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## **Food Security Monitoring in the Republic of Belarus**

**Abstract.** The article investigates theoretical and methodical aspects of food security monitoring and reveals significant development tendencies in the world market of food and agricultural raw materials. It also discusses the experience of the Republic of Belarus in the assessment level for physical and economic food availability to the population. The monitoring algorithm of national food security of the Republic of Belarus including assessment criteria, indicators and their liminal values, and an information support model is presented. The monitoring algorithm assumes complex application of techniques adapted for social and economic conditions of the Republic, including tendencies assessment and development factors of the world market food security level and independence, threats on life quality of the population, and methodical recommendations about ensuring stability of food security. The applied system of basic indicators and their threshold values allows the creation of a full picture of security and threats from different directions, and ways of developing mechanisms to deal with them.

**Key words:** world food market, Belarus, food security, monitoring

### **Introduction**

The present stage of development in the system for national food security in Belarus is characterized through realization of its conceptual bases. The sustainable innovative development strategy of the National Agroindustrial Complex is focused on increasing competitiveness of the major production types, realizing the potential of export branches, and growth in quality of life for the population in all components, including physical and moral health, ecologically safe food consumption, working conditions and life harmonization [Lukaszenko 2014, Концепция... 2004].

Belarus produces a volume in the agro-food sphere that is one and a half times more than the requirement of the domestic market, and ensures its safety. At the same time, the Republic is compelled to get expensive energy resources and earn the means for exporting food competitively. National producers have to compete on the commodity markets where products are made in the best climatic conditions with a higher level of export support. Tendency development research of the world food market helps reveal and classify the most significant of them. There are three groups of factors.

The first group includes a number of factors. Capacity of the world market grows at deterioration of formation conditions of resources and unstable production dynamics. Annual growth rates of the population (1.4%) advance the corresponding indicator of food production (0.9%). According to experts of the Food and Agricultural Organization, global food production has to increase by 60% by 2050 in order to feed the increasing global population.

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It is difficult to provide such growth on the principles of sustainable development of agriculture without damage to ecological safety because natural resources are declining, owing to the suffering caused by system intensification of agriculture ecosystems, and climatic changes can be observed [Food outlook... 2014, Food and nutrition... 2014]. The main production growth occurs at the expense of agriculture of developing countries because the developed countries have already settled ecologically safe reserves. The volume of carry-over grain stocks remains the defining stability factor of the world food system. Reduction of carry-over stocks in relation to the general requirement in 2007–2008 by 18.4% had a strong destabilizing impact. The output growth of grain allowed restoring stocks in 2014 to the level of 576.6 mln tons or 23.4% of requirement [Food and nutrition...2014].

The second group includes the following points. Hunger rates are reduced (in 2010–2014 the number of the chronically starving reached 805 mln people, in 1990–1992 – 1014 mln people [Food and nutrition... 2014, The state... 2014]). There was a new form of hunger – chronic malnutrition in developing countries that covers more than 2 bln people consuming only 1000–1800 kcal per day, rather than the norm of food that FAO recommends – 2400–2500 kcal per day. Only 40% of global inhabitants are provided with good nutrition [Food and nutrition...2014]. Essential changes happen in food ration of the population of developing countries – more high-calorie, protein-rich food replaces traditional grains and beans. Milk consumption per capita in this group increased by 2 times, meat 3x and eggs 5x over 20 years [Food outlook... 2014]. Consumers in developed countries created the priority of ecological safety and food quality (the demand growth for ecological production is 0.5% per year) [Food outlook... 2014].

The third group is a conjuncture of factors. Competition in food markets amplifies and becomes complicated owing to application measures of tariff and non-tariff regulation of the GATT/WTO. Instability of food and raw material prices remains in the long-term period owing to volume increase of world consumption and international trade: the index of Food Prices in relation to the basic level of 2002–2004 (100%) in 2008 was 201.4%, in 2011 – 230.1%, in 2013 – 210.5% [The state... 2014].

Considering world tendencies, the strategic direction of domestic food market development of the Republic of Belarus is the achievement of production stability focused on export through an innovative basis during the use of advantages of international regional integration.

The purpose of the article is the research of theoretical and methodological aspects of monitoring food security of the Republic of Belarus.

## **Research methods**

Identification and anticipation of food security threats and providing measures of sustainable development of the Agroindustrial Complex cause the necessity of continuous improvement of monitoring methods and forecasting of social and economic processes, food consumption dynamics [Концепция... 2004].

Monitoring of national food security is carried out annually according to the assessment criteria designated by the Concept of National Food Security of the Republic of Belarus, approved by the Resolution of Ministers Council of the Republic of Belarus on March 10th, 2004.

The purpose of food security monitoring is to reveal internal and external factors and potential threats on national, regional and house farm levels, to develop mechanisms of their anticipation, providing strategy of sustainable development of rural territories.

The main criteria of the reached level of food security are the following:

- satisfaction degree of physiological needs for components and power maintenance of a diet;
- compliance of a diet to restrictions of unhealthy substances existing in products;
- physical and economic availability food level to various categories of the population;
- dependence degree of food supply of the country and resources providing agro-industrial complex from import;
- volumes of strategic and operational food stocks according to standard requirement;
- efficiency of use of an export potential [Концепция... 2004].

The monitoring algorithm systematizes the original technique adapted for social and economic conditions of regions and provides the following investigation stages:

Stage I. The analysis of global tendencies and development factors of the world market (purpose – to reveal the potential of external threats and stability factors);

Stage II. The reached level assessment of food security of the country and regions (purpose – to estimate the level and food quality of the population, possibility of self-sufficiency by main food types);

Stage III. The influence threat assessment on life quality of the population (purpose – to determine the level of threat impact on quality of food allowance of the population in a section of social groups, house farms of city and rural areas);

Stage IV. The assessment of stability potential of the regional food markets (purpose – to reveal the factors forming adaptability potential to environment changes);

Stage V. Development of analytical balance model of grocery markets (purpose – to estimate the potential of deficiency threats of food resources connected with instability of agricultural production);

Stage VI. Development of methodical recommendations about ensuring food security including regulation mechanisms.

Basic indicators of food security threats of the Republic of Belarus are developed taking into account FAO recommendations including:

The I<sup>st</sup> group – the level and quality of food ration of the population (the power value of food ration is at 1 person per day (not less than 3000 kcal), the main products consumption on 1 person a year (90–110% of medical norm), specific weight in a diet of animal proteins (not less than 55 %, etc.);

The II<sup>nd</sup> group – health state of the population (natural increase of the population, the expected life expectancy in city and rural areas, disease prevalence, characteristic for the low food status, etc.);

The III<sup>rd</sup> group – education level (specific weight of the competent population, etc.);

The IV<sup>th</sup> group – physical food availability (growth rate of agricultural production (not less than 5–7% a year), the functioning agricultural organizations (not less than 60%), stability of grain production (not less than 75%), ratio creditor and receivables of the agricultural organizations (1:1), profitability of agricultural activity (not less than 40%), specific weight of investments into agriculture in a total amount (not less than 10%), etc.);

The V<sup>th</sup> group – economic food availability in a section of social groups of households in city and rural areas (a share of food costs in expenses (not more than 35%), growth rate

of purchasing power of the real monetary income of the population (not less than 1% a year), the population with the income below a living wage (not more than 8% to city and 10% to rural areas), the concentration level of income (not more than 45%), unemployment rate (not more than 4%), specific weight of import in internal consumption (not more than 20%), etc.

The monitoring algorithm of food security in Belarus is automated in a system of information support of innovative activity in the national market of raw materials and food – joint development of the Institute of System Research in Agroindustrial Complex of NAS of Belarus and the United Institute of Informatics Problems of NAS of Belarus [Eurasian Economic... 2015].

Information system represents the integrated environment with remote access providing food monitoring of security and stability of the agrarian market containing the following elements.

Common database of scientific and technical information in the sphere of food security:

- methodical means of ensuring monitoring;
- database of scientific and technical development and innovative projects in the sphere of ensuring food security (patents, projects, scientific articles, conferences materials, reports on research and development, abstracts, etc.);
- monitoring results of food security, balance forecast of grocery markets for supply and demand;
- analytical materials about the environment of world markets, markets of the State Parties of the Eurasian Economic Union.

Management subsystem of the database (provides creation and maintaining database, the organization of access for users, information input, etc.).

Web-application of navigation access to information resources (organizes input control and access to database, search via the Internet browser by users' inquiries, etc.).

Management subsystem of service and administration (provides maintaining news, support of the statistical analysis, the organization of feedback in the Forum mode, etc.).

Information support of the system is based on modern technologies of maintaining databases.

Table 1. Agricultural production per capita in participant-states of the Common Economic Space, kg

Product	The Republic of Belarus						The Russian Federation	The Republic of Kazakstan
	2000	2005	2010	2012	2013	2014	2013	2013
Grain	486,1	658,5	737,1	975,0	803,1	1010,1	637	1070
Potato	872,6	839,4	826,0	730,3	624,6	663,3	210	196
Vegetables	138,0	205,8	246,3	167,1	171,8	183,1	102	190
Sugar beet	147,5	314,3	398,0	504,3	459,0	507,6	236	4
Meat	85,5	105,0	147,7	164,5	176,1	163,5	60	55
Milk	449,4	582,1	698,7	715,1	703,2	708,2	214	287
Eggs, pcs	329,1	318,2	373,0	406,4	418,4	417,3	288	228

Source: author's calculations based on data of the Eurasian Economic Commission.

The initial socio-economic indexes are necessary for monitoring performance at the regional level that are entered from the automated remote workplaces by correspondents in regions by means of special entrance forms. The regional correspondents get access to a uniform database of scientific and technical information from the analytical center as feedback. The period of research is years 2000-2014. Data sources are statistics of the Republic of Belarus, of Eurasian Economic Union and of FAO.

## Research results

The monitoring of national food security of the Republic of Belarus during 1995–2013 executed by system means of basic indicators and their liminal value allowed to create a full picture of security and potential threats to security in the manifestation directions and to develop mechanisms and packages of measures on their anticipation.

Table 2. The main food consumption in the Republic of Belarus per capita per year, kg

Product	Medical consumption norm	2000	2005	2012	2013	Ensuring of medical norm, %
Meat and meat products	80	59	62	89	89	118
Milk and milk products	393	295	262	281	280	72
Eggs, pcs	294	224	259	310	315	110
Fish and fish products	18,2	9,5	18,6	13	16	86
Sugar	33	34,9	39,1	42	41	124
Oil	13,2	8,7	14,7	17	18	140
Vegetables	124	93	128	145	146	120
Fruit and berries	78	25	47	64	60	79
Potato	170	174	183	186	184	108
Bread products	105	110	96	90	88	83
Total kilocalories per day	3500	2900	3100	3200	3300	94

Source: author's calculations based on data of the National Statistical Committee of the Republic of Belarus.

According to the monitoring results of food security significant factors of food security are revealed, the most important of which are the following:

Physical food availability:

- high level of main types of food production and agricultural raw materials allows to provide a food ration in a power assessment at the rate of 3200 kcal on average on 1 person per day that corresponds to the optimistic safety level and testifies to accurately expressed export orientation of Agroindustrial Complex;
- the output of main types of food per capita made 803 kg of grain in 2013, vegetables – 172, potatoes – 624, meat – 176, milk – 703 kg, eggs – 418 pcs that exceeds the reached level in the State Parties of the Common Economic Space on many positions (Table 1);
- food ration of population approaches the optimum life-supporting products and made 89 kg of meat and meat products in 2013, 280 – milk and milk products, 16 – fish and fish products, 41 – sugar, 18 – vegetable oil, 146 – vegetables, 60 – fruits and berries, 184

kg – potatoes and 315 pcs of eggs, at medical norm – 80; 393; 18,2; 33; 13,2; 124; 78; 170 kg and 294 pcs respectively (Table 2);

- foreign trade balance in agricultural production and food is positive in recent years. The main export-oriented products – meat and meat products, milk and milk products, eggs, fish canned food, rawhide;
- products existence of critical import including fish and seafood – 81,3%, vegetable oil – 54,1; groats – 51,7%;

Economic food availability:

- social situation in the Republic can be characterized as stable, the actual unemployment rate is 0,5%;
- factor constraining improvement of qualitative structure of the population diet is purchasing power of the real monetary income which doesn't allow to increase consumption of products with high cost (beef, veal, fish, caviar);
- share of food costs in total of households is high, in 2013 the indicator was 37,7% (Table 3).

Table 3. Food security indicators of the Republic of Belarus, 2000-2013

Indicators	Liminal values	Actual value					Indicator stability in 2013, %
		2000	2005	2010	2012	2013	
Level and quality of population food ration							
Specific weight in a diet of animal origin proteins, %:	No less than 55,0	49,5	55,7	61,9	61,8	63,3	115,1
		total					
in rural areas		42,1	49,1	54,7	55,3	55,4	100,7
Economical food availability							
Growth rate of the real population income, %	No less than 1,0	113,8	118,1	115,1	121,5	115,4	114,3
Costs share of private households on food, %	No more than 35,0	58,0	42,4	39,0	43,0	37,7	107,7
Physical food availability							
Growth rate of agricultural production, %	No less than 5,0–7,0	109,3	101,7	102,5	106,6	96,0	91,4
Profitability of agricultural activity, %	No less than 40,0	3,0	–	–0,5	14,7	7,9	19,8
Specific weight of investments into agriculture in total, %	No less than 10,0	6,8	13,3	17,8	16,1	14,0	140,0
Market functioning efficiency							
Balance of foreign trade of agricultural raw materials and food, mln USD	–	–614,6	–388,9	626,2	1393,0	1600,0	Positive balance
Specific weight of import in internal consumption, %	No more than 25,0	18,5	15,5	14,0	13,6	14,5	Acceptable level

Source: see table 2.

The monitoring results testify the existence of potential threats of food security in such spheres as food ration quality of population, economic food availability to separate social groups, insufficient efficiency level of economic entities and competitiveness production, instability of agricultural production under the influence of difficult climatic factors.

## **Conclusions**

The executed research of methodical and practical aspects of monitoring of national food security in the Republic of Belarus allows making the following conclusions:

1. Environment conjuncture instability of the world market and moving food problem from the commercial into the political sphere promotes continuous emergence of negative manifestations of competition, food security monitoring gains increasing practical value.
2. Developed system usage of the indicators and their liminal values adapted for social and economic conditions of the country and regions allows not only to estimate a self-reliance condition but also to predict balance of the grocery markets determining the potential threats and necessary measures for anticipation.
3. The country food security is guaranteed with a set of economic and social conditions, its providing and stability increase of system assume realization of measures package. The most important are the following:
  - effective agrarian policy formation, the economic prerequisites for managing stability conditions;
  - employment population guarantee and policy activization directed on poverty eradication and an inequality in food availability;
  - complex strategy introduction of branches development of Agroindustrial Complex for the increase in food production and efficiency increase;
  - usage of advanced technologies and programs in the field of production and processing of agricultural raw materials;
  - ensuring adequacy of food deliveries to requirements satisfaction of the population, ecological safety guarantee of products;
  - carrying out the foreign economic activity, usage of international labour division advantages, optimization of deliveries on export and import;
  - improvement of the reaction mechanism in emergency situations in the food market.

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