Transformation of International Standards of Nutrition due to Increasing Demand for Ecologically Clean Production

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Abstract

The article is devoted to the evaluation of influence of global trend for increasing demand for ecologically clean production according to the international standards of nutrition. The authors build a multifactorial function of demand for ecologically clean products and research the process of transformation of traditional standards of nutrition and formation of international standards of ecologically clean production within the frame of institutionalization of this production.

Keywords: Ecologically Clean Production, Multi-Factorial Function of Demand, Institutionalization, International Standards of Nutrition

1. Introduction

The 21st century was marked not only by strengthening of integrating processes in the world economy, global financial crisis, and intensification of struggle for world’s supply of natural resources, but also by increasing demand for ecologically clean production, which turned the global community’s attention to the agricultural sphere which for long decades had stayed in the shadow of financial, political, and industrial spheres.

Under the influence of market laws, the demand determines the offer of ecologically clean production, but for further development of this tendency, there’s a need for institutionalization of ecologically clean production, state certification, and formation of international standards of nutrition. This research is devoted to the analysis of this process.

2. Results and Discussion

2.1 Multifactorial Function of Demand for Ecologically Clean Production

During two recent decades, the global market of ecologically clean food products has been developing rapidly and becoming a popular alternative to consuming harmful and ecologically unsafe products. In 2014, its global volume constituted USD 250 billion with the annual growth rate in developed countries of 20-30%.

The main reasons for increase of demand for ecologically clean products are the following. Firstly, ecological food crises of the recent decade (‘mad cow’ disease, aphthous fever, avian influenza, etc.) and growth of mistrust to usual products. Secondly, public unrest as to the harm of genetically modified components which are contained in food products.

Economically, for the market of consumer goods, a multifactorial function of demand has the following form:

\[ Q_7 = f(P_l, P_i, Y, A, T, I, D) \] (1)

where \( Q_7 \) – demand; \( P_l \) – product price; \( P_i \) – price of substitute products; \( Y \) – expendable income of consumers; \( A \) – level of activity of advertising in this product’s market; \( T \) – quantity and age pattern of assembly of buyers; \( I \) – interest rate of consumer credits; \( D \) – characteristics of trend of buyers’ preferences change.

This model can be influenced by characteristics of the
product, market situation, and specifics of the task (for example, market demand as a whole).

Besides, the following factors are rather significant: consumer expectation of inflation, exploitation costs, limitation in receiving credit resources; amount of personal available assets; property supplies; perspectives of business development; structure of families from the position of possible consumption. When the function has a linear character, it conforms to the equation:

\[ Q = \sum Bi \times Pi, \]  

where \( Bi \) – indices of flexibility for various types of products.

When building functions of demand for ecologically clean production, this usually refers to 2 varieties of products: ecologically clean products in classical understanding; products with harmful substances concentration which exceed the allowed standards of mac.

These two varieties of products cannot be considered as interdependent, as decrease of price for ecologically clean production is possible only to a certain and rather high level, determined by the critical point of rentability. However, even after reaching it, a substantial part of the consumers would not be able to pay for ecologically clean production (Table 1).

High cost of ecologically clean production primarily infers different efficiency results. In particular, the balance point for manufacture of ecologically clean production (Ei) is characterized by equilibrium quantity and equilibrium system. As a matter of fact, this point may be a guideline for so called critical level of rentability (break even point). The mentioned parameter is the main guideline of business planning, and the amount of demand and offer, adjusted to the specific share of N manufacturer of ecologically clean product, should be set as a basis of flexible budgets and procedure of direct-costing, in the regional and sectorial aspect.

In practice, the real market price will always strive to deviate from the break even price; a manufacturer of ecologically clean production must evaluate the general trend of this deviation, for the change of demand for production leads to the change of balance\(^1\). Increase of demand leads to the growth of equilibrium value of demand and equilibrium price, and, vice versa, decrease of demand determines the decrease of equilibrium value of offer and equilibrium price, if the offer is unchanged.

Change of offer with the stable demand for ecologically clean production also leads to the change of balance. Increase of offer leads to decrease of equilibrium price with growth of equilibrium value of offer. If the offer decreases, the equilibrium value of offer decreases as well, and the equilibrium price grows.

Excess of offer will conduct the pressure on the price through the competition of manufacturers and sellers, otherwise – through the competition of buyers. Profit of consumer of ecologically clean production will consist in difference between the amount which the consumer is ready to pay for the product and the amount he pays in reality. The manufacturer’s excess consists in difference between the price for which he is ready to sell the product and the price for which he sells it in reality.

Revving up the manufacture of ecologically clean production from the critical point of rentability R to

| Table 1. Comparative parameters of micro-economic efficiency of manufacturing agricultural production in view of ecological component (in nominal units) |
|-----------------------------------------------|
| Ecologically clean production | Traditional production |
| Price | Demand | Offer | Rentability, % | Price | Demand | Offer | Rentability, % |
| 10 | 1 | 4 | 30 | 6 | 1 | 6 | 50 |
| 9 | 2 | 3 | 20 | 5 | 2 | 5 | 40 |
| 8 | 3 | 2 | 10 | 4 | 3 | 4 | 30 |
| 7 | 4 | 1 | 0 | 3 | 4 | 3 | 20 |
| Economic unprofitableness zone | |
| 2 | 5 | 2 | 10 | |
| 1 | 6 | 1 | 0 | |

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equilibrium price \( E \), the agricultural enterprises will remain within the area of favorable economic decisions, increasing the level of their financial security on the basis of increasing the profit and rentability. However, after reaching point of equilibrium price, the offer exceeds the demand, which automatically leads to substantial difficulties. These include increase of expenses for advertising, payment for storage and transport costs, documentary stimulation of sales agent, etc. Besides, a significant part of ecologically clean production will be subject to risk of damage and loss of quality, which becomes actual in the perfectly competitive market, when the function of marginal gain coincides with the function of demand. A perfect rival is not able to influence the price of the sector; whatever the volume of sales may be, the price per unit will remain stable. Average costs will aim at the minimum, while the marginal costs will start to grow.

Relying on the above dependencies, the indices of profit and volume of production are calculated. For that, it is necessary to compare the marginal costs of the company with a market price which at the same time is the marginal gain for competitive enterprises. Marginal costs reflect the individual cost of manufacture of each successive unit of ecologically clean production and change quicker than average costs. Consequently, the enterprise reaches the balance between marginal costs and marginal gains, at which the amount of maximal profit is significantly higher than average costs.

The very condition of fulfilling the above equation is the rule of production optimization. This means that business structures should strive for such production volume, at which the costs coincide with profit from selling the last unit, which allows receiving all profit. An especially favorable situation arises when equilibrium price in the sector or sub-sector is higher than average costs of current rival, which leads to profit maximization. If the equilibrium price in the market drops below the average costs, then with the equality of marginal costs and marginal income, the losses minimize. If the stated situation is preserved for a long time, there is a possibility for superprofit, which, however, attracts new enterprises to this sphere. The latter increases the offer for ecologically clean production in the market and leads to reduction of the price and, consequently, to disappearance of superprofit. The further reduction of price below the average level of costs of the sector business units leads to new losses and reduction of competing enterprises, especially of those that cannot reach the decrease of costs.

In our opinion, it is highly improbable that there will be used a model, based in the leadership in prices, for under conditions of tough territorial orientation of large manufacturers of ecologically clean production it is difficult to include in this process the changes of structure of non-monetary functions of offer which change the average costs and factors of production related to other smaller manufacturers.

The simplest one is the pricing model that is oriented to average costs, increased by profit margin. Using this model, the oligopolists with close average costs can automatically equalize the prices and maximize the industry-wide profit. Thus, being interdependent and interconnected, the oligopolies set the wholesale prices and rarely change them, remaining cautious, which points at the price rigidity in view of oligopoly. Oligopolistic organization of the market of ecologically clean production brings the society less irrecoverable losses from conscious underproduction, despite the fact that there remain the barriers for entry into oligopolistic sector. Creating a certain variety of conditions for smooth development, the stated barriers do limit the competition from new manufacturers. This weakens the stimuli for development and implementation of progressive technologies that reduce the costs of production.

Considering the dynamics of changes of ecologically clean production manufacturing, it is necessary to note several distinctive moments: expansion of production is reached not by more intensive manufacture, based on the change of efficiency of artificial stimuli of productivity, but by means of factors which are oriented at the expansion of crop area, farm stock, quantity of employees, planting material, irrigation volume, food potential, etc.; by predominance of direct (variable) costs in the structure of product cost and general tendency for increase of their importance; wide use of natural elements of replenishment cycle and manual labor allows preserving competitiveness of small manufacturers, in spite of oligopolistic nature of business-processes; strongly marked seasonal character (especially, in crop production sectors) of the cycle of manufacture and realization of production.

2.2 Influence of Increase of Demand for Ecologically Clean Production on International Standards of Nutrition

Global experience shows that government supports a
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Project inly if it starts making money and becomes a part of economy. A history of formation and standardization of the ecologically clean production market in the USA is significant in this regard. The idea of ecologically clean products appeared in the USA in the 60-s. At first, it was a counter-culture, a protest against pollution of the planet and abuse of the nature. Sellers and buyers were considered to be obsessive with their health. The assortment of ecologically clean products was small, the prices were high, and the products could be bought only in specialized markets.

Eventually, more and more people started to feel that usual products were not useful and could even bring harm. A huge bulk of food additives and chemicals containing in most part of the products led to various diseases and decrease in immunity. Thus, “green wave” reached the consumer masses. People paid the attention to ecologically clean products and began visiting organic markets. Large supermarkets and companies which had been refusing to sell the organics saw a huge potential and profit in it.

Small farm enterprises which had been growing ecologically clean products began expanding and turning into large companies. And only when big business and the government saw the perspectives of the market of ecologically clean products, an issue of its standardization was raised; the standardization went through the following stages: 1989-1990 – a wave of aggravation of concern as to safety of food products led to the idea of unified national standards for organics. 1990 – creation of a variety of governmental and public organizations which were to develop the unified National Standards on the basis of public opinion-poll and of existing, but fragmented, rules.

1990-1997 – development of the unified National Standards. 1997-1998 – US Department of Agriculture brings for discussion the first project of the unified National Standards for organics. May 1998 – US Department of Agriculture agrees to impose ban on the use of genetically modifying technologies; prohibition on the use of artificially created chemical fertilizers; prohibition on the use of genetically modifying technologies; prohibition on the use of growth and fattening stimulators, antibiotics and hormonal agents, and the use of forage that is not created on the basis of organics.

Simultaneously with the implementation of the law on National Standards, an obligatory certification was introduced, aimed at the manufacturers and sellers of organics to comply with the National Standards – a product which hasn’t passed the certification cannot receive an “organic” label. A clear classification of ecologically clean production was adopted:

Natural Products – products which fully or for the most part consist of ingredients of natural origin, with minimum quantity of chemicals, artificial fillers, etc. Natural products include primarily Organic Products (OP). In Russian, they are called “ecologically clean products”. Ecologically clean products are grown on the cleaned soil, without use of chemicals, and with only natural fertilizers, like dung, compost, etc.

Functional Foods – products with artificial addition of useful components which increase protective functions of organism (e.g., orange juice with echinacea).

Nutraceuticals – special food additives which increase its sustenance, e.g. vitamins. They must have natural origin. Most of them are extracts from various plants.

Besides, organics includes not only food products, but also a variety of products – cosmetics, clothes, hygiene products – which cannot correspond to the standards, developed for food industry. Nowadays, the US trade association for organics is in search for new standards of these groups of products.

All who take part in growing, manufacturing, and pre-sale preparing the organic production must obtain a certificate. These are not only manufacturers, but also those who provide the acquisition, delivery, processing, packing, and storage of organics.

Implementation of standards positively influenced the whole ecologic industry of the USA. They facilitated the less restricted import and export of products, which brought additional funds into the budget and allowed expanding the sale market. Besides, the consumers began paying less attention to high prices for organics, as now they are sure they get what they pay for.

The industry of ecologically clean products turned into business which brings good profit. During 10 recent
years, the market has been growing annually by 20-25%. In 2002, the sale of ecologically clean products constituted USD 11.7 billion, or 1.8% of total volume of food products market in the USA².

Assortment of ecologically clean products, represented in common American stores, consists of approximately 400 items. Organics industry offers the alternative for almost every product which is presented in the traditional market. The most popular are the following categories: coffee, tea, fruits and vegetables - in both raw and processed form; certain spices, dried fruit, and nuts; seasonal products – fresh fruits and vegetables which are in demand during certain seasons; ecologically clean substitutes of traditional products: baked goods, dairy and meat products, ecologically clean beverages and wines, etc.; ecologically clean products for children (baby foods, porridges, etc.); ecologically clean clothes and cosmetics⁴.

Each group of ecologically clean products grows and develops rapidly; frozen food, processed foods, and ready-to-eat food – by 39% annually, baby food - 38%, baked goods and cereals - 37%, dairy and meat products - 36% and 30%, respectively. The main channels for selling ecologically clean products in the USA are specialized stores, traditional stores, and agricultural markets⁹.

Whole Foods Market company founded the biggest organics retail network in the USA. In 2003, the company’s sales reached USD 2.4 billion, and 2004 is expected to show USD 4 billion. Nowadays, Whole Foods network includes more than 130 supermarkets which offer their customers more than 1200 items of production in 4 series of their trademarks⁶.

Thus, ecologically clean food, having appeared in the USA in 70s as an antipode of fast food and having been supported by public opinion and the government, attracts a lot of buyers nowadays, finishing the transition from the primary form of private stores and direct sales to the networks of specialized supermarkets. At present, about 25% of Americans consume ecologically clean products⁸.

In general, the experience of US intercrosses the experience of European countries which rapidly develop the market of ecologically clean products (Germany, Switzerland, Denmark, etc.). All these countries have one common feature – orientation at the stimulation of internal market of ecologically clean products¹¹. East European and developing countries are known for the export character of development of market of ecologically clean products. First of all, it is caused by the unwillingness of domestic market for consuming ecologically clean products due to low standards of living and of ecological consciousness of population. In general, there is a huge potential of development of ecological industry in these countries due to lower level of technogenic development and pollution of the environment, and cheaper cost of ecological production¹³.

2.3 Formation of International Standards of Ecologically Clean Production

As of today, the certified organic agriculture is practiced in more than 100 countries of the world and is one of the most rapidly growing segments of food industry in the world. Rates of sale of organic food products grow by up to 15% annually¹⁰. There is also a growing interest of Russian manufacturers of agricultural products to manufacture of ecological (organic) production due to the growing consumer demand for this type of production, large market capacity, and higher cost price of production.

In solving the issues of organic products markets development a substantial role is played by the guarantee system of certification of organic products (bioproducts, ecological products) which includes specialized inspectional and certification bodies and conduct of necessary compliance research. In its activities, the system uses regulations that set the requirements within the government regulations and specific standards which are voluntary agreements between consumers and manufacturers of products and services of this sector. Guarantee system (certification, inspection, and marking) provides the conformance to standards of the whole process of agricultural manufacture of organic products and their processing to the level of final production, including packing, marking, and delivery to the consumers.

A substantial part in formation of intergovernmental standards belongs to the International Federation of Organic Agriculture Movements – an international nongovernmental organization, incorporating more than 700 active organizations-members in 100 countries of the world. In 1980, the Federation created “Basic International Federation of Organic Agriculture Movements (IFOAM) standards as to production of organic products (bioproducts) and their processing” and eventually began the evaluation of certification institutions as to
Certification of bioproducts is provided depending on its sales market. The main requirements and regulations worldwide are the following: standard “EU 834/2007”, “EU 889/2008” for the EU members; National Organic Program (NOP) “National Bioproducts Program” for the US bioproducts market; standards of Japan Agriculture Standard (JAS) for the Japanese bioproducts market.

Accreditation for certification as to observation of various standards of bioproducts (including standards of bioproducts in main target markets) is conducted by variety of organizations, for example, International Organic Accreditation Services (IOAS), founded by IFOAM. Nowadays, IOAS accredited or is in the process of accrediting of 29 certification institutions from the USA, Europe, Japan, Australia, China, and countries of Latin America, which account for 50-60% of global volume of certification services.

In the entire world the food products are marked with ecological safety signs which are related to the organic agriculture. It supposes sustaining the good condition of soil and ecosystem and health concerns. According to the conception of IFOAM, the main principles include health, ecological compatibility, concern, and justice.

Standards of organic agriculture prohibit the use of pesticides, herbicides, and seed treatment. Live stock breeding should include refusal from keeping animals in the building all year round, a necessity for cattle grazing; growth regulators and antibiotics are prohibited, etc. Moreover, it is prohibited to use genetically modified organisms.

Motivation of consumers of organic products includes the following requirements and expectations: healthy nutrition, high eating qualities, preservation of natural environment in the process of production, appropriate animal husbandry, absence of genetically modified organisms and chemico-synthetic components, support of local manufacturer, and formation of consumer societies. This motivation determines the willingness of the part of consumers to pay additional bonus (10-50% and more of the price) for ecologically clean (organic) food products.

Ecologically clean agriculture receives more and more areas: more than 5 million hectares in Europe, 1.5 million hectares in North America, 10.6 million hectares in Australia. More and more farmers in various countries of the world switch to growing organic products, almost every supermarket has a variety of products with "green" marketing signs, and the networks of “health markets” develop rapidly.

At the moment, the fully functional market of ecologically clean (organic) production formed in such sectors as fruits and vegetables, milk and dairy products, baby food, and agricultural materials for processing (particularly, cereal crops).

According to recent data, organic products of all types account for 3% of the total volume of American market, and in European countries this feature varies between 1% and 7%. There is annual increase of demand for organic products in China, Thailand, Singapore, Malaysia, and India due to the increase of consumer paying capacity.

### 3. Conclusion

Thus, it is possible to conclude that within the process of institutionalization of ecologically clean products there is a transformation of international standards of nutrition. Ecologically clean agriculture (without refusal from industrial production) supposes the strengthening of food security and is the most important part of realization of government policy in the sphere of healthy nutrition. Rapid adoption of laws on organics and development of the system of certification of organics will allow the agrarians entering into the global market of organic food products and supporting this sphere under the conditions of tough competition in view of accession to WTO.

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