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CROP PRODUCTION SUBSIDIZED RISKS INSURANCE FOR ENHANCING AGRICULTURAL RESILIENCE AND CLIMATE CHANGE MITIGATION IN MOLDOVA

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Abstract

The agricultural sector in Moldova is highly exposed to natural factors and hazards, resulting in uncertain incomes and high production volatility. Crop insurance plans against different risks plays a crucial role in supporting farmers' yield and revenues. The aim of this paper is to assess the development of subsidizing production risk insurance policy as a method to enhance agricultural resilience and alleviate the effects of climate change in Moldova. The analyzed data is based on the analysis of regulatory documents for policies regarding subsidizing productions risks insurance. For data analysis, secondary data provided by the National Bureau of Statistics (NBS), and Agency of Interventions and Payments in Agriculture (AIPA) was used. The data refer to the amount of subsidies applications for risks insurance, insured areas cultivated with different crops and its harvests, main risks insured by farmers, distribution of subsidies for risks insurance by development regions and the insurance companies. The subsidization of crop production risk insurance in Moldova has played a vital role in bolstering agricultural resilience and minimizing the adverse effects of climate change. By offering assistance to farmers and promoting the implementation of risk management practices, the government's objective is to stabilize income levels and promote sustainable growth in the agricultural sector. Nevertheless, it is crucial to continuously monitor and evaluate these policies to ensure their efficacy and fair distribution of subsidies across various regions and insurance providers.

Key words**:** *agriculture, crop production, farmers, risk insurance, subsidies*

INTRODUCTION

The agricultural sector has consistently been associated with uncertainty and risk, primarily due to its vulnerability to natural factors and various hazards.Thus, farmers' incomes are uncertain and the agricultural production presents high volatility. Climate change is causing growing uncertainty in the agricultural sector, especially in crop production, leading to concerns about agri-food production, market stability, and food security. Consequently, farmers and researchers are actively seeking innovative solutions to counter the adverse impacts of climate change and adopt cost-effective measures to enhance production efficiency [15, 16].

An important tool to support the farmers agricultural yield/revenues are crop insurance plans. Incomes related to agricultural activities are more variable than non-agricultural incomes [11]. Main economic risk for agricultural producers is related to the variation in earnings, thus insurance must be regarded as risk management strategy that allows to stabilize income and consumption for farmers [12]. Crop insurance payments has as main objective to reduce the risk by allocating payments when farmers need additional support and to reduce the negatives outcomes that they can experience under certain circumstances [19].

The U.S. federal crop insurance program is renowned for being the most substantial subsidized agricultural insurance initiative globally and is currently the most expensive agricultural policy tool in the United States [17].

The government determines the specifics of crop insurance contracts provided to farmers, establishes the premiums that they must pay for their policies, subsidizes the expenses associated with premiums and program

administration, and serves as a reinsurer for crop insurance agencies that offer these contracts [19].

These programs are aimed to reduce the risks of farmers related to undesired events as drought, insect infection, lightning, wind, excessive moisture etc. According to Shaik [18], when the risk is lower, farmers are more positively regarding the implementation of innovative technology and efficiency enhancing production practices. As crop insurance is related to a high degree of risk, it may result that private insurance is costly and not available to farmers without governmental support program [4].

According to Quiggin [14], crop insurance implies certain features that causes problems, particularly for multi-peril crop insurance. This is mostly related to the absence of pooling, moral hazard and adverse selection and imperfect indemnity. Adverse selection is the most mentioned problem [2, 10, 5]. It is mainly caused by the fact that risk vary across farmers and they have more knowledge about the risks they face than the insurer.

Governmental support is needed to achieve and maintain the farm economic performance, which is on the long run is the key to its sustainable development. The governmental intervention into the crop insurance programs was highly discussed explaining/justifying such an involvement. This is caused by some forms of market failure, when private markets are not able to function to supply efficiently crop insurance [4]. The crop insurance market in the United States exhibits significant diversity, encompassing various types of insurance coverage. This diversity ranges from single-peril insurance to multi-peril insurance and index insurance. Furthermore, within the realm of multi-peril insurance, there are distinct insurance plans designed to address either crop yield or revenue protection. The index insurance is related to other types as: area insurance plans, weather event insurance or group plans [19].

The demand for crop revenue insurance is significant due to the tendency that farmers are encouraged to depend more on insurance than direct subsidies. One of the most used types of insurances for U.S. farmers is the revenue insurance plan. It allows farmers to receive a minimum level of revenues. Revenue insurance contracts covers from 50 to 75% against yield losses due to natural causes or against a change in harvest price. According to Goodwin [5] “yields and prices are likely to be negatively correlated since low yields are typically accompanied by high prices”.

In Europe, both single and multiple peril insurance policies are available, with single peril insurance widely accessible in most member states [17]. Crop insurance, offered through private and public-private arrangements, aims to protect against climatic risks. Single-peril insurance, particularly for hail protection, is more prevalent than multi-peril risk insurance, which provides comprehensive coverage for various weather events. The public sector plays a significant role in supporting agricultural insurance due to challenges faced by private schemes, with national or Common Agricultural Policy (CAP) subsidies helping farmers afford insurance premiums.

In 2023 the European Commission has approved a €1.3 billion Polish scheme under EU State aid rules. This scheme supports agricultural producers by subsidizing insurance premiums for certain vegetable products and livestock species to protect against damage risks. The measure aligns with the objectives of the Common Agricultural Policy by ensuring stable incomes for agricultural producers. The Commission found that the scheme is necessary to address market failures, as high insurance prices would deter producers from purchasing insurance without subsidies. Additionally, a State reinsurance mechanism for drought risk is necessary as insurance companies would be reluctant to cover such risks. The measure is considered proportionate, with its positive effects outweighing any potential competition and trade distortion within the EU [3].

The primary objective of agricultural producers is to achieve profitability. From this standpoint, their top priority lies in the insurance mechanism that aims to minimize

the likelihood of income decline or productivity loss due to natural risks [8].
It is believed that there is a positive impact between the insurance demand and improvement of farm economic performance. Insurance has positive impact on farm incomes and thus it affects its performance and sustainable development on the long run. It also allows the farmers to avoid certain risks that would turn their activity non efficient.
The purpose of this research is to examine the evolution of the policy of subsidizing risk insurance as a means to enhance agricultural resilience and alleviate the impact of climate change in Moldova.

MATERIALS AND METHODS

The objective of this research is to assess the progression of the policy on subsidizing production risk insurance as a method to enhance agricultural resilience and alleviate the effects of climate change in Moldova. The analyzed data is based on the analysisof regulatory documents for policies regarding subsidizing productions risks insurance. For data analysis, secondary data provided by the National Bureau of Statistics (NBS), and Agency of Interventions and Payments in Agriculture (AIPA) was used. The data refer to the amount of subsidies applications for risks insurance, insured areas cultivated with different crops and its harvests, main risks insured by farmers, distribution of subsidies for risks insurance by development regions and the insurance companies.

RESULTS AND DISCUSSIONS

In Moldova, the agricultural sector experienced various fluctuations within the last decades. With a decreasing share in GDP (9.8%), it continues to contribute to about half of Moldova's exports and employs a third of labor force. However, the Gross Agricultural Output (GAO), increased to 40,617 million MDL in 2022, experiencing fluctuations in the last years. About 70 percent belongs to crop production (Figure 1).

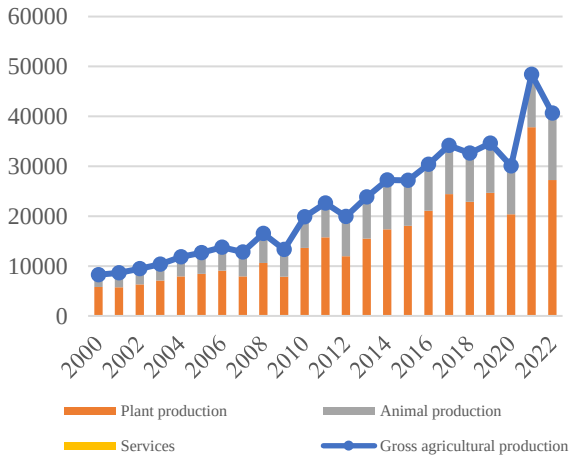

Fig. 1. Dynamics of gross agricultural output, million MDL
Source: based on data from National Bureau of Statistics [13].

Agricultural sector, particularly crop production is very sensitive to climate change. Droughts or spring and fall freeze can affect dramatically farmers harvests. The obvious decrease in GAO by 20 percent was in 2009, when one the most severe drought was recorded and caused damages of over one billion US dollars, affecting 78 percent of agricultural land. Another large drop in GAO was registered in 2020 with a decrease 26 percent of agricultural output due to severe drought caused by global warming. The adverse risks in the agricultural sector put in danger agricultural output, food security and employment.
Climate instability is one of the main causes of unstable harvests and it is a risk, particularly to crop production. The significant decrease in harvests reduces the economic efficiency and endangers the country's food security.
In Moldova, agricultural risks insurance started to be implemented with the approval of Law no. 243 from 2004 regarding subsidizing risks insurance in agriculture [9]. According to it, farmers that buy an insurance for agricultural production risks from insurance company can benefit from a subsidy between 50 and 60 percent of the paid insurance premium. Subsidizing production risks insurance in agriculture is one the subsidized measures available to farmers since 2005 when the Government approved

the Regulation on subsidizing production risks insurance in agriculture [7]. The Regulation aims at compensating farmers expenses for insured crop harvests and livestock [7]. Under this regulation, farmers can avail subsidies when they enter into an insurance agreement. The subsidy is provided for the portion of the insurance premium that remains after the farmer pays their share of the premium. Moreover, the subsidy is determined based on specific criteria, including the list of insurable risks and the list of eligible agricultural crops and animal species. The subsidies are sourced from the National Fund for the Development of Agriculture and Rural Environment.

The government can offer additional support to farmers to overcome the negative consequences of adverse weather phenomena as in 2012, when by government decision was approved the Regulation no 766 to allocate financial support to overcome drought consequences in 2012 [20].

The number of payments recipients for subsidizing production risks insurance measure increased in the last years (Table 1).

Table 1. Dynamics of subsidies applications for risk insurance

Year	Subsidy applications	Approved applications	Share, %	Amount requested, thousands MDL	Amount allocated, thousands MDL	Share, %
2013	81	78	96.3	41,440.6	41,288.2	99.6
2014	122	66	54	34,487.5	22,760.5	65.9
2015	137	128	93.4	31,225	30,858	98.8
2016	118	87	73.7	11,023.6	8,875.8	80.5
2017	83	80	96.3	4,532.9	4,474.9	98.7
2018	122	119	97.5	7,533.6	7,409.5	98.3
2019	84	79	94	5,640.6	5,438.7	96.4
2020	82	81	98.8	7,640.1	7,522.4	98.4
2021	463	420	90.7	47,410.2	41,673.9	87.9
2022	527	495	93.9	65,988.7	60,873.2	92.2

Source: based on data from Agency of Interventions and Payments in Agriculture [1].

Between 2013 and 2022, over 90 percent of the applications were approved, as indicated in Table 1. The maximum subsidy amount is determined based on the insurance premiums calculated according to the rates specified in the special conditions for insuring production risks in agriculture.

During the period of 2019-2020, there was a noticeable decline in the number of farmers opting for agricultural insurance to protect against risks. This decrease can be attributed to a broader issue concerning how farmers handle their agricultural operations and the way they perceive and manage risks through insurance. Consequently, this decline has resulted in lower insurance rates within the sector and unrealistic expectations of government intervention in mitigating these risks. Additionally, the area covered by insurance policies also experienced a reduction during this same period (Figure 2).

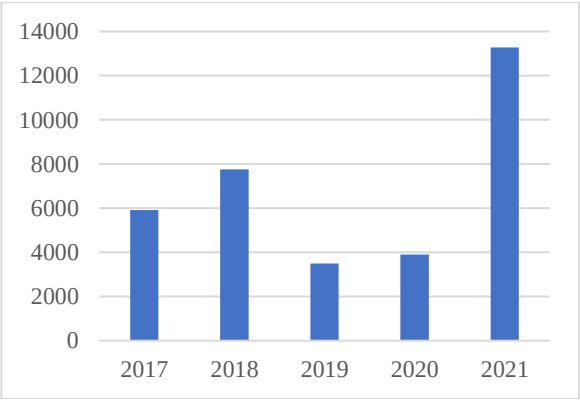

Fig. 2. Dynamics of cultivated areas under subsidizing production risks insurance
Source: based on data from Agency of Interventions and Payments in Agriculture [1].

Starting from 2021, the government provides financial coverage for up to 70 percent of the insurance premium paid to insurance companies for the assumed insurances through the National Fund for the Development of Agriculture and Rural Environment. In the same year, there was a

significant increase in requests for financial support for stimulating the production risk insurance mechanism in agriculture. Insurance companies submitted 463 requests, representing a 5.6-fold rise compared to the number of requests received in 2020. Additionally, the total subsidy amount requested by insurance companies surged by approximately 8 times, reaching 47.4 million MDL, as shown in Table 1.

In 2022, the number of payments applications reached 527, with about ten percent more that the level in 2021. Also, the financial allocations increased in 2022 with 46 percent comparing its level in 2021 (60,872.2 thousand MDL). Nevertheless, the Agency of Interventions and Payments in Agriculture could not allocate 10.7 million MDL to farmers in 2022 due to lack of funds, which remains to be allocated in 2023 (Table 1). The similar increase in observed in the area of agricultural land insured which in 2021 reached 13,287.6 hectares (Figure 2).

From the insured production risks areas, over half of it belongs to wheat and barley. In 2021, about 110 hectares of sugar beet, 3,749.9 hectares of sunflower, 3,348 hectares of maize, 2,930.8 hectares of wheat, 49,3 hectares of barley, 2,380.6 hectares of perennial plantations, 276 hectares of soybean were insured (Table 2).

Table 2. Structure of crop production areas under subsidizing risks production insurance

	2017		2018		2019		2020		2021	
	Area, ha	Share, %	Area, ha	Share, %	Area, ha	Share, %	Area, ha	Share, %	Area, ha	Share, %
Sugar beet	264	4.47	130	1.68	229	6.56	80	2.05	110	0.83
Sunflower	425	7.19	731.3	9.43	213	6.10	1,179.0	30.20	3,749.8	28.22
Maize	81.5	1.38	246	3.17	110	3.15	1,669.9	42.78	3,348.0	25.20
Wheat	2,924.0	49.47	2,627.0	33.89	1,886.6	54.04	244	6.25	2,930.8	22.06
Barley	951	16.09	2,753.0	35.51	495.2	14.19	0	0	493	3.71
Perennial plantations	1,081.0	18.29	1,248.7	16.11	524.1	15.0	726	18.60	2,380.6	17.92
Soybean	160	2.71	0	0	0	0	0	0	276	2.08
Vegetables and tobacco	24	0.41	16,2	0.21	15	0.43	5	0.13	0	0.00

Source: based on data from Agency of Interventions and Payments in Agriculture [1].

Analyzing the data related to areas insured by different crops, it is obvious that after 2020 there is a change in structure of areas. Until 2020, more than half of insured area was cultivated under wheat and barley. A smaller share was maintain by sugar beet, sunflower and perennial plantations. Since 2020, area under sunflower and maize has over half of total areas subsidized under production risks insurance (Table 2).

Table 3. Main crop production insured risks in 2022

Type of risk	Area, ha	Paid insured contribution, thousands MDL	Subsidy, thousandth MDL	Amount of compensation received, thousandth MDL
Storms	84.2	60.5	0	0
Hail	2,806.4	3,071.3	3,346.6	212.5
Hail, Spring frost	1,220.2	6,279.1	3,483.4	0
Hail, Spring frost, Heavy rain	575	2,933.9	3,636.1	0
Hail, Heavy rain, Excessive drought	3,255.0	4,063.9	0	0
Hail, Excessive drought	100	53.5	0	0
Hail+Spring frost	395.6	1,657.9	3,868.4	12,174.5
Fire	198	3.2	7.4	-
Spring frost	234.7	607.3	543.6	2,125.7
Drought+Hail	6,283.7	3,649.1	8,514.4	2,163.6

Source: based on data from Agency of Interventions and Payments in Agriculture.

From the insured risks in 2022, crops were insured against one or several adverse risks as: storms, hail, spring frost, torrential rains, excessive drought, fire (Table 3).

Analyzing the types of agricultural insured risks in 2022, the largest insured area was against the risk of drought and hail - 41 percent, hail, heavy rain and excessive drought - 21 percent, followed by insurance against hail and spring frost – 8 percent.

However, the paid insured contribution is for risks against hail and spring frost – 28 percent, hail heavy rain and excessive drought – 18 percent, drought and hail – 16 percent (Table 3).

From the subsidized insured agricultural risks received in 2022, over half belongs to insured risks against drought and hail (36%) and hail and spring frost (50%). From paid compensations, 58 percents were for risks against drought and hail.

Largest insured area are in the Southern region, while the highest subsidy and compensation paid were for farmers located in the Southern region (Table 4).

Table 4. Distribution of insured risks for crop production by development regions, 2022

Region	Area, ha	insurance premium, thousands MDL		Amount of compensation paid
		Insured contribution	Subsidy	
North	4,747.65	8,082.4	3,853.7	842.7
Center	3,492.9	5,358.5	7,018.1	21,185.1
South	5,788.2	5,990.8	6,332.4	0
UTA Gagauzia	1,114.3	433.7	1,012.1	0

Source: based on data from Agency of Interventions and Payments in Agriculture [1].

Analyzing the distribution of insured risks by development regions, the largest insured area is for agricultural producers located in the Northern and Southern region, which account together 70 percent of total insured area (Table 4).

The insured contribution from the insurance premium also have the largest share for Northern and Southern region (70 percent), followed by Center region with a share of 38 percent.

However from compensations had benefit only mostly farmers from Center region (96%), while farmers from Southern region or UTA Gagauzia had not benefit at all.

According to the regulation regarding subsidizing risks production insurance in agriculture [8], the annual amount of subsidies allocated by government is set yearly based on agricultural goods and risks eligible under this measure.

The Ministry of Agriculture and Food Industry, yearly proposes the list of crops and animals for subsidized insurance, the risks and financial amount proposed for the next year.

The insurance company that is eligible to provide production risks insurance in agriculture will receive from farmers the insurance premium (difference between the insurance premium and the subsidy), and the subsidy which is transferred from the Agency of Intervention and Payment in Agriculture after all required documents verification and validation.

The insurance companies that were providing production risk insurances in agriculture received from AIPA 29302150 MDL in 2022, with 40 percent less than in 2021 (Table 5).

Between 2020-2022, only four insurance companies received subsidies for risk insurance. Moreover, only "General Asigurari" SA and "SA Intact Asigurari Generale" companies received together over 80 percent of total subsidies during 2019-2022 (Table 5).

A similar trend in the whole analyzed period is observed where, mostly two insurance companies concentrate the majority of insurance subsidies allocations.

Table 5. Amount of subsidies allocated for risk insurance to insurance companies

Insurance company	Amount of authorized subsidy, thousands MDL									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CA Asterra Grup SA		306.9	3,965.7	9,867.4	319.9	747.2	357.9	400.8	2,785.2	1,697.1
CA General Asigurari SA					407.8	2,477.7	1,927.3	2,679.1	17,652.1	20,744.1
CA Moldasig SA	3,218.4		13,933.1	216.5	211.7	685.7	160.3	269.5	1,974.6	3,043.8
SA Intact Asigurari Generale				4,724.5	632.4	563.8	2,245.5	4,173.1	24,047.8	3,507.9
CA Garantie SA	3,789.5	2,243.1	1,519.7	732.5	413.9	234.5	341.5		0	309.3
Moldcargo	5,043.6	4,887.6	1,679.1	7,375.4	58.6					
Klassika Asigurari	270.8	196.8	1,109.9	15,558.3	1,975.4	2,664.4				
CA Acord Grup SA		146.2	1,674.4	124.5			106.3			
Galas		146.1								
CA Alliance Insurance Grup SA			7,085.5	4,986.5						

Source: based on data from Agency of Interventions and Payments in Agriculture [1].

CONCLUSIONS

The agricultural sector in Moldova is highly exposed to natural factors and hazards, resulting in uncertain incomes and high production volatility. Crop insurance plans play a crucial role in supporting farmers' agricultural yield and revenues. By providing risk management strategies, crop insurance helps stabilize farmers' income and consumption, allowing them to cope with adverse events such as droughts, pests, and extreme weather conditions, which are exacerbated by climate change.

Crop insurance programs are essential components of agricultural policies, especially in the case of Moldova, where climate instability poses significant risks to crop production. Due to market failures and the high degree of risk involved, private insurance can be costly and not readily available to farmers without government support. Thus, the Moldovan government intervenes by subsidizing crop production risks insurance to enhance the resilience of the agricultural sector and mitigate the impact of climate change.

The number of subsidies applications for risk insurance has been increasing in recent years, indicating a growing awareness among farmers about the importance of crop insurance. The insured area has also seen fluctuations, with sunflower and maize becoming dominant crops insured against risks since 2020.

The main insured risks in 2022 were related to hail, spring frost, heavy rain, drought, and storms. Southern and Northern regions had the largest insured areas, with Center region dominating in terms of paid compensations.

Over the years, a few major insurance companies have received the majority of subsidies, concentrating the market for crop insurance.

Subsidizing crop production risks insurance in Moldova has been a crucial tool in enhancing agricultural resilience and mitigating the impacts of climate change. By providing support to farmers and encouraging the adoption of risk management strategies, the government aims to stabilize income and foster sustainable development in the agricultural sector. However, continuous monitoring and evaluation of these policies are essential to ensure their effectiveness and

equitable distribution of subsidies across different regions and insurance providers.

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