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METHODOLOGICAL BASIS OF FORMATION OF AGRICULTURAL INSURANCE SERVICES IN DEVELOPING COUNTRIES

K.Nosurullaev - 3rd year PhD student, "Tashkent institute of irrigation and agricultural mechanization engineers" National research university.

Abstract

The article describes the goals, the essence of the programs, and the consequences of their implementation, which are being achieved by the state in supporting the formation of agricultural insurance services in developing countries. Special attention is given to agricultural insurance in the most developed countries (China, Germany, France, Italy, Spain, Israel). Features of agricultural insurance schemes, roles and tasks of state and private insurers, methods of state support of the offered types of insurance and achieved results are presented.

Keywords: *agricultural insurance, state support, experience, practice, low-risk, combined insurance.*

Introduction. Agricultural production is inevitably associated with industry-specific risks that must be managed to achieve high management efficiency within the risk management system. Agricultural production varies from year to year depending on unpredictable weather conditions, disease and pest damage, and market factors related to crop yields and prices.

Creating the optimal agricultural insurance product is not an easy task. Private insurance companies are slow to expand their services into the agricultural sector. This is due, firstly, to the fact that it is difficult for them to work with systematic non-diversifiable risk caused by crop losses due to natural disasters, since the latter, as a rule, affect a large number of farms over a large territory. It seems to be a difficult task to correctly calculate insurance rates taking into account the low degree of probability of risk, but with possible significant losses.

Secondly, conflicting information often leads to incorrect selection and moral problems, which increases the costs and risks when introducing insurance services in agriculture compared to other sectors of the economy. Perverse selection in the agricultural insurance market arises when insurance companies find it impossible or very costly to differentiate between high-risk and low-risk policyholders. Thus, the insurance premium is averaged for all entities, which is unacceptable because it leads to undervaluation of high-risk entities and overvaluation of low-risk entities for the same types of contracts. Over time, low-risk consumers drop out and insurance companies remain with very high-risk consumers, negatively impacting insurance company profitability.

Materials and methods.

The degree of development of the problem. The work of many foreign and domestic scientists is devoted to the problem of the formation and development of insurance in the afar sector. The methodological basis for such studies is contained in the works of such authors as Abdrakhimov E.V., Basakov M.I., Belykh V.S., Biryuchev O.I., Bland D., Burrow K., Vobly K.S., Gvozdenko A.A., Dadkov V.N., Zadkov A.P., Zernov A.A., Zubets A.N., Klimova M.A., Lapaev S.M., Linii Yu.I., Tsikitenkov L.K., Nikitin A.B., Onishchenko A. M., Orlanyuk-Malitskaya L.A., Orlova I.V., Pleshkov A.P., Semenov V.N., Fedorenko A.B., Eldiev M.N. and etc.

Theoretical and methodological issues of forming a system of state regulation of the agricultural sector are reflected in the works of Andrianov V.D., Burobkin I.N., Zagaitov I.B., Kamalyan A.K., Klyukach V.A., Krylatykh E.N., Kurnosova A.P., Kushlina V.I., Lukicheva n.M., Miloserdova V.V., Mindrina A.S., Sagaidak E.A., Serovoy E.V., Strokovoy O.G., Surkova I.M., Polovnkina P .D., Ternovykh K.S., Tikhonova T.V., Ulezko A.V., Khitskova I.F., Kholodova L.G., Khramovoy I.G., Shishkina A.F., Shutkova A.A. etc. Noting that the problems of the formation and development of the insurance services market in the agricultural sector have been studied quite deeply theoretically and practically, it should be recognized that in the context of overcoming the consequences of the global financial crisis, many issues related to the specifics of the development of insurance market institutions require further research, among them: development of methodological approaches to determining the main directions of development of agricultural insurance.

Results and discussion.

The largest agricultural insurance market has been formed in North America - it accounts for more than 50% of all insurance premiums for this insurance, about ¼ of insurance premiums are collected in Asian countries, less than 20% in European countries [1]. Existing insurance schemes differ in the range of insurance products, the role of private insurers, and methods of government participation. The most common form of insurance is voluntary. But there are countries with compulsory agricultural insurance, for example Israel, Greece, Kazakhstan, Belarus, Morocco. Finally, in a number of countries (in particular, the USA, Spain, Italy, China), when implementing insurance programs with state participation, the principle of imputation is applied, when the possibility of the state providing agricultural producers with certain types of financial support is determined by the presence of insurance contracts. This increases the participation of farms in insurance programs.

The following options for agricultural insurance, common in different countries of the world, can be distinguished:

1) insurance against individual risks (single-risk insurance);

2) combined insurance (combined (peril) insurance);

3) multi-peril crop insurance;

4) income insurance (revenue insurance) and profit insurance (income insurance);

5) index insurance;

6) animal insurance.

Agricultural Insurance in China: History, Development and Success Factors.

China is one of the world's largest agricultural production economies with a rapidly developing agricultural insurance system. The agricultural insurance system in China is distinguished by its success and

efficiency. This success was achieved through systemic efforts and reforms[3]. The model includes a high level of government action to implement an agricultural insurance program with subsidized premiums.

In 2007, following the introduction of the premium subsidy system, total premiums collected soared to US$0.68 billion, an increase of more than 500% from 2006 (US$0.11 billion). This positive trend in premiums collected continued over the following years, reaching an estimated US$6.3 billion in 2016.

In 2007, the Chinese Government allocated US$0.28 billion for a premium subsidy program to fund 50% of insurance premiums. In 2008, the government spent US$1.1 billion to cover 60% of insurance premiums. Government support aimed at subsidizing premiums in 2007 significantly contributed to the penetration of agricultural insurance into the market, making insurance the main tool for reducing risks for farmers. In 2010, a subsidy program for agricultural insurance was introduced in 25 provinces of the country.

In 2016, there were about 26 insurance companies operating in the agricultural insurance market, which offered about 170 types of insurance products for staple crops, commercial crops, livestock, forest plantations, fruits, vegetables, medicinal herbs and local agricultural products. Currently, insurance companies offer multi-peril insurance, index insurance, price index insurance, direct loss insurance and loss of profit insurance (pilot program).

Reinsurance is provided by China's agricultural reinsurance pool (CARP), established in 2014 by the Chinese company P&C Re and 23 licensed insurance companies. China's P&C Re has been appointed as managing agency. The management agency coordinates the requirements and conditions of reinsurance with its members, reviews the business activities of the members, assesses the potential of the pool and its business plans. Pool participants contribute approximately 50% of the reinsurance premium to the pool[2].

Challenges affecting China's agricultural insurance system include a lack of quality farm-level data, the need to improve loss assessment procedures, and a lack of transparency in information provided to international reinsurance companies.

Agricultural insurance in Germany: history, development and success factors.

In Germany, insurance is provided by mutual insurance associations. The first such association appeared back in 1797. Insurance is provided in Germany against only one risk - hail; it covers more than 80 percent of German agricultural crops. As a rule, insured farmers are members of such associations. However, peasants who are not members also have the right to be insured. This type of insurance has gained a good reputation among German peasants and is used as a reliable risk management tool. Monitoring and assessment of insured losses is carried out by members of associations, i.e. by the farmers themselves. In this case, an interregional system of work of appraisers is used: farmer appraisers must necessarily be from a different region than the region in which the assessment is carried out. This helps solve the problem of abuse. In the event of the formation of unclaimed insurance reserves, by decision of the General Meeting of Association Members, these funds are paid to members of the associations. Funds allocated by mutual insurance associations for the formation of insurance reserves are not subject to taxes if they do not exceed a certain percentage of the insured amount.

Agricultural insurance in France: history, development and success factors. In France, there is a Natural Disaster Fund that compensates for losses of agricultural crops and pasture-type farm animals. Insured risks include excessive precipitation, flooding and inundation, frost, drought, hurricanes, epidemics, and parasites. The Fund is formed through additional premiums to property insurance contracts.

Agricultural insurance in Italy: history, development and success factors. In Italy, agricultural insurance is provided mainly by private insurance companies, but there is significant financial assistance from the government. Moreover, hail is practically the only risk that is subject to insurance. Small crop frost insurance programs are available for the production of grapes, fruits and artichokes. 50% of the cost of paying insurance premiums is borne by the government of the country, the other half by farmers (local authorities in some cases take on up to 10% of premium payments)[5].

Agricultural insurance in Spain: history, development and success factors. Insurance is most widespread in Europe in Spain. Insurance is provided in Spain against almost any risk. In Spain, more than 70% of farmers, approximately 90% of crops and 70% of animals are insured. The Spanish government subsidizes both crop insurance and animal insurance. On average, subsidies are at the level of 53% of the total amount of insurance premiums. Of these, 40-45% are subsidized by the central government, and 10-15% by regional governments. Catastrophic losses are compensated, first of all, to farms that have insured their crops or animals. All risks are reinsured through a state reinsurance company.

When natural disasters occur, the government does not make any payments, since agricultural insurance schemes cover almost all risks that may affect farmers' incomes.

Agricultural insurance in Israel: history, development and success factors. In Israel, the development of domestic agricultural insurance has been actively supported at the state level for more than half a century. The State Natural Disaster Protection Fund oversees agricultural insurance issues in the country: subsidizing premium rates (35% for all types of crop and animal insurance) and reinsurance of risks. The state also pays farmers 80% of premiums paid under a separate disaster protection program.

Conclusion.

Different countries use different strategies for the development of agricultural insurance, but all of them can be divided into purely commercial and government-supported programs.

An important condition for the successful implementation of agricultural insurance products are the channels and methods of their distribution. Agricultural insurance contracts can be concluded both directly with large and small farms, and with exporters, importers, banks, etc. For example, you can not only consider this insurance as a tool for managing the income and risks of the agricultural producer itself, but also offer it to banks that are interested in reducing the risk of lending to the agricultural industry.

Innovative methods and technologies in the field of agricultural insurance promise to significantly increase the financial efficiency of insurance programs, as well as minimize and, under certain conditions, eliminate most of the problems that have traditionally hampered the development of agricultural insurance on market principles.

References:

1. Bokusheva, R., Breustedt, G., Heidelbach, O. (2006): Measurement and comparison of risk reduction by means of farm yield, area yield, and weather index crop insurance schemes – The case of Kazakhstani wheat farms, Poster paper presented at the 26th Conference of the IAAE, 'Contributions of Agricultural Economics to Critical Policy Issues', Brisbane/Australien, August, 12-18.
2. CME (2006): Chicago mercantile exchange, , accessed on 15.012006.
3. DORAISWAMY, P., MURATOVA, N. , SINCLAIR, T., STERN, A., AKHMEDOV, B. (2002): Evaluation of MODIS Data for Assessment of regional spring wheat yield in Kazakhstan, Geoscience and Remote Sensing Symposium, 2002, IGARSS '02. 2002 IEEE International,
4. EUROPEAN COMMISSION (2001): Risk management tools for EU agriculture; Working Document, Brussels.
5. FOOD AND AGRICULTURE ORGANIZATION (1991): FAO Crop Insurance Compendium 1991, Rome.
6. GOODWIN, B. K., SMITH, V. H. (1995): The economies of crop insurance and disaster aid, AEI Studies in Agricultural Policy, Washington
7. Summary of Business Reports and Data / Risk Management Agency. Available at: https://www.rma.usda. gov/data/sob.html.
8. Crop insurance for the wealthy? Germany: Munich RE, 2011. Available at: http://www.munichre.com/site/corporate/get/documents_E2053940859/mr/assetpool.shared/Documents/0_Corporate%20Website/2_Reinsurance/Business/Non-Life/Systemagro/systemagro-crop-insurance-for-the-wealthy_en.pdf.
9. Agricultural Insurance System in the USA. Available at: http://fagps.ru/fagps_zarub_usa.htm.
10. Zhichkin K. A., Shumilina T. V. Insurance of Risks of Agricultural Organizations in Conditions of State Support. Samara: SSAA Publ., 2013
11. Foreign Experience of Insurance in Agriculture. Moscow: FASSAC Publ., 2008.
12. K.Nosurullaev (2023). ORGANIZATIONAL-ECONOMIC BASES OF THE IMPACT OF CLIMATE CHANGE ON AGRICULTURE AND DIRECTIONS OF INSURANCE. EPRA International Journal of Climate and Resource Economic Review - Peer Reviewed Journal, Volume: 11 | Issue: 4 |July 2023 || SJIF Impact Factor (2023): 8.076 || Journal DOI: 10.36713/epra1213.
13. Nosurullaev K. (2022). Risks of agricultural products and the need for insurance in developing countries, Sustainable agriculture 4(16)-2022, 50-54.
14. Q.A.Nosurullaev, I.O.Yunusov (2022). Demand for high-quality agro-insurance services in agriculture and the main indicators of its determination, Sustainable agriculture 3(15)-2022, 28-30.
15. Q.Nosurullaev. Foreign experiences on organization of agricultural insurance system, Sustainable agriculture 1(13)-2022, 28-30.