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Evaluation of the crop insurance system in Poland

Abstract: Crop insurance is one way to reduce the risk in agricultural production. The subsidy system used since 2006 aims to increase the area of crops insured against the risk of weather anomalies. The purpose of this study is to evaluate the functioning of the crop insurance system subsidized by the State Treasury. The results indicate that this system is not effective. Up to 2018, insurance covered about 3 million ha of crops, compared to about 7 million ha required by law. The sum of payments in the years 2008–2018 amounted to PLN 1.7 billion. The risks most often insured by farmers include: frosts and negative effects of wintering and periodically hail. The attractiveness of subsidized crop insurance is to be increased by increasing the subsidies for 2019 and 2020 to PLN 1.2 and 1.4 billion, respectively. The insufficient area of currently insured crops means that the premiums obtained by insurance companies are smaller than the claims paid, which means that the insurance contracts become deficit and can be withdrawn from the insurers' offer.

Key words: crop insurance, farms, budget subsidies
JEL classification: G220, Q120, H20

Introduction

Agriculture is an activity associated to a large extent with environmental conditions over which man has no significant influence. Therefore, risk management in this activity is of particular importance. Insurance is an important tool for neutralizing risks in agriculture. The universality of crop insurance in Poland is relatively small. The reasons for this should be sought both on the demand side (farmers' de-

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cisions) and on the supply side (insurers' limited interest in offering this type of product). Discussions on crop insurance and their use by agricultural producers are associated with the perceptible phenomenon of low participation of farmers in subsidized crop insurance systems and the need to determine the reasons for this [Piet and Bougherara 2016]. Previous studies in this area included primarily attempts to identify factors affecting farmers' decision to buy insurance [Halcrow 1949, Horowitz and Lichtenberg 1993, Smith and Goodwin 1996, Goodwin et al. 2004, Sherrick et al. 2004, Ogurtsov 2008, Lorant and Fekete 2015, Heerman et al. 2016].

The need for the use and dissemination of crop insurance is indicated by the regulations contained in Commission Regulation (EC) 1857/2006 providing for a 50% reduction in the aid granted to agricultural producers from national budgets in the event that they did not cover at least 50% of the average annual production or income. This regulation has been in force in Poland since 1 January 2010. Under insurance contracts, protection should cover the effects of threats that on the one hand are associated with adverse climatic events and, on the other hand, are statistically characterized by the highest frequency of occurrence in a given Member State or region [Janowicz-Lomott and Łyskawa 2016]. In subsequent years after the introduction of Regulation (EC) 1857/2006, the subsidized crop insurance system in Poland was subject to certain modifications. However, significant changes were introduced by the laws of 2015, 2016 and 2018. The adopted regulations were aimed at creating an effective instrument of risk insurance in accordance with the guidelines provided for in the assumptions of the Common Agricultural Policy (CAP) for 2014–2020.

The purpose of the paper is to present the current state and perspectives of the subsidized crop insurance system in Poland.

Risk in agricultural activity

The principles of functioning of the subsidized crop insurance system in Poland in 2008–2018 are regulated by the Act insurance of agricultural crops and livestock in 2005. During this period the act was modified several times. The example of these amendments was the change in the amount of subsidies to insurance premiums, which was carried out depending on the size of the premiums and the sum insured. This subsidy ranged from 35 to 50% and finally reached the level of 65% of the premium. This is the maximum support that can be granted to agricultural producers in this respect (Table 1).

The next stage of modifying the subsidized crop insurance system was the introduction in 2017 of a transitional period in which the government subsidies for premiums in crop insurance were up to 65%. The condition for obtaining these payments was the conclusion by the farmer of a contract insuring the package of all 10 types of risk indicated by the legislator, i.e.: drought, flood, negative effects of wintering, spring frost, hail, hurricane, heavy rain, lightning, landslide and avalanche.

Table 1

Changes in the maximum subsidy rates for premiums in crop insurance in 2006–2018 according to Acts on insurance of agricultural crops and livestock

Subject of regulation	Act of 7 July 2005	Amendment of 7 March 2007	Amendment of 15 December 2016		Amendment of 23 October 2018
Maximum rates entitling to additional payment	max. 3.5% of the sum insured	max. 6% of the sum insured	max. 6% of the sum insured, the limit does not apply to ground vegetables and fruit trees and shrubs	max. 9% of the sum insured, 12% for agricultural land class V and 15% for class VI	max. 9% of the sum insured, 12% for agricultural land class V and 15% for class VI
Amount of the subsidy	In 2006, the subsidy (up to 1 ha) amounted to: • 40% premium for cereals, corn, rapeseed or colza, • 35% premium for potatoes or sugar beet.	Between 1 January and 4 June 2007, the subsidy (up to 1 ha) amounted to: • 40% premium for cereals, corn, rape or colza, • 35% premium for hops, vegetables, fruit trees and shrubs, potatoes or sugar beets. Since 4 June 2007 the subsidy amounted to 50%.	Up to 65% of the premium, assuming the rate: • 3.5% of the sum insured for the cultivation of cereals, maize, spring rape, colza, potatoes or sugar beet, • 5% of the sum insured for winter oilseed rape, ground vegetables, hops, tobacco, fruit trees and shrubs, strawberries or legumes.	Up to 65% of the premium, assuming the rate: • 9% of the sum insured, • 12% of crops cultivated on agricultural land class V, • 15% of class VI.	Up to 65% of the premium, assuming the rate: • 9, 12 or 15% of the sum insured, • possibility of reducing the compensation (reduction franchise) in terms of drought risk by 20, 25 or 30% of the sum insured.

Source: Own study based on Kaczała and Rojewski [2015], Ustawa z dnia 7 lipca 2005 r. o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2005 nr 150, poz. 1249, Ustawa z dnia 7 marca 2007 r. o zmianie ustawy o dopłatach do ubezpieczeń upraw rolnych i zwierząt gospodarskich oraz niektórych innych ustaw. Dz.U. 2007 nr 49, poz. 328, Ustawa z dnia 15 grudnia 2016 r. o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2016, poz. 2181, Ustawa z dnia 23 października 2018 r. o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2018, poz. 2124.

These risks can be divided into three groups (Table 2):

- catastrophic risks (summer season) – drought and floods,
- catastrophic risks (winter season) – negative effects of wintering and spring frosts,
- risks of the local nature not causing significant damage to the overall sown area – hurricane, heavy rain, hail, lightning, landslides and avalanches.

Table 2

Definitions of risks covered by the subsidized crop insurance system according to Acts on insurance of agricultural crops and livestock

Types of risk	Definition of risk
Drought	Damage caused by occurrence in any sixty-decade period from 21st March to 30th September of a decrease in the climate water balance below the value specified for individual crop species and soil.
Flood	• Flooding of areas as a result of rising level of flowing or standing water. • Flooding of areas as a result of heavy rain. • Water flow down slopes or slopes in mountainous and foothill areas.
Negative effects of wintering	Freezing, soaking or scalding of plants in the period from 1st December to 30th April, consisting in complete or partial destruction of plants or total loss of crop or part thereof.
Spring frost	Total or partial destruction of plants or total or partial loss of crop caused by temperature drop below 0°C in the period from 15th April to 30th June.
Hurricane	Damage resulting from the action of wind with a speed of not less than 24 m/s, whose action causes massive damage; individual damages are considered to have been caused by a hurricane if a hurricane operation has been identified in the immediate vicinity.
Heavy rain	Damage caused by rain with a performance factor of at least 4 or damage that clearly indicates the effects of torrential rain.
Hail	Precipitation consisting of ice nuggets.
Lightning	Damage resulting from a lightning discharge leaving indisputable traces of this event.
Landslide	Soil collapse and soil removal, i.e. caused by land subsidence due to collapsing of underground free spaces in the ground or caused by ground movements on slopes.
Avalanche	Rapidly sliding or rolling down the slopes of mountain or foothill masses of snow, ice, rocks, stones, soil or mud.

Source: Own study based on Ustawa z dnia 24 kwietnia 2015 r. o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2015, poz. 892, Ustawa z dnia 15 grudnia 2016 r. o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2016, poz. 2181, Ustawa z dnia 23 października 2018 r. o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich. Dz.U. 2018, poz. 2124.

Material and methods of research

The current state and prospects of crop insurance in Poland were examined using data from secondary sources, including available literature and legal acts. The figures come from statistical summaries of the Statistics Poland (Główny Urząd Sta-

tystyczny), the Ministry of Agriculture and Rural Development (Ministerstwo Rolnictwa i Rozwoju Wsi), the Polish Chamber of Insurance (Polska Izba Ubezpieczeń) and the Polish Financial Supervision Authority (Komisja Nadzoru Finansowego), as well as conclusions from the analysis of the literature on the subject, legal acts as well as statistical summaries.

The analysis was carried out for the period 2008–2018, which is justified, among others, by the fact that during this period legislative work was carried out to change the system of subsidized crop insurance in such a way as to increase the universality of these products among agricultural producers. In the data analysis, indicators of the structure, dynamics and share of insured crop areas in the total crop area were used.

Results and discussion

Materialization of catastrophic risk occurring most frequently in the summer season may lead to damages estimated at high amounts, even reaching the level of PLN billions. According to 2015 Regulation of the Council of Ministers about implementing certain tasks of Agency for Restructuring and Modernization of Agriculture, due to the high amount of these damages, the option of using public aid was introduced in the form of:

- preferential loan for the resumption of agricultural production,
- guarantees for repayment of bank loans granted for the resumption of production on farms,
- assistance in paying current social security contributions,
- deferment and payment in installments of contracts for the sale and lease of real estate of the Agricultural Property Stock of the Treasury (Zasób Własności Rolnej Skarbu Państwa),
- subsidies for agricultural producers for crop damage up to PLN 1,000 per 1 ha,
- agricultural tax rebates.

Although drought and flooding are of catastrophic nature, the number of insurance contracts concluded for these risks is small. In 2010, 1,494 crop insurance policies were concluded against drought risk, and 85 contracts in 2014 (Table 3). Flood risk is also rarely insured by insurance companies. In 2010, 2064 such contracts were concluded, and in 2014 only 352. Such a low insurance scale means that they are almost unused in agricultural activity, despite the significant risk caused by drought and floods. A similar problem has already been signaled by Zawojska [2008] indicating that in 2006 only 8–10% of sown area was covered by insurance protection, and in 2007 only 3% of farmers voluntarily insured their animals and crops against losses caused by heavy rains, low temperatures, hail and lightning.

The second group of risks insured under the subsidy system also covers risks of the catastrophic nature however usually occurring in the winter season. The above mentioned risks include negative effects of wintering and spring frosts. These types

Table 3
The number of concluded insurance contracts covered by the subsidy system in 2010–2017

Type of risk	2010	2011	2012	2013	2014	2015	2016	2017
Drought	1 494	648	274	117	85	90	143	456
Flood	2 064	610	348	427	352	321	249	406
Negative effects of wintering	50 770	54 204	63 030	65 620	72 391	37 2172	38 274	65 066
Spring frost	73 631	69 896	77 672	75 063	92 923	39 3923	53 512	88 383
Hurricane	4 623	4 970	6 468	11 328	15 553	17 038	17 080	24 799
Heavy rain	4 623	4 970	6 468	11 328	15 553	17 038	17 080	24 799
Hail	188 008	171 835	169 950	181 256	202 484	541 901	137997	201 324
Lightning	4 597	4 882	4 851	5 492	7 228	7 169	9083	10 140
Landslide	4 597	4 882	4 851	5 492	7 228	7 169	9083	10 140
Avalanche	4 597	4 871	4 728	5 492	7 228	7 169	9083	10 140

Source: Own study based on the data of the Ministry of Agriculture and Rural Development, *Uzasadnienie do projektu ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich*, retrieved from: https://legislacja.rcl.gov.pl/docs//2/12281402/12334151/12334152/dokument209144.pdf [access: 20.07.2019].

of risk are more frequently insured by insurance companies than drought and flood risks (Table 3). Damages and payments due to the materialization of negative effects of wintering and spring frosts risks are the largest in the subsidized crop insurance system. The value of claims paid resulting from the negative effects of wintering in 2012 amounted to PLN 588 million, which accounted for approximately 82% of all claims paid under crop insurance. Also in 2016, significant compensation of PLN 434 million for damages caused by the negative effects of wintering was paid out. They accounted for around 66% of claims paid [Weremczuk 2017].

The third group of risks are residual risks of a local nature that do not cause significant damage to the overall sown area. Hail risk is one of the most commonly--insured risks for farmers. Farmers often protect themselves against its negative effects, including using anti-hail protection networks or anti-hail protection cannons. A significant number of farmers conclude insurance contracts to protect against materialization of this risk, and these contracts are among the most common crop insurance contracts (Table 3). Historically the highest number of these contracts was concluded in 2015.

To encourage farmers to insure crops, the Ministry of Agriculture and Rural Development has established a subsidy system. Subsidy payments are made subject to the condition that the crop insurance premium does not exceed 9% of the sum insured. The value of the premium was also conditioned by the quality of the land. If the agricultural producer's activity is carried out on V and VI class of the agricultural land, the premium may not exceed, respectively, 12% and 15% of the sum insured. Despite many modifications and changes in the system of subsidized crop insurance,

the number of concluded contracts in the years 2009–2018 remained at a level close to 150 thousand (Table 4), and in 2016 the share of holdings with insured crops was only 18% [NIK 2019].

Table 4
The number of crop insurance contracts and insured crop area in Poland in 2009–2018

Item	2009	2010	2011	2012	2013
Number of contracts (thousand)	144	135	138	136	151
Area (thousand ha)	2 808	2 846	3 033	2 751	3 399
Item	2014	2015	2016	2017	2018
Number of contracts (thousand)	142	139	117	162	165
Area (thousand ha)	3 270	2 824	2 340	3 272	3 256

Source: Own study based on the data of the Ministry of Agriculture and Rural Development, NIK [2019].

To pursuant to the provisions of the Act of 7 July 2005 on insurance of agricultural crops and livestock, agricultural producers who do not insure at least 50% of the area of arable crops for which they receive direct payments are obliged to pay a penalty fee of EUR 2 per 1 ha. The area of arable fields under insurance protection in Poland in the years 2008–2018 averaged about 2.9 million ha annually (Table 4). According to the provisions of the Act, this area should amount to at least 50% of the cultivated area, which in Poland is about 7 million ha. This standard is determined on the basis of a measure of insured crop area and is calculated as the quotient of insured crop area and total arable land area. However, according to the data of the Ministry of Agriculture and Rural Development, the value of this coefficient in the analyzed period ranged from 13 to 24%. The largest crop area was covered by insurance in 2013 and amounted to 3.4 million and 3.3 million ha in 2017–2018. On the contrary, in 2016 and 2008 the smallest area of arable crops was insured, i.e. 2.3 million and 1.8 million ha, respectively. This means that the crop insurance system is currently not effective. For this reason, the Ministry of Agriculture and Rural Development expects that as a result of the modification of the crop insurance system carried out in 2016 and 2018, the area of agricultural crops covered by insurance protection will increase to the level of, respectively: 6 million ha (43.4% share in the area of crops) in 2019 and 7 million ha in 2020 (50.7% share in the area of crops, it means it will slightly exceed the statutory minimum requirement). Taking into account the experience of the years 2008–2018 assumptions contained in the explanatory memorandum to the Act of 2016 may not be realized. The high loss ratio of crop insurance that has occurred in recent years and the drought taking place in 2018 may mean that in subsequent years insurance companies will limit the sale of these products to avoid taking too high risk for insurance. In the years 2008–2018, the budget subsidy for co-financing premiums in crop insurance was subject to significant fluctuations and

the average annual amount was about PLN 343 million (Table 5). The lowest value of the planned subsidy (PLN 150 million) was recorded in 2009, and in turn, the highest amount of PLN 853 million in 2018. In the years 2019–2020, the Ministry of Agriculture and Rural Development predicts that the area of insured crops will increase and the value of budget funds allocated for subsidies will increase. To this end, a subsidy of PLN 1.2 billion in 2019 and PLN 1.4 billion in 2010 is planned. These are much higher amounts than in previous years. The total value of payments in the years 2008-2018 amounted to approximately PLN 1.7 billion, i.e. approximately PLN 149 million per year (Table 5).

Table 5
Amounts of subsidies from the state budget planned and used for agricultural insurance and the coefficient of the subsidy used

Year	Insured crop area (ha)	Planned subsidy from the state budget (PLN million)	Use of subsidies (PLN million)	Subsidy use (%)
2008	1 832 036	545	150	27
2009	2 808 104	150	133	89
2010	2 845 777	300	100	33
2011	3 032 634	200	100	50
2012	2 751 438	203	162	80
2013	3 398 811	183	164	90
2014	3 269 871	201	161	80
2015	2 823 606	212	173	82
2016	2 339 578	203	209	103
2017	3 272 468	726	397	55
2018	3 255 697	853	450	53
2019	6 000 000*	1189*	–	–
2020	7 000 000*	1422*	–	–

*Planned values for 2019–2020.
Source: Own elaboration based on data from *Uzasadnienie do projektu ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich*, retrieved from: https://legislacja.rcl.gov.pl/docs//2/12281402/12334151/12334152/dokument209144.pdf [access: 20.07.2019]; *Projekt ustawy o zmianie ustawy o ubezpieczeniach upraw rolnych i zwierząt gospodarskich oraz ustawy o opłacie skarbowej*, retrieved from: http://www.mir.krakow.pl/resources/articles/9323/13_2016%20proj%20ustawy%20o%20ubezpieczeniach%20rol%20i%20oplacie%20skarbowej.pdf [access: 20.07.2019].

Significant differences in the amount of compensation paid in 2011 and 2012 as well as in 2015 and 2016 resulted from the materialization of only one of the catastrophic risks – the negative effects of wintering. In 2012, compensation for materialization of this risk amounted to PLN 590 million which accounted for 82% of all

crop insurance benefits paid. In 2016 the payments amounted to PLN 434 million, i.e. approximately 66% of claims paid. In the years 2008–2016 the average value of the ratio of claims to the premium paid was 112%. This means that for every PLN 1 million of subsidy received, the insurance companies have paid PLN 1.12 million in the form of compensation, which meant that for insurance companies this type of insurance products became scarce.

Profitability of subsidized agricultural insurance, from the point of view of insurance companies, is determined on the basis of the ratio of the amount of written premium (premium collected from the farmer and state budget subsidies) to the compensation paid. In 2008–2016, claims paid by insurance companies amounted to over PLN 2.7 billion, while the gross written premium amounted to about PLN 2.5 billion (Table 6). The shortage of these products for insurance companies in the long run may lead them to give up offering these products.

Table 6
Premium collected and compensation paid in the subsidized agricultural insurance system in Poland in 2008–2016

Specification	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG	Total
GWP (PLN million)	160	176	134	270	285	378	355	375	320	273	2 453
Compensation (PLN million)	193	121	98	362	719	151	263	172	659	304	2 738
Coefficient (%)	121	69	73	134	252	40	74	46	206	111	112

GWP – gross written premium, coefficient – a relation of the value of compensations paid to the gross written premium collected (the premium collected from the farmer and state budget subsidies).
Source: Own study based on the data of Ministry of Agriculture and Rural Development, *Uzasadnienie do projektu ustawy o ubezpieczeniach upraw rolnych i zwierząt*, retrieved from: https://legislacja.rcl.gov.pl/docs//2/12281402/12334151/12334152/dokument209144.pdf [access: 20.07.2019].

Low profitability and even deficit of subsidized crop insurance may have a significant negative impact on the number of insurance companies providing protection in this respect. In 2018, such products offered only 5 out of all 34 domestic non-life insurance companies.

Conclusions

Crop insurance is one way to reduce the risk in agricultural production. The system of the governmental subsidies is aimed at increasing the area of crops insured against risk, in particular catastrophic risk that could deprive farmers of their annual income.

The risks most often insured by farmers include: frosts and negative effects of wintering, and periodically hail. The functioning insurance subsidy system is ineffective as the share of the area of insured crops is significantly lower than the 50% required by law. The insufficient area of currently insured crops means that the premium obtained by insurance companies are smaller than the compensation paid, causing these insurances to become deficit.

Low profit or even deficit activity may force insurers to withdraw crop insurance from their offer. The fact that in 2018 only 5 out of 34 domestic non-life insurance companies insured crops increases the risk of monopolizing this market, and also exposes farmers to the risk of losing the possibility of using this form of risk neutralization in agricultural production.

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Ewaluacja systemu ubezpieczenia upraw w Polsce

Abstrakt: Ubezpieczenia upraw są jednym ze sposobów ograniczenia ryzyka występującego w produkcji rolnej. System dopłat stosowany od 2006 roku ma na celu zwiększenie obszaru upraw ubezpieczonych od ryzyka związanego z anomaliami pogodowymi. Celem niniejszego opracowania jest ocena funkcjonowania systemu ubezpieczenia upraw dotowanych przez Skarb Państwa. Wyniki badania wskazują, że system ten nie jest efektywny. Do 2018 roku ubezpieczeniem obejmowano około 3 mln ha upraw, w porównaniu do około 7 mln ha usta-

wowo wymaganych. Suma dopłat w latach 2008–2018 wyniosła 1,7 mld zł. Do najczęściej ubezpieczanych przez rolników rodzajów ryzyka należą przymrozki i ujemne skutki przezimowania oraz okresowo grad. Zwiększeniu atrakcyjności dotowanych ubezpieczeń upraw ma służyć zwiększenie dotacji na lata 2019 i 2020 do odpowiednio 1,2 i 1,4 mld zł. Niewystarczająca powierzchnia aktualnie ubezpieczonych upraw sprawia, że pozyskiwane przez zakłady ubezpieczeń składki są mniejsze od wypłacanych odszkodowań, co powoduje, że ubezpieczenia te stają się deficytowe i mogą zostać wycofywane z oferty ubezpieczycieli.

Słowa kluczowe: ubezpieczenie upraw, gospodarstwa rolne, dotacje budżetowe
Kody JEL: G220, Q120, H20

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