СУЧАСНІ ТЕНДЕНЦІЇ І ПРОБЛЕМИ УКРАЇНСЬКОГО РИНКУ ЯЄЦЬ І ЯЄЧНИХ ПРОДУКТІВ У УМОВАХ НЕВИЗНАЧЕНОСТІ

Актуальність. Проблеми посідання з військовою агресією з боку Росії проти України, а також запровадження військового стану та бойові дії на більшості територій України, привело до падіння виробництва на птахофабриках яєць та яєчних продуктів. Сучасні тренди та проблеми розвитку ринку яєць та яєчних продуктів, зумовлені національною обставиною розглянути їх на прикладі продовольчого ринку в умовах невизначеності. Інтеграція вітчизняних підприємств з виробництва яєць та яєчних продуктів, сектор тваринництва, ринок агропродовольства України. Участь нішових ринків в таких логістичних ланцюгах дає синергічний ефект, який дозволяє учасникам, стейкхолдерам об'єднувати потужності для досягнення поставленних цілей і завдань і загалом покращує конкурентоспроможність на продовольчих ринках у тим числі і зовнішніх. Стратифіковані приоритети економічного розвитку національного ринку яєць та яєчних продуктів в умовах після воєнного економічного відновлення на продовольчому ринку. Сучасна економічна політика та зацікавленість стейкхолдерів логістичних ланцюгів ринку яєць та яєчних продуктів, саме тому формується і імплементується крізь призму уможливиків і нестабільності.

Мета та завдання. Метою статті є аналіз трендів та проблем розвитку українського ринку яєць та яєчних продуктів в умовах невизначеності.

Результати. Аналіз проблем з ефективності глобальних селективних ланцюгів розвитку ринку яєць та яєчних продуктів та конкретного учасника ринку яєць, дозволяє вивчити підприємства з птахиниців у селективному ланцюжку ринку яєць, щоб побачити, як і коли вони можуть бути посилені, щоб домогтися більш високої ефективності та екстенсивної ефективності. Або щоб використати більшу ефективність виробництва ринку яєць. Такий аналіз ринку яєць може виявити обчижки з ефективності, пов'язаних з конкретною особливістю товарних нішових ринків. Останні дани свідчать, що в міру збільшення країнами участі в глобальних ланцюгах створення вартості товарних ринків, темпи зростання їх валового внутрішнього продукту збільшуються. Важливу роль відіграють ланцюги створення доданої вартості в якості джерела створення робочих місць.

Висновки. Таким чином, сучасний ринок яєчної продукції напряму птахиниців має ряд організаційно-економічних освідчень, що характеризуються високим рівнем насиченості внутрішнього ринку яєць. Тому нестабільна ціна кон'юнктура ринку яєць, та пасивний процес завоювання зовнішнього ринку яєць. Виходячи з розрахунків, розрізняють чітку тенденцію до зменшення рівня ренти стабільності продажу яєць. Нестабільна цінова кон'юнктура ринку яєць, та пасивний процес завоювання зовнішнього нішового ринку яєць, що характеризована високим рівнем насиченості внутрішнього ринку яєць. Тому нестабільна ціна кон'юнктура ринку яєць, та пасивний процес завоювання зовнішнього ринку яєць.

Ключові слова. ринок яєць, селективне управління, невизначеність, розрив товарних потоків, метод ентропії, стейкхолдери.
CURRENT TRENDS AND PROBLEMS OF THE UKRAINIAN MARKET OF EGGS & EGG PRODUCTS IN THE CONDITIONS OF UNCERTAINTY

**Topicality.** Problems related to Russia's military aggression against Ukraine, as well as the imposition of martial law and hostilities in most parts of Ukraine, have led to a decline in production on poultry farms, egg and egg farms. Current trends and problems in the development of the market of eggs and egg products, led to the urgent need to consider them on the example of the food market in conditions of uncertainty. Integration of domestic enterprises for the production of eggs and egg products, the livestock sector, the agri-food market of Ukraine. The participation of niche markets in such logistics chains provides a synergistic effect that allows stakeholders to join forces to achieve their goals and objectives and generally improves competitiveness in food markets, including foreign ones. Strategic priorities of economic development of the national market of eggs and egg products in the conditions after the military economic recovery in the food market. Modern economic policy and the interest of stakeholders in the logistics chains of the market of eggs and egg products, which is why it is formed and implemented through the prism of risk conditions and instability.

**Aim and tasks.** The aim of the article is to analyze the trends and problems of development of the Ukrainian market of eggs and egg products in conditions of uncertainty.

**Research results.** Analysis of the problems of efficiency of global selective chains of egg and egg products and specific egg market participants, allows the study of poultry enterprises in the selective chain of the egg market to see how and when they can be strengthened to achieve greater production and marketing efficiency; or to promote more efficient egg market production. Such an analysis of the egg market may reveal performance constraints related to a specific feature of niche markets. Recent data suggest that as countries participate in global value chains, commodity growth rates increase. Value-added chains play an important role as a source of job creation. Thus, trade and supply in food hubs within the logistics chains of food markets stimulates the development of logistics as a critical component of global chains, as the most important problem is to supply products in the right quantity, quality, on time. The study also focuses on general market factors that affect the efficiency and dynamics of specific projects in the development of the egg market in the postwar period. The model of selective management of innovative organizations on the example of the market of eggs and egg products has been improved. The author proposes to use the entropy method to calculate the period and conditions of uncertainty in the niche market of eggs and egg products.

**Conclusion.** Thus, the modern market of egg products in the field of poultry has a number of organizational and economic features, characterized by a high level of saturation of the domestic market of eggs. Therefore, the unstable price situation of the egg market and the passive process of conquering the foreign niche egg market. Based on the calculations, there is a clear tendency to reduce the level of rent stability of table eggs in the sub-field due to low prices and instability of the domestic market in the production and sale of products, which is offset by sales revenue. A survey of sales by region shows that the largest production is concentrated in Kyiv (31%), Odessa (11.2%), Khmelnytsky (10.9%) regions, where the largest poultry farms are located. The dynamics of prices in the domestic market of eggs and egg products indicates their higher level in the population of farms, compared with enterprises, the decline in egg production due to war and economic crisis and uncertainty about increasing spending on poultry resources, feed, medicine, and other types of egg products. In the future, we consider it expedient to use the methodology of fuzzy sets, simulation modeling for the market of eggs and egg products for calculations of uncertainty and risks, dynamics of crises of niche markets.

**Keywords.** egg market, selective management, uncertainty, gaps in trade flows, entropy method, stakeholders.

**Problem statement and its connexion with important scientific and practical tasks.** The current state of the Ukrainian egg market during the war requires careful further study of the problematic issues of the Ukrainian egg market and egg products in conditions of instability to increase the efficiency of enterprises. These issues concern the agricultural enterprises of the agri-food market of Ukraine, the war, the crown crisis The impact of the COVID-Sars-19 pandemic has caused the deteriorating economic situation in Ukraine, shrinking the raw material market, changing the sales structure of major operators, and so on. Today, with the invention of innovative technologies for processing eggs into dry egg products (semi-finished products, powders), the food industry has been able to harvest eggs and store them using them when needed, rather than the presence or absence of fresh eggs. Poultry farms play a significant role in agri-food production, and poultry products (eggs, egg products) occupy a significant share in the diet of Ukraine. The problem of development and efficiency of the poultry industry at the enterprises of Ukraine is still relevant.
With regard to the production of chicken eggs, this is a very important factor, because demand for eggs is not always stable throughout the year and economic conditions for the development of the market of eggs and egg products, which can only remain stable and profitable, an industry that ensures food security in global instability economic situation.

This determines the specific requirements for the quality of finished products (eggs). First of all, these are external factors: the economic situation in the country, which affects the purchasing power of buyers, the level of egg prices, the lending rate and the ability to obtain credit. Inflationary processes make production uncertain in the context of the possibility of making a profit - currency fluctuations can provoke an unpredictable change in the value of the components of feed for poultry, and therefore the cost of production of the egg itself increases significantly. The danger is that the cost of production in integrated associations may be objectively lower than in small poultry farms and poultry farms. Also, companies with large volumes of finished products have better opportunities and access to supermarket chains and access to the world market. A serious threat to the poultry farm is livestock disease, which can lead to a drop in egg production and even death of the bird. Some infectious diseases include restrictions on the sale of poultry products. There are some threats to chicken egg exports, which may decline due to the poor epidemiological situation in some parts of Ukraine. Quarantine restrictions can apply even to companies that do not have these diseases, but are in a region of tense epidemiological situation. With the current fluctuating level of prices for energy, feed, vitamins, medicines, technological equipment and materials that are close to the world, so the production of eggs and egg products becomes unprofitable.

**Analysis of recent publications on the problem.** Leading domestic scientists, such as: T. Sturgeon, M. Baker, D. McCormic, V. Danchuk, V. [1-4], O. Nikishina [5], B. Burkinskyi [6], O. Zakharchenco, M. Postan, V. Piterkaz [8], S. Kolodynskyi [13], A. Shakhov [17], T. Lozova M. Tarakanov [15] and many others. The works of these scientists consider the state of the poultry industry and predict its further development. However, the poultry industry needs constant attention and analysis of trends under the influence of globalization. Promotion of products on consumer markets is faced with significant competition, production requires constant improvement of poultry technologies, product processing, implementation of modern quality standards, strategic planning, etc. Therefore, the issue of improving the efficiency of poultry production does not lose its relevance. Recent decades have been characterized by a qualitative transformation of international business, which is reflected primarily in the relocation of production capacity of multinational corporations and their integration into production networks and value chains to ensure global competitive leadership. In Ukraine, there are opportunities for integration into global value chains, primarily in the agricultural markets.

**Allocation of previously unresolved parts of the general problem.** Concentration of these strategic resources in the structural units of agri-food enterprises in all segments of the global market with the formation of dynamic competitive advantages of national economies of their countries. This process is facilitated by the availability of developed transport infrastructure, especially sea and river ports, attracting investment, including foreign in increasing the production of crops (grain, fruit, sunflower), high-fertile land, increased role of the state in regulating strategic agri-food markets. At the same time, this powerful potential is not used effectively. Significant losses are due in particular to the creation of logistics of foreign economic export flows, which in many cases make domestic food products uncompetitive in foreign markets, due to inflated costs of supply to final consumers [6, 19]. Such inflated costs indicate the lack of coordinated interaction of export-oriented chains and organizational and economic mechanisms, their regulation. At the present stage, processes are taking place market segmentation - the market for fresh eggs and products of their processing.

Ukraine for the last 10 years increased industrial production egg products 3.6 times when activating waspswarfare technology and the formation of demand for eggs products in the domestic market. Ukraine in mainly exports eggs in shell in 2021, the revenue from their implementation exceeds 6.3 times the income from egg products. Microorganisms do not develop in dry egg powder: they die during drying of the egg mass. According to estimates of domestic transport carriers, the savings in logistics costs when using dry egg products instead of liquid and frozen are 25-35%, and instead of raw eggs - 70-80%. However, despite the generally positive assessment of research published in the scientific literature, it should be noted that the problem of entering agri-food markets into global value chains requires additional in-depth research in terms of strengthening logistics to ensure the effectiveness of foreign economic supply. In particular, the urgency of this issue is exacerbated by the need to use logistical reserves in the process of servicing export flows. Therefore, the priority development of the domestic selective market of egg products should be sought in the production of dried egg products include: egg white powder, dry egg yolk, dry melange, and dry omelet - egg
whites and yolks mixed with whole or skim milk. They have a number of advantages over frozen eggs and even more so - fresh eggs. Dry egg products are divided into two subgroups: for industrial consumers (confectionery, meat products, bakery, meat and other industries) and for households and catering. In the food industry, dried egg products are in demand in the production of bakery and confectionery products, mayonnaise, sauces. Mayonnaises and sauces contain up to 8% egg powder or dried yolk. The demand for these products is constantly increasing. Their advantage is that they can be stored for a long time without refrigerators, they are convenient to use in the confectionery industry, in catering and for other culinary needs [7].

Formulation of research objectives (problem statement). The aim of the article is to analyze the trends and problems of development of the Ukrainian market of eggs and egg products in conditions of uncertainty.

An outline of the main results and their justification. At present, the egg business is one of the most productive and profitable areas in poultry farming. This is primarily due to the high egg production of birds: the ratio of weight of laid eggs to body weight of birds is 1 to 25. The first poultry farms began to appear in Japan about 200 years ago, but the active development of the industry began only in the 70's of XX century. It was during this period that an active campaign was conducted, the main purpose of which was to promote this product among the population. After that, quail meat and eggs became an important part of the Japanese diet. Eggs have been produced in Europe for a long time. In Ukraine, the first supplies of birds were made from Yugoslavia in 1946, and by 1970 there were already farms with a population of 50-100 thousand heads. However, the development of this area was associated with active "anti-marketing activities", which promoted the absence of serious differences between different eggs and meat from chicken counterparts. It provoked a decline in the industry, which lasted until the 1960s and 1980s. A new stage in the industry in Ukraine began in the late 1980s. Despite this, the eggs of birds (chickens, quails, guinea fowl, turkeys, ostriches) remain quite common and traditional birds for Ukrainian poultry farms. In Ukraine, the number of poultry before the war from October 1, 2020 to October 1, 2021 decreased by 1.8% to 234.03 million heads: in agricultural enterprises it decreased by 1.7% (to 118.36 million heads), in households - by 2.0% (up to 115.67 million heads). For example, in Japan, more than 120 million heads are raised annually. The dynamics of poultry livestock in Ukraine is given in table. 1.1 and fig. 1.1 [6]. From 2010 to 2014, the poultry population in Ukraine grew, albeit at a slower pace each year. This is due to the effect of saturation of the egg market. Political and military events of 2014-2015 affected the poultry industry by a sharp decline of 11.7%. From 2015 to 2019, the market was restored and stabilized. Every year, the rate of decline in the egg market decreased, and in 2019 for the first time was positive at 4.1%. [8].

In recent years, Ukraine has also significantly increased egg exports. In 2015, Ukraine exported 59,291.8 tons of eggs in shell - fresh, canned or boiled, as well as 3,312.7 tons of egg products - meaning eggs without shells, fresh or dried egg yolks. This is 5% and 2% more than in 2014, respectively. It is nice to note that recently Ukraine is developing the direction of egg processing with the subsequent export of finished egg products, which is a very positive trend. The main countries importing fresh eggs from Ukraine were: Iraq (28277.3 tons), the United Arab Emirates (19178.5 tons), Moldova (2231.6 tons). In two months of 2016, 5,252 tons of fresh eggs and 603 tons of processed products were exported to foreign markets. According to the International Poultry Development Program, the share of meat products made using egg white is increasing by 2-3% per year. In addition, dry egg products from proteins (albumin) confectioners use to create gels, meringues, marshmallows and souffles. Strategic priorities for the development of the domestic market: dried egg products are in demand by fast food and other catering companies. There from egg powder, dissolving it in milk, prepare scrambled eggs and omelets. Egg products are used in the HoReCa market industry (hotels, restaurants, cafes) for making sandwiches and salads. In catering establishments, egg powder can completely replace raw eggs in many recipes. Omelets, sauces are prepared from the powder, it is added to the dough for pancakes and buttery pastries, sauces, batter for frying fish, meat and vegetables.

Different regions of Ukraine have very different approaches to processing chicken eggs into dry and liquid products. "The main reason for using deep egg processing technologies is the need to smooth out seasonal fluctuations. After Easter, from late April to early May, demand for marketable eggs falls sharply, so companies using this technology produce from surplus eggs, such as melange powder, taking thus, new market niches and profits from the sale of "deep processed" products. Egg production in the world is growing steadily [9, 20].

EU countries, USA, India and Argentina, Ukraine has joined them in recent years, and in the case of exports of Ukrainian egg products, it grew steadily until 2016, but fell by 40% in 2016. As peak volumes were recorded in 2013-2014. In 2019, the production of dried egg products decreased by 1.9% to 9,865 tons,
due to a decrease in the production of dried egg products from them from the leading producers in favor of a larger volume of liquid egg products. According to Pro-Consulting, EU countries in 2020 exported 61% of total world exports of dried egg products - 74.3 thousand tons. In Ukraine, large-scale industrial production of egg products began in 2005 and has grown 3.6 times over the past 10 years. The growth of exports of egg products resumed only in 2021. According to its results, 7.8 thousand tons of dried egg products were exported (98% higher than in the previous year) and 6.2 thousand tons of liquid egg products (an increase of 24%).

Although exports of dried and liquid egg products are almost equal, they have different values. If we translate them into eggs used for their production, 670.8 million eggs were exported in the form of dry egg products (about 86 eggs are used per 1 kg) and 136.4 million eggs in the form of liquid egg products (per 1 kg). kg - 22 eggs). The Ukrainian market leader in dried egg products, Avangard, produced 6,500 tons in 2018, which is 66% of the Ukrainian market. Avangard's export share last year was 70%, or $ 21.5 million. At the same time, egg production in Ukraine has been based on external demand since the beginning, as the domestic market was virtually non-existent, experts say. From 2010 to 2020, the production of dried egg products in Ukraine increased from 4.2 thousand to 11.9 thousand tons (forecast for the current year), there is an increase that will be very uneven [10].

Egg production is directly proportional to the number of poultry. Between 2011 and 2020, there was an increase in domestic egg production. The main reasons for the growing demand in the period 2011 - 2021 were:

- ease of keeping and feeding poultry and egg production;
- high taste of meat and chicken eggs;
- long shelf life of quail eggs compared to chicken;
- low investment threshold and short payback period of the project [11].

It should be noted that the egg market is characterized by price fluctuations that depend on the quality of eggs, the region of sale, the seasonality of consumption, taking into account the holidays. Significant fluctuations in prices in the trade network and local markets in terms of regions of Ukraine are evidence of shortcomings in logistics and differences in income levels by region [12]. The price fluctuates during the year and has the lowest level in May - August and the highest - in October-March. The price range in 2018 was 1213 UAH in June and 1879 UAH per 1 thousand units - in December. The reason - in the seasonal growth of competition from households through which industrial egg producers are forced to work at a loss. The selling price of eggs from the producer is 11-11.5 UAH / dec. at an average cost of 15 UAH. Increase in total egg production over the past year by 7%, as well as Seasonal growth of egg production in households (which account for about 50% of the production structure) keeps the price low. The cost of eggs may temporarily decrease in the near future, poultry enterprises to end the year with a minimum level of profitability [15]. The decline in prices is associated with an increase in production due to a significant increase in productivity of laying hens. The factors of such growth were the modernization and launch of new production facilities, the renewal of poultry with the replacement of more productive crosses of the last selections, the introduction of modern highly efficient feeding systems. Increased competition has led to the gradual withdrawal from the market of small inefficient enterprises.

It should be noted that Ukraine in mainly exports eggs in shell in 2019 the revenue is UAH 2,921.2 million, and egg products provided revenue from exports of UAH 461.9 million, or 15.8%. In the structure of importers of table eggs for commodity group 0407 in 2019 the leader we are the countries of the Middle East - United Arab Emirates, of which is 25.4%, and Iraq (12.4%). Power importer of fresh table eggs with Ukraine also has Hong Kong (10.7%), Virgin Islands (9.7%) and Latvia (8.1%), In relation to exports, imported operas walkie-talkies in this product group are 18%, the main exporters are countries. Of the European Union - Poland (33.1%), Bulgaria (28.0%), Germany (24.4%). It should be noted that this is in mainly egg for high incubation incubation crosses of foreign selection, which country exports at high prices, while har eggs are exported at world market prices.In product group 0408 Poultry eggs without shells and egg yolks other structure of imports and exporters [18].

Export leaders are Yes (30.7%), Virgin Islands (16.5%), Indo-Asia (11.6%) and Latvia (10.1%). The volume of chicken egg production in Ukraine exceeds 850 million. At the same time, in 2021, further growth in production is expected, despite the crisis that was present in the economy of Ukraine. But the war that began on February 24, 2022, between Ukraine and Russia made adjustments. Thus, it is currently difficult to predict the development of the egg market. In the post-war region of Odesa, there are opportunities for the integration of projects into global value chains, primarily as part of selective integrated markets such as egg products and the egg market. Today, the reduction in egg production by 68% of the pre-war period remains a
problem. Taking into account the logistical specifics of servicing selective markets in the postwar period, i.e., measures being studied for increased economic integration of the Ukrainian market. Unlocking the post-war potential of agri-food projects, production chains of Odessa region, this will require a more effective, simpler and more transparent policy of state support that stimulates investment, diversification and focus on the food industry and egg market, implementation will require action at the state and regional levels [13].

At the level of Odessa (military administration) regional state administration, adopt administrative, orders to stimulate and support egg production in poultry farms, plants, farms, agricultural enterprises, etc. Such selective management will also promote the development of innovative production structures of egg plants and attract foreign investment creation of new poultry farms, poultry farms, agricultural enterprises, which will increase the growth of the market of eggs and egg products. Measures to improve the post-war reconstruction of the agri-food chain, as well as the development and modernization of production, warehousing and processing capacity of the industry and logistics infrastructure will expand the capabilities of Ukrainian agribusiness and increase its competitiveness, including egg market. Thus, it is necessary for the Department of Agrarian Policy, Food and Land Relations of Odessa (OMA) Regional State Administration, other local authorities in the region to take economic, tax, credit and investment measures to attract cash flows to restore, launch and increase egg production, the purchase of poultry feed [2] for selective management should promote the development of various forms of organizations of egg producers, egg products and their representative offices to increase their capacity and accordingly help adapt the food business to new uncertainties, economic postwar realities and challenges of Ukraine.

Thus, due to limited budget resources in the early stages of the Odessa Regional State Administration can be introduced: a limited number of simple, targeted and controlled measures, including small agri-food egg producers and farmers to support their development of egg production. The Department of agrarian policy, food and land relations of the Odessa Regional State Administration, other local authorities in the region should develop a comprehensive program of sustainable development of the egg market. for the development and reconstruction of Ukraine. Production issues related to the establishment and reconstruction of poultry farms, poultry farms, egg plants in the Odessa region need to be resolved: Lymanska, Chernomorska, Tatarbunarska, Bilyaivska, Bilyaivska, Bessarabian broiler, sales and other measures will require action at the regional level [14].

Measures for the selective formation of value chains of egg products, which may consist of integrated networks of production, sale, processing, trade, investment, advertising, branding, etc. The practical component of the functioning and growth of the egg market are farms, agricultural enterprises, personal farms of the egg market, processing plants, logistics organizations, advertising firms, supermarket chains, etc. those components that apply labor, knowledge, skills, human intelligence to creation, reproduction of high final added value in the Odessa region.

The proposal to form a value-added network of eggs and egg products consists of many different chains of its creation, use and reproduction after the war in the Odessa region. Their main selective property should be the adaptation of their work to the new post-war conditions of the egg market and the possibility of its radical qualitative and quantitative changes in the protection of egg plants, agricultural enterprises from inspections of various state regulatory authorities, deregulation of market eggs. Measures to attract, stimulate small and medium-sized businesses to invest, lend to private enterprises for the production of eggs by poultry farms are necessary: further processing or sale on domestic agri-food markets [15].

Involvement in projects and agri-food chains of small and medium-sized egg producers in order to obtain appropriate benefits and profits is necessary: to intensify practical activities on selective management of various management structures of the relevant department of agricultural policy, food and land relations of Odessa (military administration) egg market associations.

Model of innovation organization uses an expansive interpretation of resources actually determined the term "resources" and considering the organization as extended. Resources of selective innovation eggs market are not just its costs under reporting or plan next year's budget and not a power (laboratories, office space, equipment). Resources also include financial support, and of course employees, suppliers, partners, customers and even competitors. There is still a need to add knowledge, competencies, technologies in the organization. According to the selective model of organization of resources - are assets that need to systematically manage to improve the efficiency of their use.

Model selective organization eggs market in developing its organizational structure based on the following key provisions. First, the structure of the innovation is moving. Ideas, knowledge and information move freely from one part to another organization - between the main leaders, managers, employees, customers, partners and suppliers - without having to go through a complex system of checks and
comparisons. Even if the organization extends over a large area and covers different cultures, languages, information systems, innovative ideas spread quickly and freely through all borders, and reach those they are necessary for the practical implementation and use.

![Organizational structure selective management egg market](image)

* Author's development

Secondly, for the innovative structure eggs market of typical selective management innovation top down and bottom up. The role of managers in the management innovation is the key to the whole organization eggs market. This role goes far beyond the centralization or decentralization in the management of research and development. Development Director is responsible for managing of the innovation process from top to bottom, from generating ideas, concepts to use it in practice, the consumer, for the creation and getting value in the process as well as product-development process eggs market production \[8, 16\].

The economic task that is solved in the course of removing uncertainty is to reduce the number of options considered (diversity reduction), and as a result, the choice of one option corresponding to the situation from among the possible ones. Uncertainty removal provides an opportunity to make informed decisions and act.

The situation of maximum uncertainty eggs market implies the presence of several equally probable alternatives (options), i.e. none of the options is preferred. Moreover, the more equally probable options are observed, the greater the uncertainty, the more difficult it is to make an unambiguous choice and the more information is required to obtain this. For N variants, this situation is described by the following probability distribution: \(\{1/N, 1/N, \ldots 1/N\}\). The entropy reaches its maximum value in this case when both probabilities are equal to each other and equal to \(\frac{1}{2}\), the zero entropy value corresponds to the cases:

\[(p_0=0, p_1=1) \text{ and } (p_0=1, p_1=0).\] \hspace{1cm} (1)

The minimum uncertainty eggs market is 0, this situation of complete certainty, meaning that the choice has been made, and all the necessary information has been obtained. The probability distribution for a situation of complete certainty looks like this: \(\{1, 0, \ldots 0\}\). The quantity characterizing the amount of uncertainty in information theory is denoted by the symbol \(E\) and is called entropy, more precisely entropy \[17\].

Entrophy (E) is a measure of uncertainty expressed in bits. Entropy can also be considered as a measure of the uniformity of the distribution of a random variable. For this reason, the formulas that will be presented below for calculating the entropy \(E\) are also formulas for calculating the amount of information \(I\), i.e. when it comes to the complete removal of uncertainty, \(E\) in them can be replaced by \(I\). When the uncertainty eggs market is removed completely, the amount of information received \(I\) is equal to the initially existing uncertainty \(E\). With partial removal of uncertainty, the amount of information obtained and the remaining unresolved uncertainty add up to the initial uncertainty. \(E_t + I_t = E\). \hspace{1cm} (2)
To proceed to quantify the uncertainty of the egg market, we use the probabilities of occurrence of signs, calculated from their frequencies. The decision tree algorithm uses this result to make the first split on the dynamic of Balances attribute of the egg market, in order to later decide on which attribute to split the next nodes of the market.

Thus, selective identification may also require hazardous sources that produce food chains of environmental pressures after the war in the Odessa region (poultry farms, egg plants, etc.), which are associated with the cultivation of food products of environmentally threatening nature (egg poultry, etc.), and their recycling, closure and disposal, implementation will require these measures and actions at the regional level in the postwar period. This will provide promising projects and selective logistics routes for the supply of eggs and eggs, strengthen cooperation between the links in the chain, fully take into account the requirements of consumer markets in the postwar period [18].

**Conclusions and perspectives of further research.** Thus, the modern market of egg products in the field of poultry has a number of organizational and economic features, characterized by a high level of saturation of the domestic market of eggs. Therefore, the unstable price situation of the egg market and the passive process of conquering the foreign niche egg market. Based on the calculations, there is a clear tendency to reduce the level of rent stability of table eggs in the sub-field due to low prices and instability of the domestic market in the production and sale of products, which is offset by sales revenue.

A survey of sales by region shows that the largest production is concentrated in Kyiv (31%), Odessa (11.2%), Khmelnytsky (10.9%) regions, where the largest poultry farms are located. The dynamics of prices in the domestic market of eggs and egg products indicates their higher level in the population of farms, compared with enterprises, the decline in egg production due to war and economic crisis and uncertainty about increasing spending on poultry resources, feed, medicine, and other types of egg products. In the future, we consider it expedient to use the methodology of fuzzy sets, simulation modeling for the market of eggs and egg products for calculations of uncertainty and risks, dynamics of crises of niche markets.

**Funding.** The publication of the article was made within the scientific topic "Selective regulation of commodity markets" (Decision of the meeting of the Bureau of the Department of Economics, Minutes №226 / 8-sh.1.3 from 25.11.2021. № State Registration 0122U000825).

**ЛІТЕРАТУРА**

REFERENCES


12. Nikolskyi V.V. Cyclic-genetic methodology of project management of the organization of the intermodal hub system in conditions of uncertainty / V.V. Nikolskyi // "Management of complex systems development". Kyiv: KNUCA. 2020 - №43. – P.40-46. [in Ukrainian].


