

**The CAP and national priorities
within the EU budget
after 2020**



INSTITUTE OF AGRICULTURAL
AND FOOD ECONOMICS
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The CAP and national priorities within the EU budget after 2020

Editors:

dr Marek Wigier

prof. dr hab. Andrzej Kowalski

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Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej

– Państwowy Instytut Badawczy

ul. Świętokrzyska 20, 00-002 Warszawa

tel.: (22) 50 54 444

faks: (22) 50 54 636

e-mail: dzw@ierigz.waw.pl

<http://www.ierigz.waw.pl>

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11. The risk management and the insurance of agricultural production

*Prof. Drago Cvijanović¹, PhD Željko Vojinović², Prof. Otilija Sedlak²,
PhD Dejan Sekulić¹*

*¹University in Kragujevac, ²University of Novi Sad,
drago.cvijanovic@kg.ac.rs, dvcmmv@gmail.com,
zeljko.vojinovic@ef.uns.ac.rs, otilijas@ef.uns.ac.rs, dejan.sekulic@kg.ac.rs*

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Abstract

The plant production, as the primary production in agriculture is at risk of natural disasters and other harmful incidences. Thus, the agricultural production which mostly takes place “under the open sky” is always exposed to the influence of many natural factors that cannot be often predicted. Natural forces because material damages in plant production, which are often catastrophic and lead to interruption of the production continuity and disturbance of the production process.

The subject of this paper is the analysis of the dangers faced by plant production, their recognition by the degree of action and damage they cause in a specific area. Research was conducted based on collecting data and analysis of the business results and implementation of the insurance on a farm, where the agricultural production was the most important activity. The primary goal of this paper was to point out to significance of the risk management process in a particular branch, in a specific area and possibility to protect manufacturers from natural disasters. Protection of the primary agricultural production is significant, as regards production protection and business of an economic entity, as well as stability, growth and development of state’s economy.

Keywords: risk, insurance, agricultural production, technical result, natural disasters

JEL codes: G22, G32, Q13

11.1. Introduction

The plant production, as the primary production in agriculture, is more liable to natural disasters and other harmful incidences than production in other branches of the economy. Since the agricultural production is mostly run “under the open sky, it is often exposed to the influence of natural factors that are rather unpredictable [Marković, 2010].

Goal: The goal of this paper is to show the way how the insurance in agriculture is carried out, and the extent of insurance coverage in Serbia, with an emphasis on the business results of insurance companies, i.e. individual efficiency of plant production insurance.

Research subject: The subject of research is the insurance in agriculture, in part relating to production, how they work, what are the insurance functions, how to manage risks that threaten to destroy agricultural plantations, crops and yields. The technical result in the plant production insurance was also analysed.

Research problem: The basic problem is that the risks agriculture and its production are exposed to, cannot be completely controlled or eliminated, but they can only react preventively. Therefore, there are preventive measures that are being taken to reduce or prevent damages, which can appear as a result of the risk that the agricultural production is exposed to. The problem is also present regarding the undeveloped awareness of the importance of insurance in a sector of agriculture.

The insurance in agriculture is a type of protection in case of risk realisation by way of compensation of damages. This is exactly the basic and the most important function of insurance in this field, as well as its contribution to business and its stability and provision of certain protection and a sense of security to subjects, and provision of income in a form of insurance benefit to an insurance company, which can be invested further.

11.2. Theoretical basis

From the reviewed available literature, it is noticeable that the agricultural insurance is present in various forms and develops under different institutional framework in different countries. In some countries (developing countries), it appears as a recent phenomenon, while elsewhere it has a tradition of over a century. Insurance coverage ranges from the protection against only one risk to joint coverage of numerous hazards. Methods of determining the insurance premium and compensations also differ from country to country [Miletić, Milivojević and Terzić, 2016].

The most widespread method of insurance [Marković and Jovanović, 2008] is called the single risk insurance and is present in most of the European countries. However, in few European countries, farmers can only insure themselves from hail (Belgium, Denmark, Finland, Ireland, and Great Britain).

There are two systems in the multi-risk crop insurance. The first system is characterized by the compensation that depends on an estimated damage, which occurred under the influence of weather disturbances [Marković, 2008]. This system is being applied in several European countries (Portugal, Austria, Greece, Cyprus, France and Italy).

On the other hand, in Spain [Marković and Jovanović, 2008], the US and Canada, the multiple peril crop insurance eliminates the estimation of damage and implies determining the difference between a guaranteed and a realized yield, so possible decrease in yield is compensated to farmers. The European system requires higher costs of compensating losses, but it avoids the existence of a moral hazard, as one of the biggest problems of the insurance system in the US. The all-risk crop insurance provides farmers to insure themselves from all perils that can harm their crops and fruit. This insurance system is live in the US and Spain.

Risk reduction and risk placement can be implemented only after a well-functioning, internal risk-detecting and monitoring system is in place [Vojinović et al., 2016]. Individuals or organized groups of individuals, who independently make decisions on the use of available resources and bear risks of previously made decisions, are the agri-business entities. Households, as a basic form thereof, enterprises and the state are included in the category. In agriculture, manufacturers can be family agricultural holdings, but also bigger agrobusiness corporations [Matić, 2004].

The agricultural production is consisted of labour and means of production. The means of production are consisted of instruments of labour and materials, which together with manpower mean “*condition sine qua non*” for every material production. The instruments of labour are those means used in several production cycles, whereby they are consumed progressively, i.e. transfer a part of their value to the product. According to Jovanović [2001], the instruments of labour in agriculture are: land and buildings, which are considered as the objective condition of production and the agricultural machines, tractors, tools, perennial plantations (orchards, vineyards, hop plantation) and livestock units, as means used directly as working tools.

As regards the existence of variability in the need for manpower, in the human resource management, the emphasis is put on the selection of an optimal number of employees, favourable employee structure and the effective management from the aspect of the appropriate organization and motivation of employees [Birovljev and Tomić, 2009].

Agricultural activity is characterized by numerous production, organizational and technical specificities, which impose the need for special treatment of agriculture [Vasiljević, 2008]. These specificities are related to:

- Influence of natural factors on the production results;
- Possibility of self-reproduction in natural form;
- Biologically determined period of production and performance of some production activities;

- Phase character of production, i.e. incompatibility of work time and period of production;
- Seasonal character of production;
- Slow turnover of capital;
- Expressed horizontal and vertical connections among varied production lines.

Functioning of the agri-business organisation is considerably determined [Birovljev and Tomić, 2009] by natural factors (fertility of soil, plant and animal characteristics and climate) and environmental factors (the level of agricultural development, agrarian and economic policy, global market, scientific and technological processes in agriculture). It is much harder to have an effect on the natural than the environmental factors, which have been pre-set and cannot be controlled. However, it is possible also to improve the natural factors, to a lesser extent.

On the occasion of making high-quality strategic, tactical and operational decisions, it is necessary to consider soil specificities. Only this approach enables the harmonization between an economic decision and the business goal of agricultural holdings. Some natural characteristics of soil should be taken into account to assess the role and significance of soil [Zakić and Stojanović, 2012].

The amount of yield has been largely determined by the natural fertility of soil. Regarding to different fertility of the observed arable land, there is necessary a different investment volume to realize the same yield. This fact represents a base for differential rent, i.e. for making a higher profit in regard to competitors. The next important consequence of different soil fertility is that it reflects the existence of diversity in production, i.e. a degree of specialization. Thirdly, different fertility defines the role and significance of crop rotation. Respecting the peculiarities of the observed land and taking into consideration its different fertility, the managers in agricultural holdings make selection, through an operational plan – what to produce, on which land, by which mechanization and how many working capital is needed for production [Jovanović, 2001].

Prostran [2016] considered that the plant production insurance had a significant role in protection of farmers, since the insurance costs have been extremely low in regard to their share in total costs (1.5-2%).

11.3. Characteristics of the plant production insurance in Serbia

Insurance of agriculture can be divided into two types of insurance [Vojinović and Žarković, 2016]:

- Insurance of plant production, i.e. crops and yields;
- Insurance of domestic and other animals.

Every agricultural product is exposed to the risk posed by nature, at every phase of their development, i.e. during sowing, growth and ripening, and therefore it is especially important to protect them. The increasing popularity of protection of agricultural production means the inclusion of insurance; the insurance indemnity covers everything that is destroyed by the realization of insured occurrence and thus the function of agricultural production, i.e. economic protection, is fulfilled.

Although the state offers incentives, only 10% of the entire area of arable land in Serbia is insured. The payment of a premium in agricultural insurance is alleviated by incentives offered by the Ministry of Agriculture, Forestry and Water Management. There is expected no less than RSD 50 million of incentives for premiums. Every holder of an agricultural holding is entitled to use an incentive for insurance in the amount of 40% of an insurance premium amount without taxes on premium of non-life insurance. Every holder of a holding can be entitled thereto by submitting a claim with all the documentation to the National Treasury Administration.

The insured object in insurance of agriculture are crops, yields (fruit), medicinal herbs, meadow grasses, orchards and vineyards, ornamental plants, young forest crops up to 6 years and others. Likewise, the insured object can be sheep, hoofed animals, cattle, pigs, bees, dogs, fowls such as hen, guinea fowls, turkeys, peacocks, geese, ducks and pheasants, exotic animals in zoos and outside zoos.

Crops and yields that are damaged from the insurance risk cannot be covered by the plant production insurance. If the insurer determines that after a contract is concluded, that insured crop or fruit was damaged from the risk that was covered by insurance before the insurance contract was signed, an insurer can demand the cancellation of the concluded contract [Miloradić, 2004].

Total gross value of agricultural production in 2016 in Serbia was USD 5.3 billion or 11.8% above the realized value in 2015. At the same time, a net realized value of agricultural production amounting to USD 4.4 billion is higher by 8.5% compared to 2015. By regions, Central Serbia has a gross value of agricultural production in the amount of USD 2.9 billion, with the share of 54.3% in total value realized by Serbia, which is above the realized gross value in Vojvodina (USD 2.4 billion, i.e. 45.7%).

However, as the production of basic crops in 2015 (dominant by the production capacity and the production volume) was below average, the base in the evaluation of production was significantly decreased in 2016. It refers primarily to maize (the share of maize in gross value of agriculture in 2016 was 23%), soy 3.9%, sunflower 3.1%, and sugar beet 1.7%. Insignificant variations in livestock production were realized in 2016. There was increased production of all kinds of meat, while the production of sheep milk, honey and table eggs was decreased.

In the structure of realized gross value of agricultural production in Serbia for 2016, the share of plant production was USD 3.5 billion or 66.2%, with the share in Central Serbia of USD 1.6 billion or 45.9%, while the plant production in Vojvodina was USD 1.9 billion, with the share of 54.1%.

In 2016, a total value of the realized plant production in Serbia was assessed at USD 3.5 billion, or it was increased by 20.28% compared to 2015, with the share of 66.2% in the realized value of total agricultural production.

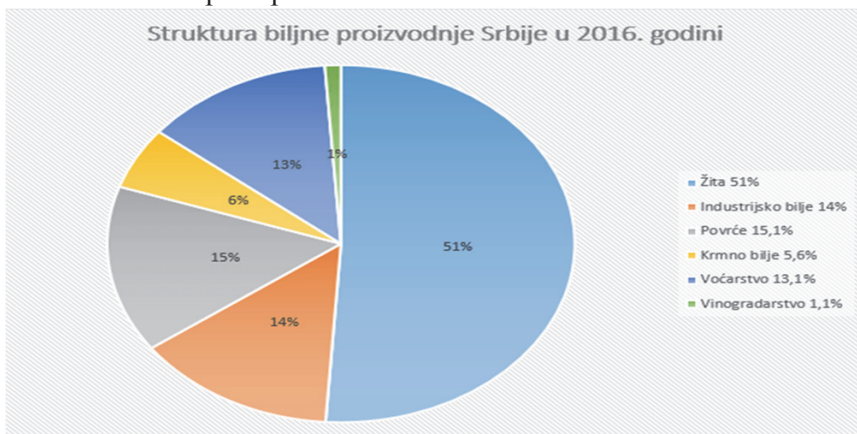
Table 1. Plant production in Serbia by cultures, with the share by regions in 2016

Crop	Serbia		Central Serbia		Vojvodina	
	Value (in euro)	Share in %	Value	Share in %	Value	Share in %
Maize	1,257,643.540	100.0	431,279,443	34.3	826,364,097	65.7
Wheat	472,439.103	100.0	181,630,487	38.4	290,808,616	61.6
Sunflower	165,420.168	100.0	11,759,209	7.1	153,660,959	92.9
Soy	207,263.613	100.0	15,019,660	7.2	192,243,953	92.8
Sugar beet	93,400.681	100.0	0	0	93,400,681	100.0
Lucerne	69,082.155	100.0	48,611,380	70.4	20,470,775	29.6
Sour cherry	40,170.642	100.0	34,571,391	86.1	5,599,251	13.9
Peach	33,386.321	100.0	25,881,893	77.5	7,504,428	22.5
Raspberry	101,525.033	100.0	101,135,711	99.6	389,322	0.4
Strawberry	15,406.257	100.0	13,727,138	89.1	1,679,119	10.9
Apple	88,540.856	100.0	47,734,336	53.9	40,806,520	46.1
Pear	27,677.352	100.0	22,010,785	79.5	5,666,567	20.5

Source: *Statistical Yearbook of the Republic of Serbia Agriculture*.

The agricultural production in the Republic of Serbia is based on the structure of property in which prevail semi-sustainable agricultural holdings. The agricultural holdings, which use up to 2 ha of agricultural land, are represented with 47% in the property structure. In comparison with the average size of an agricultural holding in the EU, it is around 20 ha. This fact has a direct effect on the competitiveness of agricultural production, incomes and payment ability of an agricultural holding, and thereby on demand on the agricultural insurance market in the Republic of Serbia. Poor association of farmers has an effect on inefficient demand on the market of crop and yield insurance, which disables the favourable insurance conditions [Žarković, 2016].

Figure 1. Structure of plant protection of Serbia in 2016



Structure of plant protection of Serbia in 2016:

- Cereals 51%,
- Industrial crops 14%,
- Vegetables 15.1%,
- Fodder 5.6%,
- Fruit growing 13.1%,
- Viticulture 1.1%.

The percentage share of insured areas in the period from 2006 to 2014 in the total agricultural area of the Republic of Serbia was 6.32% in average, while it was 9.32% in the total arable land of the Republic of Serbia. A significant increase in the percentage of insured area has occurred after catastrophic floods in some areas of the Republic of Serbia in the previous period, and in 2016 it was estimated that around 10-12% of areas were insured.

The average share of plant production insurance premium in the total premium of agricultural insurance of the Republic of Serbia for the observed period was 70%, and the insured animal premiums were 30%.

In accordance with the presented data, we can conclude that possibilities for the development of insurance against agricultural risks are significant, as due to the insufficient level of this insurance segment development in the Republic of Serbia, as well as due to the insufficient implementation and competence for the business of state institutions and the understatement of legislation.

Around 10% of arable land and less than 5% of registered holdings in Serbia is insured. The insurance premiums of crops and yields of RSD 1.85 billion make less than 3% of the total insurance market, and around 40% of premiums are subsidized by the state, which was around RSD 450 million in 2016 for the insurance in agriculture for which subsidies were used.

11.4. The position of farmers in the system

According to results of the Census of Agriculture in 2012, there were 1.44 million members and full-time employees of agricultural holdings in the Republic of Serbia. Of this number, around 98% are owners of holdings and members of their families, and only 1.9% persons are regularly employed in agriculture.

If expressed in number of annual work units (AWU), the number of employees in agriculture is 646,283 persons. Of this number, approximately 40% of AWU by persons who are 100% engaged in agriculture, while around 28% of AWU are persons who are occasionally hired in agriculture (less than 50% of working hours). Of the total AWU, 91% is work of a holding's holder, i.e. members of their holdings (44:47%), 4% – work of full-time employees, and 5% is seasonal workforce. Preliminary results of Census show that the level of qualification of a holding's manager for being engaged in agriculture is not particularly high. In other words, data shows that 60% of managers of holdings have only the experience gained in agricultural production, 2.5% have secondary agricultural education, and 1.4% of managers have the Faculty of Agriculture diploma. Only 3% of holding managers had combined some form of education and training in the census year.

Table 2. Subsidiary table for the classification of settlements and municipalities into the classes of peril in the hail emergence

Long-standing technical result of a regional unit	Classes of peril
Up to 10%	I
From 10% to 30%	II
From 30% to 50%	III
From 50% to 90%	IV
From 90% to 150%	V
From 150% to 220%	VI
From 220% to 300%	VII
From 300% to 400%	VIII
From 400% to 500%	IX
Over 500%	X

Source: prepared by authors.

As for our insurers, there is mostly the manifestation of their premium rates that imply the conditional franchise of 5%. In other words, if damage occurs, which is less than 5% of the insurance amount, the insured person bears the entire damage; however, if it is higher than 5% – the damage will be completely covered by the insurer. Thus, the insurers make selection, i.e. exclude small damages, whose costs exceed compensation, as well as those damages with low values in which case it is hard to decide whether they are generally the consequence of the insured risks or not [Miloradić, 2004].

According to the Table, if in the last ten years the average technical result of 47% in some place was recorded in the hail insurance, this insurance will be classified as third class peril. If this result becomes more unfavourable in the next year, for example 52%, this same place will be classified into the fourth – higher class, and thus the premium is higher.

In the research of damage and success in business trends, every insurer follows necessarily the so-called damage rate or technical result. In most general terms, this indicator represents the ratio between damages and the insurance premiums. It is expressed proportionally or by the coefficient. As it is lower than 100%, the technical result is more favourable or better. Instead of the total premium, there can be taken into consideration only a part intended for payment of damages – the technical premium [Miletić, Milivojević and Terzić, 2016].

11.5. Research results

If the obtained amount of technical result is lower than 100%, it means that the technical result is favourable, i.e. high-grade. However, if this amount is higher than 100%, it means that the technical result is unfavourable, i.e. low-grade, and in the observed period the amount of damages was higher than the premium. It is possible to follow in the current period or at the relevant level of disbursed amount of damages and incoming premiums in an absolute amount.

Farmers mostly insure their crops only against the basic risks (hail, fire and thunder strike), and it makes from 95% to 98% of all concluded insurances, while they are insured mostly against spring frost and storm, as it comes to the additional risks.

The annual insurance premium for field crops, depending on the crop and the average amount per hectare, ranges from RSD 4,020 for 1 ha of maize to RSD 3,050 for 1 ha of wheat.

Table 3. Number of the effected insurance contracts and a total insurance premium of crops and yields in the Republic of Serbia between 2012 and 2016

Year	Number of concluded insurance contracts	Total insurance premium of crops and yields (RSD)
2012	14,871	1,126,363.000
2013	18,658	1,503,919.000
2014	19,768	1,603,900.000
2015	27,652	1,672,794.000
2016	28,749	1,847,144.000

Source: National Bank of Serbia – Insurance sector in Serbia (Annual reports 2012-2016).

When it comes to the insurance of fruit cultures, what should be mentioned is the offer for the insurance of plums with the premium of RSD 29,937 per ha, and the insurance of raspberry, RSD 120,582 per ha, as well as the insurance of blackberry with the premium of RSD 90,436 per ha.

In the Tables, we can see a reliable and constant growth of premium and the concluded contracts in the period from 2012 to 2016.

Table 4. Number and amount of the accepted crop and yield damages insurance in the Republic of Serbia in the period from 2012 to 2016

Year	Number of accepted damages	Amount of accepted damages
2012	2,519	416,273.000
2013	6,019	1,506,422.000
2014	6,278	1,062,003.000
2015	3,151	710,060.000
2016	7,755	1,584,411.000

Source: National Bank of Serbia – Insurance sector in Serbia (Annual reports 2012-2016).

We have a sudden decrease in the following two years, and in 2016 it was the same as in 2013, as it is described in the Table that shows the amounts of accepted damages after the big growth in 2013 in regard to the previous year. There is also a growth in the accepted damages, except in 2015.

The research refers to the largest insurance company in the field of agricultural production insurance in Serbia, which is located in predominantly agrarian region of Vojvodina. We observed the centres of plant production in towns of Novi Sad, Sremska Mitrovica and Zrenjanin in long-lasting period from 2010 to 2017.

Table 5. Technical result of the plant production insurance by branch offices for the observed period from 2010 to 2017

Branch office	Closed technical premium (RSD)	Liquidated damages (RSD)	Technical result (%)
Zrenjanin	85,367,039.91	62,032,255.00	72.66
Novi Sad	103,295,126.86	100,590,906.08	97.38
Sremska Mitrovica	39,590,086.79	44,806,035.00	113.17
Total	228,252,253.56	207,429,196.08	90.88

Source: prepared by authors.

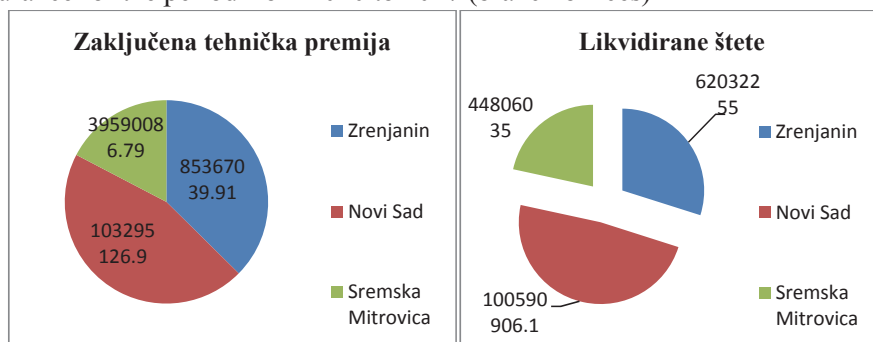
If we consider business success, the most relevant are data on the financial result, considering that agriculture is the field we observe, the most important is to precisely take account of the relation between the premium and damage from the insurance-technical point of view. Data were expressed in domestic currency, dinar (RSD). Bearing in mind that it is the most important

for an insurance company, and more precisely its business efficiency, to regularly monitor the result (damage and premium ratio), the following tables show data by branch offices.

If we observe the obtained data, we can see that the results for branch offices in Zrenjanin are 72.66% and Novi Sad – 97.38%, the positive, i.e. technical result, is high grade, and it points to the fact that insurers, in respect of crop insurance, were careful while insuring and rating. The technical result in Sremska Mitrovica is 113.17% and as such it is not favourable or high grade.

The number of insured crops in the observed period was in Novi Sad, as we can see from the Table, where the effected technical premium was RSD 103,295,126.86 and thereby the amount of damages was higher in regard to Zrenjanin and Sremska Mitrovica (RSD 100,590,906.08), and accordingly the technical result was 97.38%. The lowest number of insured crops was on the territory of Sremska Mitrovica with the technical premiums of RSD 39,590,086.79, and thereby the least liquidated damages in amount of RSD 44,806,035.00, which led also to unfavourable technical result for this territory (113.17%). While Zrenjanin is in the middle between these two towns with RSD 85,367,039.91 of technical premiums and RSD 62,032,255.00 of liquidated damages and accordingly has the most favourable technical result of 72.66%. Besides the data processed for the period from 2010 to 2017 on the basis of the total for these three areas, the results were processed separately by years.

Figure 2. The effected technical premiums and liquidated damages in crop insurance for the period from 2010 to 2017 (branch offices)



Source: prepared by authors.

According to this Figure, we can notice that the highest technical premiums occur on the territory of Novi Sad, and the lowest on the territory of Sremska Mitrovica. The analytical review by years, shows that the premium increases and the increase in premium from plant production is significant. Only the branch office in Sremska Mitrovica has achieved a significant decrease in premium in the

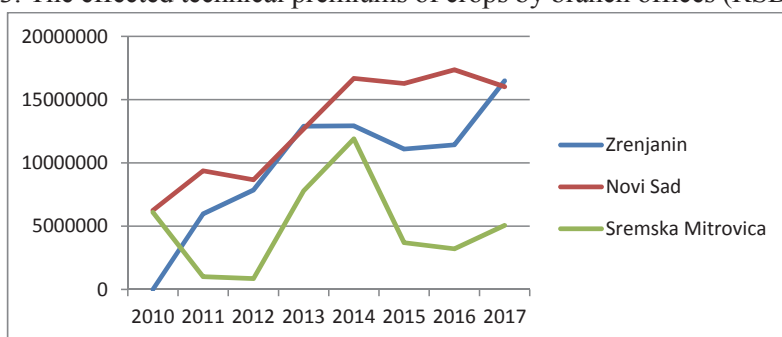
observed period, which is the consequence of the insurer's supply decrease and the risk analysis. Negative technical result defines the policy of supply decrease and failure to take into account in the insurance the plant production risk.

Table 6. Analytics of the effected crop insurance technical premium in the observed period, in RSD

Year	Zrenjanin	Novi Sad	Sremska Mitrovica
2010	6,720,584.90	6,243,477.10	6,094,251.71
2011	5,968,855.92	9,369,405.19	997,519.53
2012	7,848,859.85	8,666,554.54	848,933.23
2013	12,889,967.03	12,680,792.39	7,789,405.46
2014	12,925,929.86	16,680,700.12	11,901,011.98
2015	11,096,585.99	16,276,473.50	3,691,241.54
2016	11,425,122.11	17,354,360.52	3,204,675.37
2017	16,491,134.25	16,023,363.50	5,063,047.97
Total	85,367,039.91	103,295,126.86	39,590,086.79

Source: documentation "DDOR Novi Sad" 2017.

Figure 3. The effected technical premiums of crops by branch offices (RSD)



Source: prepared by authors.

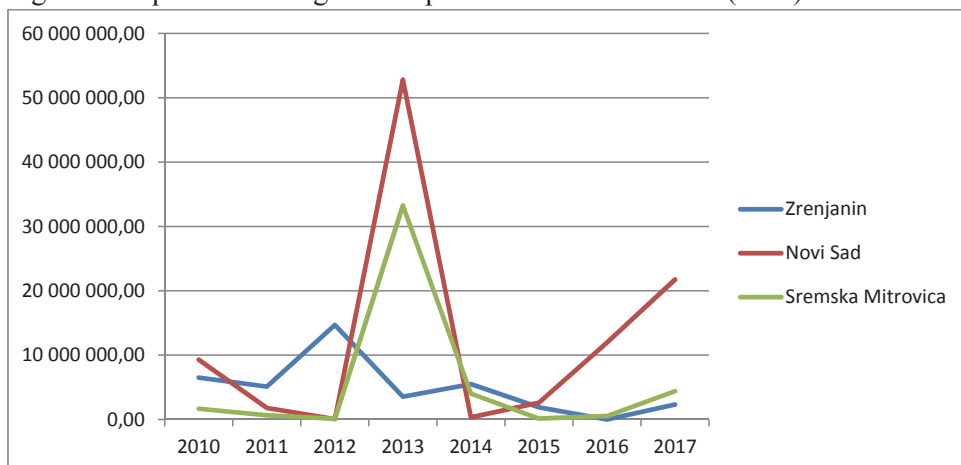
Table 7. Liquidated damages in the period from 2010 to 2017 by branch offices (RSD)

Year	Zrenjanin	Novi Sad	Sremska Mitrovica
2010	6,506,142.00	9,301,566.00	1,678,959.00
2011	5,118,808.00	1,781,575.00	651,516.00
2012	14,692,205.00	61,790.00	106,424.00
2013	3,535,908.00	52,795,697.04	33,262,481.00
2014	5,483,450.00	343,217.00	4,025,936.00
2015	1,897,278.00	2,596,758.04	138,294.00
2016	22,463,057.00	11,955,484.00	546,269.00
2017	2,335,407.00	21,754,819.00	4,396,156.00
Total	62,032,255.00	100,590,906.08	44,806,035.00

Source: documentation "DDOR Novi Sad" 2017.

If we observe the damage analysis in the specific period, we can conclude that there is a negative result in 2013, when the technical result was 4.3 index points. Dynamics of premiums and damages in this area points to a strange behaviour and the occurrence of unusual risks, floods and drought with catastrophic consequences in this year.

Figure 4. Liquidated damages in crop insurance in 2010-2017 (RSD)



Source: prepared by authors.

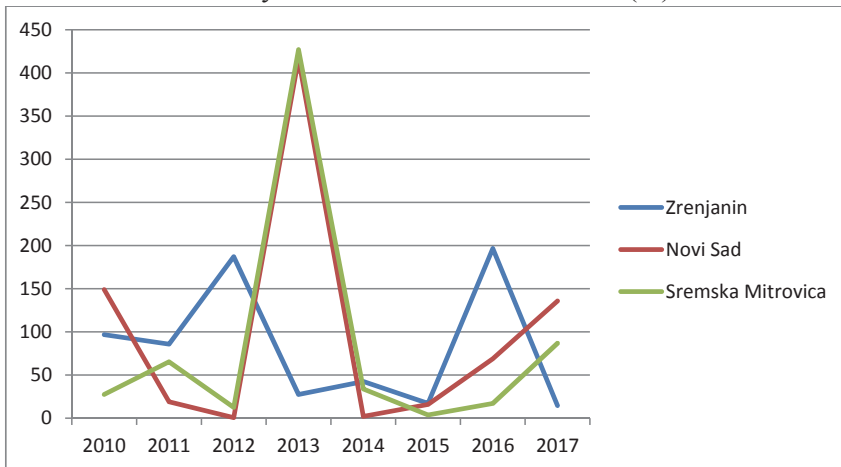
In the following review, we provide an analytical review of the achieved result of a technical premium by years.

Table 8. Technical results by branch offices for the period 2010-2017 (%)

Year	Zrenjanin (%)	Novi Sad (%)	Sremska Mitrovica (%)
2010	96.81	148.98	27.55
2011	85.76	19.01	65.31
2012	187.19	0.71	12.54
2013	27.43	416.34	427.02
2014	42.42	2.06	33.83
2015	17.09	15.95	3.75
2016	196.61	68.89	17.05
2017	14.61	135.77	86.83
Total	72.66	97.38	113.17

Source: prepared by authors.

Figure 5. Technical result by branch offices for 2010-2017 (%)



Source: prepared by authors.

We can notice from the enclosed data that the technical result was the most unfavourable in Sremska Mitrovica in 2013, with 427.02% and this was caused by the fact that production was realized in the conditions of major and fast meteorological changes, which have affected the growth and development of plants. Very unfavourable technical result occurred in Novi Sad in the same year and it amounted to 416.34%, while in Zrenjanin the most unfavourable technical result was in 2016 (196.61%).

The increased damages in 2013 caused by to overdrought, which hit Serbia and thereby had an effect on the unfavourable technical result (Figure 5). Climate changes and anomalies have a negative effect on development and growth, as well as on the condition of most of the agricultural crops. Yields were halved and it resulted in big damages.

11.6. Summary and conclusions

Agriculture, as the sector of the economy, is vital for the Republic of Serbia and its total social and economic development. The position of agrarian sector is specific, because besides the economic, it also has special social and ecological importance, whereby it is instantaneously the carrier of rural development. Agriculture contributes to the national wealth that is important in creating GDP (assessed at 10%) and the total employment of population (around 20%).

Serbia has very favourable natural conditions (soil and climate) for diverse agricultural production (both plant and livestock production), experienced farmers, top experts and scientists, and the selection of various plant products recognized worldwide.

Plant production should be developed in direction of total areas under crop reduction, increase in areas under orchards, vineyards and meadows, the increase in yield per unit of capacity with the reduction of their variability, wider range of products and higher product quality, stronger market and export orientation.

The crop production should be developed in the direction of reduction in areas under cereals, and increase in areas under industrial crops, fodder and vegetables. According to optimal, projected structure of sown areas, the share of cereals should reduce from 51.4% in 2016 to 50% in 2020. At the same time, the share of industrial crops should be increased from 13.3% to 15%; the share of vegetables should be increased from 8.3% to 15%, and the share of fodder should be increased from 14% to 18%.

In fruit production and wine growing, it is necessary to prevent the reduction in the number of continental fruit trees, grapevine vines and total areas under vineyards. The share of these branches in the structure of total agricultural production value can be increased by more significant increase in yield per capacity unit. Development of fruit production from big plantation orchards in monoculture, predominantly in the plain area, should be directed to new plantations located in the appropriate agro-ecological regions, in hilly areas, respecting the local pomological potentials. The increase in the number and varieties requires improvement in domestic selection of certain varieties of continental fruit, but also import of an adequate assortment of high production and market value of raspberry, blackberry, walnut and hazelnut.

Serbia belongs to the group of countries with low yields, and it is noticeable that insurance does not cover arable land sufficiently. This is because of the manufacturers' trust, their habits and the insurance awareness, as well as the economic policy carried out by the state, and also maybe the poor access of insurance brokers or lack of adequate supply of insurance companies [Birovljev, Vojinović and Balaban, 2015].

Eight big insurance companies in Serbia offer agricultural insurance services in the form of crop/yield/animal insurance. Crops and yields can be insured against hail risk, risk of fire and thunder as the basic risks, and storm, spring and autumn frost, draught, flood, loss of quality and quantity, as additional risks. The amount of premium in this type of insurance depends on many factors, including: plant variety, area in which crops and fruit are located, a contracted insured amount, risks covered by insurance, etc. The insured amount is determined according to the expected yield in kg per ha and the market price of a product.

Underdeveloped agriculture disables higher amounts of investments, due to which yields are low as well.

Without the specific financial products and services that provide insurance against production and market risks and motivate enterprises to make new investments, SMEs and farmers have no other option, but to borrow under market conditions [Sedlak et al., 2016]. Consequently, small manufacturers often assess that paying the insurance premium is uneconomical, although the premium costs are in average only 1.5-2% of the production value. Relatively more opportunities to afford the insurance have big socially-owned farms, which remained in minority due to the privatization process and fragmentation of properties, as well as farmers jointed in cooperation and associated under agricultural cooperatives, while individual farmers, whose existence depends on yield, insure rarely [Petrevska, Toskano and Milošev, 2010]. Likewise, in the conditions of relatively low level of development the insurers themselves do not dispose with sufficient financial capacities in order to offer the insurance against natural hazards at affordable prices, and this is why the supply is scarce. For example, the risk of drought can be insured at just one insurance company for a limited number of crops [Kočović, Rakonjac Antić and Jovović, 2016].

Reasons for the underdevelopment of plant production insurance are low life standard of rural population, ignorance of manufacturers on the insurance advantages, low insurance culture, limited capacities of insurers and the opinion that has taken root with us that the state should compensate. In such conditions of natural hazards, the state compensates damages in the largest part. Ultimately, their effects flow over to population as taxpayers and the users of agricultural products.

From the above, it can be clearly concluded that a new platform, which would better encourage farmers to insure their production, is inevitable for the development of crop and yield insurance in Serbia. It is necessary to create long-term solutions:

- Stable portfolio (along with the risk diversification),
- Adequate system of subsidies (acceptable for all parties),
- Development of the preventive funds (as a measure to reduce risk),
- Products adjusted to the needs of insured persons (with the necessary levels of covered risks), and
- Programmes to raise the awareness on risks in agriculture and improve the availability of such insurance.

One of the suitable solutions, by which the market could accelerate, is a model in which a pre-contractual obligation of adequate insurance cover would be introduced, as the condition for obtaining subsidies in agriculture by the state.

This would realize multiple effects; on the one hand, farmers would have predictable incomes, while on the other, the state would protect investments in the form of subsidies in agriculture and hereto it would protect the state budget

from further unplanned expenses. Neither the positive effect on the insurance industry generally, nor the return effects in the sense of preventive measures development and the education on the agrarian production risks and measures to overcome them should be neglected [Žarković, 2000].

Žarković points out that the plant production insurance in the Republic of Serbia has been carried out in almost unmodified way for decades. Starting from the frequency and severity of consequences, the hail hazard, as a basic risk, takes the first place. Fire and thunderstruck also belong to the basic hazards. The additional hazards are storm, spring and autumn frost and flood. The insurance companies offer also other possibilities to protect plant production: protection from seed quality loss, the crop and fruit protection in glasshouses and greenhouses, protection of crops and fruit after harvest, protection of quality loss, but these additional insurances are not of great concern. Experts think that possibilities of the plant production insurance market in the Republic of Serbia are better than the current level of development.

Researchers can get the approximate data according to a number of registered farms (agricultural holdings), which are entitled to the insurance premium recourse. It is calculated directly that only 3.14% of registered farms is insured. Adoption of Positive Practices of the countries in the region could be a good example (e.g. the Republic of Croatia), which implies designing the “map of agricultural risks”.

The maps are the technical means by which determine the probability of hazard emergence and zones of specific risk areas. The maps represent a base for determining a risk coefficient of some areas. The so-called partly compulsory insurance of agriculture would be statutory, as a compulsory insurance model for users of the government subsidy in the insurance of agricultural production. Prostran promotes the model of legal mandatory insurance in agriculture, “primarily for farmers who use the state subsidies, because in that way there would be avoided confusion what, when and how to insure. In that way, the risk would be avoided, and manufacturers would be protected from bankruptcy”. In accordance with the proclaimed state strategy, the insurance companies would be under an obligation to organize trainings in the field of insurance for manufacturers. A certificate would be an integral part of documentation necessary for getting the state subsidy.

Some experts speak in favour of raising a percentage of the regressive insurance premiums from the current 40% to 50%, in accordance with the good European practice, which aims to increase the economic protection of manufacturers. The suggested measures avoid the moral risk as a condition to insure against the loss of income, which implies the obligation of agricultural entities to sow the declared seed, use mineral fertilizers in the required amount, as well

as the chemical protective agents, whereby insurance gets full meaning. The mentioned measures should have long-term positive effects on the development of insurance and ensuring a stable source of financing for agriculture.

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