

MUTUAL INSURANCE FUNDS TO REDUCING AGRICULTURAL RISKS- A THEORETICAL APPROACH

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Abstract

Production risk insurance is a mandatory component of any effective management system in all areas of economic activity. In agriculture, where production activities, primarily in crop cultivation, are subject to the influence of uncontrolled natural factors - droughts, hail, heavy rains, hurricanes, abnormal temperature fluctuations, etc., risk insurance remains an objective necessity. The study conducted by the authors in this paper on the level of development of agricultural insurance in the Republic of Moldova highlights the poor development and low interest of farmers in agricultural risk insurance products. The application of statistical analysis tools and content analysis allowed the authors to conclude that the problem of agricultural risk insurance could be solved to some extent by the implementation of the Agriculture Index Insurance method by insurers. At the same time, the association of groups of agricultural producers in the establishment of mutual agricultural insurance companies based on public-private partnership principles would increase the insurance coverage of this sector

Key words: mutual insurance, agriculture, risk, Agriculture Index Insurance

INTRODUCTION

Agriculture, by its very nature, is a risky business, as it is often carried out under the open sky, and over the last thirty years, the agricultural sector has been facing increasing risks as a result of the already visible effects of climate change. Unlike other sectors, farmers' incomes are affected by climate-related risks, which are more difficult to manage, and the negative impact affects not only farm performance and wealth (assets) but also food security, the sector's ability to grow, and also the entire supply chain.

In this context, an important role is played by agricultural insurance, in most cases supported by governments through various aid instruments, as insurers do not consider agricultural risk insurance an efficient insurance product.

At the European level, agricultural risk management is constantly changing, conditioned by the agreements concluded with the World Trade Organisation, as well as by the policies of governments that are increasingly withdrawing from providing aid in the event of disasters, epidemics, etc. The

experts recommend income insurance as a useful tool for managing farm risks (Kahan, D., 2013 [9]; Pierce, J., 2020 [15]; Severini, S. et al., 2021 [16]). At the same time, this instrument is subject to criticism arguing that income insurance for farmers is problematic. As reasons are cited asymmetry of information and a high probability of risks due to price fluctuations, floods, drought, and animal epidemics. The most eligible forms of insurance include field crop insurance products, especially if there are relevant futures markets and relevant crop productivity databases. Such insurance schemes are also practiced in EU countries, both by private insurers and through subsidy or public-private partnership measures.

In this context, the purpose of the paper is to investigate the agricultural insurance in the Republic of Moldova in the period 2012 - 2021, in the light of the following:

-dynamic development of the number of insurance policies concluded, of the amount insured and the insurance premiums collected by insurance companies for insuring the production risks in agriculture;

- determination of the amount of financial means annually allocated by the State for subsidised production risk insurance;
- dynamic development of compensation paid to producers to cover financial losses caused by agricultural risks and their share in total compensation paid by insurers;
- determination of the insurance object most affected by risk factors during the period under review;
- identifying solutions to increase the insurance coverage of the agricultural sector.

MATERIALS AND METHODS

For the present study, the authors applied the content analysis method related to agricultural risk insurance, factors motivating insurance in agriculture, and established research on the role of mutual societies in ensuring the financial stability of agricultural farms. The comparative analysis allowed us to highlight the Agriculture Index Insurance method as an insurance tool for small farmers to manage climatic risks. The index developed by MRR Innovation Lab researchers can be used by both commercial and mutual insurers to indemnify the policyholders.

As data sources for the presentation of the current state of agricultural risk insurance in the Republic of Moldova, the reports of the Agency for Intervention and Payments for Agriculture (AIPA), data collected from the Information System “Evidence of Applicants and Beneficiaries of Subsidies” (SIA ESBS) were used.

The statistical processing of the evolution of the mutual insurance sector at the European level was carried out using the least squares method. Comparison, dynamic, and structural indices methods were also applied.

RESULTS AND DISCUSSIONS

To cover damage caused by natural factors (frost, drought, heavy rains, etc.) farmers contract insurance protection services. In this context, agricultural insurance in most countries is characterized by state participation in insurance programmes, which

in turn are a component of state or Community agricultural policy.

Subsidized agricultural insurance through state programmes is also carried out on the insurance market in the Republic of Moldova. Their purpose is to encourage agricultural producers to insure their property interests against risks specific to agricultural activities and to protect these interests in the process of insuring production risks in agriculture (Act no. 183, 2020) [1].

The state subsidisation of the insurance premium is a much more effective instrument than the financial assistance that is granted in bad years in the form of financial aid to cover losses or other forms of aid. At the same time, premium subsidisation for agricultural insurance is seen as an instrument, the application of which does not violate the rules of the World Trade Organisation and can serve as an effective lever to stabilise the income of agricultural producers.

Table 1. The evolution of the financial means allocated by the state for the subsidized agricultural insurance (million MDL)

Year	Subsidized gross written premiums, million MDL	including for:			Increase/decrease compared to previous year, %
		crop	Multiannual plantations	animals	
2012	42.7	42.0	0.2	0.5	-
2013	54.5	18.2	35.4	0.85	27.6
2014	29.15	14.55	11.8	2.8	-46.5
2015	21.85	190.0	1.1	1.7	-25.0
2016	7.49	5.62	0.79	1.07	-66.0
2017	4.84	4.07	0.13	0.65	-35.4
2018	5.01	3.69	0.56	0.76	3.5
2019	5.1	4.03	0.25	0.82	2.0
2020	7.8	6.6	0.1	1.4	55.7
2021	45.1	35.0	2.6	7.5	478.2

Source: Prepared by the authors on the basis of the reports of the National Commission for Financial Markets, 2012-2021 (NCFM, 2021 [14]).

Despite the fact that the subsidisation of agricultural insurance is intended to maintain the financial stability of farms, it has not become popular and attractive to farmers in

Moldova (Table 1). Under the conditions of subsidisation of insurance premiums for farmers from the resources allocated through the National Fund for the Development of Agriculture and the Rural Environment, Submeasure 1.7A, Stimulation of risks insurance mechanism in agriculture, the insurance coverage rate of biological assets (plantations, crops, livestock, poultry, bee families, etc.) is very low.

Agricultural risk insurance is currently not a widely used instrument by agricultural producers in the Republic of Moldova due to the limited funds allocated to Submeasure 1.7A, Stimulation of risks insurance mechanism in agriculture, At the same time, the high costs of insurance services, the difficult financial and economic situation of agricultural producers and other factors prevent the development of another form of insurance relationship, represented by mutual insurance companies. In order to stimulate agricultural insurance as a form of risk management, starting in 2021 the Moldovan government, through the Agricultural Intervention and Payments Agency (AIPA), is subsidising 70% of the insurance premium paid by farmers to insurance companies.

Table 2 presents data on the structure of the areas of agricultural crops insured and subsidised under Submeasure 1.7A, Stimulation of risks insurance mechanism in agriculture.

Table 2. Structure of agricultural crop areas under Submeasure 1.7A in the Republic of Moldova, 2021-2022

Insured agricultural crops	Year		Share, %	
	2021	2022	2021	2022
Wheat	2,730.8	3,807.8	16.11	29.28
Barley/rape	493.0	219.5	2.9	1.69
Sugar beet	220.0	75.0	1.3	0.58
Sunflower	7,499.6	3,050.1	44.25	23.45
Soy	276.0	284.2	1.63	2.18
Corn	3,348.0	3,450.1	19.75	26.52
Multiannual plantations	2,380.6	2,119.8	14.06	16.3
Total	16,948.0	13,006.5	100.0	100.0

Source: data systematized and calculated by the authors based on the Information System "Evidence of Applicants and Beneficiaries of Subsidies (SIA ESBS) of the Agency for Intervention and Payments for Agriculture (AIPA) as of 31 December 2022."

An analysis of the crop structure insured under Submeasure 1.7A shows that the largest share goes to cereal and technical crops. In 2022, the insured area under sunflower has doubled, which has also influenced the decrease of the total insured area by 3,948 hectares (Figure 1), although the share of the publicly subsidised insurance premium has increased.

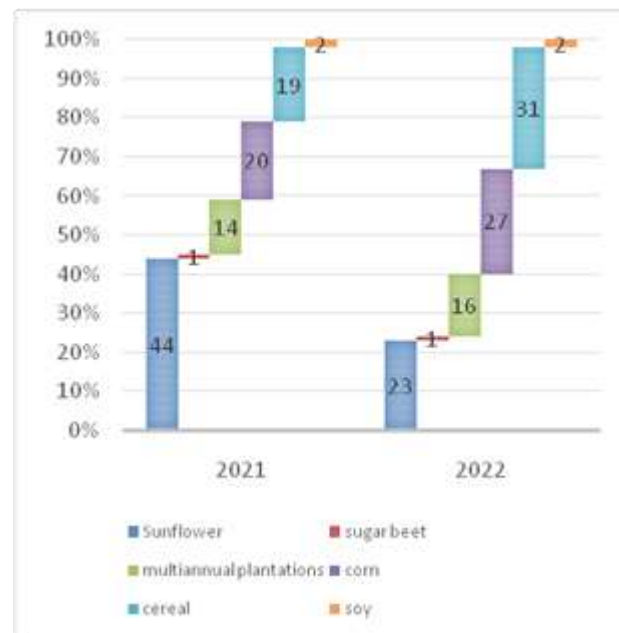


Fig. 1. Structure of areas under insured agricultural crops, %.

Source: data systematized and calculated by the authors based on the Information System "Evidence of Applicants and Beneficiaries of Subsidies (SIA ESBS) of the Agency for Intervention and Payments for Agriculture (AIPA) as of 31 December 2022."

The analysis of subsidised production risk insurance in agriculture for the period 2012-2021 shows a reluctance of farmers to use insurance policies as a production risk management tool. The downward trend in insurance premiums paid by farmers is an eloquent argument in support of this claim (Table 3).

The situation changed in 2021, thanks to legislative changes. In 2020, Law No. 183/2020 [1] on subsidised insurance in agriculture came into force, allowing agricultural producers to pay insurance premiums in instalments and increasing the share of the insurance premium covered by the National Fund for Agriculture and Rural Development from 50% to 70%.

Table 3. Agricultural insurance in Republic of Moldova in 2012-2021

Year	Total insurance premiums, million MDL	Gross premiums underwritten by agricultural producers, million MDL	Share of gross agricultural premiums in total gross premiums subscribed, %	Insurance claims - total, million MDL	Insurance claims paid to agricultural producers	Share of insurance claims paid to agricultural producers in total, %
2012	1,089.3	74.4	6.83	430.5	100.2	23.27
2013	1,198.9	91.0	7.59	432.4	27.4	6.37
2014	1,203.6	58.3	4.84	513.6	6.7	1.3
2015	1,225.5	43.7	3.56	386.6	5.7	1.47
2016	1,380.1	14.97	1.08	519.1	11.07	2.13
2017	1,441.9	10.73	0.74	506.03	1.98	0.39
2018	1,518.1	10.16	0.67	549.0	2,65	0.48
2019	1,624.7	11.0	0.68	653.8	4.6	0.7
2020	1,452.9	15.5	1.07	596.4	26.5	4.44
2021	1,926.3	67.5	3.5	662.1	16.5	2.49

Source: Prepared by the authors on the basis of the reports of the National Commission for Financial Markets, 2012-2021 (NCFM, 2021 [14]).

This has influenced a sevenfold increase in the number of subsidised production risk insurance policies in agriculture, but not the average amount insured per policy. If in 2012 the average amount insured per policy was 5.11 million MDL, then in 2021 was 1.05 million MDL.

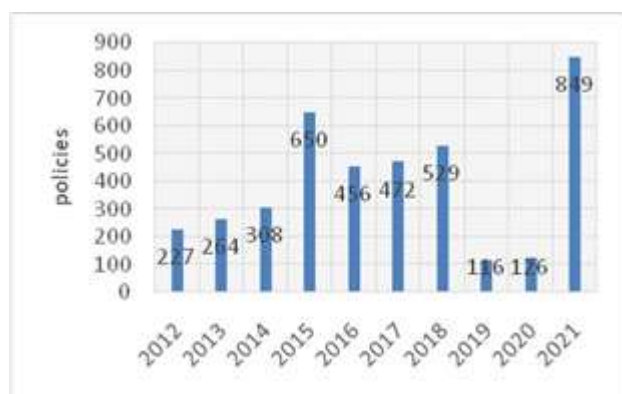


Fig. 2. Subsidized production risk insurance policies in agriculture

Source: Prepared by the authors on the basis of the reports of the National Commission for Financial Markets, 2012-2021 (NCFM, 2021 [14]).

Risk factors such as spring frosts, hail, floods or excessive drought affect crop yields to a large extent. An analysis of the compensation paid by insurance companies to agricultural producers affected by risks shows that in most cases financial losses were covered as a result of a reduction in the quality or a lower than planned crop yields due to the insured risk

occurrence. The share of compensation paid for these insurance subject matters is between 82% and 99.8%, with the exception of 2013 and 2014, when half of the compensation was directed towards compensating insured farmers for financial losses in cases of total or partial destruction of multiannual plantations. In 2022 the value of risks insured through Submeasure 1.7A amounted to 94.3 million lei, which is 26.6 million lei (39.3%) more than in 2021. At the same time, the value of subsidies requested by insurance companies amounted to 66 million lei compared to 47.4 million lei in the previous year.

Yu, J., Smith, A., and Sumner, D.A. analyzed the effects of subsidizing crop insurance premiums on the development of the areas occupied by these crops (Yu, J. et al., 2018) [21]. Crop insurance is the most expensive agricultural policy in the United States, so subsidised crop insurance programs are becoming increasingly popular worldwide in both developed and developing countries (Barnett, B. 2014 [3], Mahul, O., Stutley, C. 2010) [11]. Research conducted on a sample of US farms allowed the authors to find that subsidizing insurance premiums encouraged farmers to increase their crop insurance coverage. The authors also estimated that a 10% increase in the insurance premium subsidy results in a 0.43% increase in crop

acreage if the competing crop insurance premium subsidy is held constant.

The analysis of the number of livestock and poultry insured by farmers in the Republic of Moldova (Figure 3) revealed an 18% increase in the amount of livestock and a decrease in the percentage of insured poultry by about 20%.

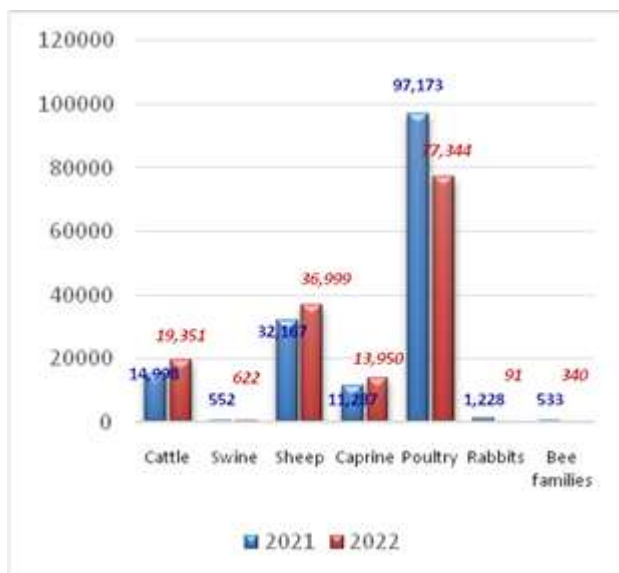


Fig. 3. Livestock and poultry population, and bee families insured under Submeasure 1.7A

Source: Prepared by the authors on the basis of the Information System "Evidence of Applicants and Beneficiaries of Subsidies (SIA ESBS) of the Agency for Intervention and Payments for Agriculture (AIPA) as of 31 December 2022.

In the Republic of Moldova the potential of agricultural insurance is insufficiently exploited. The areas covered by insurance policies vary between 3% and 5%.

In our opinion, one of the significant reasons why agricultural insurance has not yet become an effective instrument for protecting farmers' incomes, is the lack of confidence that insurers will meet their obligations to pay claims. This is explained by the fact that insurance contracts often contain conditions and clauses that leave insurers very wide opportunities to refuse insurance payments. In this case, a solution would be the application of Agriculture Index Insurance, which is recommended as an insurance tool for small farmers to manage climate risks. The index developed by MRR Innovation Lab researchers can be applied to estimate farmers'

losses, including those using state-of-the-art remote sensing technologies. This index facilitates both farmers and insurers, increasing the quality of insurance and the confidence of farmers as consumers of insurance services that contracts will protect them. Factors taken into account when estimating losses are average yields, rainfall, etc. "Index insurance is attractive as a risk-management tool in developing countries where the fixed costs of verifying claims for a high number of small farms make conventional insurance too expensive." (BASIS, 2022)[4].

Agricultural production is substantially affected by global weather variations and the Agricultural Insurance Index can increase the effectiveness of crop insurance (Yi, F. et al., 2020)[22]. Conventional insurance pays estimated claims individually to each farmer, while Index insurance (right) involves paying the insurance premium to all insured farmers in the region in equal amounts, estimated as an average of their losses (Yu, J. et al., 2018)[21].

Compensation of agricultural producers on the basis of the agricultural insurance index has advantages for strengthening agriculture, acting as a protection tool for periods affected by natural disasters and calamities, epidemics, etc., and as an investment catalyst in years without destructive phenomena for agriculture.

At the same time, insurers also face difficulties in developing insurance products to cover systemic agricultural risks (Skees, J., 1997)[17] that do not burden farmers, while governments often intervene ad hoc in disaster situations with instruments to support farmers, which does not contribute to the development of new agricultural insurance products. As solutions to these challenges, the World Bank recommends that governments support agriculture by implementing other instruments.

One solution would be to associate agricultural producers with mutual insurance companies, which have non-profit status. The work of mutual insurance funds and mutual societies is based on the principles of cooperation, mutual aid, and mutual support.

This form of organizing insurance relations helps to increase the interest of agricultural producers in insurance, reduce the costs of its implementation and solve many problems. Mutual insurance companies are at the basis of the agricultural insurance system in Canada, the USA, Japan, and the EU.

Under Law No 312/2013 on agricultural producer groups and their associations, farmers in the Republic of Moldova could solve the problems of insufficient public funds for subsidized insurance by setting up mutual funds for agricultural risk insurance. In this case, farmers would not be dependent on government policies and priorities and bureaucratic procedures, often invoked by farmers, as well as the cumbersome procedure for recovering compensation from insurers.

Such crop insurance schemes are an agricultural policy tool in both developed and developing countries. However, according to experts, they are fiscally costly for the state and do not have wide coverage, as insurance is only provided within the limits of an insurance fund, to which small farmers do not have much access and which favors large agricultural producers (World Bank, 2008)[20].

The following principles underlie the mutual system(ICMIF, 2020)[5]:

-*Strategically oriented management* aims first at long-term value creation, then at profitability.

-*Customer orientation* requires a model of owner involvement that is different from customer involvement.

-*Value creation* for key stakeholder segments and their peripheral components plays a decisive role in achieving growth and innovation objectives.

-*Social and economic transformation* of local communities and disadvantaged segments is the core objective.

Of particular interest in this respect is the experience of Canada, where insurance of agricultural risks by mutual insurance companies has become widespread. More than 200 years ago, farmers' associations began operating in Canada on the "neighbor helps neighbor" principle. In the 20th century, many of these associations, already legally

registered as mutual insurance companies, went through a process of consolidation, resulting in a strong pool in the market: FarmMutualFinancialServices.

Turkey has adopted Spain's Agricultural Insurance Pool model to establish the appropriate agricultural insurance system – TARSİM. "With the application of the pool in Turkey, catastrophic risks such as drought and frost that an insurance company cannot undertake alone can be covered" (Tekin, A. et al., 2017)[18].

In the Netherlands, mutual insurance schemes are being developed to insure risks caused by outbreaks of contagious diseases in certain agricultural crops, poultry and animals (Meuwissen M. et al., 2001)[12].

Unlike mutual societies, mutual stabilization funds, as defined at the European level, are set up on the private initiative of producer groups with the aim of sharing comparable risks at the sector level. Fund resources are used according to predefined rules to mitigate the financial losses of members who have suffered from risk events.

The problem with their operation is the limited nature of the financial sources to cover losses. At the same time, sharing the same risks, there is a likelihood that the activity of all farmers contributing to the fund will be affected. Reinsurance or cooperation with similar funds in other regions would be a solution in these situations. Also, in some EU countries, the capital of mutual insurance funds is supplemented by a public financial contribution.

Mutual insurers are key stakeholders in Europe's social economy, which comprises 2.8 million businesses and organizations, including mutual insurers, and employs 13.6 million people, whose contribution to EU GDP is 8%. This contribution is due to the EU policy of promoting the social economy and creating favorable conditions for mutual insurers and increasing awareness of the role of mutual insurance in the Member States, including Romania. An important role is played by the Association of Mutual Insurers and Cooperative Insurers in Europe (AMICE), which represents the interests of the mutual and cooperative insurance sector in Europe.

According to studies by European researchers, mutual insurance is supported by the Common Agricultural Policy. Meuwissen, M.P. and others have researched the activity of mutual insurance companies in the Netherlands, identifying both privately established companies and companies receiving financial assistance from public funds. These companies insure risks that are not covered by commercial insurers, such as crop and animal disease risks (epidemics) (Meuwissen M. et al., 2013)[13]. Another solution for insuring agricultural risks is smart insurance projects (e.g. insurance schemes based on satellite images). Climate change is increasing the scale and likelihood of extreme weather events (IPCC, 2014)[8], which requires farms to increase their resilience to them.

Vroege, W. and Finger, R. highlight the following advantages of smart insurance: it provides more accurate information, and better, faster and cheaper observations, which can reduce damage assessment costs, delays in claims payments and can reduce information asymmetry. However, the authors note that satellite information does not automatically provide better insurance (Vroege, W., Finger, R., 2020)[19].

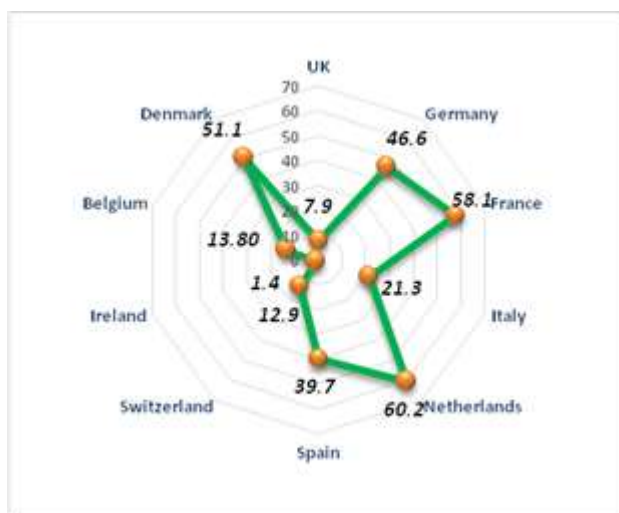


Fig. 4. Market share of mutual insurance in 10 European countries, %
Source: ICMIF, 2022, p.8 [16].

Mutual insurers in Europe have shown great resilience to the challenges of the COVID-19 pandemic. According to data from the

International Cooperative and Mutual Insurance Federation, the market share of European mutual life and non-life insurance increased in 2020 compared to 2019. In 2020, mutual insurers experienced a much smaller decrease in total insurance revenues (-1.6%) compared to the significant decrease in insurance premiums across the European insurance market (-6.7%). The European countries with the highest mutual insurance market share are Denmark, the Netherlands, France, and Germany (Figure 4).

Trend analysis for the last decade (2010 - 2020) shows a steady growth of the mutual insurance industry, with a total premium growth of 32.1% over the period, which cumulates in a premium income of €469 billion in 2020. The market share of mutual insurers amounted to 33.4%, representing more than a quarter (25%) of the local market in thirteen European countries.

The development of mutual and cooperative insurance premium income over the period 2011-2020 and its upward trend expressed by a linear model.

The mutual form of organization manifests itself in different forms, depending on the culture and roots of mutuality in the respective country:

- Mutual insurance companies
- Mutual holding companies
- Fraternal/friendly societies
- Groups of insurers and reinsurers
- M&I Associations (Mutual Protection and Indemnity)
- Takaful (Islamic mutual insurance)
- Discretionary mutual societies

One of the mutual forms of insurance is Takaful, often referred to as "Islamic insurance" - a way for companies to mitigate the financial risk of unforeseen events. Takaful is based on solidarity and social cooperation, it is a pact between a group of people who agree to jointly indemnify losses or damages from a fund to which they collectively donate.

The potential of new insurance mechanisms can help increase the resilience of European farms to extreme weather risks. In this context, farmers can apply on-farm risk

management strategies, also called control strategies, or share the risk with others. Risk control strategies reduce the impact of weather risks. For example, prevention measures, such as the installation of hail protection netting or irrigation equipment, reduce the impact of extreme weather on

production, increasing farmers' ability to cope with weather shocks. Risk-sharing helps farmers reduce their exposure to risk. Building up reserves can mitigate the consequences of damage caused by risk. However, these strategies increase production costs (e.g. purchase of an irrigation system).

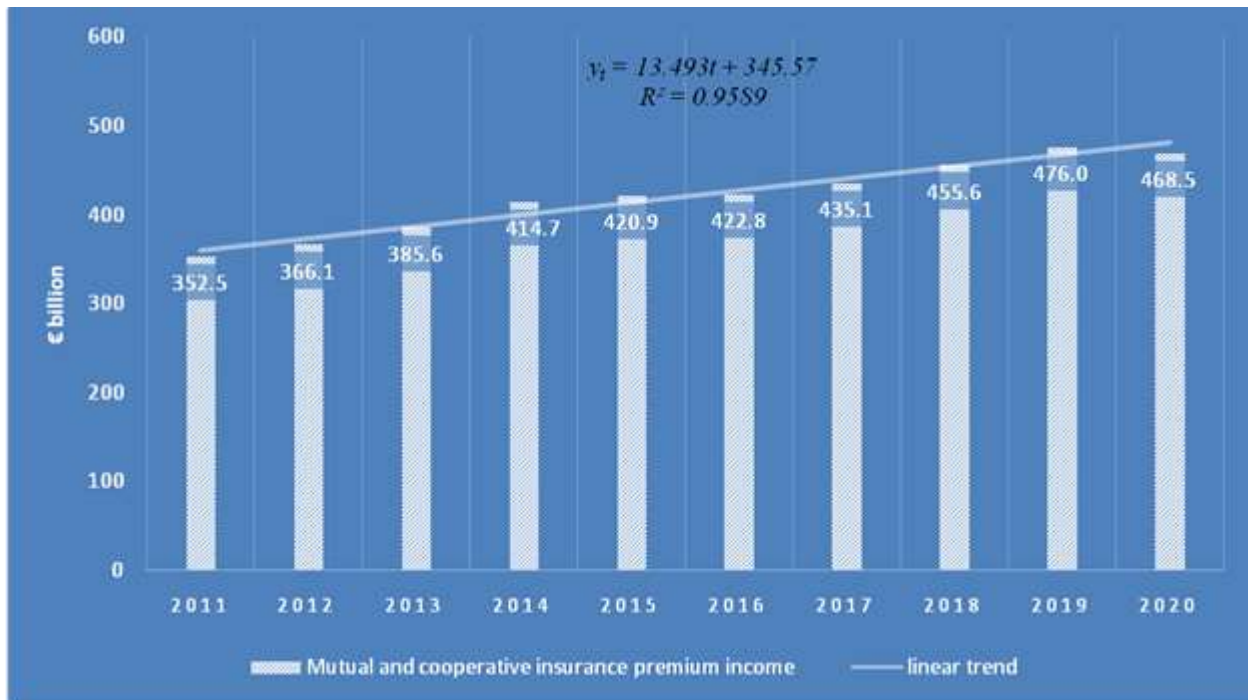


Fig. 5. Evolution and trend of mutual and cooperative insurance premium income at the European level, 2011-2020, € billion

Source: prepared by the author based on data ICMIF [6].

In this way, non-commercial mutual insurance is seen as a more effective form of risk insurance for farmers, which can provide a reliable, accessible, and cheap insurance protection system for businesses, thus contributing to the development of rural communities and the preservation and enhancement of rural employment. For the development of agricultural insurance on mutual principles as an economic and financial mechanism for agricultural risk management, we recommend that the following conditions are met:

- The system of economic relations of a mutual agricultural insurance company is aimed at the establishment and use of insurance funds, the creation of reserve funds as well as other special funds guaranteeing its solvency.

- One of the ways of ensuring the solvency of a mutual insurance undertaking is investment

activity. The income from insurance premiums may be used to reduce insurance premiums, to finance preventive measures, to grant short-term loans to members, and for other purposes provided for in the statutes of the society and agreed by its members.

- Reinsurance is an economic instrument for insuring the association's obligations towards its members.

- State support for mutual insurance companies may take the form of subsidization of insurance premiums, allocation of soft loans or grants to top-up insurance funds, and tax facilities.

However, there is a need for greater public sector involvement, through public-private partnerships for reinsurance, which could expand the diversity of income insurance schemes. But there are views that government involvement in subsidized agricultural

insurance should be cautious, as studies show it is fraught with pitfalls. The implementation of income and risk subsidy schemes for farmers could be implemented through pilot measures/experimental trials to determine the attractiveness and effectiveness of income insurance schemes and other income stabilization instruments for stakeholders.

CONCLUSIONS

The results of the study on the level of development of agricultural insurance in the Republic of Moldova highlight the weak development and low interest of farmers in agricultural risk insurance products.

The purpose of agricultural insurance is to compensate for damage to agriculture caused by natural disasters and other risks. Insurance protection helps to increase the financial stability of farmers and enables them to meet their obligations.

However, the difficult financial and economic situation of most agricultural enterprises, the high cost of insurance services, and the underdevelopment of non-commercial forms of insurance protection in agriculture do not allow insurance to fully manifest itself as a stabilizing and mitigating factor against the consequences of natural disasters in recent years.

Among the factors explaining this situation are the following:

- The difficult financial and economic potential of most farms, which limits their ability to participate in insurance;
- The high cost of commercial insurance services;
- Uncertainty in the interpretation of insurance rules and claims assessment;
- Reluctance on the part of insurers to compensate for losses.

A solution to these problems could be the widespread promotion of mutual insurance protection for agricultural risks.

Its advantages are the provision of insurance services that are comparatively cheaper than commercial insurance, the possibility of accumulating insurance reserves and their subsequent use to cover losses in years with low productivity yields, as well as to finance

risk prevention measures, the granting of short-term loans, and the presence of mutual control over compliance with insurance conditions.

For the development of mutual agricultural insurance companies, the following measures are necessary:

-Stimulating through government initiatives the creation and development of agricultural insurance associations and mutual funds by supplementing insurance funds from public funds;

-Encouraging producer groups to form mutual insurance associations with the help of tax incentives.

In our opinion, the presence of mutual societies and funds in the agricultural insurance system will make it possible to solve a number of problems:

(i)The specific insurance needs of agricultural producers will be taken into account to a greater extent, since the rules and conditions of insurance, including insurance premiums and the size of the indemnity, will be determined independently by the members of the mutual society.

No insurance company can offer better insurance conditions than those approved by the policyholders themselves, who are members of a mutual insurance company.

(ii)Reducing the cost of insurance premiums for agricultural producers. Insurance companies do not aim to make a profit, so mutual insurance is cheaper than commercial agricultural insurance.

(iii)Increasing the effectiveness of state aid to farmers.

The insurance funds collected, including those from public funds, will remain at the disposal of policyholders, and it will be possible to direct them in the form of interest-free loans to company members, joint investments, and other purposes.

(iv)Actual compensation of insured losses.

In mutual companies, there is higher reliability of the information on compliance with insurance conditions and the occurrence of insured events based on mutual control.

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