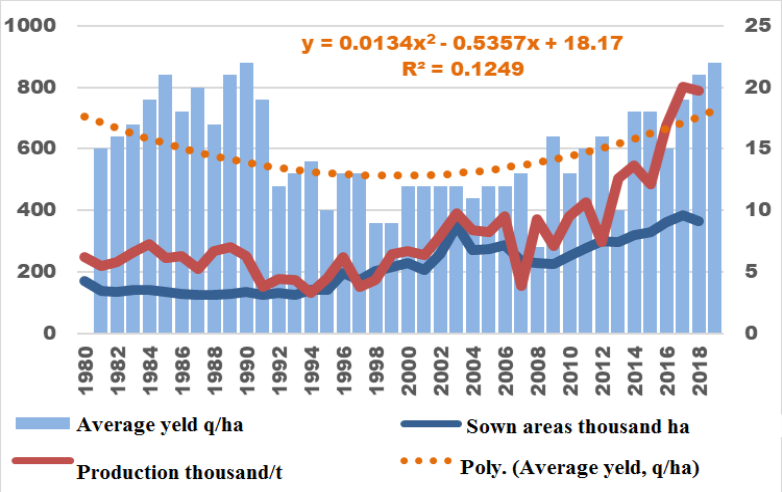

Figure 3. The sunflower sown area, average production and harvest from 1980 to 2018

Source: based on statistical data [2]

Depending on the average sunflower harvest values, characteristic for each phase of the period, three specific phases can be distinguished, each of which being characterized by different environments, which actually reflect the different conditions of the sunflower crop productivity (Figure 4a). Therefore, we are currently in a period of productivity growth, and this could advance to higher levels if there have been such situations in the past.

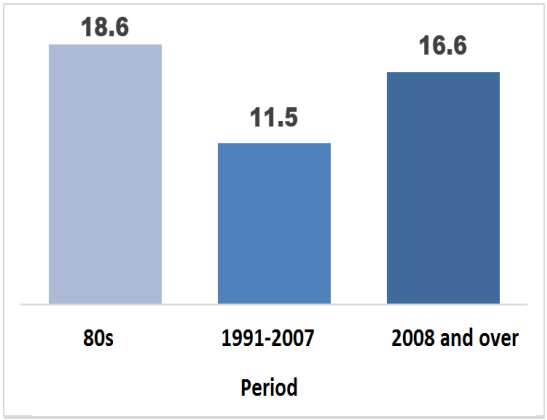

Figure 4a. Specific periods by average sunflower harvest in 1980-2018, quintals per hectare

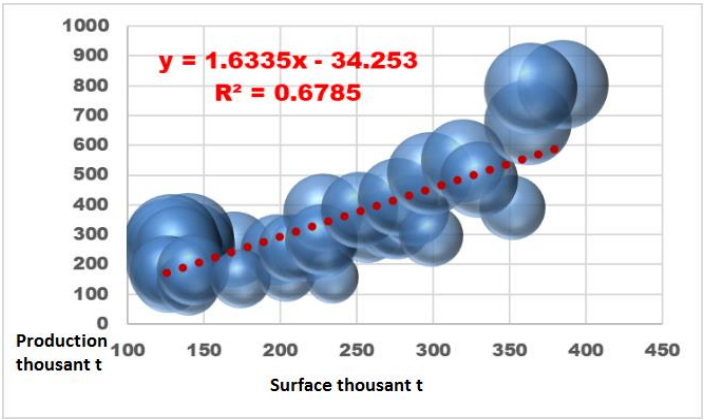

Figure 4b. The sunflower sown area, average production and harvest, from 1980 to 2018

Source: based on statistical data[2]

The placement of the three variables in the coordinate space through the correlogram, in which the average crop harvest is represented by the size of the bubbles (Figure 4b), indicates the existence of a moderate interdependence between the variables, although in the coordinate space there is some concentration of the bubbles in the area of small surfaces and large production. Otherwise,

with the growth of sunflower planted areas, the volume of the production also increases, in conditions of a relatively constant average harvest. Being aware of the fact that the average harvest is a function of area and production, we will try using the regression model to characterize the extent to which the average harvest depends on the two determinant variables. The results of specifying the regression model are shown in Table 2.

Table 2. Dependence between the average sunflower harvest (dependent variable), area and volume of production (linear model)

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	**0.94223**							
R Square	**0.887798**							
Adjusted R Square	**0.881564**							
Standard Error	**1.370879**							
Observations	**39**							
ANOVA								
	df	***SS***	***MS***	***F***	***Significance F***			
Regression	**2**	**535.3193**	**267.6596**	**142.4246**	**7.94E-18**			
Residual	**36**	**67.65509**	**1.879308**					
Total	**38**	**602.9744**						
	Coefficients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 99.0%***	***Upper 99.0%***
Intercept	**16.70834**	**0.632495**	**26.41656**	**3.66E-25**	**15.42558**	**17.9911**	**14.98828**	**18.4284**
S	**-0.06823**	**0.004798**	**-14.2188**	**2.42E-16**	**-0.07796**	**-0.05849**	**-0.08127**	**-0.05518**
P	**0.040815**	**0.00242**	**16.86778**	**1.13E-18**	**0.035907**	**0.045722**	**0.034234**	**0.047395**

Source: authors' calculations

Thus, approximately 88,8% of the average sunflower harvest variation is determined by the variation of the area and total harvest, while the overall significance of the model and the specific significance of the estimators being sufficiently large. The model which describes the dependency between the correlated variables, has the folowing form:

$$\hat{R}m = \hat{b}_0 + \hat{b}_1 S + \hat{b}_2 P = 16{,}708 - 0{,}068 \cdot S + 0{,}041 \cdot P \qquad (3)$$

where:

$\hat{R}m$ - adjusted values of the average sunflower harvest as a function of factorial variables related to the sunflower planted area and total sunflower production;

$\hat{b}_0, \hat{b}_1, \hat{b}_2$ - the estimators of the parameters of multifactorial linear model;

S - sunflower planted area;

P - total sunflower production.

According to the estimated model, *the average sunflower harvest determined by factors other than the sown area and the total sunflower production is at about 16,7 quintals per hectare*, and the increase in the area planted with sunflower leads to a reduction of the average crop harvest by about 0,07 quintals per hectare, while the modification of the total sunflower production by one thousand tons will cause an average crop harvest increase per hectare by about 0,04 quintals.

Table 3. The sunflower sown area, production and average harvest in 2008-2018 and forecast for 2019-2022

Years	Area (S), thous. ha	Production vol. (P), thous. tons	Av. harvest (R_M), q/ha	R_M (Lower 95%)	R_M (Upper 95%)
2008	228	372	16	11.01	21.66
2009	227	284	13	7.93	17.70
2010	252	382	15	9.50	20.72
2011	277	427	16	9.16	21.31
2012	299	296	10	2.74	14.03
2013	298	505	18	10.33	23.65
2014	320	548	18	10.16	24.33
2015	330	485	15	7.11	20.86
2016	362	677	19	11.51	27.77
2017	385	804	21	14.28	32.23
2018	364	789	22	15.38	32.77
FORECAST					
2019	400.31	801.80	22.12	13.01	31.24
2020	416.39	851.05	23.04	14.81	32.55
2021	432.47	900.31	23.95	15.32	33.86
2022	448.55	949.56	24.86	15.84	35.17
Average for 2019-2022	**424.43**	**875.68**	**23.49**	**14.74**	**33.20**

Source: calculated based on statistical data [2]

If one takes into account the long-term trend for the period for which the presented model (1980-2018) was specified, an extrapolation of the factors' (S and P) dynamics, for the period 2019-2022, shows for 2019 *a higher level of the average sunflower harvest compared to 2018 (about 22,12 q/ha) and a growing trend of this indicator until 2022*. The confidence interval for the predicted values, with a probability of about 95%, shows values of the average harvest in the range of -41,2% and +41,4, that, in the most favorable conditions, there is a chance that sunflower productivity will be about 35,17 q/ha, and, in the worst case, the productivity of the sunflower crop could fall to an average of 13,1 q/*ha.*

Quite suggestive, the dynamics of the average sunflower harvest for the 2008-2018 timeframe and the forecast values for the 2019-2022 period are shown in Figure 5.

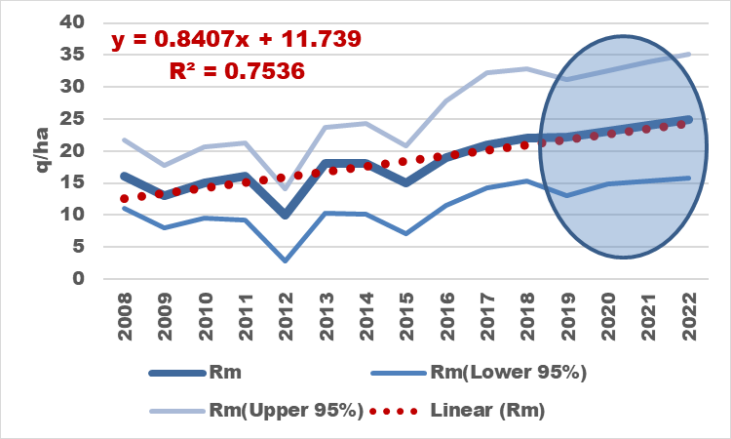

Figure 5. The average sunflower harvest in 2008-2018 and the forecast for 2019-2022

Source: calculated based on statistical data [2]

Although the relationship between the productivity of the sunflower crop is almost functional, given by the multiple correlation coefficient R=0,94, we will try to identify other factors that could influence the volume of sunflower production and indirectly its productivity. The consistent variation in the *sunflower production* leads us to the idea of *its dependence on climatic conditions*, characterized by the average air temperature (C) and the amount of precipitation (W). Data on annual meteorological conditions, characterized by the variables mentioned, are available on the NBS website since 2008 and are quite accidental from year to year (Figure 6).

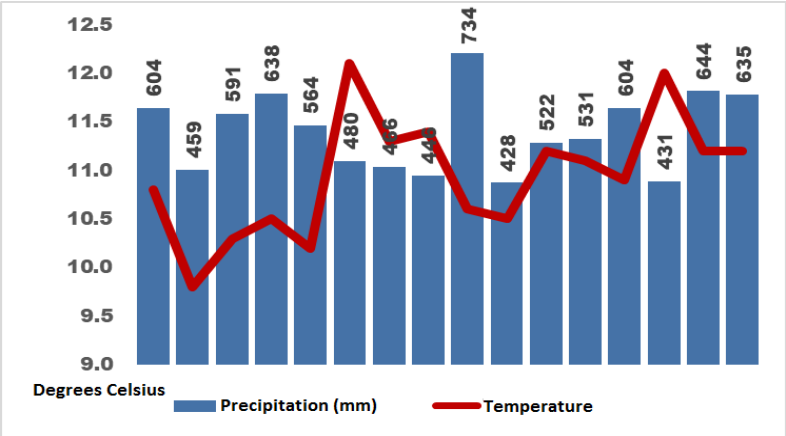

Figure 6. Average annual meteorological conditions in the Republic of Moldova, 2002-2017

Source: calculated based on statistical data [2]

Attempts to specify a model to characterize the dependence between the average productivity of the sunflower crops did not succeed. The results of multifactorial linear model estimation, of the average sunflower harvest dependence on the weather factors (annual averages), are the model quality indicators below the limit of some criticism according to Table 4.

Table 4. Dependence between the average sunflower crop (dependent variable), annual average temperature and annual average amount of precipitation (linear, multifactorial model)

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	**0.311704**							
R Square	**0.097159**							
Adjusted R Square	**-0.04174**							
Standard Error	**3.754758**							
Observations	**16**							
ANOVA								
	df	***SS***	***MS***	***F***	***Signifi-cance F***			
Regression	**2**	**19.7233**	**9.861651**	**0.699497**	**0.514604**			
Residual	**13**	**183.2767**	**14.09821**					
Total	**15**	**203**						
	Coeffici-ents	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 99.0%***	***Upper 99.0%***
Intercept	**-0.77341**	**20.28424**	**-0.03813**	**0.970164**	**-44.5948**	**43.04802**	**-61.8751**	**60.32831**
X Variable 1	**0.724849**	**1.62075**	**0.44723**	**0.662069**	**-2.77657**	**4.226267**	**-4.1573**	**5.606996**
X Variable 2	**0.012926**	**0.010989**	**1.176251**	**0.260585**	**-0.01081**	**0.036667**	**-0.02018**	**0.046029**

Source: authors' calculations

Thus, neither the multiple correlation indicators (R=0,31) nor the Fisher test, which characterize the general significance of the model (F=0,699), as well as the statistics (t-statistics) of the model parameters estimators do not meet the criteria for adopting a regression model. *In these circumstances, it may be appropriate to approach the specific weather conditions of the sunflower harvesting period or those prior to sowing.*

A separate challenge regarding the analysis of the sunflower production in the Republic of Moldova will be its territorial approach.Thus, the analysis of data on the regional distribution of sunflower productivity (weighted average productivity for the 2007-2018 period) and total sunflower production (total sunflower production for 2007-2018) shows the prevalence of these indicators in the Northern region (18,6 q/ha and 21,7 million tonnes respectively), followed by the Southern Region (16,7 q/ha and 12,6 million tones). The Center region was ahead of other two stronger regions in terms of the volume of production and less in the average sunflower productivity (Figure 7). The detailed situation of the labor productivity dynamics can be seen in Figure 8, which shows the dominant situation in the Northern region, exclusively during the 12-year period (2007-2018), and the Center was overtaken by the Southern region, especially in the second half of the analyzed period. The upward dynamics of the Southern region, which in some periods outpaced the productivity of the Northern region, is also shown in Chart 7.

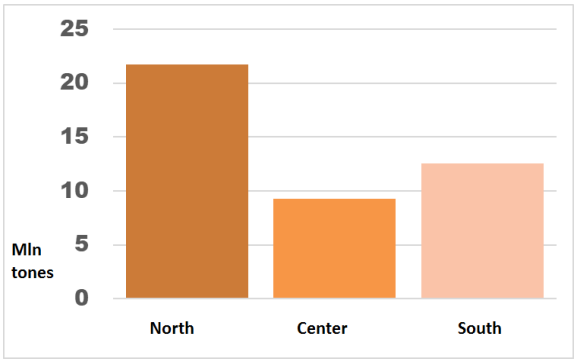

Figure 7. Total volume of sunflower production in 2007-2018 (mil tons)

Source: authors' calculations, statistical database

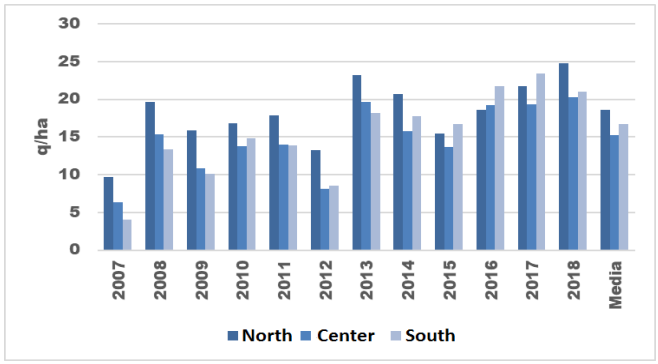

Figure 8. Average sunflower productivity in 2007-2018 (q/ha)

Source: NBS data bank

The situations described above can also be seen in the more detailed analysis of the territorial distribution of sunflower production. Thus, the downward distribution of the average sunflower harvest by districts (from North to South), for two consecutive years (2017 and 2018), shows some productivity distortions in the districts listed in descending order from the geographical point of view (Figure 9) [1].

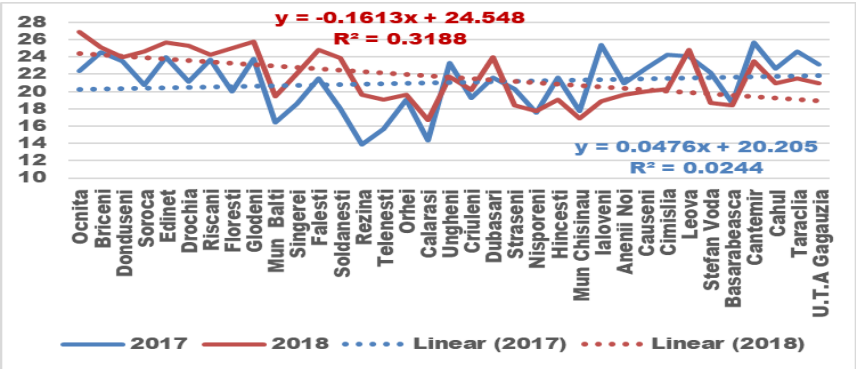

Figure 9. Average sunflower harvest in territorial profile 2017, 2018

Source: calculated based on statistical data [2]

As seen from the chart, the year 2017 is characterized by an upward trend (from North to South), with some crashes (accidents) specific for the districts of the Center, whereas in 2018 the average sunflower harvest recorded a general decline from North to South, with safer regularity and stronger dynamics than in 2017.

Although we may judge about the manifestation of arbitrary (non-logical) interdependence between the two-year data, distributed into a territorial profile, we will try to test the dependence between the data for two consecutive years. To this end, to confirm the hypothesis about the growing/decreasing dynamics of the average sunflower harvest (yield) from North to South, we will try to verify whether the data typical for two years are similar. A regression model was developed for this operation, which evaluated the interdependence between 2018 and 2017 data.

Table 5. Average sunflower harvest in territorial profile in 2017 and 2018 (linear, unifactorial model)

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	**0.493565**							
R Square	**0.243606**							
Adjusted R Square	**0.223163**							
Standard Error	**2.49173**							
Observations	**39**							
ANOVA								
	df	***SS***	***MS***	***F***	***Signifi-cance F***			
Regression	**1**	**73.98507**	**73.98507**	**11.91632**	**0.001408**			
Residual	**37**	**229.7226**	**6.20872**					
Total	**38**	**303.7077**						
	Coeffi-cients	***Standard Error***	***t Stat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 99.0%***	***Upper 99.0%***
Intercept	**11.86905**	**2.873505**	**4.130514**	**0.000198**	**6.046779**	**17.69133**	**4.066313**	**19.67179**
X Variable 1	**0.465274**	**0.134784**	**3.452002**	**0.001408**	**0.192176**	**0.738373**	**0.099281**	**0.831268**

Source: Author's calculations

The specification of the model shown in Table 5 presents a moderate intensity dependence on the average sunflower harvest data for two reference years with a multiple correlation coefficient R=0.494 and an acceptable Fisher test (F=21,5), with a significance of α=0,001. Under these circumstances, it can be concluded that the average sunflower harvestis relatively similarover two consecutive years. This generally increases with the movement from North to South, or as sunflower plantations are placed further South, the more favorable are the conditions for their maintenance and harvesting.

5. Conclusions

From the forecast, the following findings can be made: in 2018, the areas planted with sunflower accounted for about 23,6% of the total sown area, and the dynamics of the share of the sunflower planted areas, for a rather long period (1980-2018), recorded fluctuations and approached an

exponential one. Based on some prediction aspects, we find that the sunflower planting potential still has reservations so it can exceed ¼ of the totally sown agricultural area by 2022.

Thus, on the basis of the specified model, by 2022 the volume of sunflower production is expected to be about 949.56 thousand tons, and,with a probability of about 95%, it can be estimated that the productivity of the sunflower per hectare will fall within the limits of 14.7 and 33.2 quintals per hectare.

That is why, it is important for the enterprises in the given field to review their strategies in the management of international economic relations for the purpose of increasing their efficiency, in order to maintain or even increase the export potential of the sunflower production.

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Rezumat

În condițiile moderne, caracterizate de o complexitate sporită a fenomenelor și proceselor social-economice, la care se alătură și disponibilitățile restricționate ale resurselor, prognozele economice și sociale devin remedii pertinente pentru determinarea obiectivelor de dezvoltare a sectorului agricol. Astfel, prezenta cercetare este dictată de faptul că, în prezent, s-a produs o schimbare calitativă a conceptului de capacități agricole regionale care funcționează nu doar pentru piețele regionale și naționale, dar și pentru piața mondială.

Floarea–soarelui este una din principalele culturi de origine oleaginoasă din Republica Moldova care se cultivă în regiunile de nord, centru și sud a țării. Fiind unul din produsele tradiționale autohtone aceasta este utilizată pe larg în sectorul alimentar și industrial, contribuind la soluționarea mai multor probleme de valoare economică. Totodată, cultura de floarea-soarelui se caracterizează printr-o evoluție semnificativă în ultimii ani, iar piața de desfacere la nivel mondial denotă o creștere considerabilă a recoltei globale și a suprafețelor însămânțate cu aceasta. Din acest motiv în prezentul articol se analizează dinamica producției de floarea soarelui în Republica Moldova și sunt efectuate prognoze privind volumul proiectat al producției de floarea-soarelui până în anul 2022, pentru a determina potențialul de export al acestui produs și de asigurare a pieței locale.

***Cuvinte-cheie**: floarea soarelui, analiză şi prognoză a recoltei, export*

Аннотация

В современных условиях, характеризующихся повышенной сложностью социально-экономических явлений и процессов, для которых доступны ограниченные ресурсы, экономические и социальные прогнозы становятся подходящими средствами для определения целей развития сельскохозяйственного сектора. Таким образом, это исследование продиктовано тем фактом, что в настоящее время произошли качественные изменения в концепции регионального сельскохозяйственного потенциала не только для региональных и национальных рынков, но и для глобального рынка.

Подсолнух является одной из основных культур масличного происхождения в Республике Молдова, возделываемый в северных, центральных и южных регионах страны. Являясь одним из традиционных местных продуктов, он широко используется в пищевой и промышленной отрасли, помогая решить многие вопросы экономической ценности. В то же время, культура подсолнуха характеризуется значительным развитием в последние годы, и мировой рынок показывает значительное увеличение глобального урожая и посевных площадей. По этой причине в данной статье анализируется динамика производства подсолнуха в Республике Молдова и делаются прогнозы относительно прогнозируемого объема производства подсолнуха к 2022 году с целью определения экспортного потенциала этого продукта и обеспечения местного рынка.

***Ключевые слова**: подсолнух, анализ и прогноз урожая, экспорт*

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