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FORECASTING THE MAIN CHARACTERISTICS OF CROP INSURANCE MARKET

ABSTRACT. This article is devoted to the estimation of the forecasted volumes of crops, corps capacities and sown area of crops in the insurance case. The forecasted values of crops capacities in Kyiv region for 2015 calculated by correlation and regression analysis and the method of statistical dependency equations.
It is proved the expediency of applying modeling techniques to determine the volume, value of expected crop and the amount of insurance in the insurance case.

KEYWORDS: insurance, crops, crops capacities, cultivated area, forecasted values, regression analysis, a method of statistical dependency equations.

АНОТАЦІЯ. Стаття присвячена визначенню очікуваних обсягів врожаю, врожайності та посівної площі сільськогосподарських культур при на-

станні страхового випадку. Розраховано прогнозні значення врожайності сільськогосподарських культур по районам Київської області на 2015 рік методом кореляційно-регресійного аналізу та методом статистичних рівнянь залежностей. Доведено доцільність застосування методів моделювання для визначення обсягів, вартості очікуваного врожаю сільськогосподарських культур і розміру страхового відшкодування в разі настання страхового випадку.

КЛЮЧОВІ СЛОВА: страхування, сільськогосподарські культури, врожайність, посівна площа, прогнозні значення, регресійний аналіз, метод статистичних рівнянь залежностей.

АННОТАЦИЯ. Статья посвящена определению ожидаемых объемов урожая, урожайности и посевной площади сельскохозяйственных культур при наступлении страхового случая. Рассчитано прогнозные значения урожайности сельскохозяйственных культур по районам Киевской области на 2015 год методом корреляционно-регрессионного анализа и методом статистических уравнений зависимостей. Доказана целесообразность применения методов моделирования для определения объемов, стоимости ожидаемого урожая сельскохозяйственных культур и размера страхового возмещения в случае наступления страхового случая.

КЛЮЧЕВЫЕ СЛОВА: страхование, сельскохозяйственные культуры, урожайность, посевная площадь, прогнозные значения, регрессионный анализ, метод статистических уравнений зависимостей.

Formulation of the problem. In terms of building a market economy a significant role plays insurance coverage of agribusinesses for stabilization of their economic development. The use of rational and acceptable for the manufacturer approaches to crop insurance needs scientific evidence in identifying the ways of development for this type of insurance [5, 6].

Gaining importance gets the development of new theoretical and methodological approaches and methods for forming methodology for assessing the expected yield, determining the actual amount of damages and destruction to crops as a result of the insured event (frost, hail, flood, etc.). In other words, when there is damage or loss of crop due to events that have signs of contingency [1, 4].

Increasing efficiency in agriculture and providing protection of economic interests for the internal agricultural producers of all ownership types calls for the revision of mechanism for risk management in the agricultural sector of Ukraine.

Analysis of recent research. In the works of Ukrainian and foreign scientists such as: O. Balatskiy, I. Bystryakov, V. Borisova, P. Borschevsky ,V. Vitlinsky A. Danilenko, A. Disyaka, S. Doroguntsov, I. Hubenko, V. Krestyaninova, R. Mikhailov, S. Nakonechny, L. Nowakowsky, O. Oliynyk, P. Sabluk, N. Siletska, M. Reimers, V. Trehobchuk, A. Sholoyko, V. Yakubovich and others, — highlighted

features of agricultural insurance, revealed disadvantages of this type of insurance in Ukraine and indicated the main directions for overcoming these barriers.

Presenting main material. The purpose of the article is to estimate the forecasted volume of crop, yields and cultivated area for basic grains and oilseeds. Research methods based on general scientific and fundamental economic theory provisions as well, as statistical science. The methods of generalization and systematization, grouping, averages, statistical analysis of dynamics, variation, forecasting methods, graphical and tabular methods were used in this work. The above mentioned, made it possible to assess the actual volume of crop and its destruction in the insurance case [1, 4].

Based on the inertia properties of the crops market key characteristics throughout its life cycle, there offered hypothesis about their future development. The inertia characteristics of crop insurance market is shown, on one hand, as the inertia of interrelations, that is, maintaining the main features of their formation mechanism (correlation of projected variable on a complex of variables); on the other hand, as a lag in the development process of the operation, that is, some degree of keeping the nature quantitative indicators on the agricultural insurance market functioning dueing relatively long, chronological periods [3].

The inertia in the first case, allows to use for the forecasting a model that describe the dependence of indicators of crop insurance market functioning; while the inertia, in the second case, allows the extrapolation of trends, treating them as a starting point for forecasting and appropriate further processing [2].

Forecasting the main characteristics of crop insurance market is divided into several stages: the first step is to gather statistics on the main characteristics of agricultural insurance market functioning; the second step is to detect trends in the main characteristics of the agricultural crops insurance market; the third stage is considering different mathematical functions that describe the processes occurring in the crops insurance market and made selection of features that most optimally characterize the development of the phenomenon.

Figure 1 shows the basic dynamics of the grains and oilseeds yield in Ukraine in 2005—2014. The smallest yield of the major grains and oilseeds recorded in 2007 (23.4 quintal / ha), and the highest — in 2014 (40.1 quintal / ha). This, accordingly, depended on weather, economic and other conditions that significantly affect crop yields.

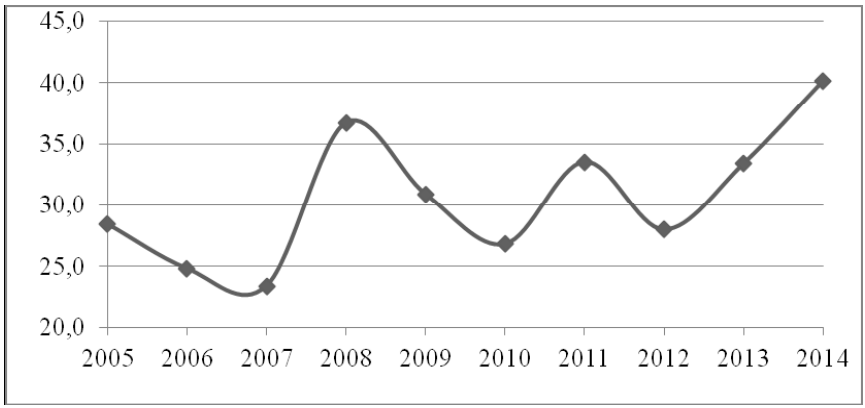

Fig. 1. Crop capacity of the major grains and oilseeds in Ukraine in 2005—2014, quintal / ha.

Data source: build by the author according to official statistics data [7, 8]

Figure 2 presents time series of the major grains and oilseeds cultivated areas in Ukraine in 2005—2014.

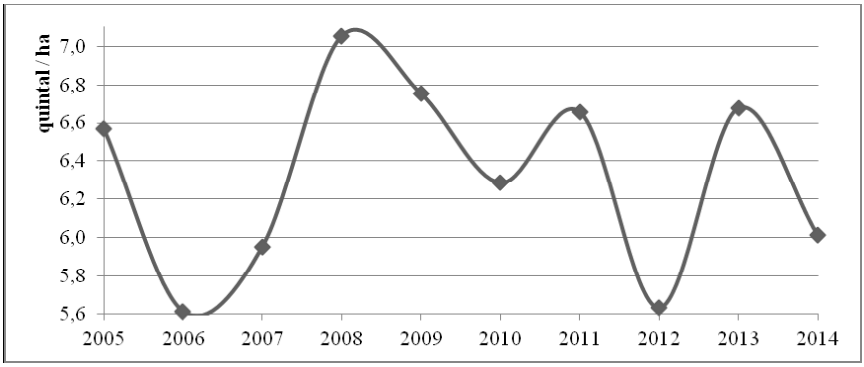

Fig. 2. Major grains and oilseeds cultivated areas in Ukraine in 2005-2014, thsnd. ha

Data source: build by the author according to official statistics data [7, 8]

Analysis results reveal the least amount of acreage occurred in 2012, also this period characterizes by the lowest gross harvest.

The need for forecasting the volumes of future yields, average crop capacity, crops cultivated areas proved in the system of setting the

levels of insurance coverage. There are cases when the average yield on the areas of risk that are used during installation and adjustment of insurance rate and insurance coverage, experiences significant fluctuations and correlation between the average value for the area and the corresponding indicators for individual districts within the area is extremely weak.

Dynamics of corps capacity for major grains and oilseeds in Ukraine for 2005—2014, as well as theoretical and forecasted value (determined by regression analysis) for 2015 and its confidence interval shown in Fig. 3.

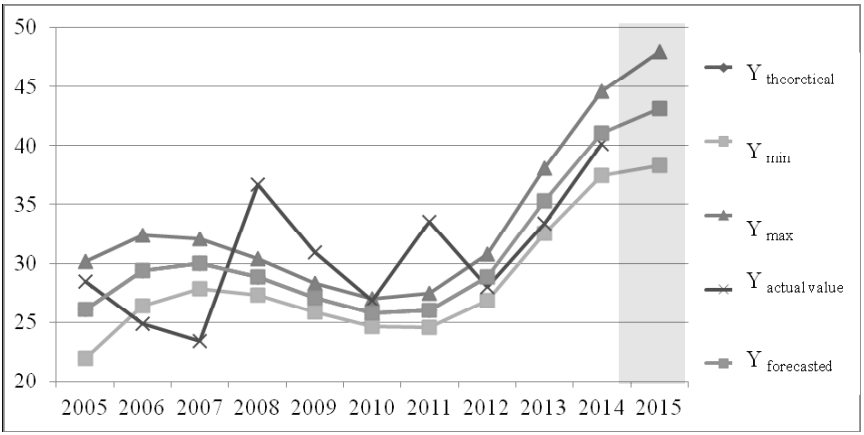

Fig.3. Dynamics of actual and theoretical level of corps capacity for the major grains and oilseeds in Ukraine in 2005—2014 and forecasted values, determined by regression analysis method for 2015

Data source: build by the author according to official statistics data [7, 8]

The results of the calculations made for forecasting corps capacity of major grains and oilseeds in Ukraine by regression equations trend method we supplement b by using the method of statistical dependency equations. Obtained forecasted values of average corps capacities for the major grains and oilseeds in Ukraine can be used to analyse individual statistics data of a certain insurance company (Figure 4).

Methodological principles of forecasting by the use of regression analysis as well, as statistical dependency equations performed for output data of interval (moment) time series of the investigated phenomenon. The tendency of development (trend) is determined for this phenomenon.

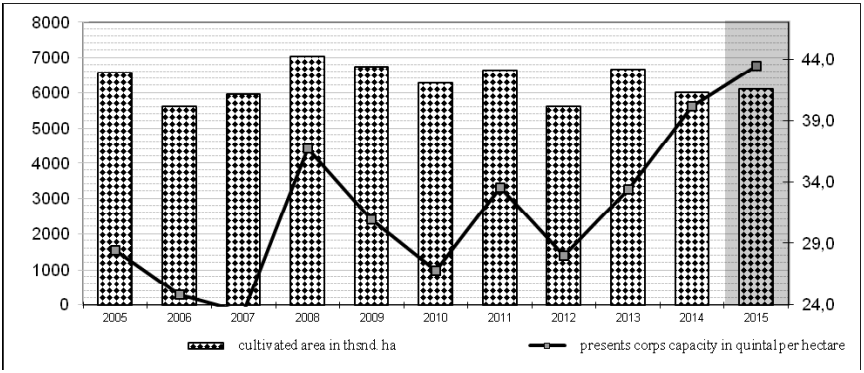

Fig. 4. Actual and forecasted values of corps capacities, cultivated area and gross harvest of the major grains and oilseeds in Ukraine in 2005—2014 and forecasted values, determined by the method of regressive analysis for 2015

Data source: build by the author according to official statistics data [7, 8]

Applying the method of statistical dependency equations one can solve thwe following tasks for statistical analysis of the phenomena and processes relationship:

— identification of the main development direction;

— grounding of economic phenomena forecasted levels.

The method of statistical dependency equations allows for reasonable scientific study of general trends and forecasting the dynamics of phenomena and processes based on a small number of equations for the series. The calculated for 2015 forecasted values of the corps capacities for the major grains and oilseeds in Ukraine shown in Fig. 5.

Approximation error by the method of regression equations of the trend makes 8.1 %, and by the method of statistical dependencies equations — 8.6 %. It indicates a reliable choice of regression equations, since approximation error is less than 15 %.

Calculations showed that in eighteen districts of Kyiv region forecasted values for crop capacities by trend extrapolation are lower than by forecasted values of gross harvest and cultivated area relation. In other areas, forecasted values of the crops capacities by extrapolation of the trend are more than the forecasted values of gross harvest and cultivated area relation. A similar situation observed in Kiev region as a whole [2].

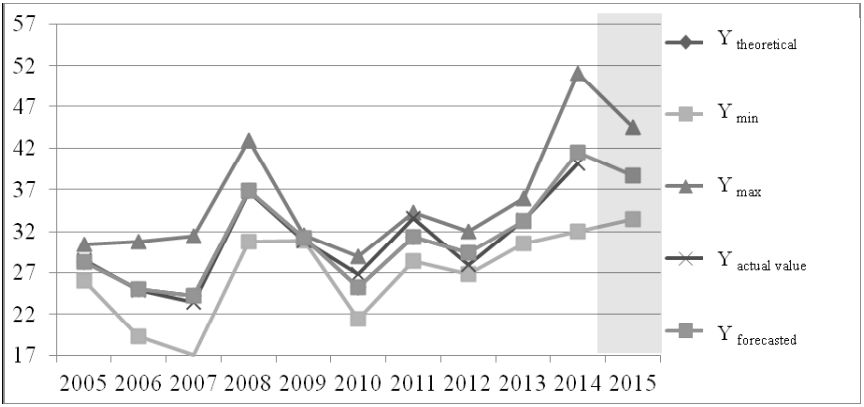

Fig. 5. Dynamics of actual and theoretical corps capacity level for the major grains and oilseeds in Ukraine in 2005—2014 and forecasted data made by statistical dependency equations for 2015

Data source: build by the author according to official statistics data [7, 8]

There is reason to consider that the forecasted values obtained by dividing forecasted values of gross harvest and cultivated area compared to trend extrapolation of that most important indicator of the crops insurance market is more accurate due to the fact that it takes into account fluctuations elements. Overall, the forecast for crop capacities in Ukraine for 2015 can be considered realistic and appropriate for the purposes of statistical analysis. The forecasted data are recommended for comparisons with the actual ones.

Conclusion. Proved the expediency of applying modelling techniques to determine the volume, value of expected crops harvest and the amount of insurance coverage in the insurance case. Adequate models building for the corps capacities based on effective monitoring system. According to internal and international experience, an insurance company should provide it for quantitative assessment and valuation the risks in order to supply a balanced insurance portfolio, to improve its reliability and financial stability, create favorable conditions for the development in agricultural sector, and protect the property interests of agricultural enterprises of all property types.

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ІНТЕГРАЛЬНА СТОХАСТИЧНА НЕЛІНІЙНА МОДЕЛЬ ДИНАМІКИ ІННОВАЦІЙНОЇ ЕКОНОМІКИ

АНОТАЦІЯ. На базі сучасних методів, моделей, інформаційних та інноваційних технологій розроблено і досліджено інтегровану стохастичну нелінійну модель техногенних об'єктів і процесів, придатну для умов системних криз. У роботі розглянуто аспекти інтеграції багатьох сфер і секторів діяльності сучасних складних систем, які функціонують і розвиваються в сучасних умовах нелінійності, нестабільності і криз.

КЛЮЧОВІ СЛОВА: інтегральна, стохастична, інноваційна, динаміка, модель, нелінійна, нестабільна, кризи.

