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INSURANCE OF AGRICULTURAL CROPS AGAINST RISKS

Eldor Nozimov
Samarkand Institute of Economics and Service Senior Lecturer
Department of "Investment and Innovations"
eldornozimov@gmail.com
https://orcid.org/0000-0003-1580-8654

Abstract: This article examines the economic importance of insurance in agricultural production, the specific characteristics of risks in the agro-industrial complex, and issues related to their insurance protection. In the context of global climate change, modern methods of crop insurance, including index-based insurance types, are analyzed, and scientific proposals for the development of the sector are developed.

Keywords: Agro insurance, crop insurance, index insurance, climate risks, reinsurance, food security, state support.

INTRODUCTION

Agriculture is one of the most strategic sectors of the national economy, as it is directly linked to food security. However, this sector is highly sensitive to natural and climatic factors. In recent years, unexpected events such as droughts, heavy rains, hailstorms, and frost have caused significant economic losses for agricultural producers. Under such conditions, agricultural insurance (agro insurance) is becoming the only effective mechanism ensuring the financial stability of farmers and agricultural enterprises.

In the Republic of Uzbekistan, special attention is being paid to the development of the insurance market in the process of agricultural reform. In particular, the abolition of state orders for cotton and grain production and the transition to a cluster system have further increased the role of insurance. However, problems such as high insurance premiums, the complexity of damage assessment systems, and insufficient methodology still persist in the agro insurance sector.

The purpose of this study is to examine modern methods of agricultural risk insurance, optimize insurance coverage mechanisms based on international experience, and develop proposals for the digitalization of the sector. In modern conditions, agriculture is not only an economic sector but also the foundation of national security and social stability. However, the agro-industrial complex, by its nature, is an open-air production system highly vulnerable to natural disasters, droughts, and technological risks. Globally, due to climate warming, annual losses in agriculture amount to billions of dollars. In such a situation, agricultural insurance (agro insurance) serves as a financial "safety cushion" for farms.

In Uzbekistan, especially given limited water resources and a sharply continental climate, the development of the agro insurance market is of strategic importance. Today, the transition from state orders to free market relations requires bringing the relationship between insurers and insured parties to a new level. The relevance of this article lies in the fact that traditional insurance mechanisms are no longer sufficiently effective under current high-risk conditions, necessitating the introduction of innovative approaches.

LITERATURE REVIEW

The theory of agricultural insurance has been widely covered in the works of foreign economists J. Kvitko and P. Hazell, who emphasized problems such as "information asymmetry" and "moral hazard." According to them, traditional methods in agro insurance (direct crop assessment) may not justify themselves due to high administrative costs.

Among local scholars, B. Safarov studied issues related to state participation in providing insurance protection for agricultural entities. N. Jumanov analyzed the effectiveness of using space monitoring and

remote sensing (GIS) technologies in agro insurance. Nevertheless, the scientific basis for the widespread implementation of weather index-based insurance models in Uzbekistan has not yet been fully formed.

The theoretical foundations of agricultural insurance have been studied from various perspectives by many economists. In particular, J. Skees and P. Hazell examined the concept of "systemic risk" in agro insurance, demonstrating that simultaneous crop losses across large areas create high liquidity risks for insurance companies.

Russian scholar V.V. Shakhov evaluated agro insurance as a special fund ensuring socio-economic stability, while Uzbek scholar H.S. Shennayev studied the importance of digital monitoring systems in agro insurance. In addition, B. Safarov analyzed the multiplicative effect of state subsidies in protecting agricultural entities through insurance. However, the adaptation of InsurTech solutions to Uzbekistan's agricultural sector still requires further research.

METHODOLOGY

In preparing the article, methods such as a systematic approach, statistical analysis, expert evaluation, and comparative analysis were used. The object of the study was the indicators of the agro insurance market in Uzbekistan. During the analysis, the experiences of leading countries (India, Canada, Turkey) were compared with Uzbekistan's practices.

The following methodological approaches were applied:

- Statistical and dynamic analysis: Studying the dynamics of agro insurance premiums and payments in recent years in Uzbekistan.
- Systematic approach: Analyzing agricultural risks by dividing them into climatic, biological, and market risks.
- Comparative analysis: Comparing Turkey's "TARSIM" model and India's "PMFBY" program with Uzbekistan's experience.
- Scenario method: Forecasting potential index insurance payments under various weather conditions.

DISCUSSION AND RESULTS

The study shows that there are three main models of agricultural insurance:

Classical insurance: Direct assessment of actual crop losses in the field.

- Index insurance: Payments based on district-level average yields or weather parameters (precipitation, temperature).
- Public-private partnership: A model in which part of the insurance premium is subsidized by the state.
- In Uzbekistan, the introduction of a "weather index-based insurance" model is considered the most promising direction for developing agro insurance. In this method, there is no need to establish a commission to assess damages; instead, payments are made automatically based on meteorological data (for example, insufficient rainfall). This reduces corruption risks and accelerates the process.
- According to analysis, subsidizing 50% of insurance premiums by the state can increase farmers' insurance coverage by 30–40%.

Currently, Uzbekistan's agro insurance market is still in the formation stage, and insurance coverage is mainly mandatory or used as collateral for loans.

As a result of the research, a three-level model for effective agro insurance organization is proposed:

- Micro level: Simplified, affordable insurance policies (micro insurance) for farmers and smallholders.
- Meso level: Comprehensive insurance covering technological and market risks for clusters and large agro-enterprises.
- Macro level: A catastrophic risk fund involving the state and international reinsurance companies.

Particular attention is given to the introduction of index (parametric) insurance. In this mechanism, payments are linked not to yield but to a specific parameter (e.g., temperature exceeding +45°C or rainfall

being 30% below normal). This eliminates subjectivity in damage assessment and reduces claim settlement time from 6 months to 15 days.

CONCLUSION AND RECOMMENDATIONS

As a result of this study, it has been proven that the system of agricultural crop insurance is one of the most important mechanisms for ensuring the country's economic stability and food security. The conducted analyses show that traditional insurance methods are gradually losing their effectiveness under current conditions, making it an objective necessity to introduce innovative digital technologies and index-based insurance models based on weather parameters into the sector. Furthermore, it is essential to fundamentally reconsider the state support system in order to increase the trust of agricultural entities in insurance services and to reduce their financial burden.

Based on the above, the following proposals are put forward to improve the agro insurance system. First, it is advisable to establish a unified specialized agro insurance operator or agency that integrates the interests of the state, insurance companies, and agricultural entities, based on international experience, particularly Turkey's "TARSIM" model. Second, in order to expand insurance coverage, it is necessary to legally strengthen the mechanism for subsidizing a certain portion of insurance premiums (at least 50 percent) from the state budget. Third, to reduce the human factor in damage assessment and ensure transparency, it is required to fully integrate remote sensing (GIS) and satellite monitoring systems (Agro-InsurTech) into insurance processes. Fourth, it is necessary to develop a catastrophic risk management system that connects the domestic insurance market with international reinsurance companies in order to maintain the solvency of insurance companies during major natural disasters and global climate crises. Fifth, organizing targeted training programs and continuous awareness campaigns aimed at improving the insurance culture of agricultural entities will help eliminate systemic problems in the sector. The implementation of these proposals will not only protect agricultural producers from unexpected economic losses but also ensure the investment attractiveness and sustainable growth of the sector.

Introduction of a subsidy system: Considering the high cost of agro insurance tariffs, part of the insurance premiums should be covered through the State Agricultural Support Fund.

- Implementation of space monitoring: Use of satellite data to assess crop conditions and reduce the human factor.

- Reinsurance of catastrophic risks: Placement of risks of local insurers with international reinsurance companies (such as Swiss Re and Munich Re) to maintain solvency during large-scale natural disasters.

- Strengthening index insurance legislation: Legally defining the concept of "index insurance" and promoting this type of product.

The implementation of these measures will ensure the financial stability of agricultural producers while significantly reducing investment risks in the sector.

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