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Multifunctionality of Agriculture in the Reality of Globalization Crisis

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ABSTRACT
The article is devoted to the study of implementing the multifunctionality of agriculture in the context of the globalization crisis. In particular, it is the assessment of the indicators related to implementing the multifunctionality of agriculture concept in Ukraine, the mutual influence of the industry efficiency, and the efficiency of performing certain functions. The practical implementation of the multifunctionality of agriculture concept was proven. It has acquired conceptually new features under globalization, such as the diversification of functions and the integration into the global economic space. The expediency of distinguishing the globalization function of agriculture was substantiated. The function involves intensified integration of countries in the global economic processes due to the activation of international trade transactions with agricultural products, the participation in the implementation of global programs aimed at overcoming hunger and poverty. A close relationship between the economic efficiency of agriculture and the effectiveness related to the implementation of its functions, was established. The increased efficiency of the realization of economic and globalization functions of the industry was proven. It was substantiated that the activation of the social and ecological functions of agriculture requires consolidated efforts of business entities and state institutions.

Keywords: multifunctionality, globalization, crisis, agriculture, function of agriculture.

INTRODUCTION

Under the conditions of globalization, multifunctionality has become as a critical characteristic of agriculture. At the same time, Willson (Willson, 2007, p. 6) argued that the last 20 years or so had seen the use of this term in a wide variety of contexts, spanning a broad spectrum of proponents from policy-makers to rural stakeholder groups and from politicians to non-governmental organizations (NGOs). Durand & Huylenbroek (2003, p.16) suggested that multifunctionality has been introduced in recent years as a leading principle and new paradigm for the future development of agriculture and rural areas. Similarly, Andersen et al. (2013, p. 168) characterized multifunctional agriculture as a policy-led process describing the current agricultural trends, rather than as a concept explaining the agricultural change, and still primarily embedded in structuralist theory rather than informed by normative concepts.

Borodina (2006, p. 109) discussed multifunctionality of agriculture in terms of additional internal effects, which could be created in the process of economic activity, but had no market values. They could be positive, negative, and neutral. The positive ones were identified as public goods – food safety (Shorikov & Babenko, 2014), rural areas vitality, landscape, and environmental protection (Czyżewski et al., 2019). Therefore, from an economic point of view, the market mechanisms do not apply to multifunctional agriculture.

Many authors develop a wide variety of approaches to specific scientific backgrounds and

epistemologies of agriculture multifunctionality (Caron et al., 2008; Renting et al., 2008; McGranahan, 2014; Jordan & Warner, 2010). In most of them, this term is generally categorized, noting that rural communities and agriculture can serve the functions beyond food and fiber production. As seen in previous and other (Chang & Ying, 2005; Hall et al., 2004; Popova, 2015; Moon, 2011) studies, they all are integrated by an association of multifunctionality of agriculture with three functions: *the economic function; the social function; the environmental function.* Concerning these functions (Huylenbroek, G. van et al., 2007) underlined their clear interrelations. Their relative importance will depend on strategic choices at the local and national levels. The multiple functions may, as already indicated, be relevant at many scales, from local, through national and regional, to global, and operate over different horizons (Olshanska, 2011). Indeed, some innovations and transformations may have short-term disadvantages, such as lower productivity, before leading to longer-term, overall economic, and environmental benefits (Mettepenningen & Verspecht, 2008). It also explains the difficulty of finding the empirical evidence.

According to Blandford and Boisvert (2002, p. 110-112), the definition of multifunctional agriculture covers two distinctive types: technical externalities and/or public goods (*includes wildlife habitat, recreational benefits, farm landscapes amenities*), and pecuniary externalities (*involves food security, food safety, and quality, animal welfare, and rural development*). At the same time, multifunctionality of agriculture is not a uniform concept. Delgado *et al.* (2003, p. 28) emphasized that "the concept of multifunctionality is still being formed. Even the different countries supporting it do not interpret it the same way". This concept is examined differently by various researchers and policy-makers. Distinguishing between the five approaches can help identify the opportunities and limitations of various studies. These five approaches are *market and economically focused; rural land-use; ecological; public regulation and policy; actor-oriented* (Korzun, 2015, pp. 116-118). Paarlberg Ph., Bredahl M., Lee J. (2003) believe that differing views of multifunctionality – attributing the non-market benefits to agricultural production – continue to be an obstacle in World Trade Organization (WTO) negotiations. Some nations see multifunctionality as justifying subsidies to agricultural production; others consider it as disguised protection.

A broad acceptance of multifunctionality transforms into a new paradigm, enriched by the role of agriculture in the achievement of international trade and global development goals. In a trade policy and globalization contexts, the potential to develop unpriced transaction mechanisms for valuing products of multifunctional landscapes (Dibden, 2009), influencing the trade regimes (Vatn, 2002), needs to be recognized. Despite such importance in designing effective trade rules, the transnational differences in the conceptualization of multifunctional agriculture have not received adequate consideration either from trade negotiators or from academic communities (Moon, 2015, p. 257). Thus, the concept of multifunctional agriculture represents a pivotal juncture in coping with the agricultural policy/trade issues.

Several existing academic papers on agricultural multifunctionality are mainly focused on the theoretical issues, attempting to define and re-define the concept by identifying and analyzing specific related issues as a joint production of agricultural outputs, market failures, options for ensuring the provision of non-commodities outputs from multifunctional agriculture or the policy implications of this concept, but without paying much attention to the provision of meaningful quantitative results (Paarlberg et al., 2003; Bulysheva, 2015).

We propose an alternative approach: instead of assessing the environmental or social functions from the production activities, we assume that agriculture also provides globalization function. Thus, the aims of this article are developing a conceptual model of multifunctional agriculture, realizing economic, ecological, social, and globalization functions, from a global perspective and its quantitive formalization.

METHODOLOGY

The research was based on the deduction and induction methods. Their application made it possible to disaggregate the functions of agriculture (in economic, social, ecological, and globalization function) and to identify their influence on the efficiency of industry. The scientific hypothesis of the study is the assumption that under globalization, apart from economic, social, and ecological functions, agriculture fulfills the globalization function. The globalization function intensifies

the integration of countries into the global economic processes due to the activation of the international trade transactions with agricultural products, the strategic planning of ways to overcome problems of food security, and the integration of international efforts in the field of struggle against hunger and poverty of the rural population. Since the basis of sustainable development of agriculture and rural areas is the complete fulfillment of all functions, the scientific research aimed to assess the parameters of the implementation of the concept of multifunctional character of agriculture and evaluate how well agriculture fulfills the globalization function.

With this regard, an analysis related to the mutual influence of the industry's efficiency and the effectiveness of its economic, social, ecological, and globalization functions for the period between 2010 and 2016 was carried out in the context of Ukraine. The official data of the State Statistics Committee of Ukraine served as the information basis of the research. It comprised the data regarding rural areas (*education, employment, an income of the rural population, consumption of products*), and individual indicators of agricultural enterprises (43359 enterprises operating in 24 administrative regions of Ukraine).

In order to carry out a comprehensive assessment of the results related to the practical implementation of multifunctionality of agriculture, using Ukraine as an example, the methods of indicator multiplication and correlation-regression analysis were employed. The method of indicator multiplication was applied to assess the influence of an increase in the economic performance of industry on how effectively the functions of agriculture are fulfilled. The value of output produced in agriculture (in constant prices for 2010, UAH million) was used to indicate the economic performance (Y).

A correlation-regression analysis was used to determine the mutual influence of the effectiveness of fulfilling certain functions of agriculture and the multiplication effect related to the multifunctionality of industry. In order to achieve the purpose, a set of criteria for the effectiveness of fulfillment, certain functions by agriculture was systematized, and their indicators were singled out (Table 1).

Realization of agriculture functions

Agriculture is a priority branch of the economy, taking into account its role in providing food security and ensuring the socioeconomic development of rural areas. In Ukraine, agriculture is not merely a branch for economic activity. It is a way of life of the population (the share of rural areas is 87%, whereas the share of rural population amounts to 30.1%). Awareness of its national importance, on the one hand, and global trends in the development of agricultural markets and state regulatory actions, on the other hand, facilitate the process of practical implementation of the multifunctionality of agriculture concept.

Several factors determine the multifunctionality of agriculture development: the importance of the branch in the formation of incomes, quality of the living environment of rural population; the branch is a kind of an "inhibiting agent" for the deterioration of the ecological and social environment in rural areas; objective capability and needs of the society for the creation of not only specifically economic (maintenance of food security, forming the sources of income), but also public goods (preservation and rehabilitation of natural environment and biodiversity, development of social infrastructure, ensuring employment, access to public services); the necessity to create the protection mechanisms against the globalization of economy. World agricultural markets are monopolized by highly developed countries (the USA and EU countries are the leaders), which have extraordinary investment abilities to implement innovative technologies and introduce cheap products.

Economic function

Agriculture is one of the primary and determinant sectors of the economy. Therefore, its primary function is creating economic goods by ensuring food provisioning, raising the economic potential and investment attractiveness of agricultural production and rural areas. Ukraine has one of the most potent agricultural sectors globally, enabling the country to keep the leading positions in the world markets for grain, sunflower oil, sugar, honey, and other agricultural products. The agricultural potential of the country allows for maintaining a 100% level of self-provisioning with most food products. Being oriented at the increase of global demand for food, Ukraine continues increasing the production volumes of agricultural products.

The potential of agriculture is reflected in its diversification, particularly the development

Table 1. Criteria and indicators of the effectiveness of the fulfillment of functions by agriculture

The criterion of function fulfillment	Indicator
Economic function	
Supporting food security	Level of provision with certain types of food products
Developing recreation potential of rural areas	Dynamics in the number of agritouristic farm stays
Increasing investment attractiveness of rural areas	Value of attracted capital investments in the industry
Social function	
Ensuring employment of the rural population	The number of people officially employed in agriculture
Forming sources of income for the rural population	Average total resources per month per one household
	Average total expenses per month per one household
Developing human capital of rural areas	Level of secondary and higher education of the rural population
	Personnel expenses of agricultural enterprises
Developing social infrastructure	Reach the level of social infrastructure objects in villages
Forming conditions for a sufficient level of quality of life in rural areas and its maintenance	Rural population quantity
Increasing social attractiveness of rural areas	
Ecological function	
Sustainable use of resources (land)	Level of land ploughings
	Share of high-value crops in the total acres
The intensity of pollution of the natural environment	Waste from economic activities
Active investment of capital in environmental protection actions	Capital investment in the protection of the natural environment
	Operational expenses on the protection of the natural environment
Globalization function	
Assignment of specialization and increasing competitive ability in the world market for agricultural products	Value of export of agricultural products
	Country's share in the world agricultural market
Import dependence	Value of import of agricultural products
	Value of import of agricultural machinery in Ukraine
International investment attractiveness of the industry	Direct foreign investments in the industry
Active interstate migration processes involving rural population	The number of interstate emigrants from rural areas
	The number of interstate immigrants to rural areas

of its recreational component. On average, up to 100 agritouristic farm stays are created in Ukraine each year. In general, according to the Union for Promotion of Rural Tourism, there are about 1600 farm stays providing such services. Most of them – more than 1000 farm stays – are located in the western regions of the country. The increasing economic potential of the agricultural sector had a positive impact on its investment attractiveness, which is evidenced by the increase in the volumes of the capital attracted to the industry (Fig. 1).

Social function

Despite the economic nature of agriculture, the strategic goal of its functioning is to form the conditions for essential services for the rural population. The criterion of its general designation or effectiveness of the social function is to preserve and increase the human potential of rural areas. In order to achieve that, it is necessary to create the employment opportunities for rural inhabitants and form their income sources, as well as to develop their human capital. The research results allow drawing the conclusion about the dual character of the social results of agriculture functioning, the manifestation of quantitative negative and qualitative positive changes. Thus, at the initial stage of agricultural transformations, the funding programs related to the rural development amounted to approximately UAH 500 million. Between 2004 and 2008, the funding increased and reached, on overage, UAH 2.8 billion per year. However, in the years that followed, it was reduced considerably (Borodina, 2012). The low quality of life and the social unattractiveness of rural areas lead to a further decrease in population size. Adverse changes in the size of the rural population and the number of people employed in the sector are of global character and have objective causes. In particular, the reduction in the number of people officially employed in agriculture is an objective consequence of industrialization and increased investment in the technological development of industry (Table 2).

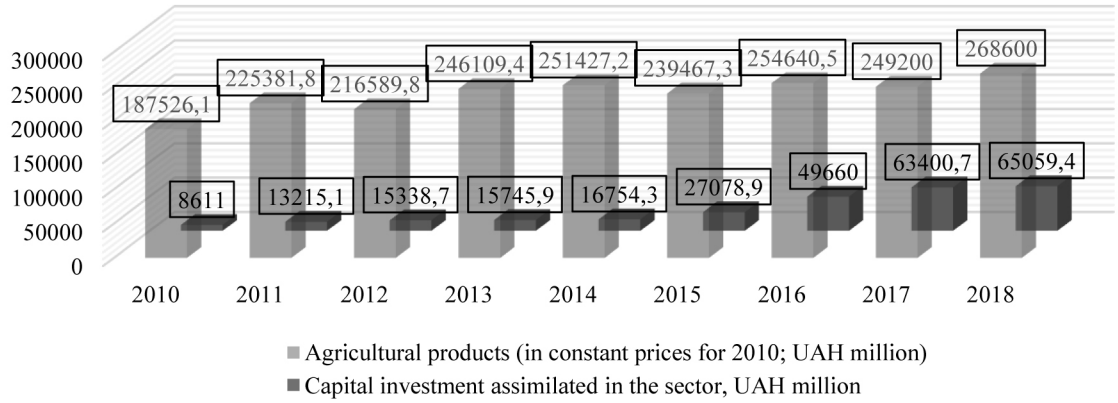

Figure 1. The economic potential of agriculture in Ukraine [The State Service of Statistic of Ukraine]

Table 2. Effectiveness of fulfillment of social function by agriculture [The State Service of Statistic of Ukraine]

Indicator	Year					2018 over 2010 ratio, +/-	Multiplication coefficient of gross agricultural output by the level of indicator, 2018 over 2010
	2010	2012	2014	2016	2018		
The number of the rural population, thousand people	14438.1	14252.7	14089.6	13175.5	13015.4	-1422.7	-0.0175
The number of officially employed (in agriculture, forestry, fishery), thousand people	3115.6	3506.7	3091.4	2866.5	2937.6	-178.0	-0.0022
Average total resources per month per one household, UAH	3481.0	4144.5	4563.3	6238.8	9904.1	6423.1	0.0792
Average total expenses per month per one household, UAH	3073.3	3592.1	4048.9	5720.4	8308.6	5235.3	0.0646
Level of secondary and higher education of the rural population, %	83.9	88.7	95.4	96.0	96.1	12.2	0.0002
Personnel expenses of agricultural enterprises, UAH million	14352.9	22300.6	23558.3	32994.3	55058.8	40705.9	0.5021

Ecological function

Under the conditions of the aggravation of global problems, the strategic imperative of the functioning of agricultural production is the provision of sustainable and inclusive development, which involves balancing of the economic, social, and environmental benefits, that is, achieving economic efficiency, social equality, and justice, and environmental equilibrium (Kwilinski, 2019). Increasing the assimilation potential of the natural environment requires compliance with the scientifically grounded norms of safe economic activity, in particular waste management and sustainable use of natural resources.

The analysis of the individual indicators related to the activity of agricultural producers shows their complete ecological irresponsibility, which leads to an annual increase in the intensity of soil use and much waste in the natural environment. The reduction in the expenditures of enterprises on environmental protection is also negative (Table 3).

Globalization function

For Ukraine, the agricultural sector is an industry that maintains the internal economic security and determines the level of international competitive ability. During the last decade, Ukraine has held a leading position in the world market for agricultural products, in particular, the 1st place in the export of sunflower oil (4.3 million tons), third place in corn (18 million tons), 4th in barley (2.7 million tons), 6th in wheat (11 million tons), 7th in soybeans (2 million tons), and 8th in poultry (170 thousand tons). Simultaneously, the international trade in agricultural products between 2010 and 2018 had a positive balance and development trends – exports increased by 1.5 times, whereas imports – by 13.8% (see Table 4).

However, the factors reducing the investment attractiveness of agricultural production are mainly macroeconomic (instability of the economic and political system, military conflict in the east, bureaucratization, and corruption). An

Table 3. Effectiveness of the ecological function fulfillment by agriculture [The State Service of Statistic of Ukraine]

Indicator	Year					2018 over 2010 ratio, +/-
	2010	2012	2014	2016	2018	
Level of land plowing, %	78.0	78.2	78.3	78.4	78.4	0.4
Waste from economic activities, thousand tons	8353.7	10199.6	8451.4	8715.5	5968.1	-2385.6
Capital investment in the protection of the natural environment, UAH million	49.3	48.4	23.0	41.9	5,9	-43,4
Operational expenses on the protection of the natural environment, UAH million	46.8	151.7	149.1	76.5	70,1	23,3
Share of high-value crops in the total acres, %	34.4	42.7	46.4	46.9	48.1	13.7

Table 4. Effectiveness of fulfillment of globalization function by agriculture [The State Service Of Statistic of Ukraine]

Indicator	Year					2018 over 2010, %
	2010	2012	2014	2016	2018	
Value of export of agricultural products, USD million	9936.1	17880.6	16669.0	15280.8	18611.8	153.8
Value of import of agricultural products, USD million	28261.9	7519.7	6059.3	3891.1	5055,5	13.8
Direct foreign investments in agriculture (forestry), USD million	669.2	725.3	776.9	502.2	578.6	-90.6
The number of interstate migrants from rural areas, people	2739	2167	2370	1261	3609	870,0
The number of interstate immigrants to rural areas, people	7637	8413	6493	2385	4903	-2734,0
Value of import of agricultural machinery in Ukraine, USD million	687.0	930.0	688.1	652.3	756.0	69.0

essential criterion for the effectiveness of agricultural globalization function involves the interstate migration processes in rural areas. According to this indicator, there is a positive trend for a significant decrease in external migration intensity.

MULTIFUNCTIONAL AGRICULTURE

Multifunctionality is a strategic vector and a means of agricultural development. Only effective fulfillment of all functions is the basis for achieving a synergistic multiplication effect in rural areas (Babenko, 2013). In order to carry out a comprehensive assessment of the results related to the practical implementation of multifunctionality of agriculture in Ukraine, the analysis of mutual influence (correlation) of how effectively certain functions are fulfilled (economic, social, ecological, and globalization-related) by the set of individual indicators was carried out (see Table 1). The indicator of the multiplication effect of multifunctionality (Y) was used to define the value of produced output in agriculture as a quantitative reflection of the results of the sector operation and the basis for raising the welfare of the rural population and the development of rural areas.

When developing a correlation-regression model, the output factors (indicators) were eliminated; their relationship strength is relatively low. On this basis, the most significant functional factors were singled out, namely:

- x_1 – the value of the capital investment, UAH million;
- x_2 – the value of export of agricultural products, USD million;
- x_3 – the value of import of agricultural products, USD million;
- x_4 – level of employment of the rural population, %;
- x_5 – level of secondary and higher education of the rural population, %;
- x_6 – personnel expenses, UAH million.

On the basis of the necessary calculations, the estimated values and mean square deviations of matching correlation coefficients were determined (Table 5).

Table 5. Results of the correlation-regression analysis of the mutual influence of the effectiveness of the fulfillment of agricultural functions in Ukraine

Indicator	y	x_1	x_2	x_3	x_4	x5	x6
Matching correlation coefficients (r_{yxi})		0.6429	0.6562	-0.8454	-0.6423	0.8824	0.8018
Mean square deviations (σ_i)	23814.8	11999.7	2763.3	8621.8	3.0	4.9	6187.9
Mean values	231591.7	20141.5	14879.7	9106.7	65.1	91.0	23269.6

All identified factors have a high degree of impact on the performance feature, since the matching correlation coefficients for them are within the range of 0.6–0.9. In order to determine the effect of the change in each of the factors on its unit of measurement with the fixed values of other factors included in the equation of the multi-factor correlation-regression model, its parameters were calculated, and the multi-factor correlation-regression dependence equation was constructed:

$$y = -1208585.6 + 4.1162x_1 + \\ + 0.5386x_2 - 1.7024x_3 + 7745.03x_4 + \\ + 12633.5216x_5 + 12.4391x_6 \quad (1)$$

It shows that, with the fixed values of other factors, the growth of capital investment in the industry by UAH 1 million will lead to an increase in production by UAH 4.1162 million as well as an increase in the value of export of agricultural products by UAH 1 million – by UAH 0.5386 million. It is explained by the productive investment of foreign exchange earnings from exports in the development of production. At the same time, there is an inverse relationship between the industrial productivity and the value of imports since the expansion of national production allows for meeting their own needs for food and raw materials and reduces the import flows.

The correlation-regression analysis results show that the human capital is a critical factor in commercial success in all areas of entrepreneurship. Investments in its development have the highest level of return. The generalization of the obtained results suggests that the economic, social, and globalization functions of agricultural producers are closely correlated. However, this does not indicate the expediency of ignoring the ecological component comprised in the activity of enterprise, since conducting an economic activity without observance of environmental norms can only be useful in the short term. That is, investing all types of capital should be multidirectional. This will promote the development of multifunctional agriculture and obtainment of a complementary, synergistic effect. Considering the above-metnioned research results, the functional profile of the agricultural sector is as follows (Table 6).

A detailed analysis of the multifunctionality of agriculture in Ukraine provides the grounds for arguing that the industry effectively fulfills its economic and globalizational functions. The activation of the social function of the agricultural business entities requires an increase in their social responsibility towards improving the working and living conditions of the rural population (Dzwigol et al., 2020; Boiko et al., 2019). The ecological function of agriculture is the most problematic to fulfill. It is due to the irresponsibility of agricultural producers and the incompleteness of the formation of an institutional environment for environmentally responsible agribusiness. Its solution requires the use of a comprehensive mechanism of economic levers for the stimulation of environmentally safe activities and social and psychological tools for influencing the consciousness and mentality of rural entrepreneurs.

Taking into account the objective commercially-oriented nature of the agricultural activity (Prokopenko et al., 2014; Mura & Ključnikov, 2018), it is crucial to use the economic levers to ensure control and stimulation for agricultural business entities to use natural resources, in particular, land resources rationally, produce environmentally friendly and organic products, introduce advanced technologies of non-waste production or utilization of waste, as well as to modernize technological processes in order to reduce their resource and energy consumption.

CONCLUSION

In the context of the intensification of world globalization processes and the activation of agricultural production participation in leveling out the externalities of globalization crises, there is a conceptual rethinking of multifunctionality of agriculture. Along with the classical functions

Table 6. Functional profile of agriculture

Criteria of function fulfillment	Tendencies of functional activity			
	E_{con}. F	SF	E_{col}. F	GF
Supporting food security				
Providing the processing industry with raw materials				
Developing recreation potential of rural areas				
Increasing investment attractiveness of rural areas				
Ensuring employment of the rural population				
Forming sources of income for the rural population				
Developing human capital of rural areas				
Forming conditions for a sufficient level of quality of life in rural areas and its maintenance				
Developing social infrastructure				
Influence of the social attractiveness of rural areas				
Sustainable use of resources (land)				
The intensity of pollution of the natural environment				
Active investment of capital in environmental protection actions				
Assignment of specialization and increasing competitive ability in the world market for agricultural products				
Import dependence				
International investment attractiveness of the industry				
Active interstate migration processes involving rural population				

Note: Econ. F – economic function, SF – social function, Ecol. F – ecological function, GF – globalizational function.

(economic, social, ecological), it is expedient to distinguish globalization. Fulfillment of this function is manifested in the intensification of the country's integration into international trade, investment, and migration processes.

The correlation between the functions of agriculture was proven. The results of the comprehensive assessment of the results of practical implementation of the concept of multifunctionality of agriculture in Ukraine give grounds to argue that achieving sustainable development of the industry in the national context is a declarative mission due to the inadequate level of social development in rural areas and increasing environmental threats. The prerogative of the development of the Ukraine industry is to ensure the economic effect (fulfillment of the economic and globalization functions). The crisis and depression periods in the Ukrainian economy development helped the agricultural entrepreneurs form a 'strong instinct' to survive and develop, which determined their purely commercial business orientation. Therefore, on the part of the state, it is necessary to activate the mechanisms for stimulating environmentally safe and socially responsible activities, introducing co-investing in the social and environmental projects in rural areas.

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