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FORMATION OF THE INVESTMENT CLIMATE IN ECOLOGICALLY-FOCUSED GRAIN PRODUCTION IN UKRAINE

Summary

Formation of organizational-economic fundamentals in the development of grain production in Ukraine under the conditions of preserving ecological-economical systems, their discussionб and analysis should consider the interrelation and interaction of processes, which take place in the economic component and in the environment is a significantly actual task taking into account the wider attention devoted to the formation of requirements to the quality of life and increase in standards of consumption in day-to-day life. The solution of this scientific task provides the task resolution to the formation of the strategy for the economic development of grain production in Ukraine. The results of those processes determine a new, higher level of life and higher social standards. The essential component, which defines the term «quality of life», is food. This very component directly influences our daily routine. The increase in indexes of standards of quality, which list a set of requirements for food, set the conditions, which might correspond to highly-clean agricultural processes of forming raw materials, from which nutrition values are made. The main aspects are the support at the corresponding level of the biological activity of soil with simultaneous production of food, and agricultural production with high consumption characteristics are based on it.

Introduction

Formation of competitive signs of grain complex produce, a list of factors and mechanisms of establishing analysis on their basis toward economic expediency of introducing modern, ecologically-focused agrarian technologies is an actual scientific task. State programs of developing grain production should provide not only modern approaches but also economic efficiency. Considering the fact that during the development of modern chemical, agro-technological, biotechnical fields of the industry, modern requirements started to be considered relatively recently in comparison to general historical and scientific traditions of those industries, not all methods and approaches, which provide high efficiency of agro-technological processes, are at the same time economically and socially expedient. Formation of the investment climate, which provides the investment policy and mechanism of its realization, determines the list of the unsolved tasks.

The development of the agri-technological processes in the coordinate system: person – animal – soil – plant is a maximally complete circulation (cycle), in which the main problem is the essence of processes when they are self-sufficient and do not require external additional inflow, is the main purpose of state programs on implementation of the innovative policy. The simultaneous resolution of contradictions, which lie in the need for the provision of positive dynamics of general economic indexes in combination with solving the problem of providing food to the general population of the country under conditions of simultaneous export satisfaction imply the limitations in the development of the enterprise focused on the closed cycle. While preserving mainly stable indexes of productivity, the

development is possible mainly in the direction of improving and enhancing the «purity» and quality of agri-technological processes.

It is obvious that those processes of developing the model of state regulation over the processes of developing grain production in Ukraine due to the transition to contemporary agrarian technologies should have a significant economic grounding at all stages of developing the new type, contain recommendations, implementation of which will ground the formation of competitive features in produce of the grain complex in Ukraine [9; 10].

Part 1. The theoretical-methodological and applied aspects of management over processes of forming the produce of the grain complex based on ecologically-focused technologies

Considering the experience of the state regulatory policy in countries of Eastern Europe, it is concluded that the typical transition of processes to a new type may take 2-4 years. It cannot help but influence the initial capital intensity. Besides climatic features of the region, in which new approaches towards the realization of agriculture are planned to be developed, should be considered. Minimization of risks is prompted by the organization of production with the maximally complete cycle, which includes stages from a plant growing to cattle breeding. Different time interval, which is typical for each agri-technological subcycle, makes possible to distribute the expenses by time and organize local positive subsystems [1; 5]. Thus, the most perspective from the point of view of providing the highest economic efficiency simultaneously with minimization of risks is the system of agri-technologies, which maximally completely includes the full list of agricultural activity, which is typical for a certain geographical region.

Ecologically focused technologies at the time of their application promote the significantly different set of actions, which require personal implementation. Considering final produce with much better quality, which could be obtained from grain crops grown by ecologically efficient technologies, and the prospect of their spread remain essential. Natural conditions in Ukraine provide the possibility for the active implementation of methods for growing grain crops, which minimizes the negative influence on the environment. The decrease in resource depletion of soils is provided by the correct application of organic fertilizers, which increase the level of dependency of crop yield on natural factors. Besides, the provision of technological processes is significantly more labour-consuming. It creates additional workplaces but requires the increase in financial expenses on the provision of technological processes. The foods, which were obtained by technological principles aimed at the same time at increasing the produce quality and provision of processes of the cyclic restoration of land fertility by using natural mechanisms with consideration of local climate conditions, are of a higher quality. At the same time, the mentioned type of technologies is significantly more capital-intensive and vulnerable to external negative factors.

An analysis of publications states that in general the task of the scientific grounding of the efficiency of using ecologically-focused technologies during the growth of grain crops is quite actual that is confirmed by numerous publications and social trends toward the development of standards of life quality [8–10]. Concurrently, the major difference of economic and technological processes, which take place in the system of ecologically focused technologies, grounds the need for the detailed scientific research [2; 7]. Particularly, classical stages with the determination of positions of goods at the market of consumers, stages toward

making decisions about the efficiency of implementation of new ecologically-saving technologies, possess certain differences. The feature, which is caused by new technologies that consider the ecological component while growing agricultural produce, creates new limitations and forms features of marketing in agriculture. Much attention of authors has been paid to determine those differences and develop methods to consider them but the strategy of forming and realization of marketing measures for grain crops remains incompletely defined [3].

The agrarian sector of marketing activity contains significant differences from other sectors. Firstly, it is a wide-range method of making decisions towards buying goods. For example, while visiting a grocery shop, the system of values of a consumer is essentially different from the process of choosing grain crops, from which the finished goods are made. For instance, making a decision about production of the corresponding quality and assortment, which will be in demand at the moment, or producing readiness, which will not sooner than one year later. The situation is complicated by the production of fertilizers, pesticides, and so on. Hence the process simultaneously belongs to two segments of activity: classical production and agrarian sector. Agrarian marketing is complicated by the fact that it deals with an extremely wide assortment of intermediate final produce, which has a different target value. For example, some of them are the goods of first need (essential bread produce) while others are raw materials for the processing industry (grain, flour and so on). Marketing influences the processes of adding value and creation of new values by providing such qualities for the goods, which make them useful for the consumption. Because of inclusion into the agrarian market of different types of activity (physical and economical), the formation of the strategy should consider a simultaneous connection and interaction of these processes [4]. Formation of strategic marketing means, their timely combination, and exact characteristics towards the determination for their realization and implementation should be based on the previously determined model of making strategic decisions [8]. Though in almost any decision, there are different components, which characterize it, and consequences of their implementation (Fig. 1).

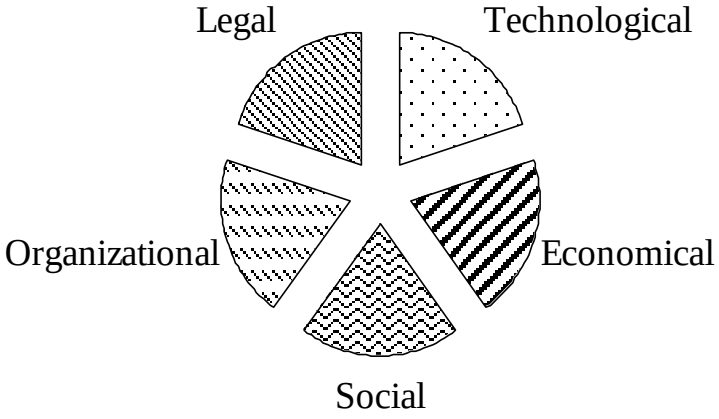


Fig. 1. Components of the decision

The economic component is characterized by economic consequences from the implementation of the made decision. For an ecologically-focused segment of the agrarian business, the time shift is essential (not less than one year) between the point of making a decision and the moment of receiving results from its realization. The organizational component considering much bigger labour consumption of agrotechnological processes in general and ecologically-saving technologies while

growing crops is vital, hence the workers themselves implement it into practice through the realization of managerial decisions. Technological component obtains major limitations; most of them cannot be excluded (for example, time factor, the sequence of actions, speed, and conditions of growing crops, and so on). The legal segment considers limitations in the field of the law; it is unacceptable to violate any regulations. The main purpose of the social segment is to consider trends and wishes of the society; the process of making decisions about any marketing strategy relies on them [11].

Multifold approach while making managerial decisions is an essential element of marketing provision for agricultural processes. Changes in requirements to agricultural produce, with the only unchanging trend of quality enhancement, complicate the process of making decisions require considering more and more factors and aspects, which form the environment for the economic system functioning. The theory of making decisions is based on fundamental works on mathematics, psychology, sociology, economic, and legal sciences (Fig. 2). Interdisciplinary type of the process of making decisions is grounded by its variety analysis of the phenomena, which form the decision. At the same time, an excess amount of the informational vector complicates the process of making decisions due to excess amount of secondary factors, which to the insignificant extent influence the formation of conditions for the functioning of the economic system.

Each of the elements, which form the decision (Fig. 2), has specific characteristics and methodologies of application. Thus, the informational aspect underlines the informational nature of making decisions. From the basic approaches of the informational aspect, the process of making decisions is considered as the process of transforming the incoming information into the information of managerial decisions.

This decision is formed during the processing of the informational vector for the condition of the object (system), which is studied by the subject of management. Usually, the informational component is implemented in the form of the system, which may include two purposes: support of the most optimal decisions among the list of all possible decisions or ranging of variants of decisions by certain lists of classification.

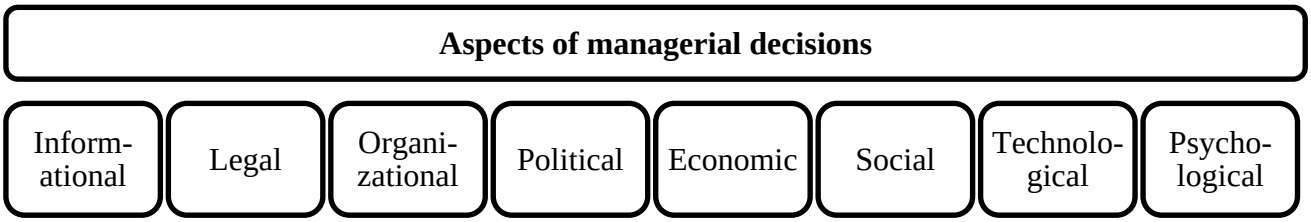


Fig. 2. Aspects of managerial decisions

For both variants, the most important are the reasonable selection of the set of criteria and their ranging by priority classifiers. During the analysis and search for information, the method of informative search is used, intellectual analysis of data, search for information in databases (Fig. 3), analysis of precedents, imitative modelling, evolutionary calculation and genetic algorithms, neural networks, situational analysis, and so on.

Each of the mentioned approaches (Fig. 3) focuses attention on a certain aspect or a set of aspects during the formation of the managerial decision, at the same time not providing an overall idea about it. General combination of all aspects while making a decision provides minimization of risks from incorrect managerial influence on the

economic system. Informational component makes possible to unite in one environment general for all aspects of making decisions, their characteristics, and conditions of implementation.

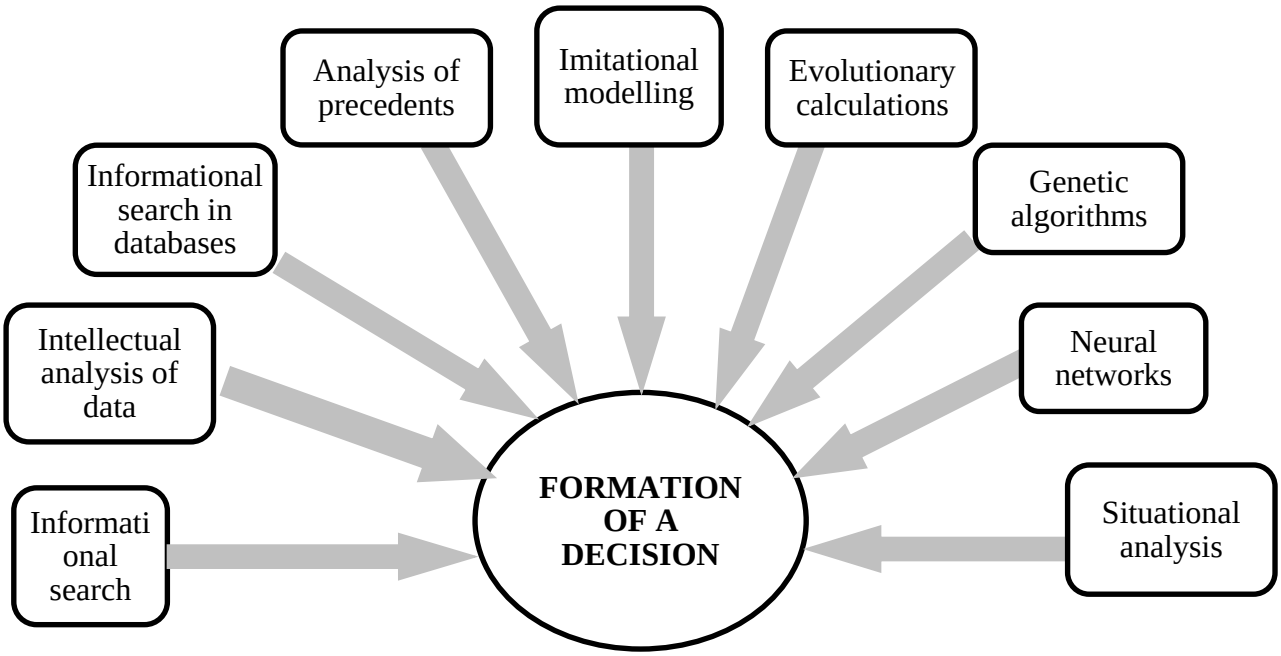


Fig. 3. Methods of analysing information for forming recommendations on decision-making

While making a decision, usually there are two approaches: intuitive and rationalistic. At the initial stage, it is possible to rely on intuitive choice only under conditions of possessing overall information in the market, using long-term statistics, which forms the dynamics of changes in demand. The dynamics of changing the demand for the produce received from ecologically clean grain crops mainly depends on the degree of attractiveness of a healthy lifestyle in the society, season, economical condition and prospects of developing the economy of the country and region. Uncertainty is the biggest problematic component while making decisions about marketing in the agrarian industry.

There are four types of uncertainties (Fig. 4). The low level of uncertainty almost does not influence the quality of making decisions. The middle and high levels of uncertainty require the development of new and specification of the existing methods of making decisions.

Extremely high uncertainty is located beyond professional competence or informational provision of a person who makes a decision.

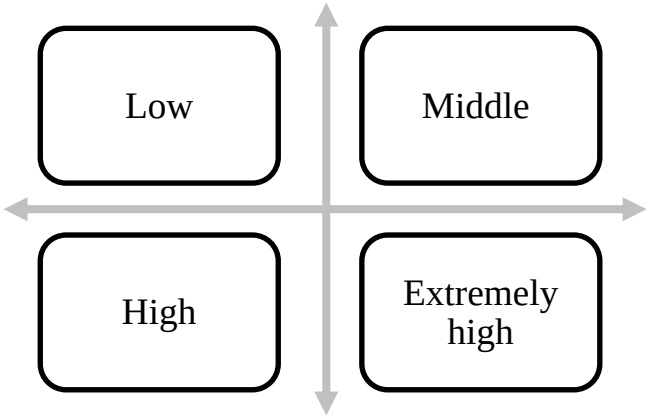


Fig. 4. Types of uncertainties

For agrarian business processes, there is a typical situation when the factor of uncertainty is extremely high but the competence of people who make decisions does not become doubtful. There are four known main types of models for making decisions considering managerial processes (Fig. 5). The suggested models unite the possibility of their application at the initial stage of decision-making toward implementation of ecologically-focused agrarian technologies of growing grain crops. The initial superficial analysis, which includes a wide range of informational vector condition, provides the possibility to choose the correct direction toward making decisions and formation of the following tasks concerning analysis.

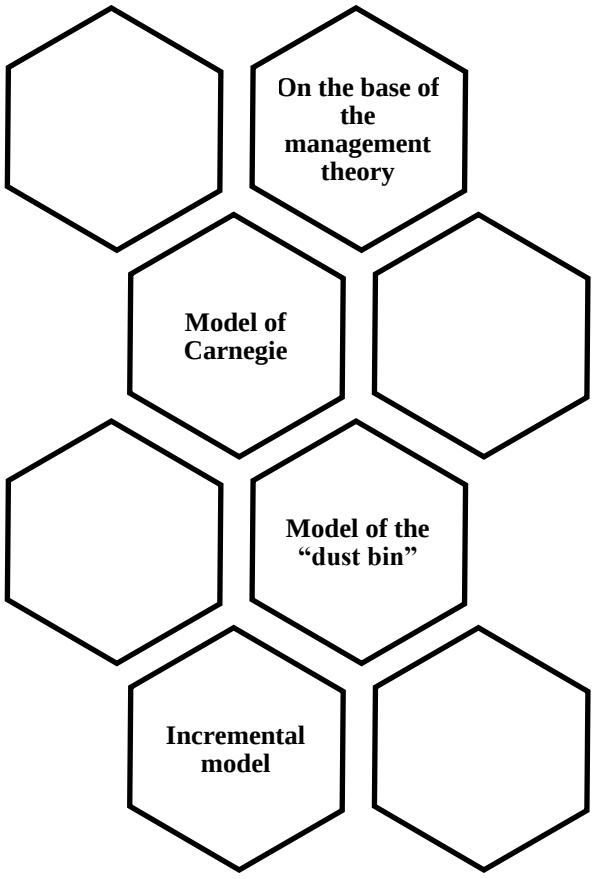


Fig. 5. Models of making decisions

At the stage of macro- and micro-environment, it is quite reasonable to carry out the analysis of trends, which form conditions of functioning of bank establishments

and policy of support for the agrarian sector from the government. Hence technological agrarian processes, which are focused on the ecological component, preservation of the environment is more long-term by the time of the implementation and they possess smaller margin of safety toward hardly foreseeable contaminations, determination of trends and prospects for the allocation of financial inflow (investment) at the early stages of developing new technologies are a necessary factor. Formation of the price policy, retailing and wholesaling prices is based on a consideration of such a factor as sufficient presence of ecologically friendly fertilizers at the needed amounts. It influences crop yield and quality of the received grain crops. The unknown factor at that stage is information about weather conditions of ripening and harvesting grain crops. This factor also cannot be influenced by any factors except for environmental (excluding technological disasters). Formation of the methodology of calculating multi-segment price policy, which considers a variety of factors of influence on the process of making decisions by a consumer provides stimulation for processes of consumption and purchasing by means of widening segments of produce consumers, should be based on a motivational factor, which is caused by the dynamic component of the price. For example, if the produce is used for the first time, the price discount is provided.

Organizational measures planning aimed at selling produce also stimulates sales and it should consider the significant used capacity (use of «remote» workforce in the process of supporting technologies for providing conditions of growing grain produce). It causes big financial expenses but the bigger part of those can be viewed as an investment into future business processes. Strategic marketing forms the trajectory, which considers maximal possible equal interests of a consumer, agrarian producers and ideally related enterprises, which provide business processes in the agrarian sector. So, at the initial level, it is necessary to provide a formulation of tasks, main objectives, which must be achieved as a result of implementing the marketing strategy (Fig. 6).

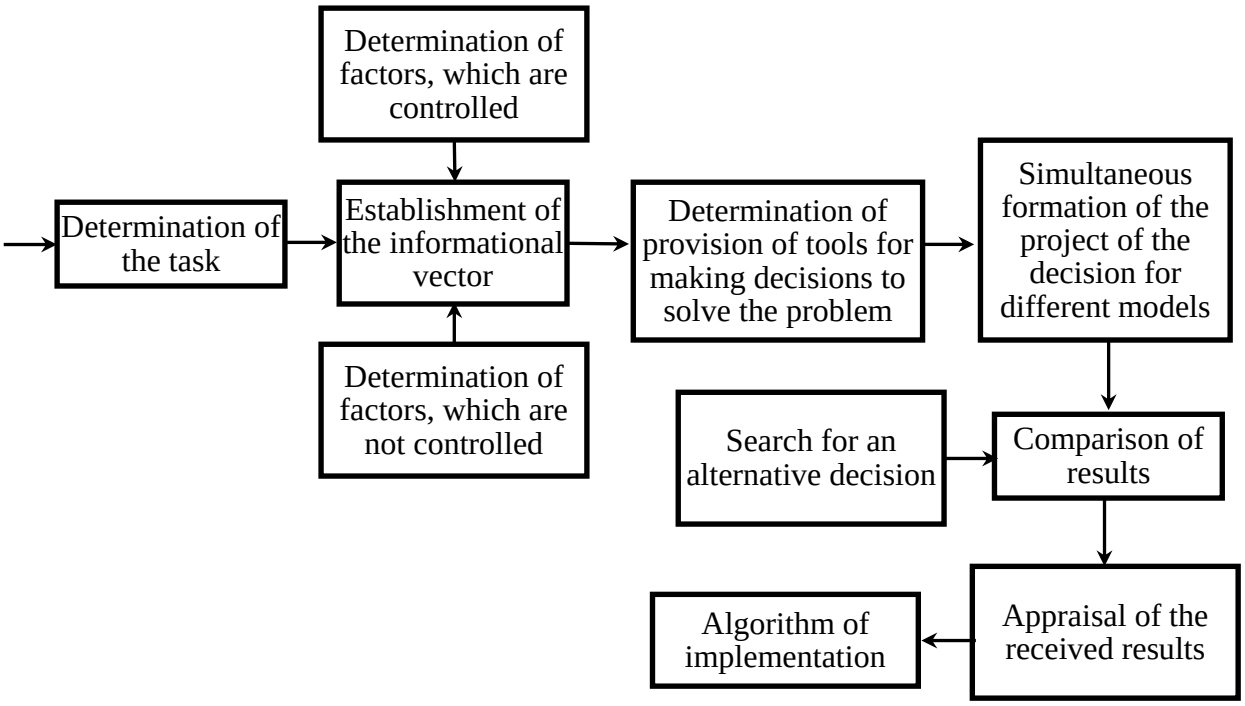


Fig. 6. Stages of forming a strategy

While forming the informational vector, it is necessary to realize all numerical characteristics, which describe the capacity of the market, its dynamical and statistical indexes, trends toward seasonal changes, and so on. The essential stage is the determination of a set of factors, which can be corrected and should be considered as uncontrollable and weakly determinative. Based on that, the model for making decisions and formation of decisions simultaneously by the set of certain models is defined. Based on a comparison of results, the analysis is carried out toward the possibility and necessity of alternative tools for solving the set task. Upon carrying out appraisal, the algorithm of implementing the suggested strategy is formed.

Part 2. Distinguishing features of the contemporary process of growing grain crops and formation of macroeconomic indexes of grain production

Global processes significantly influence the list of components of demand for agricultural produce, which also stimulate the essence of the ecological component in the characteristics of the agrarian produce. Taken together all that forms the sales strategy of agricultural enterprises. But the production, which was made using ecologically-focused technologies, possesses certain distinguishing features while developing production cycles and in the process of selling and promotion (targeting) in the market.

In the market economy, the term «demand» means a description of needs, which possess their own form of manifestations, financial representation. The interrelation between price and demand for production states to the fact that the decrease in production price stimulates its purchase by potential buyers (Fig. 7). In case, there is a change of indexes in amounts of purchases by production users with invariable prices the demand curve is moving to the left or to the right from the initial position.

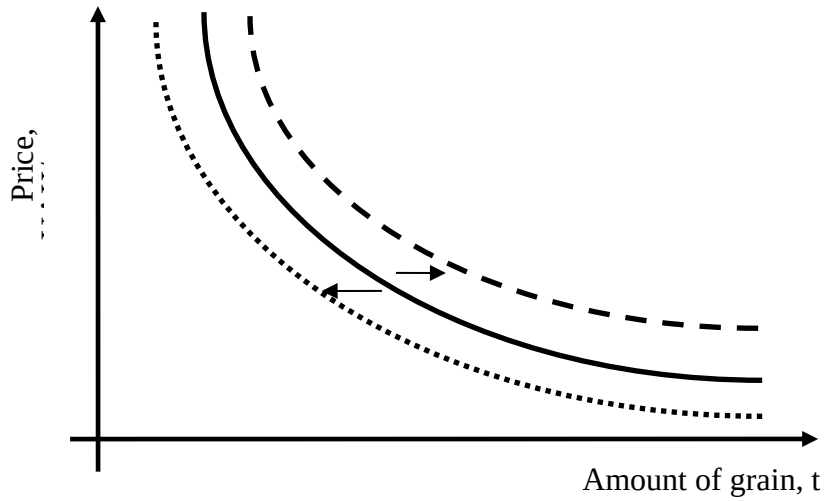


Fig. 7. Demand curve for grain

Analysis of the demand for the production of agricultural enterprises determined certain features, which should be considered in researches:

1) derivative nature of demand. Demand for grain produce depends on changes in demand and its structure for finished goods, which are produced with such main ingredient as grain crops;

2) changes in demand for agricultural production is more slowly compared to indexes, which characterize the dynamics of changes in demand for the produce of other production fields;

3) under conditions of insignificant inflation influence, the demand for agricultural produce tends to be stable.

It is worth noting that the grain market is structured by the types of produce as the market of fodder grain, the market of bread-grain, and the market of seeds. Each of these types has a typical set of factors, which determine the level of elasticity of the curve «price-demand» and dynamics of processes. Tastes and preferences of consumers directly influence the use of agricultural production, which was received using ecologically-focused technologies. The attention to the produce of this segment is caused not only by its consumer characteristics but also by the desire of people to protect the environment and improve the ecological condition of the environment. It is notable that the attention to the condition of the environment is not typical for a certain layer of society and does not depend much on the income of people. First of all, the relation to ecological problems is formed in the outlook of the citizen and during his/her routine life and experience (negative / positive) – getting through or recovering from the disease, conditions of rest, meeting with attitude to the environment and surrounding world.

Dynamics in changes of the area under wheat cultivation in Ukraine from 2005 to 2011 demonstrates almost permanent numbers (Fig. 8).

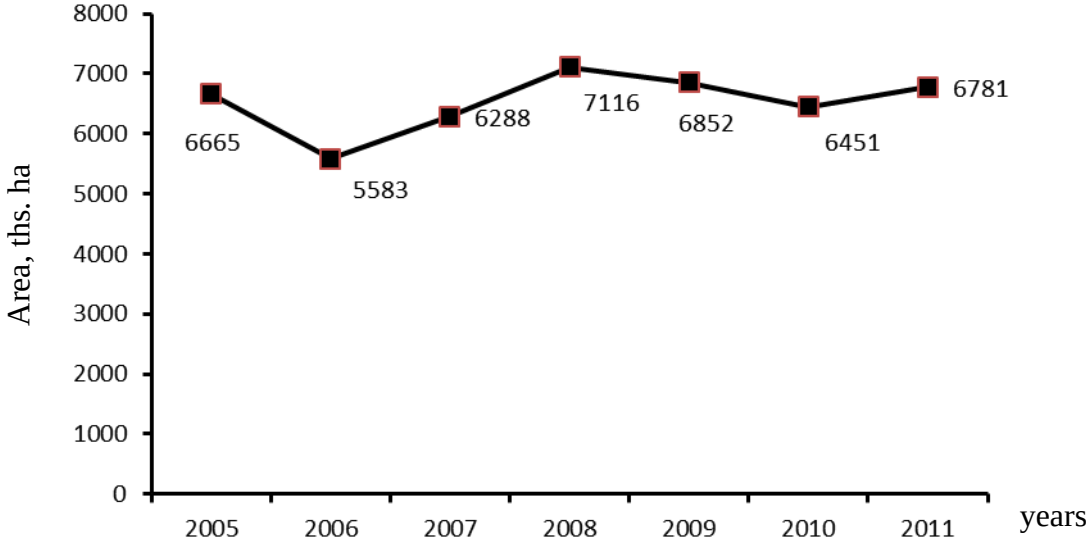


Fig. 8. Area under wheat cultivation in Ukraine

One of the factors, which causes small fluctuation in numbers of areas under wheat, is more dynamic processes in other crops (rape, sunflower, corn for grain, barley and so on), which are caused by more situational and financial attractiveness for selling a certain set of grain crops and technical crops. The almost similar situation is observed in the low dynamics of changes in the number of agricultural enterprises (Fig. 9).

The difference between minimum values in 56,133 enterprises and maximum in 59,059 makes less than 5%, which implies, on the one hand, the certain condition of saturation of the agrarian market, on the other hand, the moderate speed of changes in consumer characteristics of the suggested produce.

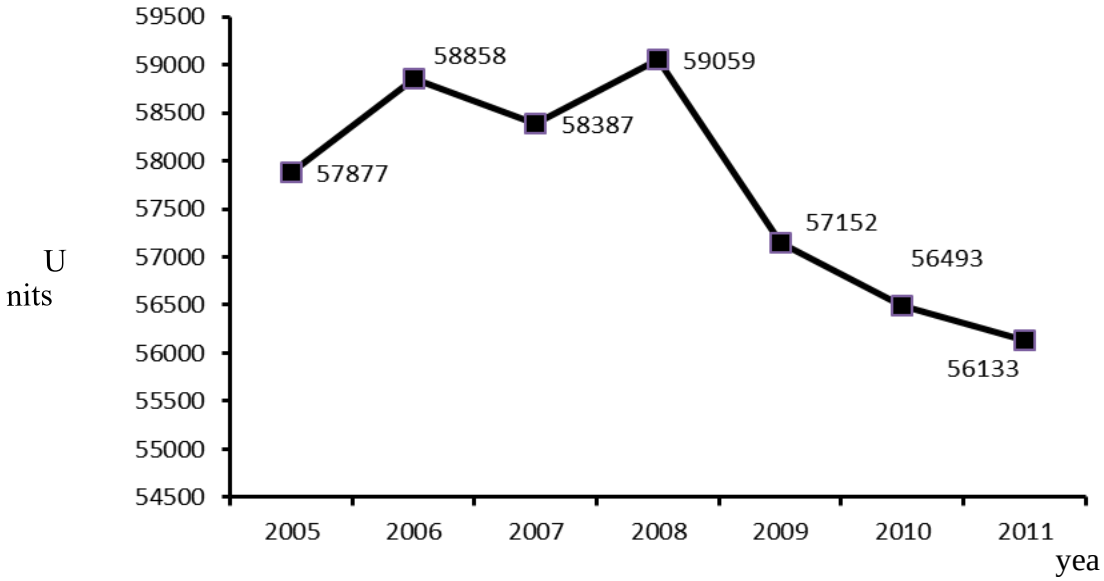


Fig. 9. Number of the existing agricultural enterprises

It is remarkable to pay attention to fluctuations in indexes, which characterize changes in production of wheat. They were the largest (Fig. 10). Thus, the difference between the minimum and maximum values is 46% from maximum. Undoubtedly, it has been caused not least by natural-climatic conditions for growing grain crops.

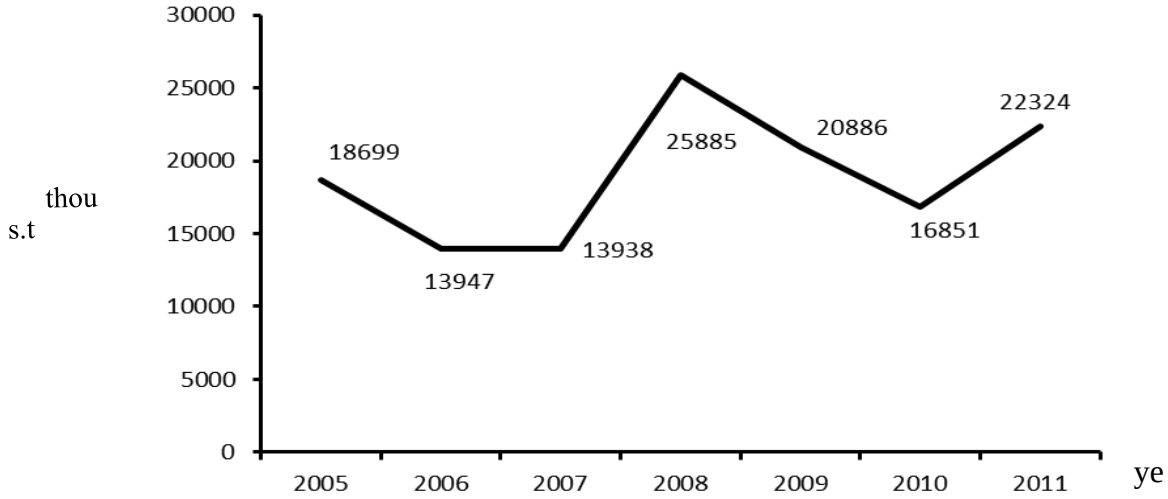


Fig. 10. Production of grain crop (wheat)

Hence the product offering at the market of grain crops is strategically difficult to predict. Unfavourable climatic conditions for growing grain crops create contradictions between desires of producers to sell more produce at the increased price and limitations in the existing amount of production (strategic reserve grain funds are limited by the capacity). The speed of getting grain crops depends on climatic, seasonal changes.

Expenses per hour to grow agricultural produce are also poorly controlled since the time of passing natural processes can be changed only within a narrow time range.

Part 3. Analytical research of conditions for the functioning of the grain complex based on ecological-focused technologies

It has been reported [6] that the use of neural networks provides the most positive effect in situations when it is precisely known that between the list of incoming parameters and characteristics, which describe reaction to them, there is an interrelation though the exact type of that interrelation remains unknown. One more condition for application of neural networks is the possibility to carry out the process of education. To provide data gathering, which is the basis for the process of studying the neural network, it is necessary to determine the number of variables, which are to be gathered and the amount of data, which characterizes them and is necessary. The simpler is the case when data are characterized by a numerical scale. It can be statistical information, which describes intensity and efficiency of economic processes.

Taking into account advantages of neural networks over classical approaches of analysis and synthesis of new knowledge, it is quite reasonable to create the system of informational provision of economic processes, and the main difference is the ability to learn from a huge number of examples and conditions, when mechanisms of the situation and function development depends on input and output indeterminate. It is worth noting the proven capacity of neural networks to successfully form decisions based on the incomplete informational vector. Considering area spread of agricultural land and the level of development of wireless technologies, which provide access to the Internet, the ability of neural networks to be integrated with databases significantly exceeds the efficiency of the process for initial data processing.

It is known [6] that an artificial neuron imitates the features of a biological neuron. Several signals are sent to the input of the artificial neuron, each of those signals is the output of another neuron. Each input is multiplied by the corresponding weight which is the analogue of synoptical effort. The whole multitude is added, which defines the level of activation of a neuron. The model, which realizes this principle (Fig. 11), contains the sum-total of input signals $x_1, x_2, ..., x_n$, to vector X. The weight of each signal is defined as $\omega_1, \omega_2, ..., \omega_n$. Each weighting coefficient multiplied by the own input signal is delivered to the totalizer $\sum$. Output «NET» contains the result of transformations of the chains mentioned above. The next step is in the transformation of the signal «NET» by the function, which activates «F» and forms the output signal «OUT».

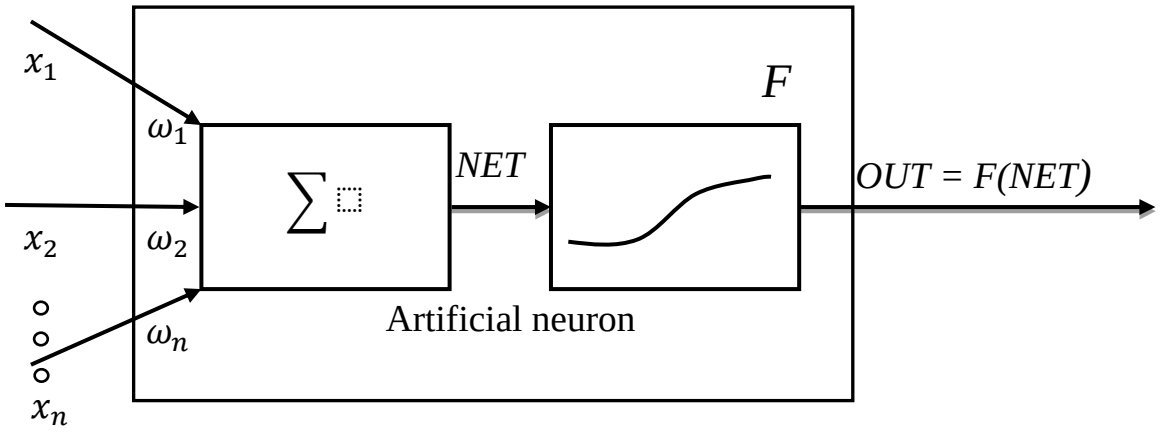


Fig. 11. Artificial neuron with the activating function

The function, which activates, can be an ordinary linear function of the type $OUT = K(NET)$, where K – constant of the threshold function, T – constant threshold value:

$$\begin{cases} OUT = 1, NET > T; \\ OUT = 0, NET \le T. \end{cases}$$

Block «F» (Fig. 1) carries out the narrowing of value «NET» in such a way that at any values of «NET» the value «OUT» will have a certain limited range. The function, which performs narrowing, is most frequently a sigmoid or logistical function: $F(x) = \frac{1}{1+e^{-x}}$. Thus we can determine: $OUT = \frac{1}{1+e^{-NET}}$.

It is necessary to note that the use of sigmoid function makes possible to process (consider) both poor and multiple outputs of stimulation. Using different variations of the narrowing function and activating function, it is possible to use neural network approaches to: predicting and risk estimating possible future deal; predicting amounts of sales; predicting loads of work capacities; predicting demand for new production; determination of trends, correlations, typical samples, and exceptions in big amounts of data. The need to consider different factors, which influence the formation of prices in the mechanism of self-regulation of the market economy leads to the need for the development of mathematical models, with the help of which it is possible to carry out the prediction of price trends [8].

The equilibrium is the result of interaction between demand and supply (Fig. 12). The point of equilibrium (point «A», Fig. 12) reflects the equilibrium price, which satisfies both the buyer and the seller. In the classical situation of the market economy, the increase in prices leads to the increase in supply and decrease in demand. In the case of produce with a changeable time of production (industrial goods), the time of reaction delay to external stimulus is similar to the time needed to produce the goods. For agricultural production, the situation is different.

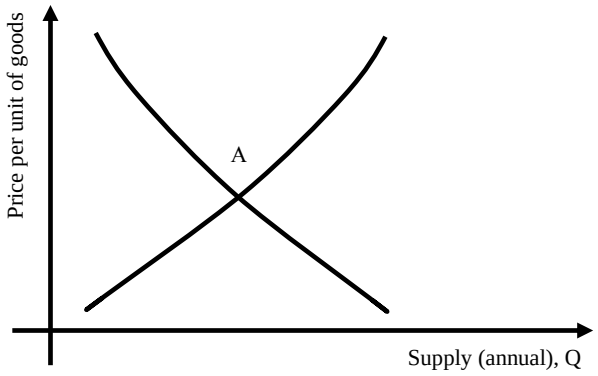


Fig. 12. Equilibrium price

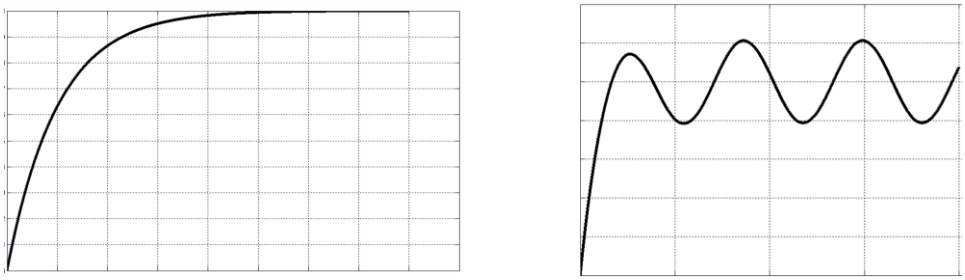
In the first place, manufacturers of agricultural production do not possess significant possibilities to influence the time of receiving (ripening) production especially considering ecological limitations. Thus, the manufacturers react to market changes with a big delay. It leads to cyclic fluctuations of supply and price.

We shall consider the model of equilibrium price for the market of one type of goods – grain crops. We consider the time to be continuous. Demand and supply

$(d,\ s)$ are such factors that depend on price by the linear law. Change of price is proportional to the exceed of demand over supply: $\Delta p = \gamma(d - s)\Delta t$, on conditions that $\gamma > 0$. Based on the above, we can write: $\frac{1}{\gamma}\frac{dp}{dt} + (b + \beta)p = a - \alpha, \quad p(0) = p_0$.

Thus, we can see that the process of changes in prices is described by inertial chain by the constant of time (Fig. 13): $T = \frac{1}{\gamma(b + \beta)}$. Equilibrium price p_e that is the point of intersection of demand and supply graphs is determined as: $p_e = \frac{a - \alpha}{b + \beta}$.

The transitional process, which describes the change of price by time for the market of one type of goods, takes the following form of a curve (Fig. 13 a).



a) b)

Fig. 13. Curves of price changes by time without considering a variable component (a) and considering a variable component (b)

At the same time, the presence of cyclic fluctuations influences the supply and prices and changes the graphic solution for the equation with price is represented (Fig. 13 b). From the picture, it can be seen that there are fluctuations of the price around a certain equilibrium value. Creation of a mathematical model, which considers factors, which influence the process of price formation makes possible to predict trends of variable changes in the market of grain crops.

On the whole, investment prospect of ecologically focused agricultural technologies depends on a multi-variable system of making decisions by potential consumers of the finished goods. Therefore, it is reasonable to apply tools, which consider multi-variability with the purpose of defining prospect and investment attraction of ecologically-focused technologies under specific economical-social conditions. Moreover, agriculture just as any other field considers the effectiveness of work in other fields of economy.

We will consider the multiple interconnected linear dynamic system, in which the output condition is defined by several output variables $y_1,\ldots,y_n$. The statistical intersectoral analysis by Leontiev is obtained by comparing field outputs by final consumption to the produce of the fields [8]:

$$x - Ax = y. \quad (1)$$

At that $(n \times 1)\ x = \begin{pmatrix} x_1 \\ .... \\ x_n \end{pmatrix}$ – column vector of annual gross field outputs; $(n \times 1)\ y = \begin{pmatrix} y_1 \\ .... \\ y_n \end{pmatrix}$ – column vector of annual final demand for field produce; $(n \times n) A = \|a_{ij}\|$ – matrix of direct costs at that each element a_{ij} demonstrates the number of units of produce i necessary to produce the unit j of produce.

To obtain the model of the dynamical intersectoral equilibrium vector y_i in each year t will be written in the form of two vectors, which characterize investment goods and consumer goods: $x_t = Ax_t + B(x_{t+1} - x_t) + c_t$. At that $(n \times n)B$ – a matrix of capital-output ratio, which increases. Each element of the matrix shows how many units of produce i are necessary to produce in order to increase the annual production of j product per one unit; c_t – column vector of final consumption. To move from the discrete form (1) to continuous time, it is possible to write [4]:

$$B(x_{t+1} - x_t) = (E - A)x_t - c_t,$$
$$B(x(t + \Delta t) - x(t)) = ((E - A)x(t) - c(t))\Delta t$$
$$B\frac{dx}{dt} = (E - A)x - c(t)$$

Or in the form when there is matrix B^{-1} then:

$$\frac{dx}{dt} = B^{-1}(E - A)x - B^{-1}c(t), \quad x(0) = x^0. \qquad (2)$$

To provide the stability of the economic system, the roots of the characteristic equation must have negative and real parts:

$$\left|B^{-1}(E - A) - \lambda E\right| = 0. \qquad (3)$$

Thus, for example, if $n = 1$ the expression (3) will take the form: $\frac{1 - a}{b} - \lambda = 0$. Considering that a – a part of the intermediate product in the total yield, b – positive capital-output ratio of the gross production, then: $\lambda = \frac{1 - a}{b} > 0$ – the economy is not stable and it can formally without limitations increase the gross output, which is impossible in real life. Therefore, it is necessary to consider limitations. For example workforce resources.

Conclusion

Thus, considering the mentioned features of agrotechnological processes of growing grains by ecologically protecting technologies, it is quite reasonable to form the informational vector, which describes the system of making decisions considering controllable and uncontrollable factors of influence. It makes possible to set the level of uncertainty for processes of predicting possible situation and it leads to achieving the purposes of the marketing strategy.

It is necessary to consider features of the agrarian market itself and motivational components for making decisions by the potential consumer during the positioning in the food market.

Under conditions of practically unchangeable (or insignificantly changeable) indexes in the number of enterprises-producers of agricultural produce, areas under wheat, dynamics of crop yield are essential. This yield in combination with other additional risks, which are typical for ecologically-focused agricultural technologies, and consideration of factors, which influence integral indexes of supply and demand, the level of their influence on the process of making decisions towards buying the corresponding produce, require additional research.

To decrease the risks that are important for enterprises, which use ecologically-focused agricultural technologies, it is reasonable to create the system of informational provision of economical processes. The main difference of such a system should be the ability to learn by a large number of examples if patterns of situations and dependence functions between input and output data are unknown.

Application of the dynamic model of intersectoral balance by Leontiev makes possible to predict by the time the trajectory of movement for the main values, which characterize economical processes. At the same time, incorrect ignorance of the limiting factors leads to the presence of mathematically correct but economically not grounded results. It is quite logical to develop the methodology of defining the list and coefficients of limiting factors to provide an adequate mathematical model in the real object of the research.

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