UDK: (1-8.7) 37.018.7:368.5:368.54+368.32:368.8:347.6:35.078.5:368.025.1
(72)(71)(5)(8)(6)(93)(31) (4)
DOI: 10.5937/tokosig2004

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FOREIGN EXPERIENCE IN AGRICULTURAL INSURANCE

REVIEW ARTICLE

Abstract

The aim of this paper is to present characteristics of agricultural insurance at the global level. Agricultural insurance is most often seen, in a narrower sense, as crop insurance and livestock insurance. This type of economic protection has been applied since the 18th century, and today it is considered a part of a comprehensive risk management strategy in agricultural production. The most significant differences in agricultural insurance, at the global level, are the risks that can be insured in certain countries, as well as whether, or to what extent, agricultural insurance premiums are subsidized by the state. Agricultural insurance in most countries is voluntary, somewhere it is a condition for exercising the right to agricultural subsidies, and it is mandatory only in Greece and Cyprus.

***Key words**: agricultural insurance, crop insurance, livestock insurance, risks in agricultural insurance, state support to agricultural insurance, insurance premium subsidies, agricultural insurance market models.*

I. Introduction

Agricultural insurance is a type of property insurance that combines crop insurance, livestock insurance and several special subtypes of insurance that cover dangers threatening agricultural production or only certain subject of insurance. In a broader sense, it can be said that agricultural and any other insurance is intended to protect workers and assets as a part of production process in that business activity.

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Paper received on: 08 December 2020
Paper accepted on: 29 December 2020

This includes liability insurance in agriculture, business interruption insurance of farms, which compensates for lost profits and certain fixed costs. The offer contains special legal protection insurance for agricultural activities. In recent years, advances in biotechnology and genetic technology have become increasingly important in agriculture, and since they increase risks, they affect insurance.[2]

Agricultural insurance is most often viewed in a narrow sense as crop insurance and livestock insurance. Crop insurance has been in place for three centuries. In Europe, crops were first insured against the risk of hail. This insurance was first to appear in Germany in 1719, in France in 1802, and has been effected in the United Kingdom since 1840. It was not until 1870 that crop insurance against the risk of hail took roots in the United States of America.[3] Today, crop insurance accounts for about 90% of the total global agricultural insurance premium written.[4]

Insurance can be one component of a comprehensive agricultural risk management strategy.[5] According to international experts, agricultural insurance, in addition to financing agriculture, is strategically important for eradicating extreme poverty and promoting common prosperity on a global level. It is estimated that agriculture is the only or an additional source of livelihood for 500 million small farms or 2.5 billion people worldwide.[6] The importance of agricultural insurance lies in the fact that it allows small farms greater access to quality sources of financing, given that lenders are more willing to lend to farms when crops are insured.[7]

Crop insurance, as a type of security, provides economic protection for annual or perennial plants, regardless of whether they are the main crops, sub-crops or stubble crops. Subject of insurance may be arable crops, vegetable crops, orchards, vineyards, planting material, flowers and ornamental plants, as well as young forest plants. Subject of insurance can even be those plants that are not the subject of cultivation, that is, those that freely grow in the nature, such as poplar and reed. Regardless of whether being annual or perennial, only annual yield is insured. The subject matter of insurance is mostly fruit, but other parts of the plant can also be insured (flower, stem, leaf and root).

[2] Nebojša Žarković, „Osiguranje u poljoprivredi – nedovoljno razvijeno, a još manje korišćeno", *Poljoprivrednikov poljoprivredni kalendar 2016,* 2016, str. 72.

[3] Swiss Re, „Product innovation in non-life insurance", *Sigma*, 4, 2011, p. 1.

[4] Rosa Rico Iturrioz, „Agricultural Insurance", *Example Series on Insurance*, The World Bank, Washington, DC, 2009, p. 11.

[5] Olivier Mahul, Daniel Clarke, Brendan S. Maher, „Agricultural data and insurance", *Disaster risk financing and insurance technical note Washington, D.C,* World Bank Group, 2013, *http://documents.worldbank.org/curated/en/823271468321541794/Agricultural-data-and-insurance*, pristupljeno: 16. 9. 2020, str. 2.

[6] Panos Varangis, *Agriculture Finance & Agriculture Insurance*, Tho World Bank IBRD – IDA, 2019, *https://www.worldbank.org/en/topic/financialsector/brief/agriculture-finance*, pristupljeno: 16. 9. 2020. str. 1.

[7] Debraj Ray, Madhumala Pathy, Vijay Kalavakonda, „Program Information Documents (PID)", *Agriculture Risk Resilience and Insurance Access Program*, The World Bank, 2018, *http://documents1.worldbank.org/curated/en/719431542613347393/pdf/Appraisal-Stage-Program-Information-Document-PID-Agriculture-Risk-Resilience-and-Insurance-Access-Program-P165923.pdf,* pristupljeno: 16. 9. 2020, str. 2.

Livestock insurance is one of the oldest classes of insurance. All types of domestic and wild animals can be insured, although cattle is mostly insured since it makes up the largest part of this insurance line. According to the definition, "cattle insurance is a specific class of insurance given that the subject of insurance is a living being that operates according to biological laws, and that the possibility of an occurrence is more frequent than plant production, because it is possible throughout insurance period."[8] The subject of insurance is the animal as a whole, and not its products such as meat, milk, wool, skin, eggs and feathers. Animals that are in poor condition, as well as animals kept in poor zoohygienic conditions, cannot be the subject of insurance.[9] Livestock insurance is a short-term insurance, lasting one year or less, and is usually tied to one production cycle or shift. Based on research conducted in the USA in 2001, it was concluded that the occurrence of many animal diseases deviates significantly from the conditions required for their breeding, which are defined by insurance.[10]

The aim of this paper is to present characteristics of crop insurance and livestock insurance at the global level. The paper uses a descriptive and comparative method, as well as a method of analysis and synthesis.

II. Presence of Agricultural Insurance in Certain Parts of the World

Crop insurance is one of the fastest growing insurance lines. According to the World Bank, the agricultural insurance premium in 2005 amounted to eight billion US dollars, and only three years later, in 2008, it reached the amount of 18.5 billion US dollars. In the structure of premium, in 2008, crop insurance accounted for as much as 90%, and livestock insurance only 4% of the total agricultural insurance premium worldwide.[11]

According to the World Bank, when observing the geographical dispersion of premium by continents in 2008, agricultural insurance was most represented in North America, i.e. in the USA and Canada, which accounted for 62% in the total world agricultural insurance premium. It is followed by Asia with 18%, Europe with 17%, while Latin America, Africa, Australia and New Zealand individually accounted for 1% in the total world agricultural insurance premium in 2008.[12] Based on the

[8] Todor Marković, „Razvoj osiguranja stoke u Srbiji", *Letopis naučnih radova*, 2007, God. 31, br. 1, str. 158.
[9] Priručnik za praksu u osiguranju i reosiguranju DDOR „Novi Sad", Novi Sad, 1996, str. 290.
[10] Stephen R. Koontz, Dana L. Hoag, Dawn D. Thilmany, John W. Green, Jennifer L. Grannis, (Edt.), *The Economics of Livestock Disease Insurance: Concepts, Issues and International Case Studies*, CABI Publishing, Cambridge, USA, 2006, pp. 7-8.
[11] R. R. Iturrioz, pp. 3-5.
12 R. R. Iturrioz, p. 5.

above data we can conclude that Europe is only in third place, although agricultural insurance began in Europe.

In some European countries, agricultural insurance is poorly developed. This is the case in Norway, Sweden and Estonia. In Latvia, Lithuania and Poland, although these countries have extremely developed agriculture, it has only just begun to develop. In Finland, crop and fruit insurance is also poorly developed, but the state organized a compensation fund to cover yield losses caused by natural disasters.

The most significant differences in agricultural insurance at the global level exist in the types of risks from which it is possible to insure agricultural production in certain countries. There are also differences in whether, in addition to quantity, it is possible to ensure quality when insuring crops, i.e. whether farmers can also insure their income. In addition, there are differences in whether certain countries provide financial support from their budgets for the development of agricultural insurance, i.e. for subsidize insurance premiums. Agricultural insurance is mainly effected on a voluntary basis. There are countries such as Greece and Cyprus, where agricultural insurance is mandatory and a condition for farmers to exercise the right to state subsidies.

III. Risks in Crop Insurance

In the USA, as the largest food producer in the world, there is huge experience in agricultural insurance.[13] Insurance of crops against several types of risks originated in the 1930s of the 20th century in the USA. However, in most European countries, even today, the most common crop insurance is effected against the risk of hail, and to a lesser extent against the risk of frost and storm. In countries such as Belgium, the United Kingdom, Ireland, Denmark and Finland crops can be insured only against hail (Table 1).

Table 1. Crop insurance risks in certain countries[14]

COUNTRY	RISK OF HAIL	OTHER RISKS
AUSTRIA	YES	Frost, drought, flood, snow, excessive precipitation, storm, pests
BELGIUM	YES	-
THE CZECH REPUBLIC	YES	Flood, storm, fire, freezing, spring frost, frost in viticulture
DENMARK	YES	-
FINLAND	YES	-

[13] Barry K. Goodwin, Vincent H. Smith, *The economics of crop insurance and disaster aid*, AEI Press, Washington, 1995, p. 153; Dennis A. Shields, „Federal crop insurance: background and issues", In: Angela M. Gil (Editor): *Agriculture Disaster & Crop Insurance,* Nova Science Publishers, Hauppauge, NY, 2011, p. 46.

[14] Todor Marković, „Osiguranje useva i plodova kao instrument za upravljanje rizikom u poljoprivredi", *Letopis naučnih radova*, 2009, god. 33, br. 1, str. 32.

COUNTRY	RISK OF HAIL	OTHER RISKS
FRANCE	YES	Flood, drought, excessive precipitation, ice, frost, storm (corn and sunflower)
GREECE	MANDATORY INSURANCE	Storm, drought, frost, flood, heatwave, damage caused by bears and wild boars
IRELAND	YES	-
ITALY	YES	Earthquake, avalanches, frost, excessive rain, drought, ice, hail, frozen dew, storm, flood
JAPAN	YES	Drought, typhoon, snow drift, flood, earthquake, volcano, diseases and pests
CANADA	YES	Drought, frost, snowfall, flood, storm, snow, various diseases and pests
CYPRUS	MANDATORY INSURANCE	Excessive precipitation, frost, heatwave, storm, drought, strong dry wind, flood
LITHUANIA	YES	Excessive precipitation, freezing, drought
LUXEMBOURG	YES	Frost, storm, flood, drought, freezing, long-term humidity
HUNGARY	YES	High waters, storm, fire, frost, drought, freezing, snow, flood, torrents
GERMANY	YES	Storm, flood, frost, freezing
PORTUGAL	YES	Fire, lightning, explosion, storm, frost, rainstorm, earthquake
USA	YES	Drought, flood, frost, fire, lightning, storm, various diseases and pests
SLOVAKIA	YES	Flood, storm, fire, freezing, spring frost, frost in viticulture
SLOVENIA	YES	Fire, lightning, frost, storm, flood
SERBIA	YES	Fire, lightning, frost, storm, flood
SPAIN	YES	Fire, frost, flood, cloudburst, storm, drought, diseases and pests
THE UNITED KINGDOM	YES	-

In Germany, for many years, there was only traditional insurance against hail and in recent years insurance companies have offered the possibility of limited coverage against other risks (storm, flood, frost and freezing).[15] In a small number of European countries, there is insurance against the risk of drought, which is increasingly occurring due to climate changes. This risk is insured only in Spain and Turkey. In Serbia, less than ten years ago, a partial, initial form of insurance protection against this peril appeared.

Crop insurance in the USA includes traditional insurance against several risks, as well as revenue insurance. Revenue insurance premiums (and sums insured) are determined based on expected revenue, which is determined on the basis of average revenue in a certain period of time, as well as on the basis of market expectations.[16]

[15] T. Marković (2009), str. 32.

[16] Robert Dismukes, John Bird, Fred Linse, *Risk Management Tools in Europe: Agricultural Insurance, Futures and Options*, U.S. – EU Food and Agriculture Comparisons, 2004, p. 14.

Presence of crop insurance, as a dominant form of agricultural insurance, in addition to the coverage of risk depends on the level of insurance premium. According to a research (Bastian, 1999), farmers decide to insure crops after considering two issues. First, how to ensure revenue with minimal costs, and second, against which most important risk they should insure their crops. After that, they select certain insurance services. Practically, a higher insurance premium will cover a higher risk, but as the quoted author points out, "it is necessary to choose the optimal insurance."[17]

High premiums are the reason why in some parts of France the insurance of fruit against frost (to which it is very sensitive) is insufficiently present. In France, insurance premiums against the risk of frost are 15% – 20% of the sum insured, depending on the area where the plantations are located, as well as the type of fruit and other parameters.[18]

A typical example is Argentina, where the insurance supervisory authority permitted one insurer (*Sancor Seguros*) to accept payment in kind as a means of paying insurance premiums. This is a new practice in the Argentinian insurance market, which enabled agricultural insurance in Argentina to be on the rise. For example, 25% of arable land was insured in 2003, while in 1999 only 10% of arable land was insured.[19]

IV. Role of the State in Agricultural Insurance

Agricultural insurance, as well as financing, is a condition for development of this economic activity in a country, a region, or a community of countries, such as the European Union. Precisely for the purpose of development, but also to ensure food security of the population, in many countries agricultural insurance is effected with a strategic and financial support of the state. Support is most often manifested by subsidizing insurance premiums. Dominant influence of the state in agricultural insurance" is not only a characteristic of developing countries but also of great number of the most developed European countries."[20]

The reason for a dominant role of the state in agricultural insurance is a limited financial capacity of the private sector, which often cannot take on the risks of natural disasters and climate changes, both from the aspect of insurance and reinsurance. In addition, many insurance companies are reluctant to place services related to agriculture

[17] Chris Bastian,„Crop Insurance as a Tool", *Risk and Resilience in Agriculture*, 1999, *http://www.uwagec.org/rnrinag/RnR%20Section%202%Crop%20Insurance%20as%20a%20Tool.pdf,* pristupljeno 8. 9. 2020, pp. 1-7.

[18] Martin Rüegger, *Trends in Agriculture Insurance in the European Union, Agriculture Reinsurance*, Winterhur, Switzerland, *http://www.microinsurancecentre.org/resources/documents/doc_download/330-trends-in-agricultural-insurance-in-the-european-union.html*, pristupljeno: 14. 9. 2020.

[19] „Argentina – plaćanje premija osiguranja poljoprivrede u naturalnom obliku", *Osiguranje*, Zagreb, 2003, Br. 4, str. 51.

[20] Stephanie Hussels, Claire Sherman, Damian Ward, Ralf Zurbruegg, "South and East Asian Insurance Market Growth and Development", In: *Handbook of International Insurance,* David Cummins, Bertrand Venard (Eds.), New York, 2007, p. 864.

on the market due to high costs regarding this insurance line. On the other hand, if the state did not have a significant role in the insurance market, premiums would be high and economic protection of production would be inaccessible to most farmers.

There is almost a single position of a group of authors in the literature that due to the specificity, complexity and high administrative costs of agricultural insurance, as well as significant risks in agricultural production that often cause great damage, it is necessary to manage this insurance line with the support and intervention of the state, which is most often realised in the form of insurance premium subsidies.[21]

In addition, due to great social importance of food production, crop insurance with the state support occurs in a large number of both developed and developing countries. In general, in the world there is a direct connection between the involvement of the state and the level of development of crop insurance worldwide.[22]

Insurance is successfully effected in developing countries due to great involvement of the state. One of the oldest crop insurance programmes, which has existed since 1946, is the *Sugar Insurance Fund Board* in Mauritius, as a quasi-state agency.[23] In addition, in Cyprus, the *Agricultural Insurance Organization of Cyprus* was established in 1978, as a quasi-state insurance corporation.[24]

It is also noticeable that the governments of developing countries are increasingly providing support to crop insurance and that the experiences of developed countries help them a lot. According to (Ray, 1999), for developing countries one of important issues is introduction of extended crop insurance in order to upgrade the protection provided by pure hail insurance.[25]

In addition to subsidizing insurance premiums, there are other manners of state intervention in agricultural insurance. According to one of the World Bank studies, which included an analysis of the situation in 65 countries, five modalities of state support were defined:[26]

(1) subsidizing insurance premiums;

(2) investing in research and development of agricultural insurance services;

(3) development of legislation in the field of agricultural insurance;

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[21] Neves Cesar da Rocha, Miranda Evandro Fazendeiro, "Governamental Support to the agricultural insurance a parallel between Spain and USA", *Brazilian Magazine of Risks and Insurance*, Rio de Janeiro, Funenseg, 2007, Vol. 2, No. 4, p. 57.

[22] Bielza Diaz-Caneja M, Costanza G. Conte, Francisco J. Gallego Pinilla, Josef Stroblmair, Remo Catenaro, Christoph Dittmann, *Risk management and agricultural insurance schemes in Europe*, JRC Reference Reports, European Commission, The Institute for the Protection of the Citizen, Ispra, VA, Italy, 2009, p. 28.

[23] SIFB, Sugar Insurance Fund Board, 2012, *http://www.sifb.biz/* pristupljeno: 12. 9. 2020.

[24] AIO, Agricultural Insurance Organization, 2012, *http://www.cyprus.com/agricultural-insurance-organization.html,* pristupljeno: 12. 9. 2020.

25 Parimal Kumar Ray, *A practical guide to multi-risk crop insurance for developing countries*, Taylor & Francis IncScience Publishers, Entfield, USA, 1999, p. 174.

[26] Vladan Manić, *Osiguranje u poljoprivredi: Uloga javnog sektora, industrije osiguranja i pravci razvoja*, Prezentacija, Drugi poljoprivredni forum: Hrana za Evropu – u susret novoj Strategiji razvoja agroprivrede Srbije, Subotica, 11–13. oktobar 2012. godine.

(4) development of reinsurance by the public sector;
(5) subsidizing administrative costs.

According to results of the said research, presented in Table 2, subsidizing insurance premiums is the most common manner of state support in crop insurance. The most common state intervention in livestock insurance is investing in research and development of insurance services, followed by subsidies for insurance premiums.

Table 2. Modalities of state support to agricultural insurance[27]

MODALITIES OF STATE SUPPORT	CROP INSURANCE (% of analysed countries)	LIVESTOCK INSURANCE (%of analysed countries)
Subsidizing insurance premiums	63%	35%
Investing in research and development of agricultural insurance services	41%	37%
Development of legislation in the field of agricultural insurance	51%	33%
Development of reinsurance by the public sector	32%	26%
Subsidizing administrative costs	16%	11%

There are conflicting opinions in the literature regarding the justification of insurance premium subsidies in agriculture. Opponents of this manner of state support believe that subsidies are expensive, complex and lead to potentially significant inefficiencies i.e. in terms of efficiency there are no successful experiences with these subsidies in the world.[28]

On the other hand, one of authors (Taboroši, 2006) believes that "granting subsidies to the sector where food is produced (agriculture) is a legal function of the state".[29] In addition, and according to other authors, "in developed countries, governments subsidize crop insurance in order to reduce farm income instability, which is caused by reduced yields due to numerous risks in crop production".[30]

In support of the view that insurance premiums, if the state did not play a significant role in the insurance market, would be high, i.e. that this economic protection would not be available to most farmers, we can see the example of India. In that country, the government decided to increase subsidies to farmers from 50% to 75% of premiums from 2004, so that they would not be burdened by new regu-

[27] Vladan Manić, *Osiguranje u poljoprivredi: Uloga javnog sektora, industrije osiguranja i pravci razvoja*, Prezentacija, Drugi poljoprivredni forum: Hrana za Evropu – u susret novoj Strategiji razvoja agroprivrede Srbije, Subotica, 11–13. oktobar 2012. godine.
[28] Jerry R. Skees, *I Agricultural Insurance Programs: Challenges and Lessons Learned, 2000, http://www.citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.199.5867,* pristupljeno: 14. 9. 2020.
[29] Svetislav Taboroši, *Ekonomsko pravo*, Univerzitet u Beogradu, Pravni fakultet, Beograd, 2006, str. 308.
[30] Darrell L. Hueth & Furtan H. William (Eds.), *Economics of Agricultural Crop Insurance: Theory and Evidence,* Springer Science & Business Media, New York, USA, 2012, Vol. 4, p. 370.

lations that include an increase in insurance premiums in agriculture.[31] According to a study conducted by Mishra in 1996, even before this decision by the Indian government, crop insurance in developing countries, especially in India, is justified given that the benefits (revenue) outweighed the insurance costs. The author arrived at these results based on an economic analysis of India's comprehensive insurance programmes.[32]

State support for agricultural insurance also exists in Russia, where the state "provides partial coverage of insurance costs of agricultural producers at the expense of the budget that is not less than 50% of insurance premium".[33] In addition, in Russia, the state, i.e. the Ministry of Agriculture, adopts plans for agricultural insurance.

State support for agricultural insurance exists in Canada as well as in the USA. In Canada, 60% of insurance premiums is subsidized, 36% from the federal budget and 24% from local budgets, and in the USA, an average of 62% of insurance premiums is subsidized from the federal budget.

Authors (Goodwin & Smith, 1995) believe that state support for crop insurance in the USA is not satisfactory. Therefore, these authors conducted researches on possible options for state support, under market economy conditions, which would aim to help farmers insure their crops against the risk of natural disasters.[34]

Certain authors (Skees, 2000) believe that many countries face the challenge of how to enable affordable and functional conditions for crop insurance with the state support.[35] Authors (Mahul & Stutley, 2010) believe that when determining the state support model in agricultural insurance it is necessary to have one expert centre with a team of agricultural experts in insurance. It is necessary for the centre to provide a central database with all the elements related to agricultural insurance in that country, and availability of data from that database. In addition, it is necessary to provide adequate promotion, as well as the exchange of knowledge between insurance companies through organized trainings, publication of manuals, etc.[36]

[31] „Indija – veće subvencije u osiguranju useva", *Osiguranje*, Zagreb, 2003, Broj 12, str. 57.

[32] Pramod Kumar Mishra, *Agriculture Risk, Insurance and Income: A Study of the Impact and Design of India's Comprehensive Crop Insurance Scheme,* Avebury, UK, 1996, p. 333.

[33] Valery Baskakov, Anna Selivanova, Yevgeny Janenko, "Agricultural Insurance with State Support in the Russian Federation", In: Jelena Kočović, Biljana Jovanović Gavrilović and Mirjana Radovic Marković (Eds.) *Product Specifics on the Market of Insurance and Reinsurance*, University of Belgrade, Faculty of Economics Publishing Centre, Belgrade, 2013, p. 143.

[34] Barry K. Goodwin & Vincent H. Smith, *The Economics of Crop Insurance and Disaster Aid*, American Enterprise Institute, USA, 1995, p. 153.

[35] Jerrry R. Skees, *I Agricultural Insurance Programs: Challenges and Lessons Learned,* 2000, *http://www.citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.199.5867,* pristupljeno: 14. 9. 2020.

[36] Olivier Mahul & Charles J. Stutley, *Government Support to Agricultural Insurance Challenges and Options for Developing Countries,* The World Bank, Washington, 2010, p. 29.

V. Models of Agricultural Insurance Market

There are three main models of agricultural insurance markets:[37]

(1) a market fully controlled by the state;

(2) a market dominated by public-private partnerships;

(3) a market of companies on a purely commercial basis.

A market fully controlled by the state is characterized by good coverage, i.e. agricultural insurance presence, monopoly of one state-owned insurance company, high fiscal costs, a uniform service where social component is dominant compared to technical and commercial component.

A market dominated by public-private partnerships is characterized by good presence of agricultural insurance, competition in service provision, real fiscal costs, and insurance services are dominated by technical component compared to commercial component. In this model, private companies are in charge of service development, and the state is in charge of the stability of the agricultural insurance system.

A market of companies on a purely commercial basis is characterized by moderate and even insufficient market coverage, i.e. presence of agricultural insurance. Insurance services are dominated by the commercial component compared to the technical component. In this model, there are no fiscal costs and not sufficient stability and development of an insurance system.

At the global level, as the most successful for development of agricultural insurance market, has proven to be a market dominated by public-private partnerships. In these markets, participation of the public sector proved to be the key to establishing the development and proportional increase of agricultural insurance programmes, while the contribution of the private sector was based on providing innovation and development of insurance services, as well as required expertise and quality of services.[38]

This model of agricultural insurance market is developing very successfully in Hungary but as a forced solution, in a sense. In particular, a model of an insurance market based on premium subsidies was developed in this country until 2004. In that year, the state withdrew from the insurance market, which resulted in a sharp reduction in insured area, i.e. failure to cover numerous risks in agricultural production. All of the above caused the state authorities to decide to create a model of agricultural insurance market based on public-private partnerships. It is estimated that today in

[37] Vladan Manić, *Osiguranje u poljoprivredi: Uloga javnog sektora, industrije osiguranja i pravci razvoja*, Prezentacija, Drugi poljoprivredni forum: Hrana za Evropu – u susret novoj Strategiji razvoja agroprivrede Srbije, Subotica, 11-13. oktobar 2012. godine.

[38] Vladan Manić, *Osiguranje u poljoprivredi: Uloga javnog sektora, industrije osiguranja i pravci razvoja*, Prezentacija, Drugi poljoprivredni forum: Hrana za Evropu – u susret novoj Strategiji razvoja agroprivrede Srbije, Subotica, 11–13. oktobar 2012. godine.

Hungary more than 50% of arable land is insured, which proves the success of this agricultural insurance model. At the same time, "in Serbia crop insurance covers only 12% of arable agricultural land."[39]

In addition, in the USA, Canada and the European Union countries, particularly Spain, Portugal and Italy, there is a good cooperation between the public and private sector,[40] i.e. the model of public-private partnerships is present in their agricultural insurance markets. According to data from these countries, it can be concluded that there is a correlation between the level of public sector support to agricultural insurance and the presence of this insurance line. In addition, these countries have the largest share in the structure of agricultural insurance premiums at the global level. On the other hand, there is no state participation in agricultural insurance systems in South America, Africa, Australia and New Zealand, and the offer of this insurance line is not sufficiently developed in their markets. These geographical units also have a slight share in the structure of agricultural insurance premiums, according to a World Bank study.[41]

Based on results of a study conducted by a group of authors (Rejesus et al, 2009), it can be concluded that younger farmers, for whom agriculture is the only source of income, have bigger farms and higher yields, and therefore are more exposed to risks and expect more from the state, that is, from public insurance programs, than those that do not have these characteristics.[42]

Public insurance programs are certainly the most important in developing countries. However, many of them fail to achieve greater market penetration and continuously record insurance losses due to high administrative costs and unfavourable peril selection (insured risks). In addition, in many, especially non-European developing countries, presence of agricultural insurance is still insufficient, i.e. only 1% –3% of arable land is insured.[43]

In the USA, farmers are provided with two types of crop insurance: insurance against hail and extended insurance. Commercial insurers mainly provide insurance against hail, and the federal government provides extended insurance that is

[39] Snježana Davidović, „Moguće je unaprediti postojeći model subvencija", *Svet osiguranja*, 2020, br. 4 str. 34.
[40] Bielza M. Diaz-Caneja, Costanza G. Conte, Francisco J. Gallego Pinilla, Josef Stroblmair, Remo Catenaro, Christoph Dittmann, *Risk management and agricultural insurance schemes in Europe*, JRC Reference Reports, European Commission, The Institute for the Protection of the Citizen, Ispra, VA, Italy, 2009, p. 28.
[41] R. Iturrioz, p. 4.
[42] Roderick M. Rejesus, Bruce J. Sherrick, Gary D. Schnitkey, Cesar L. Escalante, *Factor influencing producers perceptions about the importance of government support programmes in agriculture: application of a semiparametric ordered response model,* Applied Economics, Routledge, 2009, No.41, Issue 24, p. 3081.
[43] David C. Hatch, *Agricultural insurance: a focus on the southern cone – observations and critical success factors*, 2009, *http://www.iica.int/Eng/regiones/norte/USA/Documents/Agricultural%20Insurance%20-%20A%20Focus%20on%20the%20Southern%20Cone%20-%20Observations%20and%20Critical%20Success%20Factors.pdf,* pristupljeno*:* 15. 9. 2020; Bulent Gulcubuk & Erdogan Gunes, *Applicable agricultural insurance models at the rural area: A case study from Turkey*, Scientific Research and Essays, 2010, Vol. 9, p. 838.

constantly at a loss due to a relatively small number of insureds and high claims, so it is subsidized by the state.[44]

Another public crop insurance programme was introduced in the USA. According to some opinions, existence of two public programs questions their economic feasibility and there are opinions that state support for farmers should undergo fundamental changes.[45] In addition, according to governing opinions, the manner of calculating the crop insurance premium should undergo changes.[46]

Taken as a whole, agricultural insurance market is still underdeveloped. Factors that could encourage its development are trade liberalization and transition from agriculture for their own needs to agriculture markets.[47] In both cases, that is, models of agricultural insurance market, the scope of coverage is constantly increasing in accordance with farmers' needs. A special challenge for the former socialist countries, which not so long ago joined the EU, i.e. are in the process of joining, among them Serbia, is development of crop insurance.[48]

VI. Conclusion

Based on the conducted analysis, it can be concluded that agricultural insurance, both at the global level and at the level of certain countries, is of great importance. The reason for this is twofold. First, agricultural production is the basis for ensuring food security of a country or a nation. Second, in many countries, the largest percentage of the population is engaged in agriculture, either as a basic or additional source of income, and this activity is of great economic and social importance.

In agricultural insurance systems of some countries there are significant differences caused by the characteristics of agricultural production and natural conditions, and the insurers offer insurance of different risks. Essential differences are present in the relationship between the country and the market in certain agricultural insurance systems, as well as in whether agricultural insurance is mandatory or not, or whether it is a condition for farmers to exercise the right to state subsidies.

[44] Loftin Graham, Xiaoying Xie, „The United States insurance market: characteristics and trends", In: D. J. Cummings and B. Venard (Editors), *Handbook of international insurance*, New York, USA, 2007, p. 29.

[45] Bruce A. Babcock, "The political economy of the US crop insurance program", In: Eldon V. Ball et al. (Editors), *The economic impact of public support to agriculture: an international perspective,* New York, 2010, p. 295.

[46] Thomas O. Knight, Keith H. Coble, Barry K. Goodwin, Roderick M. Rejesus, Sangtaek Seo, „Developing variable unit-structure premium rate differentials in crop insurance", *American Journal of Agricultural Economics*, 2010, Vol. 92, p. 144; Roderick M. Rejesus, Barry K. Goodwin, Keith H. Coble, Thomas O. Knight, „Evaluation of the reference yield calculation method in crop insurance", *Agricultural Finance Review*, 2010, Vol. 70, p. 429.

[47] „Insurance in emerging markets: sound development; greenfield for agricultural insurance", *Swiss Re,* 2007, Vol. 1, p. 14.

[48] Eva Vavrova, „The Czech agricultural insurance market and a prediction of its development in the context of the European Union", *Agricultural Economics / Zemedelska ekonomika*, 2005, Vol. 11, p. 533.

We believe that foreign experience is useful for creation of a quality agricultural insurance system in Serbia where agriculture is of great importance. Significance, above all, is to ensure food security, but also economic one, and it is reflected in the share of agriculture in the creation of domestic gross product, providing employment and an adequate standard of living for the inhabitants of rural areas. This is very important because of stopping continuous migration of inhabitants from these areas to cities, and stopping the tendency of abandoning of our villages. We believe that previous agricultural insurance models have not proved to be successful, because the percentage of insured arable land has stagnated over the years despite the constant growth of the percentage of subsidized agricultural insurance premiums. Solution could be in the introduction of partial compulsory agricultural insurance, i.e. for a start, in linking the right to agricultural subsidies with the submission of an insurance policy as mandatory in tender documentation. Such practice already exists in analysed foreign experiences. Later, this obligation could be extended to use of other state resources in agriculture.

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