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METHODS OF QUANTITATIVE ASSESSMENT OF PRODUCTION RISKS IN FARMS

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ABSTRACT

In agricultural production, there is practically no way to completely get rid of risks. Risk, as an objective factor, exists in almost any economic activity, including in the activities of farms. Economic losses resulting from a number of risks can be mitigated or reduced through effective risk management. The effectiveness of the organization of the agricultural production process depends on the type, degree of impact and other specifics of the risks involved. Without taking into account the impact of risks, it is impossible to establish an effective system of agricultural production. This article discusses the issues of risk management in the activities of farms and their quantitative assessment. The author described and quantified the risks of production (yield) in farms. In particular, the correlation between regions in terms of wheat yield was studied. The author analyzed the regression equation of factors affecting productivity. In our study, the coefficients of variation of wheat yield indicators in Uzbekistan were calculated and grouped. Risks in the activities of farms were calculated using standard deviation coefficients. The author has developed proposals to minimize the impact of risks on farms.

Key words: agriculture, farming, risk, risk management, production risk, market risk, correlation, regression, variation, standard deviation, production, yield.

I. INTRODUCTION

Modern production in agriculture is an activity directly related to risk. The process of agricultural production proceeds under the influence of various types of risk. That is why States have been making efforts to eliminate and mitigate risks, and thereby helping farmers to effectively cope with risk for many decades in almost all developed countries of the world. Modern production in agriculture is everywhere transferred to market mechanisms, when the farmer must not only produce, but also receive the corresponding profit in the course of his economic activity. That is, one of the important tasks in modern agriculture is the development of agricultural production in accordance with the requirements of market relations. According to the report of the Organization for Economic Cooperation and Development (OECD, 2009), the presence of various factors directly affecting crop yields and prices largely determine the efficiency of the industry.

Risk is an objective factor that exists in almost any type of economic activity. The risk is associated with the deviation of losses (or profits) from the planned indicators. The process of studying risk in the field of agriculture is particularly interesting. In agricultural production, there is practically no way to completely get rid of risks. Therefore, the development of risk management measures is the most important task in the activities of modern agriculture. A distinctive feature of risks in agriculture from risks in other areas is their uniqueness; that is, some risks are inherent only in agricultural production. Agricultural production is directly related to natural phenomena, soil, plants, animals, insects. In general, we can state that natural processes and market relations are reflected in the economic results of agricultural production.

Economic losses can be minimized through effective risk management. Among other things, in the process of risk management, it is necessary to take into account such important aspects as the country's food security, food safety and environmental protection. Risk management in agriculture will become an even more relevant topic in both scientific and political circles in the future.

It is important to note that the specialization of farms (and entire regions) in one or another area of agricultural production is a direct result of the impact of risks[1]. The effectiveness of the organization of agricultural production depends on the type, degree of impact and other specifics of the impacting risks.

II. LITERATURE REVIEW

Theoretical and methodological issues of risk assessment have been widely studied by well-known economists and scientists, such as J. M. Keynes, F. Knight, J. Schumpeter and others. J. M. Keynes (1948) in his writings paid attention to solving economic problems, credit and inflation risks in conditions of uncertainty. F. Knight (2003) investigated the relationship between risk, uncertainty and profit of an enterprise in conditions of perfect and imperfect competition. Austrian economist J. Schumpeter (1982) investigated the factors contributing to constant changes in the economic system, while paying special attention to the classification and grouping of risks based on the study of economic dynamics. N. Syropolis (1997) understood entrepreneurial risk as the probability of financial losses, dividing them into three categories: net risk, speculative risk and fundamental risk. B. Hardaker et al. (2015) investigated various (quantitative and qualitative) methods of complex analysis and risk management in agriculture. At the same time, the authors use the following classification in their scientific work:

1. Production risk is a risk arising from the unpredictable nature of climatic, technological conditions and uncertainty regarding the productivity of crops or livestock due to the presence of agricultural pests, diseases and other negative factors);
2. Market risk is the risk arising from changes in prices for finished products or resources used by the farmer after the start of the fulfillment of production obligations;
3. Financial risk is the risk arising from the use of a particular method of financing agricultural production (own funds, loans, etc.);
4. Institutional risk is a risk that arises as a result of changes in policy and legislation in the field of agriculture[2].
5. Personal (anthropogenic) risk is a risk arising as a result of significant changes in the professional or personal life of a farmer[3].

R. Anderson et al. (1977) made a significant contribution to the practical application of mathematical methods in decision-making in conditions of risk in agriculture. For example, the paper considered in detail the application of Bayes theory for various types of distributions of random variables.

The study of risk management problems in the CIS countries became relevant at the end of the twentieth century in the process of transition to market relations in agriculture. Methodological and practical aspects of qualitative and quantitative risk assessment are reflected in the works of V. P. Buyanov (2003), S. M. Vasin (2010), V. N. Vyatkin (2006), A. P. Algin (1991), I. T. Balabanov (1996), P. G. Grabovoi (2012), L. N. Tapman (2002) and other scientists engaged in research in the field of risk management.

Agricultural production is carried out (in most cases) in the open air, and it directly depends on the weather and climatic conditions of the region (temperature and relative humidity; maximum, minimum and average temperatures during the vegetative period of plants, the amount of precipitation, etc.). Moreover, the supply of agricultural products on the

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[1] For example, beekeeping, fish farming, gardening, sericulture, etc.

[2] This type of risk usually manifests itself due to changes in legislative acts or agricultural policy of the state, which leads to unforeseen production restrictions or changes in prices for the resources used by the farmer or the products produced. For example, changes in legislative acts concerning the use of pesticides, herbicides or veterinary products may affect the cost of production, and the decision of a foreign state to restrict the import of agricultural products may significantly collapse its price in the domestic market.

[3] Death, illness, divorce of farmer spouses, disagreements of partners, getting occupational diseases or injuries in the workplace, etc.

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market is inelastic, and, consequently, the volume of supply does not depend much on market prices in the short term.

Figure (1) shows the classification of risks in the activities of farms by their sources of origin (Fleisher, 1990; Hardaker, et al., 2015; Boehje, et al., 1977; Harwood, et al., 1999).

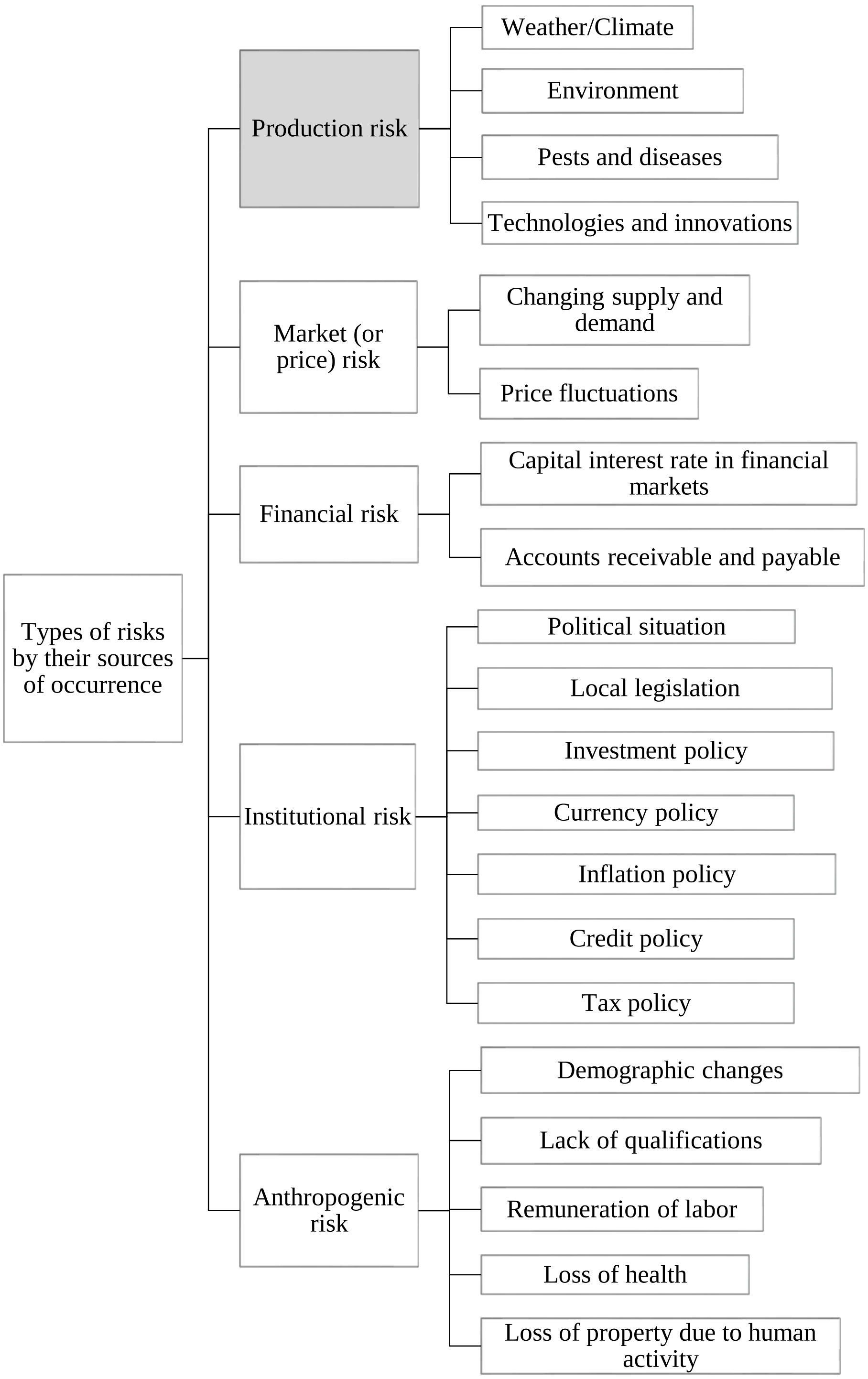

Figure (1): Classification of risks by source of origin

One of the most serious problems in the activities of farms is the production risk[4]. It is directly related to a decrease in crop yields. The main sources of production risk are: changes in weather and climate, the spread of pests and diseases, the development and introduction of

[4] In some scientific papers, the term "yield risk" is used.

new technologies, the efficiency of the operation of agricultural machinery and equipment, the quality of raw materials, etc. Usually, farmlands in one region are subject to the same factors of production risk; as a result, farms often suffer from loss or decrease in yields to the same extent in individual regions. For example, drought leads to a decrease in yields for almost all farmers.

In this article we will consider the production risk in farms on the example of the Namangan region of Uzbekistan.

III. METHODOLOGY & EMPIRICAL ANALYSIS

The methodology of the study is based on the results of research works of domestic and foreign scientists in the field of risk management in farms. In the course of the study, the coefficients of variation in the yield of wheat grown in the farms of the Namangan region of Uzbekistan were calculated and grouped. The methods of correlation, variation and grouping were used in the quantitative assessment of production risks.

The analysis of wheat yield indicators in farms of Namangan region for the period 2008-2018 showed the presence of a correlation between the regions of the region (Table (2)).

Table (2): Correlation of wheat yield indicators between regions of Namangan region[5]

	Name of the region	Mingbulak	Kasansay	Namangan	Narin	Pap	Turakurgan	Uychi	Uchkungan	Chartak	Chust
1.	Mingbulak	1									
2.	Kasansay	-0,368	1								
3.	Namangan	-0,362	0,794	1							
4.	Narin	0,702	-0,131	0,165	1						
5.	Pap	0,978	-0,333	-0,432	0,628	1					
6.	Turakurgan	0,846	-0,289	-0,310	0,502	0,853	1				
7.	Uychi	-0,662	0,730	0,802	-0,141	-0,705	-0,617	1			
8.	Uchkurgan	0,935	-0,433	-0,338	0,690	0,917	0,853	-0,742	1		
9.	Chartak	-0,360	0,809	0,925	-0,011	-0,445	-0,307	0,825	-0,428	1	
10.	Chust	-0,149	0,738	0,483	-0,358	-0,133	0,087	0,365	-0,226	0,678	1
11.	Yangikurgan	-0,221	0,395	0,835	0,349	-0,361	-0,248	0,671	-0,188	0,768	0,157

Differences and similarities in the natural and climatic conditions of the regions of the region, the soil layer, the reclamation state, the degree of water availability and other features of the regions cause both high and weak closeness of the correlation between the regions. The high degree of close correlation between yields by region indicates that agrotechnical characteristics, climatic conditions, soil fertility, the level of land reclamation and other important factors of production are very similar by region.

In order to quantify the natural factors affecting the yield, a regression analysis of the yield of winter wheat grown in Namangan region during 1997-2018 was carried out.

The author selected temperature indicators and precipitation indicators for the entire vegetative period (September-June), calculated the arithmetic averages of these indicators for each year for regression analysis (Table (3)).

Table (3): Winter wheat yield factors[6]

[5] Developed by the author.
[6] Developed by the author.

№	Years	Yield, kg/ha (farms of all categories), (Log)	Exogenous factors			
			Maximum temperature (arithmetic average), ⁰C	Minimum temperature (arithmetic average), ⁰C	Average temperature (arithmetic average), ⁰C	The amount of precipitation (logarithmic arithmetic. average), мм
1	1997	3,49	18,59	7,07	12,38	-1,21
2	1998	3,40	17,23	7,01	11,58	-0,44
3	1999	3,44	19,23	8,07	13,05	-0,60
4	2000	3,51	21,12	8,96	14,32	-0,31
5	2001	3,65	19,69	7,80	13,14	-0,46
6	2002	3,80	18,55	7,53	12,69	-0,26
7	2003	3,83	17,81	7,33	12,24	-0,04
8	2004	3,84	19,01	8,07	13,27	-0,46
9	2005	3,88	18,19	8,35	13,05	-0,36
10	2006	3,90	19,22	7,94	13,34	-0,65
11	2007	3,88	19,13	8,31	13,41	-0,48
12	2008	3,89	18,49	6,88	12,51	-1,07
13	2009	3,87	18,19	7,44	12,67	-0,42
14	2010	3,90	18,96	8,00	13,28	-0,10
15	2011	3,89	19,12	7,50	13,14	-1,31
16	2012	3,92	16,95	7,00	11,83	-0,24
17	2013	3,93	18,45	6,93	12,50	-0,54
18	2014	3,96	18,22	6,41	12,06	-0,76
19	2015	3,98	18,49	7,32	12,75	-0,37
20	2016	4,00	19,79	8,48	13,84	-0,23
21	2017	3,98	18,30	7,35	12,61	-0,07
22	2018	3,75	18,93	7,65	12,97	-0,47

The regression model of the wheat harvest looks like this:

$$Ln(y) = 2{,}69 - 0{,}47x_1 - 0{,}66x_2 + 1{,}17x_3 + 0{,}19lnx_4 \quad (1)$$

Here: y – wheat yield, c/ha; x_1 – maximum temperature, ⁰C; x_2 – minimum temperature, ⁰C; x_3 – average temperature, ⁰C; x_4 – amount of precipitation, mm. There is a non-linear relationship between the yield and the above exogenous variables. The author uses the logarithm of the variable yield (Table (5)). Fluctuations in precipitation were also reduced by logarithming this variable.

The R-square of the regression model is 0.906 (or 90.6%). More detailed information is given in Table (5).

Table (5): Regression analysis results[7]

Regression statistics		
Множественный R		0,952291325
Multiple R		0,906858768
Normalized R-square		0,884943184
Standard error		0,062523913
Observations		22
Analysis of variance		
	Degree of freedom	***Significance F***
Regression	4	0,000000015
Remains	17	
Total	21	
	Coefficients	***P-Value***

[7] Developed by the author.

Y-intersection	2,694893453	0,00000028
Maximum temperature	-0,466323332	0,00000001
Minimum temperature	-0,663626547	0,00000001
Average temperature	1,166096386	0,00000000
Precipitation amount	0,191299307	0,00109208

The results show that the yield of winter wheat is positively affected by the average air temperature and the amount of precipitation during the growing season[8].

Considering that the optimal temperature for the main breeding varieties of winter wheat (grown in Uzbekistan) is 25-30 degrees 0C, the positive effect of the average daily temperature on wheat yield is logically justified.

According to equation (4), the values of maximum temperatures negatively affect the yield of wheat (i.e., the higher the daily maximum temperature, the lower the yield). At the same time, the lower the daily minimum temperature, the higher the yield. The influence of natural factors on wheat yield is quite significant.

According to wheat yield indicators for the entire period under review, it can be seen that the yield level in the Yangikurgan region is lower than in other regions of the region (Table (6)). The yield in this region ranges from 26.4 - 52.9 c/ha. The highest yield was observed in 2012. A similar situation can be seen in the regions of Kasansay, Chust, Chartak, located in the north of Namangan region.

Table (6): Wheat yield in Namangan region (c/ha)[9]

T/p	Name of the region	Years										
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
1	Mingbulak	45,7	42,3	42,3	42,0	42,3	43,6	45,4	46,3	46,9	58,1	44,0
2	Kasansay	45,3	46,2	48,0	39,2	39,3	44,1	44,9	45,4	46,1	34,6	32,3
3	Namangan	57,3	62,3	62,5	62,6	63,2	63,1	64,3	64,9	66,6	51,9	45,1
4	Narin	58,0	66,0	65,8	66,2	67,2	66,0	69,2	72,3	73,6	79,0	62,6
5	Pap	42,3	38,3	39,4	34,9	35,6	37,3	40,9	41,4	42,0	59,3	39,9
6	Turakurgan	62,5	57,1	59,7	58,9	59,4	55,1	57,3	59,7	61,1	68,4	57,6
7	Uychi	50,3	53,8	57,3	54,5	54,5	54,8	58,1	60,3	61,5	36,7	47,7
8	Uchkungan	67,9	63,2	67,2	67,5	67,6	68,0	66,3	67,4	69,7	99,4	64,1
9	Chartak	51,1	47,4	47,4	49,5	49,6	51,4	53,2	54,5	55,7	37,0	33,9
10	Chust	52,9	40,1	42,5	39,0	38,9	40,1	41,4	42,0	42,5	35,5	31,0
11	Yungikurgan	32,1	35,3	38,1	43,5	52,9	45,2	47,3	48,2	49,2	33,4	26,4
12	Namangan t.	-	-	40,0	50,0	10,0	22,5	10,0	12,5	0,0	40,6	33,2
	By region	**49,5**	**47,6**	**49,3**	**47,9**	**48,9**	**49,3**	**51,2**	**52,3**	**53,3**	**53,5**	**42,7**

To determine the degree of production risk, wheat yield variation coefficients can be applied within a certain period (year) or territory.

The calculation of the coefficient of variation begins with the determination of the arithmetic average yield:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad (2)$$

Here: $\bar{x}$ – is the arithmetic mean of the yield in farms in one region; x_i – is the yield indicator of a single farm; n – is the number of farms in the sample.

The standard deviation of yield on farms can be calculated by the formula:

[8] The period from September to June.

[9] Developed by the author.

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})}{n}} \qquad (3)$$

This standard deviation (σ) shows the degree of fluctuation of yield from the average yield ($\bar{x}$). To determine the degree of risk, you can use the coefficient of variation (V_σ) according to the following formula (Shodiev, 2007):

$$V_\sigma = \frac{\sigma}{\bar{x}} \cdot 100\% \qquad (4)$$

Obviously, the coefficient of variation can vary in the range from 0 to 100% and depends inversely on the arithmetic mean ($\bar{x}$). The higher the V_σ coefficient, the higher the risk. The gradation of the coefficient V_σ is presented in the following table (Kulikova, 2008):

Table (10): Coefficient gradation V_σ

up to 10%	weak degree of fluctuation
from 10% to 25%	moderate degree of fluctuation
over 25%	high degree of fluctuation

In order to analyze the production risk in this work, wheat yield indicators for the period 2017-2019 were calculated. The results of calculations by region are shown in Figure (11).

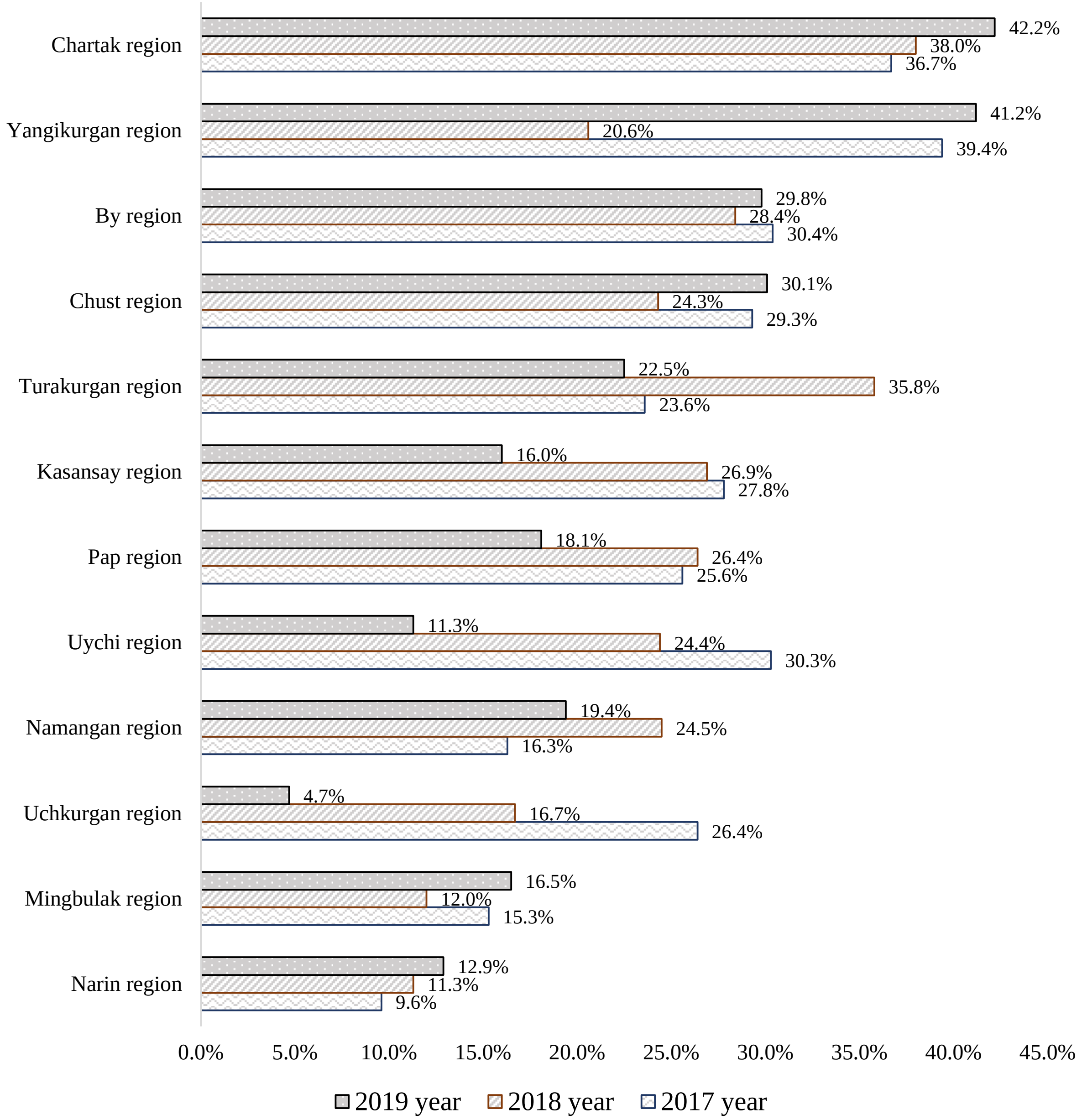

Figure (11). Wheat yield variation coefficients by regions of Namangan region.

The coefficients of variation in the Chartak and Yangikurgan regions turned out to be high. In particular, in the Chartak region, this figure in 2019 was 42.2%, in Yangikurgan - 41.2%. Wheat yield indicators in these regions indicate a significant deviation from the arithmetic mean ($\bar{x}$). Special natural and climatic conditions, geographical location, land reclamation condition, agrotechnical conditions and other factors cause a significant disparity of the coefficient V_σ in different regions

Table (12) was developed on the basis of grouping farms by wheat yield using data for 2019. So, 2.1% of all farmers in the Turakurgan region have achieved yields in the range from 0 to 10 kg/ha. In the Chartak, Chust and Yangikurgan regions, the yield indicators are scattered: farms show both high and low yields. In the Chartak region - 52%, the Chust region - 16.6% and the Yangikurgan region - 79.7% of the total number of farmers did not achieve yields above 40 kg/ha.

Table (12): Grouping of farms by yield (2019)[10]

Yield, c/ha	Name of regions											
	Uchkurgan	Kasansay	Mingbulak	Namangan	Narin	Pap	Turakurgan	Uychi	Chartak	Chust	Yangikurgan	**By region**
From 0 to 10	-	-	-	-	-	-	2,1	-	1,4	1,3	7,0	**1,6**
From 10.1 to 20	-	-	-	-	-	-	-	-	5,4	3,6	8,3	**2,3**
From 20.1 to 30	-	1,1	-	-	-	-	4,3	-	4,7	4,2	16,1	**4,0**
From 30.1 to 40	-	4,3	2,8	5,6	-	1,5	2,1	-	40,5	7,5	48,3	**13,3**
From 40.1 to 50	-	76,7	30,5	9,7	8,9	56,5	9,7	1,9	17,6	12,6	13,3	**21,4**
From 50.1 to 60	14,8	9,2	36,1	35,5	43,7	24,0	32,3	56,5	6,8	25,2	4,4	**23,3**
From 60.1 to 70	85,2	7,6	26,9	32,3	47,4	16,0	39,8	37,9	2,0	31,4	-	**28,0**
From 70.1 to 80	-	1,1	3,7	14,5	-	2,0	9,7	3,7	14,2	10,0	1,8	**4,7**
Above 80.1	-	-	-	2,4	-	-	-	-	7,4	4,2	0,8	**1,4**
Arithmetic average yield, c/ha	64,0	51,6	56,4	59,6	57,8	49,0	57,5	57,5	46,4	55,7	33,3	**51,3**
Standard deviation, c/ha	3,0	7,18	9,3	11,6	7,47	8,9	12,9	6,49	19,6	16,8	13,7	**15,3**
Coefficient of variation, %	4,7	16,0	16,5	19,4	12,9	18,1	22,5	11,3	42,2	30,1	41,2	**29,8**

Based on the data in Table (12), it is possible to visually consider the distribution of yields in individual regions and by region. If we assume that the yield will be distributed according to the normal distribution function (with an increase in the number of farmers in the sample), then the yield distribution will look like this (see Figure (13)).

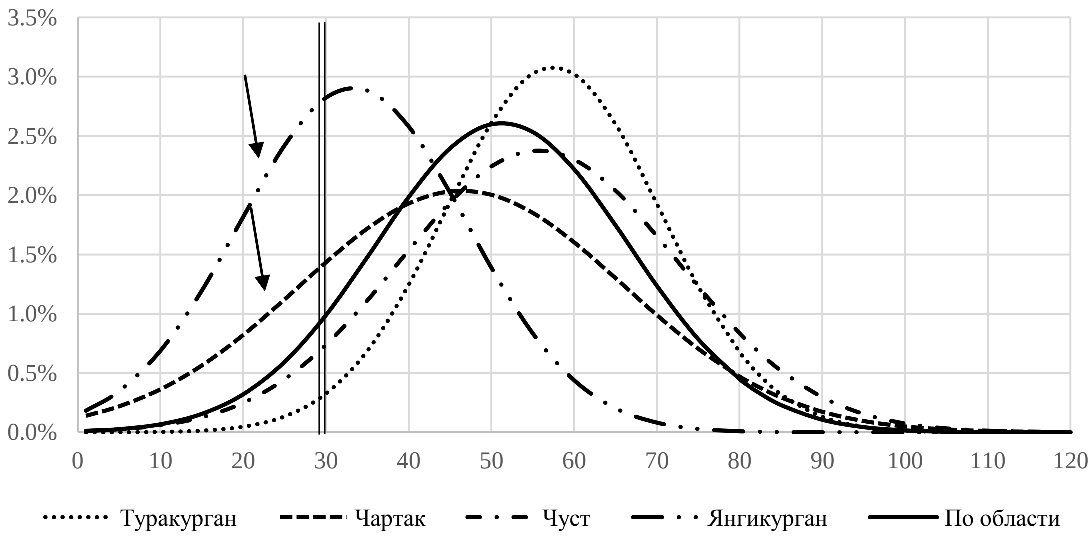

Figure (13): Standard yield distribution by region[11]

VI. RESULTS

The coefficient of variation (V_σ) of wheat yield has practically not changed over the past three years throughout the Namangan region. To identify problem regions, it is proposed to use

[10] Developed by the author.
[11] This figure was developed using the NORMALIZATION function in the MS-EXCEL application.

the standard distribution function. It is worth noting that in this case it is also possible to use other distribution functions if the corresponding conditions are met.

As can be seen in Figure (13), the graph of the yield distribution across the region (solid line) shows how disparate the yield indicators of the entire region are. A high standard deviation of the region's yield causes the function graph to be flattened to the OX axis (for example, the chart yield graph). That is, the higher the average yield ($\bar{x}$), and the lower the standard deviation (σ), the lower the risk. The yield chart of Turakurgan clearly indicates that the risk in this region is lower than the risk level of Chartak and Yangikurgan. In Figure (13), we can consider a separate area where the distribution functions are located in a zone with a reduced yield (<20 c/ha.). In this segment, we are interested in the productivity of regions (Chartak, Yangikurgan), whose graphs are higher than the distribution graph for the Namangan region (solid line), because it is these farmers in this zone who reduce the indicators for the region. It is important to note that it is possible to perform an analysis at a higher boundary (<30 c/ha).

Consideration and analysis of yield and standard deviation (as opposed to the usual calculation of V_σ) will make it possible to discern changes in $\bar{x}$ and σ yields in the long term.

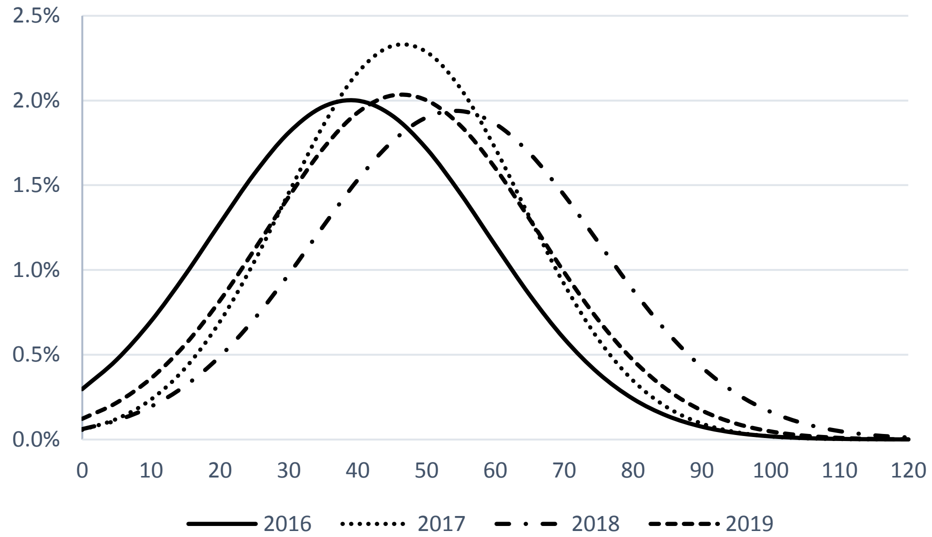

Figure (14): Standard yield distribution for the Cherkasy region for the period 2016-2019.

Applying the same methodology, it is possible to consider changes in the yield of the Chartak district. The reason for the absence of significant changes in the graph may be weather-climatic, land reclamation, geographical, technological and other factors that do not significantly increase the average yield ($\bar{x}$) and reduce the deviation (σ).

V. CONCLUSION

In conclusion, it is worth noting that the construction of risk assessment models in agriculture is difficult due to the lack or shortage of relevant data. Since the vegetative period of grain crops varies by country, the period of consideration of influencing factors in risk assessment models will vary. Among other things, in the risk assessment, it is necessary to consider the use of other distribution functions (for example, the gamma distribution function), taking into account the degree of skewness (asymmetry) of random variables in yield indicators.

REFERENCES

1. Anderson R., Dillon J., Hardaker B. Agricultural Decision Analysis. Iowa : The Iowa State University Press, 1977.

2. Boehje M., Trede L. Risk Management Agriculture // Journal of American Society of Farm Management. 1977. vol. 41. pp. 20-27.
3. Fleisher B. Agricultural risk management. Boulder, Colorado : Lynne Rienner Publishers Inc., 1990.
4. Hardaker J.B., Lien G., Anderson J.R., Huirne R.B.M. Coping with Risk in Agriculture. Wallingford : CAB International, 2015.
5. Harwood Joy [et al.] Managing Risk in Farming: Concepts, Research, and Analysis. [Report] : Research Paper / Market and Trade Economics Division and Resource Economics Division. - Washington, DC 20036-5831 : U.S. Department of Agriculture: Economic Research Service, 1999.
6. OECD Managing Risk in Agriculture: A holistic approach. Paris , 2009.
7. Shodiev T. Sh. Ekonometrika. – T.: TDIU, 2007. - стр. 14.
8. Альгин А. П. Грани экономического риска. – М.: Знание, 1991.
9. Балабанов И. Т. Риск менеджмент. – М.: Финансы и Статистика, 1996.
10. Буянов В. П. Рискология (Управления рисками). – М.: Экзамент, 2003.
11. Васин С. М. и Шутов В. С. Управление рисками на предприятии. – М.: КНОРУС, 2010. - стр. 304.
12. Вяткин В. Н. Управление рисками фирмы: программы интегративного риск-менеджмента. – М.: Финансы и статистика, 2006.
13. Грабовой П. Г. Управление рисками в недвижимости. – М.: Проспект, 2012.
14. Кейнс Дж. М. Общая теория занятости, процента и денег [Книга]. - Москва : Экономика, 1948. - стр. 136-137.
15. Куликова Е. Е. Управление рисками: инновационный аспект [Книга]. - Москва : Бератор-Паблишинг, 2008. - стр. 59.
16. Найт Ф. Риск, неопределенность и прибыль / Пер. с англ. – М.: Дело, 2003. – 360 с. [Книга]. - Москва : Дело, 2003.
17. Сирополис Н. Управление малым бизнесом [Книга]. - Москва : Дело, 1997. - стр. 613-617.
18. Тэпман Л. Н. Риски в экономике [Книга] / ред. Швандара В.А.. - Моксва : ЮНИТИ-ДАНА, 2002.
19. Шумпетер Й. Теория экономического развития [Книга]. - Москва : Прогресс, 1982.
20. Баймирзаев Д.Н. Особенности количественной оценки рисков в деятельности фермерских хозяйств // Экономика и предпринимательство. 5(118), 2020. Стр. 779-785. doi: 10.34925/eip.2020.118.5.159
21. Sotvoldiyev N.J. Socio-Economic Essence And Functions Of The Food Market// Turkish Journal of Physiotherapy and Rehabilitation. - Ankara: № 32 (3), 2021. - pp. 32030-32024.