Critical review

Food security: The challenge of the present

Alexander Y. Prosekov[a], Svetlana A. Ivanova[b,c,*]

[a] Laboratory of Biocatalysis, Kemerovo State University, Krasnaya Street, 6, Kemerovo 650043, Russia
[b] Department of Higher Mathematics, Kemerovo State University, Krasnay Street, 6, Kemerovo 650043, Russia
[c] Research Institute of Biotechnology, Kemerovo State University, Krasnay Street, 6, Kemerovo 650043, Russia

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ABSTRACT

The group of basic problems that determine the existence of mankind involves the surplus of food for some and the malnutrition of others. There is an opinion that ensuring food security is an integrated task of agriculture and political will, combined with the logistics of product delivery. Despite joint efforts and various UN programs to combat hunger, only short-term local results have been achieved. Food security, especially in the global sense, has not yet been implemented, and there are reasons for this. The analytical review presents evaluation of the achieved result and points out the activities that require adjustments.

1. Introduction

According to FAO, the prevalence of malnutrition in the world is 10.8% and 11.0%, that is, 794 and 815 million people according to the results of 2015 and 2016, respectively. So, despite all the joint efforts, the number of malnourished and hungry people in the world is growing again. In 2017 the World Bank noted that 83 million people in 45 countries were starving. In the developed regions of the world, the proportion of undernourished people does not exceed 5% of the population, in developing regions it reaches 13%, in African countries 20%, and in Asian countries 13%. A noticeable deterioration in food security in a number of countries in Africa, Southeast Asia, and West Asia is obvious (Fig. 1).

With a stable population growth, the possibility of eradicating hunger by 2050 becomes questionable (FAO, 2009). The main causes of hunger and malnutrition are natural cataclysms, armed conflicts, population growth, and poverty. The global financial crisis has made adjustments to the dynamics of poverty and, consequently, the problems of hunger challenging (Lipton and Saghai, 2017; Moragues-Faus, 2017; Leventon and Laudan, 2017; Martin et al., 2016; Borch and Kjærnes, 2016; Gohar and Cashman, 2016; Burchi and de Muro, 2016; Myers and Caruso, 2016). However, are agriculture and the lack of political will the only main problems of malnutrition and hunger? Is it enough to understand the qualitative and quantitative characteristics of the population and ecosystems and to ensure political conditions? The proposed work is devoted to an analysis of these issues.

2. Results and discussion

Many interstate official and public organizations and UN agencies, including FAO, are engaged in the study and solution of the food problem. The most comprehensive set of indicators (Global Food Security Index) of the state of food security in various countries of the world is formed by the British research company The Economist Intelligence Unit with the support of the American multinational company DuPont. Regions, whose countries have favorable political and economic conditions, are primarily represented by North America and Europe. In Africa, especially in Sub-Saharan Africa, and in some Asian countries, the problem of hunger is the most acute (Fig. 2).

At the end of 2017, the five best/worst countries with an increase/decrease in the index were selected: Sierra Leone +2.6, Paraguay +2.0, Ecuador +1.4, Bangladesh +1.3, and Nicaragua +1.3/Yemen −3.4, Congo (Dem. Rep.) −3.8, Madagascar −4.7, Qatar −6.0, and Venezuela −7.1. The decline in food supply in countries with active conflicts is obvious, but there are also some peaceful regions, where the level of food security has decreased mainly because of the global financial crisis. The problems of refugees and even by Brexit have also influenced the results. Over the past year, the state in Syria −1.3, in which the military actions are conducted, and in Ukraine −2.1 has worsened, but the authorities do not want to notice this problem, while in the United Kingdom +0.2, it seems only the results of the referendum on the exit from the EU have already affected the economy and food security of the population in a positive way.

UN organizations forecast continuing population growth, and by 2050, this figure is expected to be between 8.3 and 10.9 billion people, meanwhile current trends point to the larger version. Such growth

* Corresponding author at: Department of Higher Mathematics, Kemerovo State University, Krasnay Street, 6, Kemerovo 650043, Russia.
E-mail addresses: a.prosekov@inbox.ru (A.Y. Prosekov), pavvm2000@mail.ru (S.A. Ivanova).
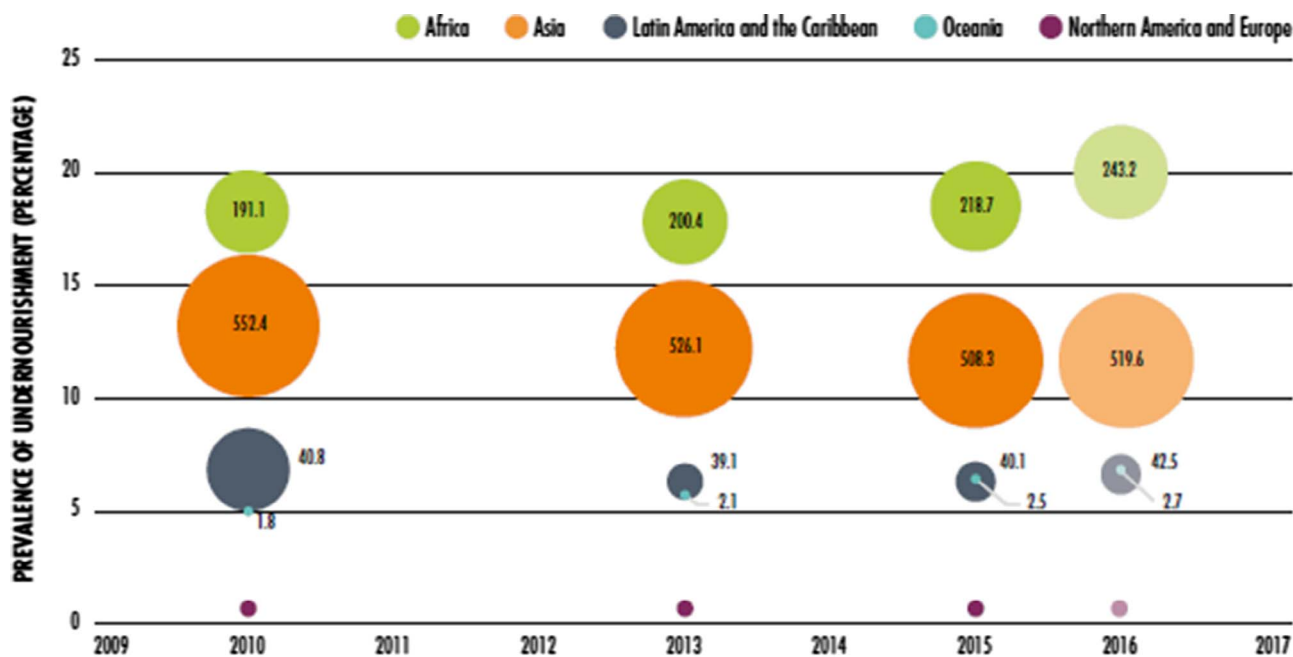
NOTE: Comparison of prevalence and number of undernourished people by region. The size of the circles represents the number of undernourished people in millions, as labelled. Figures for 2016 are projected values.

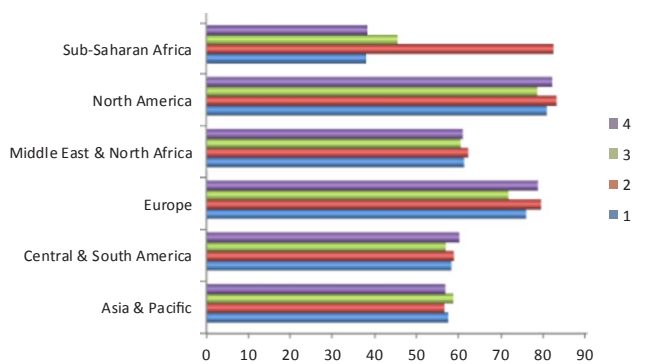**Fig. 1.** Malnutrition prevalence by regions.
Source: FAO.

Fig. 2. Global Food Security Index scores (2015): 1 – Overall score; 2 – Affordability score; 3 – Availability score; 4 – Quality and Safety score.
Source: http://foodsecurityindex.eiu.com.

rates, according to experts, will require an increase in food supply at least by 50% and in some forecasts up to 75%. At the same time, the needs of developing countries as a whole will double, including rice-consuming countries where those needs will grow by 60% and Sub-Saharan Africa – by 250%. The environment, limited reserves of global food, and energy resources will not have a big effect on these dynamics. The decline is expected only in developed European countries and developing Orthodox countries (Fig. 3).

As a rule, while ensuring food security, only the calorie content of food per person is assessed, while rationality and variety of this food are disregarded in most cases. Reducing the number of people suffering from obesity is as much of a problem as reducing the number of undernourished people (Black et al., 2013; Ng et al., 2014). Therefore, it shall be necessary to provide the population with not just foodstuffs but products within the framework of a healthy diet that guarantees the health of the nation and the security of the state.

According to the fundamental principles of rational nutrition, the optimal ratio of proteins, fats, and carbohydrates is 1:1:4 for the adult

population with low labor intensity and 1:1:5 for those with high labor intensity. The energy value of the diet of an adult living in a temperate climate and not involved in hard labor should be distributed in a sequence of 13% protein food, 33% fat-containing foods, and 54% carbohydrates. In case of significant increase in the share of physical labor, it is recommended to achieve proper energy consumption by increasing the proportion of fats and carbohydrates and reducing proteins to 11% of the total caloric value (WHO, FAO, http://health.gov/dietaryguidelines/2015/guidelines). The former Soviet Union adheres to recommendations considering gender, age, and physical activity coefficient (FCHER, 2009). According to expert.ru, British scientists have determined the average weight of a person in the world – 62 kg. As averaged index, 93.0–124.0 g of protein, 62.0–82.7 g of fats, and 372.0–496.0 g of carbohydrates per day were examined (Fig. 4).

Grain and cereals, vegetable and animal fats, and meat and dairy products have the property of interchangeability, and can be attributed to a group of basic foods. In 2017 (FAO), the cumulative increase in world meat production will be about 0.3% to 418 million tons; milk – 1.4% to 831 million tons (an increase is expected in skim milk, cheese, and butter and a decrease in whole milk); oil/fats – 7% (an increase in palm, soybean, sunflower, palm kernel, and peanut oil and a decrease in rapeseed and olive oil); and as a whole, for the grains – decline of 0.5% to 2594 million tons (cereals for food needs – an increase by 1.0% to 1115 million tons and a decrease in wheat by 2.2%, and barley and sorghum).

In 2017, the increase is planned for meat production in all countries, especially in the US, Brazil, India, Argentina, and China; growth in milk production in Asia and America, a decline in Europe, Africa, and Oceania; and for wheat production – an increase in the countries of Asia, Africa, North America, India, and Turkey, with decrease in – Russia, Ukraine, North Africa, and Europe, without change – Argentina, Australia, and Kazakhstan.

In the second quarter of 2017, world meat trade will increase by 2.5% to 32 million tons and for dairy products – by 1% to 71.8 million tons in terms of milk. The main meat importers are China, Mexico,