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доцентASSESSMENT METHODOLOGY OF FOOD
COMPONENT ECONOMIC SECURITY:
REGIONAL ASPECTМЕТОДИКА ОЦІНКИ ПРОДОВОЛЬНОЇ
СКЛАДОВОЇ ЕКОНОМІЧНОЇ БЕЗПЕКИ:
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Urgency of the research. In the terms of globalization and integration processes, there is an urgent need for scientific research on the problem of ensuring the state security in the economic sphere.

Target setting. The issues of measuring the ensuring economic security system at the state and regional levels remains unresolved because of the inconsistency of thought about its components and approaches as for assessing. It raises the need for their research and scientific justification.

Actual scientific researches and issues analysis. Issues related to the economic security of the state are highlighted in the writings of such scholars as T. Vasylytsiv, O. Vlasyuk, A. Kachinsky, O. Liashenko, V. Marhasova, L. Shevchenko and others.

Uninvestigated parts of general matters defining. Despite the attention of scientists to the problems of state economic security, the issues of the security components in the economic sphere at the regional level and the methodology of their assessment need further research.

The research objective. The purpose of the article is to provide scientific substantiation of the assessment methodology of food component economic security at the regional level.

The statement of basic materials. The differences in the list of security components in the economic sphere have been shown in the article. The methodology of assessment the level of food component economic security has been improved. The stages of its implementation have been determined. It is proposed to use an expanded nomenclature for group and individual indicators for assessment; their hierarchy is substantiated. It is recommended to use differential and integral methods to calculate the complex indicator. Gradations of its level have been proposed. The functionality of the assessment methodology of the food component economic security level has been proved via approbation.

Conclusions. The application of a justified methodological approach and an improved methodology of assessment the individual security components in the economic sphere in practice will allow formulating effective influence mechanisms at the state and regional levels.

Keywords: security in economic sphere; components; security level assessment methodology; indicators nomenclature; gradations of complex indicator level.

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Актуальність теми дослідження. В умовах глобалізаційних та інтеграційних процесів виникає нагальна потреба в наукових дослідженнях проблеми забезпечення безпеки держави в економічній сфері.

Постановка проблеми. Питання виміру стану системи забезпечення економічної безпеки на рівні держави і регіонів все ще залишаються не вирішеними через неузгодженість думки щодо її складових та підходів до оцінки. Це зумовлює необхідність їх дослідження та наукового обґрунтування.

Аналіз останніх досліджень і публікацій. Питання, що стосуються економічної безпеки держави висвітлені в працях таких науковців, як Т. Васильців, О. Власюк, А. Качинський, О. Ляшенко, В. Маргасова, Л. Шевченко та інших.

Виділення недосліджених частин загальної проблеми. Незважаючи на увагу вчених до проблем економічної безпеки держави, питання складових безпеки в економічній сфері на рівні регіону та методики їх оцінки потребують подальших досліджень.

Постановка завдання. Метою статті є наукове обґрунтування методики оцінки продовольчої складової економічної безпеки регіональному рівні.

Виклад основного матеріалу. У статті показано відмінності в переліку складових безпеки в економічній сфері. Удосконалено методику оцінки рівня продовольчої складової економічної безпеки. Визначено етапи її проведення. Запропоновано для оцінки застосовувати розширену номенклатуру групових і одиничних показників, обґрунтовано їх ієрархію. Рекомендовано для розрахунку комплексного показника використовувати диференціальний та інтегральний методи. Запропоновано градації рівня комплексного показника. Апробацією доведено функціональність методики оцінки рівня продовольчої складової економічної безпеки.

Висновки. Застосування обґрунтованого методичного підходу і удосконаленої методики оцінки окремих складових безпеки в економічній сфері на практиці дозволить сформувати ефективні механізми впливу на державному та регіональному рівнях.

Ключові слова: безпека в економічній сфері; складові; методика оцінки рівня безпеки; номенклатура показників; градації рівня комплексного показника.

Urgency of the research. In the terms of globalization and integration processes, there is an urgent need for scientific research on the problem of ensuring the state security in the economic sphere. The search of tools for identifying the effective mechanisms to control the security system of the state is a key factor of economic growth, which the National Security Strategy of Ukraine is aimed at.

Target setting. The issues of measuring the ensuring economic security system at the state and regional levels remains unresolved because of the inconsistency of thought about its components and

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approaches as for assessing. It raises the need for their research and scientific justification of security components in the economic sphere and methodology of their assessment.

Actual scientific researches and issues analysis. Significant contributions to the study of security in the economic sphere have been made by outstanding scientists of research institutes and higher education, in which at the theoretical and methodological levels the various security aspects have been discussed, including the issues of its components and evaluation. So, issues related to the economic security of the state are highlighted in the writings of such scholars as T. Vasylytsiv [1], O. Vlasyuk [2], A. Kachinsky [3], O. Liashenko [4], V. Marhasova [5], L. Shevchenko [6] and others.

Uninvestigated parts of general matters defining. Scientists and practitioners are making efforts to develop and improve mechanisms for ensuring of state economic security. Despite the attention of scientists to the problems of economic security, the issues of the security components in the economic sphere at the regional level and the methodology for their assessment need further research.

The research objective. The purpose of the article is to provide scientific substantiation of the assessment methodology of food component economic security at the regional level.

The statement of basic materials. The foregrounding of the issue of security in the economic sphere is stipulated due to their variety in amount and essence. Thus, most of the researchers believe that the main components of security in the economic sphere are: raw material resources, energy, financial, social, and technological innovation, food, foreign economic. Methodological recommendations outline such components as investment, innovation, finance, energy, foreign trade, social, demographic [7], and the Methodological of calculating of its level consists of nine positions [8]: macroeconomic, industrial, financial, investment, foreign trade, scientific and technological, social, demographic, energy, food. So, first of all, to establish the level of security in the economic sphere the broad discussion in the scientific circles to develop the range of its components is required.

The financial and foreign securities are being investigated to a greater extent, which is quite understandable, given the openness of the national economy and the influence of the global financial crisis. However, the food supply security is an issue that is recognized worldwide and the significance is greater than foreign economy, according to the «Methodological of calculating the level of the economic security of Ukraine» [8], and considering the specific food supply security in the regions, it is the one that requires adaptation of calculations for the assessment at regional level. This has led to the choice of food security as a safety component in the economic sphere in order to substantiate the methodology for its assessment at the regional level.

In order to develop the methodology for assessing food security of industrial regions the «Methodology of calculating the level of economic security of Ukraine» [8], the «Methodology of determining the key indicators of food security» [9], the «Methodical recommendations for calculating the level of economic security of Ukraine» [10] have been used. The analysis of methodological and scientific literature has shown the need for determination of regional level indicators recommended to identify the level of food security. Moreover, it is also essential to include to the list of indicators the ones that characterize features of regional food security and take into account the current requirements for food.

Thus, to determine the level of food security the evaluation methods such as differential, comprehensive (integral) and mixed can be applied. When using the differential method it can be specified, at which exact indicators the subject's performance is lower or higher. This is the method used in the «Methodology of determining the key indicators of food security», which allows assessing the food security in regions or state by each individual indicator. At the same time the complex method allows characterizing the object using the set of indicators and provides a comparison of regions, but without individual assessment of every indicator. Therefore, a more appropriate approach is to assess the food security using a mixed method that combines the advantages of integrated and differentiated ones, which presupposes the assessment of every single and complex indicator. This method is used in «Methodology of calculating the level of economic security of Ukraine», which allows to generally describe the food security of the region and to compare individual performance with standards. However, food security as a social and economic phenomenon is characterized by multiple measures, according to which the more complex system of indicators – individual indicators included in the group that are integrated into a composite index – ought to be applied.

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The algorithm for calculating the complex indicator of food security in industrial region in conjunction with the development of appropriate measures to enhance its implementation, includes three phases according to which individual indices (first stage), group (second stage) and complex (third stage) ones are calculated. The results of each stage allow taking decisions concerning food security, for example, reviewing the list of performance statistics or monitoring, which are necessary for the calculation (first stage), as well as more effective instruments for the mechanism of improving the level of services in accordance with the results for the single, group and complex indicator (first, second and third stages). At every step the corresponding approach to calculate individual, group and composite indicator is developed, the method which will be used while calculating and the regulation value of the indicator (optimum or threshold) are defined.

The hierarchy of indicators' nomenclature of food supply security in industrial region has been developed (Fig. 1). It contains 7 groups of indicators, which include 47 single ones. The nomenclature is different from those contained in previous methodologies proposed as the group of indicators and an individual list.

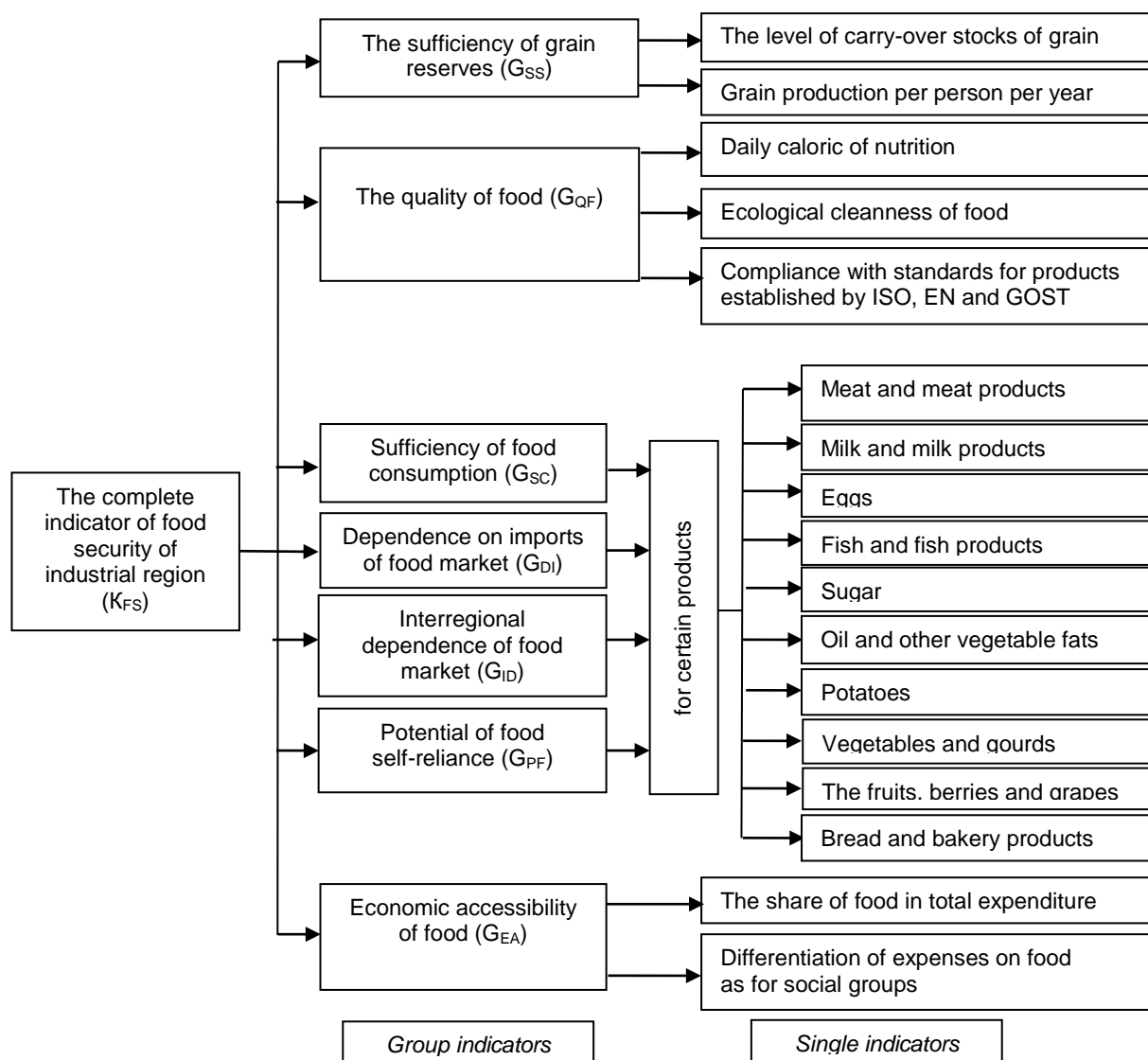


Fig. 1. Hierarchy of nomenclature indicators of food security of industrial region

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Thus, the following groups of indicators can be denoted:

the sufficiency of grain reserves (that is calculated using two single indicators contained in «Methodology of calculating the level of economic security of Ukraine», the indicator of the level of carry-over stocks of grain is contained in the «Methodology of determining the key indicators of food security», but is treated as sufficiency of stocks; indices are calculated as unit value of the actual value of the norm, the norms are set);

the quality of food (indicator was not previously used, for specification the new individual indicators have been introduced: the ecological safety of food products and compliance with standards on production with established standards like ISO, EN and GOST, and measure to calculate the daily caloric of nutrition that was used in both previous methodologies; the individual indicators are calculated as the ratio of the actual value to the norm; the norm is set only for the last indicator);

the adequacy of food consumption (used in both previous methodologies with different nomenclature; the individual indicators are calculated as the ratio of the actual value (F_{ij}) to the norm (N_{ij}), if $F_{ij} < N_{ij}$, and as the ratio of the actual norm to actual value, if $F_{ij} > N_{ij}$; the norms are established for each type of food);

the dependence on imports in food market (in the «Methodology of determining the key indicators of food security» the term «food independence» is used; the individual indicators as the ratio of the actual value to normal, if $F_{ij} < N_{ij}$, and the ratio of norms to actual value, if $F_{ij} > N_{ij}$, because the indicator is destructive, are calculated; the integrated norm on all foods is established, but it is different in both methodologies);

the economic availability of food (as a unit is calculated by both methodologies, but has such varieties as «the share of expenditure on food in total expenditure» and «differentiation of food expenditures for social groups», which are used for group rate; the individual performance as correlation of norms to the actual value, because the indicator is destructive and $F_{ij} > N_{ij}$, are calculated; the norms are established in the «Methodology of calculating the level of economic security of Ukraine» but only for the indicator «the share of expenditure on food in total expenditure» taking into account the international experience that is: in the USA it comprises 10%, Japan – about 20%, in European countries – 20-25%);

the interregional dependence of food market (introduced for determination of such dependence from interregional supply);

the potential of food self-reliance (introduced for the determination the possibility, provided consumption of foods under rational norms).

The last two groups of indicators as well as the quality of food are novations, so they require justification to calculate and establish rational regulations (optimum, threshold).

The group indicator of «quality food» has been proposed to calculate using three single indicators: daily calorie food (the best indicator value is a reasonable rate – 3000 kcal, adopted by the International Food and Agriculture Organization, and the minimum threshold rate is 2500 kcal, established by the Ministry of Health in Ukraine), ecologically clean food and compliance of standards for products norms to the established standards by ISO, EN and GOST (i.e. the level of harmonization).

The level of daily caloric of nutrition is calculated as a ratio to the norm, if $F_{ij} < N_{ij}$ and as the ratio to the share norm to interregional supply, if $F_{ij} > N_{ij}$ because the considerable dependence on interregional supply is negative. Normative values of indicator are established in «Methodology of calculating the level of economic security of Ukraine» and «Methodology of determining the key indicators of food security».

Concerning the ratios of ecological cleanness of food it ought to be noted that in Ukraine adherence to the norms is quite problematic because the area of relatively clean areas is approximately 7% of the total land, little polluted areas is 15%, contaminated areas is 40% and very polluted ones is 30%. For the actual values of the indicator the part of the relatively clean and little polluted areas of the total land that comprises 22% is taken. It is calculated as the ratio of the actual value to the norms which the maximum threshold value is 100%.

The third single indicator of group parameter is the «quality of food» which means the compliance with standards with production norms established at international and regional levels and is included

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because of the importance of safety and quality of food. The single indicator as the ratio of the share of national standards, which takes into account the international and regional requirements as ISO, EN, GOST (such standards for all types of food are 55%, including harmonized with ISO and EN – 35% and GOST – 75%), to the norms which threshold the maximum value is 100%, is calculated.

The group indicator «interregional dependence on food market» includes individual ones that describe the inter-regional supplies of separate products. The indicator of interregional supply share (in %) is the ratio of the actual capacity to inter-regional market supply. The indicator of interregional dependence is calculated as the ratio to the norm, if $F_{ij} < N_{ij}$ and the ratio to the norm of interregional supply share, if $F_{ij} > N_{ij}$ because the indicator is destructive. The best indicator is the value which equals to 25%.

The group indicator «potential food self-sufficiency» includes characterization of the possibility of providing the population with basic food (all kinds that are relevant to the food safety), provided consumption under rational norms. The potential food self-sufficiency (in %) is calculated as the ratio of production per person per year to rational standards of consumption per person per year. The indicator of potential food self-sufficiency (for certain types) is calculated as the ratio of capacity to norms, if $F_{ij} < N_{ij}$ and the ratio of norms to potential, if $F_{ij} > N_{ij}$, which threshold maximum value is 100% (for a types of food).

The methodology of assessing the food security of industrial region is based on the calculation of the complex indicator including the group and individual indicators and is based on the differential and integral methods.

Complex (K_{FS}) and group (G_j) indicators are calculated as follows:

$$K_{FS} = \sum_{j=1}^n G_j \cdot K_j, \quad G_j = \sum_{i=1}^m E_{ij} \cdot k_{ij},$$

where K_j – weight ratio of group index;
 n – number of group indexes;
 k_{ij} – weight single indicator;
 m – number of individual indicators;
 E_{ij} – value of a single indicator.

Herewith $0 < K_{FS} \leq 1$, $0 \leq G_j \leq 1$, $0 \leq k_{ij} \leq 1$,

$$\sum_{j=1}^n K_j = 1, \quad k_{ij} = \frac{1}{m}, \quad \sum_{i=1}^m k_{ij} = 1.$$

The single indicators (E_{ij}) are calculated according to the formulas:

$$E_{ij} = \frac{F_{ij}}{N_{ij}}, \quad \text{if } F_{ij} \leq N_{ij}, \quad E_{ij} = \frac{N_{ij}}{F_{ij}}, \quad \text{if } F_{ij} > N_{ij},$$

where F_{ij} – actual value of single indicator;
 N_{ij} – regulation value of the indicator.
 Herewith $0 \leq F_{ij} \leq 1$, $0 \leq E_{ij} \leq 1$.

To determine the rate of food security in industrial region the following graduations have been established: 0-0.25 – critical level; 0.25-0.5 – low one; 0.5-0.75 – average level; 0.75-1 – high one. As for the calculations in accordance with established graduations in the Donetsk region an average level of

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food security has been achieved, with the lowest value of group indicator marked on dependence on imports in food market, which indicates the need to increase it (Tab. 1).

Table 1

The comprehensive and group indicators of food security in Donetsk region

Elements of calculation	G _{SS}	G _{QF}	G _{SC}	G _{DI}	G _{ID}	G _{PF}	G _{EA}
The total value of individual indicators	1,64	1,76	8,18	2,91	3,53	5,60	1,00
The weight ratio of individual indicators	0,5	1/3	0,1	0,1	0,1	0,1	0,5
The value of group indicators	0,820	0,587	0,818	0,291	0,353	0,560	0,500
The weighting factor of group indicators	0,178	0,189	0,214	0,087	0,082	0,092	0,158
The value of the complex indicator (K _{FS})	0,617						

Conclusions. Thus, in order to establish the level of security in the economic sphere, it is necessary, first of all, to determine the list of its constituent because of differences in scientific and methodological literature. Weighting factors of components in order to calculate the complex indicator need clarification. The methodology of assessment the level of security components in the economic sphere is improved on the example of food security. The assessment stages are determined. It is proposed to use an expanded nomenclature for group and individual indicators for assessment and their hierarchy is substantiated. It is recommended to use differential and integral methods to calculate the complex indicator. Gradations of its level are proposed. The application of a justified methodological approach and an improved methodology for assessing the individual security components in the economic sphere in practice will allow formulating effective influence mechanisms at the state and regional levels.

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