

THE INFLUENCE OF BIOFUELS ON FOOD SAFETY

Makarchuk O.G.

National University of Life and Environmental Sciences of Ukraine

Skudlarski Ja., Kupchyk A., Zelazinski T.

Warsaw University of Life Sciences (SGGW)

In the article is investigated the essence of food safety and factors that contribute changes in demand and supply of food, including: population, welfare, environment and agricultural productivity. There is analyzed the impact of increasing biofuel production on food security through evaluation scenarios agricultural land assignation for growing energy crops and scenarios of possible increased demand for food in the future. The features of varied orientation of agricultural production are reviewed.

Keywords: food safety, biofuel, agriculture, demand, supply

Problem formulation. Nowadays humanity has reached the peak of its development, constantly improving living conditions through the use of new technologies in all sectors of the economy, reducing labor costs. Along with that the problem of providing the population as food and energy remain.

Food security as the main part of countries economy became more important for national security. In the condition when population of planet is growing, and area keep constant, demand on food products begin rapidly increase that nowadays substantially síñances. The second factors that influence on demand increase can refer increase welfare of population and change of climatic conditions for farming in different regions of world.

Analysis of recent publications. Issue of food security study many scientists such O. Goychuk, P. Sabluk, V. Tregobchuk, O. Shpichak and many another scientists.

Production of biofuels based on uses mostly food products, such as grains and oilseeds. Polish scientists and others have shown that the dynamic growth of consumption of food products for the production of biofuels affect the prices of food products and food [6, 7, 8, 12, 13].

Importance point in research problem of food security belong to Food and Agriculture Organization of the United Nations (FAO) that leads international efforts to defeat hunger. FAO's mandate is to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy. Also Organisation for Economic Co-operation and Development (OECD) pay attention food security and is a unique forum where the governments of 30 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

Unresolved parts of the general problem. Despite the great scientific and practical interest to the effect of biofuels on food security, many

questions remain open and unresolved. Since the cultivation of crops intend for biofuel production, it may some negatively affect the supply of raw materials for food use. On the other hand for agriculture it can be additional incomes.

Setting tasks. A main task of this article is to analyze main tendency of influence development of biofuels on food security. There is evaluated diversification of agriculture and its positive and negative aspects.

Statement of the main material of the study. Food ensuring of population at all time is actual for every country because indicate saving their independence, social stability. Food safety can compare with energy when people in contemporary conditions more and more are dependent from material values that in turn are some limited in regions of world.

Famous economist who researched issue of food security of human society was T. Maltus. His law about population he presented in the work under name «Experience about law of population» (1798). Essence of the law is that in nature all breathers reproduce rather, sooner growth quantity of food that necessary for their existence. Population increase he present like geometric progression and output expansion as arithmetic. Under such conditions thought scientist, in two century population would refer in proportion to fixed assets like 256 to 9 and in three century – 4,096 to 13 etc. Thus scientist concluded perpetual cause of threat for welfare of population is advanced increase of their quantity in compare to food increase [5].

Importance component of this law is the law of decrease land productivity. It essence consist of production increase any land always have as physical limit under limited elements that consist in and economic limit under increase of costs that are necessary for exploitation that land in condition to increase it productivity.

Law of decrease land productivity more appear in present time of society development because of majority crops rotations in Ukraine content of mineral and organic components are on the low level that result to misbalance agro-ecosystem.

Maltus T. considered that balance recreation between population and necessary subsistence occur in result of population mortality from hunger and diseases, wars and catastrophes. In his mind this process can make humane regulated population [4].

Nowadays the problem of food security is sharpening. United Nations Organization (UNO) recently represented the Map of hunger in 2011 year where is classified country of world under the level of ensuring food. In the report World food program of UNO is indicated that the main causes of hunger in many countries of world are natural rudiments, military conflicts and shortage of infrastructure in agriculture. In world about 1 billion people live in poverty and one people of six is not get sufficient food that is necessary for a healthy life-style. The highest level of hunger fixed in Angola, Haiti, Ethiopia, Zambia, Congo, Malawi, Mozambique, Chad where 35% of population are on the level of hunger [3].

In the published report «View of perspectives of agricultural development in 2011-2020 years» of OECD and FAO is considered about saving of high prices on food and instability in raw materials market. General Manager of FAO J. Diuf notes that price volatility on market could possible varies agrarian markets. It is necessary consequence politic of deterrence of variation in prices and limited of their negative consequences. In his mind the key of decision the problem is agrarian investments increase and intensification of agrarian extension of developing countries where nowadays live 98% hunger and on near decades will forecasted 47% increase of population. Activities of solution the problem should turn in the first place on small producers in countries with low level of income and shortage of food [10].

In terms of international integration of the economy, agriculture is becoming increasingly important in the context of diversification to provide the population with food, livestock industry – food, growing crops for energy purposes, as well as social and environmental performance of functions that are dictated by the growth of social demands.

Nowadays, many scientists tend to believe that the negative impact on global food security are a number of factors, among which stands out: the low rate of global production capacity in relation to the annual population growth; the welfare of the population; rising energy prices, which leads to increased production cost; lack of land and water resources; low investment in agricultural research and technology; increasing problems of hunger and malnutrition.

However, at the same time it have to be included the growth in biofuels production, which requires large areas of arable land that, according to the results lead to allocation from production for food purposes

In the XIX and XX centuries, agricultural productivity is growing faster than a growing demand for agricultural products, which led to the markets saturation. As it is known, demand for food is inelastic for the price, because of that increased in supply leads to lower prices and even incomes. This phenomenon in Western literature called «race track» [2]. German scientist Vitske suggests that «race track» will end at the beginning of the XXI century in a situation when demand for food will grow faster than supply, which will lead to a reduction in inventories. The main causes of this phenomenon called: increase of productivity slowdown in the world; limited supply of land

and water resources; growth in demand for food; increased demand for agricultural products due to the development of biofuel production.

Important to note, the external conditions of functioning of agriculture rapidly changing under the influence of the new markets emergence (including bioenergy sector), the emergence of new competitors, new technologies and biotechnology, climate change, political change, the spread of vertical integration.

In developing countries and countries with economies in transition buying food is one of the main items of expenditure of the population and food prices directly affect their food security [11].

According to the accepted definition, threat of food security occurs when a population is limited guaranteed access to sufficient quantities of safe, nutritious food that provides normal growth, development and active healthy life.

The risk of famine leads many governments to review their policies towards increasing agricultural areas under grain crops, increasing their reserves and increase subsidies to farmers. Government officials are convinced that there should be proper developed agriculture, even if it is based entirely on subsidies.

Agricultural analysts argue that rising food prices caused three powerful global trends [1]. The first correlated to the fact that in recent years greatly increased the farmers cost. Big share in the costs is occupying oil, prices of which have increased significantly, increased transport tariffs, and the costs for the purchase main types of fertilizer.

The second reason is global changes in the volume and structure of demand and supply. In India, Egypt, Nigeria, Bangladesh since 1960 the population has increased nearly threefold, while arable area remained almost unchanged. A similar situation occurs in the whole world. From 1975, when evolved and existed for the past decade the system inexpensive food, world population was 4.1 billion. In 2008, the UN estimates world population has increased to 6.7 billion. According to forecast data to 2025 the world population will rise to 8 billion. And the size of agricultural land for subsequent years remains almost unchanged [1].

The third factor in the rise in prices for agricultural raw materials is called market development of biofuels. According to expert's estimations, in the period from 2001 to 2006, the use of grains and oilseeds for the ethanol and biodiesel production worldwide increased threefold. In 2008 world wheat stocks reached their lowest level in 25 years.

However, according to experts of the USDA, the main factors that caused the rise in world food prices in recent years are: high prices of oil, growth in world food consumption and climatic conditions, while the impact of the biofuels industry in this process is not significant.

Increased of agricultural raw materials production for energy purposes is significant in size compared to the volume of agricultural production. Increased production of raw materials for processing into biofuels can be achieved by expanding the area under cultivation of energy crops or certain transformation of land use, for example, reducing the area of pastures, forests and so on.

Table 1

Land requirements for biofuel production

Country grouping	2004 p.		2030 p.					
			Reference scenario		Alternative policy scenario		Second-generation biofuels case	
	million ha	percentage of arable land	million ha	percentage of arable land	million ha	percentage of arable land	million ha	percentage of arable land
Africa and Near East	-	-	0,8	0,3	0,9	0,3	1,1	0,4
Developing Asia	-	-	5,0	1,2	10,2	2,5	11,8	2,8
European Union	2,6	1,2	12,6	11,6	15,7	14,5	17,1	15,7
Latin America	2,7	0,9	3,5	2,4	4,3	2,9	5,0	3,4
OECD Pacific	-	-	0,3	0,7	1,0	2,1	1,0	2,1
Transition economies	-	-	0,1	0,1	0,2	0,1	0,2	0,1
United States of America and Canada	8,4	1,9	12,0	5,4	20,4	9,2	22,6	10,2
World	13,8	1,0	34,5	2,5	52,8	3,8	58,5	4,2

Source: [10]

To implement a long-term biofuel production scenarios, the International Energy Agency predicts an increase in the proportion of arable land for energy purposes from 1% in 2004 to 2.5% in 2030 according to the reference scenario, 3.8% – within the alternative policy scenario and 4.2% – the scenario in which the technology of the second generation of biofuel production will be available (table 1).

Particularly within the developed world, the emergence of biofuel and other industrial uses was an important driver of rising demand for cereals throughout the past decade. The use of coarse grains (predominantly maize) for biofuels almost tripled from 2004 to 2014, with almost 40% of additional coarse grains consumed over the past decade processed for biofuels. Over the 2004-2014 period however, significantly lower crude oil prices result in biofuel demand being closely tied to policies mandating their use. The share of US biofuel mandates that can be met by maize based ethanol remains limited by the E10 blend wall, which, with decreasing domestic gasoline use over the medium-term, reduces growth prospects. As a result, there is limited scope for further expansion in the demand for biofuel, particularly in the United States and the European Union [9].

Cereals remain the most consumed agricultural product and global consumption will expand as expected experts of OECD and FAO by almost 390 Mt by 2024, with coarse grains constituting more than half of the increase. Compared to the past decade, when feed use accounted for 36% of the growth in coarse grain consumption, over the outlook period, feed demand will constitute almost 70% of coarse grain disappearance [9].

Within developing regions, almost 60% of total cereal use was consumed as food between 2012 and 2014, in contrast with the developed world, where food use accounted for only 10% of total cereal disappearance. The developing world will consume 49 Mt of additional wheat and 57 Mt of additional rice as food over the 2004-2014; marginally less than the past decade. However, rising demand for animal feed remains the core driver of cereal consumption growth. Additional global coarse grain consumption amounts to 225 Mt over the ten year period, of which feed demand constitutes 70%, while more than 68 Mt of additional oilseeds

will be processed to feed, reflecting average annual growth rates of 1.6% and 1.47% respectively [9].

As we look to the future, global quality of life will hinge on whether world food supply grows faster or slower than world food demand. If supply grows more rapidly than demand, average quality of life in the world will almost certainly improve – food prices will fall, making it easier for poor people to afford an adequate diet and freeing up income for the rich to spend on other goods and amenities. By the same token, if demand outpaces supply, quality of life is likely to deteriorate.

Leathers and Foster in future prospects for food supply and demand, define four critical factors [11]:

- population;
- prosperity;
- pollution (or environmental quality);
- productivity in agriculture.

Population, prosperity, pollution, and productivity interact with each other in complex ways:

- as population growth, urban and industrial water users compete with agriculture for scarce water;
- population growth slows as people become more prosperous;
- as agricultural productivity increases, economic prosperity improves for the entire economy;
- increased use of agricultural chemicals may improve productivity while harming the environment.

Government policies can influence the long-term supply-and-demand balance of food. However, the complexity of these interactions illustrates how difficult it can be to decide among various policy alternatives.

Table 2 shows a number of scenarios about possible growth in demand for food. Scenario building allows to investigate differences of opinion about how things will change. For example, scenario 2 in table 10.5 differs from scenario 1 only in the population growth number – scenario 1 assumes that population will grow about 40% between now and 2050 (similar to the UNs medium variant, or the US Census Bureau projection); scenario 2 assumes that population will grow only 15%. Because of the magnifying effects of growing demand per capita, this 25% difference in population growth translated into a 35% difference in total demand growth between scenario 1 and scenario 2.

Table 2
Scenarios for Growth in Food Demand to 2050
(percentage increase)

Scenario	Effect of Population Growth	Effect of Increasing Income	Effect of Dietary Diversification	Effect of Growth in Biofuels	Total Growth in Food Demand
1	40	20	10	10	95
2	15	20	10	5	57
3	15	40	15	10	95
4	60	10	5	10	95
5	40	20	10	15	100

Source: [11]

Scenario 3 has lower population growth, but higher growth in per capita income. Scenario 4 has higher population growth, but lower per capita income growth (1% annual growth). In these scenarios, the higher (or lower) growth in income is exactly offset by the lower (or higher) growth in population, so that in all of scenarios 1,3, and 4, total food demand grows by about 95 percent. In other words, demand would double between now and 2050.

Scenario 5 shows the potential impact of a policy-induced growth in ethanol demand (as translated per capita demand for food) of 15 percent. This would result from a continuation and intensification of the trends expected over the next decade. The impact is to increase total demand for food by an additional 5 percent.

Conclusions and proposals. Studies of national and foreign authors showed that food security is influenced by many factors, such as: population,

prosperity, pollution (or environmental quality), productivity in agriculture. Ambiguous position observed relative influence of biological energy sources on food safety. On the one hand, this is an incentive to improve performance of the agricultural sector, on the other – the removal of areas from growing crops for food and feed purposes and the danger of deterioration of the natural fertility of the land area.

Sustainable agricultural production targeting individual countries can not only contribute to ensuring food needs, but some energy while preserving the environment. However, the environmental factor is also considered ambiguous, because the allocation of land areas under energy crops involves increasing intensification, which in turn would increase the use of chemicals. However, other scientists argue, the use of biological fuels reduces greenhouse gas emissions. Special attention is paid to this issue in the EU, where on April 28, 2015, the European Parliament's Plenary approved the compromise agreement on the reform of the RED, which includes a 7 percent calculation cap on crop based biofuels, also known as conventional biofuels, in the EU's renewable energy target for its transport sector for 2020, and only included indirect land use change (ILUC) factors for reporting purposes. ILUC states that natural lands should not be cleared for expansion of biodiesel crops since the land use changes deplete carbon stocks and lead to additional GHG emissions. Another ILUC concern is that countries may expand their biofuel production into prime agricultural areas.

Thus, growing importance of biofuel sector raises questions about its possible consequences, especially at the point of view influences on food safety.

References:

1. Аграрні економісти закликають до зміни аграрної політики в світовому масштабі [Електронний ресурс] / Режим доступу до статті: <http://www.agribusiness.kiev.ua/uk/press/3395/>.
2. Бальманн А. Криза як шанс: чому найглибші кризи створюють інвестиційні можливості [Електронний ресурс] / Режим доступу до презентації: <http://agribusiness.kiev.ua/img/zstored/files/abalmann.pdf>
3. Власова О. Кіто наркомит планету / О. Власова, Л. Калянина и др. // Украинский деловой журнал «Эксперт». – 2008. – № 17. – С. 22–29.
4. Вікіпедія. [Електронний ресурс] / Режим доступу: <http://uk.wikipedia.org/wiki/>.
5. Гойчук О. І. Продовольча безпека. Монографія. – Житомир: Полісся, 2004. – 348 с.
6. Abbot P. Biofuel, Binding Constrains and Agricultural Commodity Volatility // NBER Working Paper, № 18873. – 2013. – 1–46 s.
7. Hamulczuk M. Polityka biopaliwowa a ceny surowcow rolnych – wybrane problem // Roczniki Naukowe Stowarzyszenia Ekonomistow Rolnictwa i Agrobiznesu, № 16, z. 2. – 2014. – 82–87 s.
8. Hamulczuk M., Klimkowski C. Response of the Polish Wheat Prices to the World's Crude Oil Prices // Acta Oecon. Infor., vol. 15, № 2. – 2012. – 50–56 s.
9. OECD FAO Agricultural Outlook 2015–2024 [Electronic source] / Access: <http://www.fao.org/3/a-i4738e.pdf>
10. The state of food and agriculture [Electronic source] / Access: <ftp://ftp.fao.org/docrep/fao/011/i0100e/i0100e.pdf>
11. The world food problem: toward ending undernutrition in the Third World / Howard D. Leathers, P. Foster. – 4th edition. – 2009. – 433 p.
12. Tyner W. The integration of energy and agricultural markets // Agric. Econ., vol. 41, issue supplement s1. – 2010. – 193–201 s.
13. Wright B. Global Biofuels: Key to the Puzzle of Grain Behavior // J. Econ. Persp., vol. 28, № 1, 2014. – 73–98 s.

Макарчук О.Г.

Національний університет біоресурсів та природокористування України

Скудларські Я., Купчик А., Желазинські Т.

Варшавський університет природничих наук (SGGW)

ВПЛИВ РОЗВИТКУ БІОПАЛЬНОГО НА ПРОДОВОЛЬЧУ БЕЗПЕКУ

Анотація

В статті досліджено сутність продовольчої безпеки та факторів, які зумовлюють зміну попиту і пропозиції на продовольство, зокрема: населення, добробут, навколишнє середовище та продуктивність сільського господарства. Проаналізовано міру впливу нарощування виробництва біопального на продовольчу безпеку за допомогою представлення оцінки сценаріїв відведення сільськогосподарських площ під вирощування енергетичних культур та сценаріїв можливого зростання попиту на продовольство в майбутньому. Розглянуто особливості різновекторного спрямування виробництва сільськогосподарської продукції.

Ключові слова: продовольча безпека, біопальне, сільське господарство, попит, пропозиція.

Макарчук О.Г.

Национальный университет биоресурсов и природопользования Украины

Скудларски Я., Купчик А., Желазински Т.

Варшавский университет естественных наук (SGGW)

ВЛИЯНИЕ РАЗВИТИЯ БИОТОПЛИВ НА ПРОДОВОЛЬСТВЕННУЮ БЕЗОПАСНОСТЬ

Аннотация

В статье исследована сущность продовольственной безопасности и факторов, которые обуславливают изменение спроса и предложения на продовольствие, в частности: население, благосостояние, окружающая среда и производительность сельского хозяйства. Проанализировано степень влияния наращивания производства биотоплива на продовольственную безопасность посредством представления оценки сценариев отвода сельскохозяйственных площадей под выращивание энергетических культур и сценариев возможного роста спроса на продовольствие в будущем. Рассмотрены особенности разновекторного направления производства сельскохозяйственной продукции.

Ключевые слова: продовольственная безопасность, биотопливо, сельское хозяйство, спрос, предложение.

УДК 658.8.013

ОСОБЕННОСТИ БРЕНДИНГА В ЭСТЕТИЧЕСКОЙ МЕДИЦИНЕ

Малухина Н.Ю.

Одесский национальный политехнический университет

Исследован брендинг в эстетической медицине, как современное направление товарной политики. Рассмотрено управление брендингом в эстетической медицине. При этом внимание сосредоточили на создании успешного бренда и его составляющих для достижения максимально прибыльного проекта.

Ключевые слова: бренд, брендинг, жизненный цикл бренда, эстетическая медицина.

Постановка проблемы. В результате активного расширения предложений в рамках украинского рынка, в условиях глобализации экономики, многие предприниматели начали задумываться над реформатированием бизнеса, повышением конкурентоспособности своего товара, услуги. Одним из направлений получения конкурентных преимуществ является брендинг. Сегодня, с помощью удачного позиционирования товара и его продвижения на рынке многие украинские производители достигли лидерских позиций. В качестве примеров можно назвать такие компании как Витмак, Чумак, Roshen, Nemiroff.

Анализ последних исследований и публикаций. Фундаментальные подходы к управлению

брендом были заложены в работах Д. Аакера, Д. Шульца, Б. Барнса, Ж.-Н. Капферера. Одно из последних исследований было проведено Урасовой А.Н., где был рассмотрен процесс взаимоотношения компании и покупателя посредством бренда [1]. Она продемонстрировала современную модель коммуникации бренда с клиентом, где, как следствие, подразумевается осуществление покупки и зарождение долгосрочных товарно-денежных отношений. Для достижения этого результата, необходим качественный брендинг или бренд-менеджмент.

Выделение нерешенных ранее частей общей проблемы. На мой взгляд, в современной экономической литературе недостаточно раз-