**REPUBLIC OF AZERBAIJAN**

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# ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

# ENHANCING THE REGULATION OF THE AGRICULTURAL INSURANCE MARKET IN THE REPUBLIC OF AZERBAIJAN

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## GENERAL CHARACTERISTICS OF THE RESEARCH

**Relevance and level of development of the topic.** Agricultural risks are primarily the main cause of the losses incurred by agricultural producers and the instability of their incomes. It is enough to say that, as a result of the impact of catastrophic natural events, 26% of global agricultural production faces losses[1].

One of the decisive tools for minimizing farmers' losses and stabilizing their incomes is the effective management of agricultural risks by the state. On the other hand, within the framework of the country's economic policy, the prioritization of the development of the non-oil sector, including the agricultural sector, increases the relevance of improving the agricultural insurance market.

At the same time, the return of the liberated lands to agricultural production creates significant potential for the growth of agricultural output. One of the means for realizing this potential is the increase in the number of agricultural entities in these regions as a result of the Great Return. The role of the agricultural insurance market in protecting against natural events in the newly established farms in the liberated territories is undeniable. In this regard, the development of the agricultural insurance market is highlighted as one of the key directions within the framework of the Social and Economic Development Strategy of the Republic of Azerbaijan for 2022-2026 and the Azerbaijan 2030: National Priorities for Socio-Economic Development.

The issue of the lack of comprehensive research on the regulation and improvement of the agricultural insurance market significantly increases the relevance of the problem. This is one of the main reasons for choosing the topic in this direction.

Numerous studies on the essence of agricultural risk management have been conducted by both local and foreign scholars and remain a focus of attention. Research on agricultural insurance, as part of the general insurance market, has been carried out by local

[1] Baeva, Y.V. Improvement of Agricultural Insurance as a Factor of Sustainable Agricultural Development: Dissertation for the degree of Candidate of Economic Sciences / - Moscow, 2022. - 190 p.

scholars such as Z.A. Samadzada, N.N. Khudiyev, B.A. Xankishiyev, E.R. Ibrahimov, I.M. Abbasov, B.Kh. Atashov, M.J. Huseynov, S.M. Mammadov, E.A. Guliyev, E.A. Salahov, and P.N. Abdullayev in various research studies.

The characteristic features of agricultural risks, their classification, management, and issues related to the improvement of the agricultural insurance market have been addressed in the research of scholars such as B. Engurulu, M. Unal, D. Acemoglu, Sh. Ozveren, P. Sulevski, K. Gajevske, D. Blandford, S. Mushtag, J. Harvud, A. Jirova, K. Batirovna, Z. Akhmadiyeva, and others.

**As the object of the research**, the agricultural insurance market of Azerbaijan has been identified.

**The subject of the research** consists of the regulation of the agricultural insurance market and the improvement of insurance relations, which play a key role in ensuring the sustainable development of agriculture.

**Aim and objectives of the research.** The aim of the research is to prepare theoretical and practical recommendations for enhancing the role of agricultural insurance in the effective management of agricultural risks and improving its regulation. To achieve this goal, the following objectives have been set:"

- systematic analysis of the nature, characteristic features, and classification of agricultural risks within the framework of risk theory;
- theoretical justification of the nature of improving the regulation of the agricultural insurance market;
- evaluation of the stages of the formation of the agricultural insurance market in Azerbaijan, the differences between them, and their characteristic features;
- identification of patterns based on the analysis of the dynamics of the covered risks in terms of territorial-geographical location, climatic conditions, frequency, and intensity;
- investigation of the attitudes of uninsured farmers towards the risks covered by insurance in terms of territorial-geographical aspects and the factors influencing the conclusion of insurance contracts;
- identification of modern models and development trends of the agricultural insurance market based on the study of international

experience;

- identification of directions for improving the regulation of the agricultural insurance market and investigation of the factors hindering its development;
- determining the role of the indexed insurance model in the diversification of the agricultural insurance market.

**Research methods.** In the execution of the dissertation, general theoretical methods (analysis, synthesis, logical reasoning, classification, etc.), empirical methods, including the collection, processing, and systematization of statistical data, as well as the use of graphical and tabular methods, were applied. The dynamic analysis of statistical data was conducted using horizontal and vertical methods. To study the current reality in the agricultural insurance market, surveys were designed. During the processing of the survey results, the SPSS statistical software was used to minimize errors and deviations in the results.

**Key provisions submitted for defense.** The key provisions presented for defense are characterized by the following:

- there is an interconnection between the effective management of agricultural risks and their classification based on their sources and scope;
- overregulation of the agricultural insurance market may create conditions for the emergence of adverse selection and moral hazards in the insurance market;
- the emergence of disproportion in the insurance of crop and livestock products in the initial stage of the agricultural insurance market has resulted in its failure;
- there is a correlation between agricultural risks in terms of territorial-geographical location, climatic conditions, frequency of occurrence, and the conclusion of insurance contracts;
- based on the analysis of data obtained from the survey using the SPSS software, a correlation has been identified between farmers' attitudes towards risks and the factors influencing them;
- the study of the advantages and shortcomings of international agricultural insurance models influences the improvement of the agricultural insurance model applied in Azerbaijan;

- the implementation of the proposed solutions to eliminate the factors hindering the improvement of the regulation of the agricultural insurance market could have a positive impact on the development of the sector;

- the implementation of the indexed insurance model, an alternative to the traditional insurance model, plays a significant role in the diversification of the agricultural insurance market.

**The scientific novelty of the research** is as follows:

- the idea of classifying agricultural risks as endogenic and exogenic based on their source has been proposed and scientifically justified;

- the emergence of commercial risks in agriculture has been linked to the productivity paradox, and the distinction from commercial risks in other sectors has been justified;

- the idea of combining business and agricultural risks into a single term, expressed as "agribusiness risks," has been proposed and theoretically justified;

- the idea of optimal risk coverage (ensuring mass participation without stimulating adverse selection and moral hazard) has been proposed as the theoretical basis for improving the regulation of the agricultural insurance market;

- the current situation of the agricultural insurance market in Azerbaijan has been assessed, and its formation has been divided into two stages, with their distinct features justified by us;

- A 20-year dynamic analysis of natural risks in Azerbaijan has been conducted by us, and their patterns have been identified;

- the idea of differentiating the tariff rate based on the territorial-geographical location and size of the farms has been proposed;

- the implementation of the indexed insurance model has been justified as a means to ensure mass participation through the diversification of the agricultural insurance market in Azerbaijan.

**Theoretical and practical significance of the research.** The scientific ideas presented in the research can be reflected in the theoretical foundations of the state's agricultural policy in this area. Based on the results of the research, the proposed recommendations and suggestions, in addition to having practical significance in improving

the regulation of the agricultural insurance market and ensuring mass participation, can be used in future programs and projects of the Agricultural Insurance Fund, joint insurance companies, and local and international donors in this field.

**The information base of the research** consists of studies conducted by Azerbaijani and foreign economists on improving the regulation of the agricultural insurance market, expert assessments, scientific articles, and information materials from periodicals, as well as relevant Decrees and Orders of the President of the Republic of Azerbaijan on the agricultural insurance market, the Law on Agricultural Insurance of the Republic of Azerbaijan, relevant decisions of the Cabinet of Ministers, annual reports and statistical compilations of the State Statistical Committee, the Central Bank, and the Agricultural Insurance Fund, as well as survey materials collected by the author in the research villages.

**Approbation and application of the results of the dissertation.** The dissertation's content was reflected in 11 articles and theses published including one in Web of Science platform - ESCI citation index. The study's findings in accordance with the dissertation theme were presented and discussed at local and worldwide scientific and practical conferences.

**Overall volume of the dissertation.** The dissertation consists of 263,534 characters in total, including the title page and table of contents (1,858 characters), introduction (10,235 characters), Chapter I (68,512 characters), Chapter II (61,981 characters), Chapter III (73,354 characters), conclusion (6,700 characters), references (24,760 characters), and appendices (7,592 characters).

The dissertation includes 8 graphics, 1 image, 13 tables, and 4 appendices. The main text of the dissertation (excluding tables, graphics, appendices, and references) is 222,082 characters.

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## SUMMARY OF THE RESEARCH

The introduction of the dissertation discusses the relevance of the topic, the state of research on the problem, the objectives and tasks of the study, its object and subject, scientific novelty, practical significance, and its approval.

The first chapter of the dissertation titled **"The theoretical and methodological foundations of the formation of the agricultural insurance market"** consists of three sub-chapters. The first sub-chapter, titled "The theoretical foundations of risk management in agricultural insurance relations" discusses the risk factor in economics, the theoretical foundations of its emergence, and scientific perspectives on the concept of agricultural risk.

In order to understand the nature of agricultural risks, it is necessary to first examine the general concept of risk and its causes.

The representative of the classical school, A. Smith, described profit as the risk added to interest and divided it into two parts: net interest for capital and a premium for risks. Another representative of the classical school, Y.X. Thunen, argued that the entrepreneur's profit is a reward for a risk that cannot be covered by any insurance company[2].

J. Neumann and O. Morgenstern, analyzing uncertainty and risk through the lens of game theory, concluded that individuals, in their economic behavior, like in any game (chess, football, tennis, etc.), aim to maximize their gains and minimize their losses. This idea was further developed by them and formed the basis of the expected utility theory[3].

From the study of the risk problem, we can draw the following generalized conclusions. Risk is directly the result of uncertainty, and the nature of risk is explained based on expected utility.

In the literature, agricultural risks are divided into two generalized categories. The first is the ordinary business risk. The second is the catastrophic natural risks, such as climate, weather, infection, and diseases, which are characteristic of this sector.

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[2] Blaug, M. Economic Thought in Retrospective / M. Blaug. – Moscow: Delo Ltd, 1994. – 720 p.

In the second chapter titled "Methodological aspects of agricultural risk classification and evaluation" the importance of correctly classifying these risks according to their sources for the effective management of agricultural risks is emphasized. In scientific literature, five main types of agricultural risks have been identified and accepted based on their sources: production risks; commercial risks (price or market risks); institutional risks; human factor risks; financial risks[3]. Risks classified according to their sources can be of endogenous and exogenous nature.

In production risks, endogenous risks arise within the production process and are mainly caused by technological factors. Exogenous production risks, on the other hand, are divided into three groups: 1) natural climate factors; 2) various dangerous infectious diseases in crop and livestock production; 3) attacks by wild animals. The endogenous nature of commercial risks is related to the inelasticity of demand for agricultural products, while supply is elastic in the long term. Therefore, changes in market prices are influenced by supply volume, not demand. The endogenous nature of commercial risk creates a paradox – the "productivity paradox"[4]. The essence of the paradox is that during periods of high productivity, producers incur losses instead of profits. Institutional risks arise from the influence of non-economic factors on economic processes. The source of these risks lies in the state's regulatory policies affecting agriculture. These risks are exogenous in nature and can be considered as risks managed by the state rather than by insurance companies. The root cause of human factor risks lies in the behavior of management and staff during the operation of the enterprise, which typically has an endogenous nature. These risks occur within the enterprise, so they can be managed by the enterprise itself and are not covered by

[3] Marin, L. Classification of risks in agricultural insurance // - Bucharest: Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, - 2019. № 19(4) - p.173-178

[4] Huseynov, M. Theoretical aspects of the insurance system in agricultural risk management // M. Huseynov, E. Salahov, J. Jafarov – Baku: Cooperative Scientific Practical Journal, 2021. No. 2 (61), pp. 10-19.

insurance companies. Financial risks are a group of risks that arise in the process of forming and using financial resources in agricultural enterprises. Depending on the level of occurrence, these risks can be endogenous or exogenous in nature.

According to the scope criteria, agricultural risks are classified into two types: systemic and idiosyncratic (non-systemic). Systemic risks refer to hazards occurring in a specific natural climate zone that affect all or a portion of the farms operating in that area, resulting in losses. Idiosyncratic risks are primarily related to the individual activities of separate farmers in terms of their farming operations. Based on the analysis of the classification of agricultural risks according to their sources and scope, we can propose certain ideas. By combining the risks related to production, commerce, institutions, and human factors into a single term, we can refer to them as agribusiness risks. The main principle of effective agricultural risk management depends on the objective and subjective nature of their sources and scope. Therefore, measurable risks can be divided into two categories: pure and speculative. Pure risk has an objective character and is associated with losses that cannot be avoided. Speculative risk, on the other hand, has a subjective character and can result in either a gain or a loss due to human behavior. The insurance system typically covers objective risks. The third section of Chapter I of the dissertation is devoted to the topic "Conditions for the formation of the agricultural insurance market and issues of its state regulation." Certain conditions must be met for the formation of an insurance market: the creation of demand and supply for insurance products, adherence to the law of large numbers, and addressing the problems of adverse selection and moral hazards caused by asymmetric information. If these conditions are not fulfilled, the agricultural insurance market may face failure. To eliminate the failure of the agricultural insurance market, the state has three main forms of regulating the insurance market: 1) the implementation of compulsory insurance; 2) the subsidization of insurance premiums; 3) their combined application.

The negative aspect of excessive regulation of the insurance market is that, rather than mitigating the adverse selection and moral hazards created by market failure, it may intensify them. Since the

insurance of agricultural products is essential, over-regulation can lead to negligence among producers, reducing economic efficiency. The solution to this dilemma depends on correctly defining the boundaries of market regulation. These boundaries should be determined by the fact that regulated insurance markets, including the agricultural insurance market, should respond in an optimal rather than a complete manner to existing risks or unwanted events.

Optimal risk management is the boundary in insurance market regulation up to which it is possible to ensure the mass participation of policyholders without stimulating moral hazards and adverse selection. Of course, this boundary can only be defined theoretically, while in practice, numerous challenges may arise in determining these boundaries.

Chapter II of the dissertation, titled **"Evaluation of the development level and regulation of the agricultural insurance market"** consists of three subsections. In the first subsection, titled "Stages of formation and current status of the regulated agricultural insurance market in Azerbaijan" the formation of the agricultural insurance market, which is a component of the insurance market, is analyzed in two stages. The first stage begins with the adoption of the Law of the Republic of Azerbaijan on June 18, 2002, titled "On Stimulating Insurance in Agriculture." The second stage starts with the adoption of the "Agricultural Insurance Law" on June 27, 2019, and the establishment of the Agricultural Insurance Fund. As a method of state regulation, the subsidization of insurance premiums is envisioned, with 50% of the insurance premiums being covered by the state budget[5].

In the first phase, which lasted until 2020, insurance coverage for agricultural products specifically in crop production and livestock sectors was provided not only by the state insurance company but also by private companies. However, the main reason for the lack of interest from private companies in the agricultural insurance market was the high risk associated with this sector and the failure to ensure the law of large numbers, meaning the lack of mass participation.

[5] Law of the Republic of Azerbaijan on Agricultural Insurance // Baku: 2019.

**Table 1**

**The share of collected insurance premiums and claims paid in the total insurance market for the crop production and livestock in the Republic of Azerbaijan in 2016-2019 (thousand manats)**

| # | Indicators | 2016 | | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Premiums | Claims paid | Premiums | Claims paid | Premiums | Claims paid | Premiums | Claims paid |
| 1 | Livestock insurance | 1222,5 | 7 57,6 | 3009,1 | 95,0 | 2040,3 | 574,7 | 1438,8 | 936,7 |
| | Share in total, % | 0,25 | 0,31 | 0,54 | 0,03 | 0,28 | 0,24 | 0,2 | 0,3 |
| 2 | Crop insurance | 600,9 | 3,8 | 1325,7 | 1419,4 | 639,8 | 180,3 | 183,8 | 0 |
| | Share in total, % | 0,12 | 0,001 | 0,2 | 0,55 | 0,09 | 0,07 | 0,03 | 0 |
| 3 | Total: crop production and livestock | 1823,4 | 761,4 | 4334,8 | 1514,4 | 2680,1 | 755 | 1621,8 | 936,7 |
| | Total for all areas | 486074,3 | 237250,6 | 556866,6 | 257109,6 | 727954,2 | 240333,5 | 681176,8 | 301536,7 |

Source: Calculation is based on statistics from the Central Bank of the Republic of Azerbaijan.
https://www.cbar.az/page-189/insurance

As shown in Table 1, in 2016, the share of collected insurance premiums for livestock and crop production in the total agricultural insurance premiums was 67% and 33%, respectively. In 2019, the share for livestock was 88.7%, while for crop production it was only 11.3%. This disproportion in the collection of insurance premiums in crop production and livestock can be explained by two reasons. The first reason is that livestock is less dependent on natural events than crop production, resulting in a lower level of risk. The second reason is the sale of breeding livestock to farmers on favorable terms through leasing since 2009 in Azerbaijan. As we know, leasing is a form of credit, and one of the main conditions of leasing is that the leased property must be insured.

Another interesting situation is the dynamics of insurance payments due to events. Between 2016 and 2019, the share of insurance payments in the total amount of collected insurance premiums varied between 28.2% and 57.7%. Despite this, the general trend shows that the share of insurance payments in the livestock sector increased, while it decreased in crop production.

In 2016, the total amount of insurance payments due to events was distributed as 99.5% for livestock and 0.5% for crop production. By 2019, this figure for crop production was completely reduced to zero, while for livestock it sharply increased from 76.1% to 100%.

Thus, the agricultural insurance market experienced slow development in the initial stage and faced a decline between 2017 and 2019.

Table 2 illustrates the overall dynamics of insurance premiums collected and insurance payments made in the crop production and livestock sectors between 2020 and 2022. Starting from 2020, a clear turning point in this sector is observed. Compared to the previous year, the increase was 75.8%. After the implementation of the new model, a positive dynamic in insurance payments is also clearly evident. In 2022, insurance payments due to events increased significantly compared to 2021, reaching 98.8%.

The agricultural insurance market in Azerbaijan has significant growth potential due to the country's rich agricultural base and expanding farming sector.

**Table 2**

**The share of collected insurance premiums and claims paid in the total insurance market for the crop production and livestock in the Republic of Azerbaijan in 2016-2019 (thousand manats)**

| # | Indicators | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|
| | | Premiums | Claims paid | Premiums | Claims paid | Premiums | Claims paid |
| 1 | Livestock insurance | 2 842,0 | 613,0 | 6 408,0 | 574,6 | 5598,1 | 1085,4 |
| | Share in total, % | 0,39 | 0,0 | 0,76 | 0,13 | 0,58 | 0,25 |
| 2 | Crop insurance | 9,2 | 0 | 6 171,0 | 28,7 | 9209,0 | 1679,6 |
| | Share in total, % | 0,001 | 0,0 | 0,73 | 0,006 | 0,95 | 0,39 |
| 3 | Total: crop production and livestock | 2851,2 | 613 | 12579 | 603,3 | 14807,1 | 2765 |
| | Total for all areas | 728 634,1 | 465 153,1 | 843897,3 | 458726,3 | 970822,8 | 433202,5 |

Source: Calculation is based on statistics from the Central Bank of the Republic of Azerbaijan. https://www.cbar.az/page-189/insurance

With increasing awareness among farmers about the benefits of risk mitigation, demand for agricultural insurance products is expected to rise.

According to the statistical data of the Agricultural Insurance Fund for 2022, the insured area of agricultural land amounted to 261,223 hectares[6]. Considering that the total area of arable land in the country is 4,780.6 thousand hectares, simple calculations show that only 5.5% of the total cultivated area in the country is insured.

A similar situation is observed in the livestock sector. Currently, the number of cattle in livestock farms is 2,648.8 thousand heads, and the number of sheep and goats is 7,899.7 thousand heads. The total number of insured animals is only 13,102 heads, which constitutes just 0.12% of the total insured livestock.

The second subsection of Chapter II is titled "Dynamic analysis and evaluation of risks covered by the Agricultural Insurance Fund." The first risk included in the agricultural insurance package is hail. Hail events are considered systemic risks and have occurred in various regions of the country, depending on geographic climatic conditions and altitude, often recurring in different forms. The analysis of hail events that took place in Azerbaijan between 2009 and 2020 shows that this phenomenon is most characteristic of the mountainous and foothill regions, with both the frequency and intensity of occurrences being particularly concentrated in the western and northern parts of the country.

The intensity and frequency of events such as storms and hurricanes vary depending on the geographic location of the economic regions and, geographically, are mainly concentrated in mountainous and foothill areas. The analysis of the areas where heavy rainfall events occur shows that such events are most characteristic of the Sheki-Zagatala and Ganja-Dashkesan economic regions. A monthly analysis of the years 2000-2019 indicates that, as is typical for Azerbaijan's climate, the months of March and April, and even May in certain mountainous areas, are characteristic of spring frosts. A statistical analysis of the frequency of frost days during the spring

[6] Video material for service use of the Agricultural Insurance Fund: [Electronic Resource] / Agricultural Insurance Fund. – Baku, 2023 URL: https://asf.gov.az/

months shows that these events are observed with the same intensity in the regions where hail, storms, hurricanes, heavy rainfall, floods, and submersions occur. There is an interdependence and connection between their occurrence.

Fires, earthquakes, and landslides do not manifest as climatic events but as consequences of emergencies. As a result, farmers tend to assess such events differently. They may have the impression that, when an emergency occurs, the state will inevitably provide them with assistance. Therefore, the costs associated with insurance for such events are often perceived by farmers as "non-recoverable costs" or "additional taxes".

Events such as plant and animal diseases, pests, poisoning from toxic plants or feed, poisoning from chemicals, bites from snakes or insects, attacks by wild animals, and actions by third parties fall into the category of idiosyncratic risks. These risks generate more interest among farmers. Since these risks are idiosyncratic in nature and directly dependent on human factors, it is impossible to analyze their dynamics. Even if such an analysis were possible, its results would not have any scientific significance. This is because, as human factors are involved in the occurrence of these events, no regularity can be found. Each event arises in a specific form and is subjective in nature. As a result of analyzing the dynamics of risks, their frequency and intensity have primarily manifested in insurance payments for events. In the livestock sector, there was no significant change in 2022, and 95% of the payments were still allocated to dairy cattle.

In the crop production sector in 2022, the share of insurance payments for overall events was predominantly dominated by systemic risks of catastrophic origin, such as storms, hail, and floods. Specifically, the share of payments for storm events was 61%, for hail it was 18%, and for floods and submersions, it was 15%, together accounting for 94% of the total insurance payments for the events that occurred[7]. As seen, systemic risks of catastrophic origin with an objective nature are characteristic features of the agricultural sector.

[7] Video material for service use of the Agricultural Insurance Fund: [Electronic Resource] / Agricultural Insurance Fund. – Baku, 2023. URL: https://asf.gov.az/

In the third subsection of this chapter, titled "Assessment of agricultural insurance market based on sociological research results of agricultural producers" the attitude of farmers towards the agricultural insurance market has been examined. To investigate the factors influencing farmers' attitudes towards the agricultural insurance market and their tendency to enter into insurance contracts, villages in the Ganja-Dashkesan economic region Sarigamish and Ziyadli in Samukh district, and Mollajalilli and Shahriyar in Goygol district were selected. The primary objectives of the survey were: to identify the size and direction of the farms, to determine the farmers' views on the risks included in the existing insurance package based on the geographical and climatic conditions of their farms, and to explore the relationship between the factors influencing the willingness to sign insurance contracts and their desire for insurance.

According to the sample size formula, considering the number of farms (770 farms) in the research villages of both districts, a total of 137 uninsured farms were selected for the survey. The results of the survey were processed using the SPSS program. The findings revealed that farmers' attitudes towards risks were correlated with their geographical location. Farmers in the lowland zone considered frost risks more significant, while farmers in the mountainous and foothill areas regarded risks such as hail, storms, and hurricanes as more important. Among the factors influencing the signing of insurance contracts, farm size, insurance companies' promotions and discounts, and the duration of the loss assessment process were identified as key determinants. The empirical data obtained through the survey and their statistical analysis are intended to be used in determining directions for improving the regulation of the agricultural insurance market.

The third chapter of the dissertation, titled **"Improvement of the agricultural insurance market"** is also divided into three subsections. The first subsection, "Possibilities for applying agricultural insurance models formed in international practice in Azerbaijan," extensively explores the insurance models used internationally. International experience shows that the applied insurance models vary in characteristics, and their differentiation between countries is primarily dependent on the specific features of

the agricultural sector in each country, geographical climate conditions, the structure and size of farms, and other factors. Depending on the method of regulating the agricultural insurance market, three main models are generally used.

1) Government-controlled insurance model: In this model, various insurance packages are offered, and the government acts as the sole provider in the agricultural insurance market. Countries such as Canada, Greece, India, Iran, and the Philippines are examples of those that have implemented this model. The downside of this approach is that it requires significant government expenditure and may result in a lower level of service due to the monopolistic nature of state control.

2) Public-private partnership model: This is the most widely used model, where the government determines the terms of the insurance service and subsidizes a significant portion of the premiums, while also handling technical matters. The model is applied in countries like the United States, Spain, Brazil, France, Turkey, Italy, Czech Republic, Slovenia, and also in Azerbaijan. This model strikes a balance between state regulation and private sector involvement, with the government playing a supportive role in terms of financial assistance and regulation.

3) Market-based insurance model: In this model, insurance companies are driven by market principles and are directly influenced by the interests of the private sector. The government's role is minimal, with no active regulatory policies in place. The prices of insurance products are determined by competition among insurance providers. This model is based on the idea that the agricultural sector operates as part of a broader market system, and government intervention is limited to ensuring the proper functioning of the market without direct involvement in pricing or service offerings[8]. Examples of countries where the model has been applied include Hungary, New Zealand, Argentina, Australia, the Netherlands, and Switzerland.

In crop insurance, multi-risk insurance products are predominant,

[8] Reyes, C.M.. Agricultural insurance program: Lessons from different country experiences // C.M. Reyes, A.D. Agbon, C.D.Mina [et al.] // PIDS Discussion Paper Series, – Quezon: - 2017. № 2017-02, - p.21-30

accounting for 74% of global premiums. Insurance coverage for a single risk (primarily hail) ranks second in popularity, making up 16%. Other sectors (livestock, aquaculture, forestry, greenhouses) cover 10% of the total agricultural insurance market[9].

Currently, the insurance model operating in Azerbaijan under the public-private partnership framework is based on Turkey's TARSİM model. Although the Turkish model is based on the Spanish model, there is a distinguishing feature between the two. In the Spanish model, insurance contracts are offered in three types of coverage (single, multiple, and all risks), and the contract's formation depends on the choice of the insured. In the Turkish model, however, only one type of coverage is offered, which covers multiple events. The primary goal of studying the agricultural insurance market through the Turkish model is to examine its strengths and weaknesses. Such research could play a significant role in improving Azerbaijan's agricultural insurance market.

In the second chapter titled "Directions for improving the regulation of the agricultural insurance market" improvement directions have been identified to enhance the efficiency of market regulation. One of the main features of agriculture in Azerbaijan is the dominance of small producers. In crop production, the number of micro and small farms (those with land holdings of up to 10 hectares) accounts for 97.7% of all farm categories and covers 59.7% of the total land area. Small farms also dominate in livestock. According to the 2022 statistical data, 98.2% of cattle and 97.7% of sheep and goats in the republic belong to individual entrepreneurs, family farmers, and household farms. The predominance of micro and small farms in terms of ownership and number of agricultural producers is one of the main obstacles to the development of the agricultural insurance market. In 2021, the share of insurance premiums collected from micro and small farms with land holdings of up to 10 hectares was only 0.52%, despite their ownership of 59.7% of the total arable land[10].

Farmers engaged in agriculture in each economic region, which

[9] Atlas magazine «Agriculture insurance: products and schemes». URL: https://www.atlas-mag.net/en/article/agricultural-insurance-products-and-schemes

[10] Video material for service use of the Agricultural Insurance Fund: [Electronic Resource] / Agricultural Insurance Fund. – Baku, 2023 URL: https://asf.gov.az/

have different geographic and climatic conditions, assess the risks included in the insurance policy based on their personal experiences when concluding insurance contracts. It is no secret that the level of risk is higher in mountainous and hilly areas, while it is lower in plain regions. In our opinion, differentiating the tariff rates according to the geographic terrain of each economic region and preparing a map based on this could be one of the most important tools for improving the regulation of the agricultural insurance market.

The main significance of international experience lies in the fact that, in traditional agricultural insurance markets, three types of coverage are used, not just one. In addition to covering multiple risks, insurance coverage is also offered for covering just a single risk. This means that each risk can be independently covered, and the insured party has complete freedom in selecting the risk.

One of the important dependencies identified during the survey was between the signing of insurance contracts and the insurance companies offering discounts or promotions. According to the terms of the insurance contract, a separate contract should be signed for each type of product. This, in turn, leads to an excessive number of contracts, increasing transaction costs. We believe that as the number of insurance contracts for a farm increases, offering discounts can be one of the significant steps to prevent anti-selection.

One of the tools for accelerating the inclusion of small farms in insurance is the combination of insurance with access to credit resources. Since small farms have a high demand and need for credit resources, linking insurance to credit can eliminate many of the obstacles to the development of the agricultural insurance market.

Low levels of information and education typically reduce trust in insurance products and insurance companies. This primarily stems from the poor financial literacy of small farmers. Financial literacy is the ability to understand and evaluate information in order to make necessary decisions. Financial education and literacy play a decisive role in the signing of insurance contracts. One of the steps to address this problem could be the establishment of an Information Agency specializing in this field within the Agricultural Insurance Fund or joint insurance companies.

In the third chapter titled “Indexed insurance model in

diversifying the Agricultural Insurance Market," the role and essence of the indexed insurance model based on weather parameters in diversifying the agricultural insurance market are examined and analyzed. One of the most important directions for improving the agricultural insurance market is its diversification, and the indexed insurance model could play a crucial role in this direction. The insurance model applied in the country only covers catastrophic risks and system risks that are local in scope. Homogeneous and dominant liability risks, such as drought insurance, are not covered. Homogeneous risks, in addition to drought, can also include excessive rainfall, which, as the opposite of drought, leads to crop loss.

This problem is particularly evident in non-irrigated arable land. According to 2020 data, on average, 40% of arable land in our country is non-irrigated. The indexed insurance model is applied based on certain hydrometeorological parameters. Hydrometeorological parameters include indicators such as air temperature and humidity, amount of precipitation, soil moisture content, snow cover thickness, and others. The advantages of indexed insurance include: insuring the cause of an event rather than the result, transforming asymmetric information into symmetric information, solving the problems of anti-selection and moral hazard, minimizing transaction costs for small and medium farms, facilitating access to credit resources, and stimulating investment. The drawback of this model lies in the existence of a base risk. The emergence of base risk is closely related to the variation in productivity among farms. As the variation in productivity increases, the level of base risk also increases, and vice versa. At the conclusion of our research on the indexed insurance model, it should be particularly noted that the infrastructure of this model, product design, long-term collection and processing of necessary information, and finally, its implementation require both scientific research and significant financial resources.

**Table 3**

**Comparative analysis of the challenges of agricultural insurance models and recommendations for improving the Azerbaijan model**

| № | Name of models | Challanges | Recommendations |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 1 | A state-controlled insurance model (Canada, Greece, India, Iran, and the Philippines) | ✓ High costs<br>✓ Complete monopoly of the state<br>✓ Low level of services<br>✓ Compulsary character in mass case | |
| 2 | Model based on market principles (Hungary, New Zealand, Argentina, Australia, Netherlands, Switzerland) | ✓ The state does not intervene in the agricultural insurance market, but provides informational support<br>✓ Subsidy is not paid for insurance premiums<br>✓ The insurance market is regulated on the basis of commercial principles<br>✓ Poor development and lack of diversification of the agricultural insurance market | |

| | | | | |
|---|---|---|---|---|
| 24 | 3 | The model created within the framework of public-private partnership (Spain, Brazil, France, Turkey, Italy, Czech Republic, Slovenia, Azerbaijan) | ✓ Cannot cover mass small farms<br>✓ Failure to include all existing risks in the insurance envelope<br>✓ Event investigation, risk assessment and damage determination shall be carried out only by AIF<br>✓ Differentiation of tariff rate only according to economic regions<br>✓ High tariff rates in certain cases | ✓ Inclusion of the risks included in the insurance envelope according to the choice of the farmer in addition to the group form<br>✓ Increasing the amount of subsidy for small farms and differentiating it according to risks<br>✓ Differentiation of tariff rates in terms of territory and climate within the economic region<br>✓ Linking insurance to loan resus instead of subsidy<br>✓ Lowering the volume of franchise in animal husbandry<br>✓ Raising the level of awareness (especially financial literacy, IT skills),<br>✓ Establishment of a Specialized Information Agency<br>✓ Insurance market diversification (introduction of index insurance) |

## Conclusion and recommendations

The solution to the issues set forth in the dissertation allows for the following effective outcomes:

1) The agricultural sector is exposed to a combination of natural risks and business risks. This combined impact of risks results in large losses for farmers and low levels of income. The distinctive nature of the risks in agriculture necessitates their classification under the term "agribusiness risks."

2) Agribusiness risks, based on their origin, can be both endogenous and exogenous, and they may occur in either systemic or idiosyncratic forms.

3) To smooth out the sharp fluctuations in farmers' incomes, the optimal management of risks should be the basis for improving the regulation of the agricultural insurance market. In the process of optimal risk management, anti-selection and moral hazard should be avoided in ensuring the market's inclusiveness.

4) The first phase of the establishment of the agricultural insurance market in Azerbaijan, with the government’s passive involvement, resulted in its failure. Although the second phase, which began in 2020, saw the active intervention of the government in the agricultural insurance market, there is still significant potential in this field.

5) The intensity and frequency of the risks covered by insurance have been analyzed and assessed over the long term. The geographical and climatic patterns of risk occurrence must be considered in improving the regulation of the agricultural insurance market.

6) A key finding of the survey on farmers' attitudes toward insured risks is that farms have different attitudes toward risks based on their geographical location. Considering this factor in policymaking could play a crucial role in the optimal management of risks.

7) Among the factors negatively affecting the signing of insurance contracts identified by uninsured farms in the survey are farm size, loss assessment period, and insurance companies' promotions and discounts. Conducting similar surveys in different regions of the country can help investigate other factors and, by considering the results, improve the inclusiveness of the insurance market.

8) Studying the achievements and challenges faced by international practices in the regulation of agricultural insurance markets is one of

the key steps in this direction. Since Azerbaijan's agricultural insurance model is based on the TARSİM model, drawing relevant conclusions from the experiences of Turkey and other countries implementing this model could positively influence the improvement of Azerbaijan's agricultural insurance market.

9) The biggest challenge in improving the regulation of the agricultural insurance market is the absolute dominance of small farms in total agricultural production. Since farm size is the main barrier to signing insurance contracts, various tools should be used to turn them into active participants in the insurance market. These tools include differentiating the tariff rates according to the geographical area and farm size and expanding the use of discounts.

10) To ensure the inclusiveness of the agricultural insurance market, linking insurance contracts with subsidies based on cultivated area would indirectly make insurance mandatory.

11) One of the challenges facing the signing of insurance contracts is the lack of information and the low level of education.

12) To improve the agricultural insurance market, diversification can occur in two directions. The first direction involves the diversification of the market within the framework of the traditional insurance model, by offering different types of insurance coverage. The second direction is the application of the indexed insurance model based on weather parameters, which is primarily designed for small farms and has been successfully implemented in many developing countries.

Based on the findings of the research, the following recommendations are made:

1) To stimulate farmers' attitudes toward signing insurance contracts under various risk conditions, tariff rates should be differentiated based on geographical area and climatic conditions.

2) To ensure the inclusiveness of the agricultural insurance market and optimal risk management, insurance companies should apply various discounts and conduct promotional campaigns.

3) To implement the principle of voluntariness, insurance contracts should be linked to farmers' access to preferential credit resources.

4) To address the issue of information scarcity, an Information Agency should be established within the relevant institutions, and

mobile teams should be created on-site to accelerate awareness-raising efforts.

5) Various insurance models, including the indexed insurance model, can be used to develop, improve, and diversify the agricultural insurance market.

**The main provisions of the dissertation are reflected in the following scientific articles:**

1. Huseynov, M.J., Salahov, E.A., Jafarov, J.F. Theoretical aspects of the insurance system in agricultural risk management // - Baku: Cooperation scientific-practical journal - 2021. №2 (61), - S.10-18. Baku. Cooperation scientific-practical journal

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3. Jafarov, J.F. Theoretıcal basis of agricultural risks and the insurance factor in its management // - Ganja: Scientific works of Azerbaijan State Agricultural University - 2023. №1, - p. 40-45

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