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ECONOMIC AND ENVIRONMENTAL PROBLEMS OF FOOD INDUSTRY ENTERPRISES

Abstract. Production in the food industry is demanding as there is lot of waste and different technological level of environmental security. So, it's a source of negative impact on the environment. *The aim* of the research is studying of proposals to improve the economic and environmental management in the food industry. In the study were used general scientific methods: statistical and economic (comparative analysis of environmental charges, environmental taxes and penalties for violations of environmental laws, the volume of capital investments for environmental protection and emissions of pollutants into the environment of the food business in Vinnytsia region for the period 2009-2012), systemic and abstract logical analysis (theoretical generalizations and drawing conclusions).

The results of the study indicate that for the period 2009-2012, businesses environmental payments remain stable, and the volume of capital investments for environmental protection was gradually increased. Average food business in Vinnytsia region cares about the environment condition by reducing the emissions into the environment. The authors have proposed measures to improve the economic and environmental management of the food business to meet the requirements of the international standards ISO 14000, namely: responsibility for the ecology of the company, implementation of ecological modernization of fixed assets, resource conservation, promotion of environmentally friendly technologies, high professional skills of staff in environmental culture.

Keywords: environmental payments contaminants; capital investment; environment; ecology; waste production.

JEL Classification: O13, Q32, M11, L66

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ЕКОНОМІКО-ЕКОЛОГІЧНІ ПРОБЛЕМИ ПІДПРИЄМСТВ ХАРЧОВОЇ ГАЛУЗІ

Анотація. У статті досліджуються економіко-екологічні проблеми підприємств харчової промисловості на прикладі виробників Вінницької області. Здійснено порівняльний аналіз екологічних платежів, які пред'явлені до сплати та фактично сплачені підприємствами регіону, обсягів капітальних інвестицій і поточних витрат на охорону навколишнього середовища, обсягів викидів забруднюючих речовин у навколишнє середовище підприємствами харчової галузі Вінниччини. Запропоновано заходи щодо вдосконалення економіко-екологічного управління підприємствами харчової галузі з урахуванням вимог міжнародних стандартів ISO серії 14000: відповідальність за екологічний стан на підприємстві; здійснення екологічної модернізації основних фондів, ресурсозбереження; сприяння поширенню екологічно безпечних технологій; високий професіоналізм персоналу з питань екологічної культури.

Ключові слова: екологічні платежі, забруднюючі речовини, капітальні інвестиції, навколишнє середовище, відходи виробництва.

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ЭКОНОМИКО-ЭКОЛОГИЧЕСКИЕ ПРОБЛЕМЫ ПРЕДПРИЯТИЙ ПИЩЕВОЙ ПРОМЫШЛЕННОСТИ

Аннотация. В статье исследуются экономико-экологические проблемы предприятий пищевой промышленности на примере производителей Винницкой области. Осуществлен сравнительный анализ экологических платежей, которые предъявлены к уплате и фактически уплачены предприятиями региона, объемов капитальных инвестиций и текущих затрат на охрану окружающей среды, объемов выбросов загрязняющих веществ в окружающую среду предприятиями пищевой отрасли Винницкой области. Предложенные меры по улучшению экономико-экологического управления предприятиями пищевой отрасли с учетом требований международных стандартов ISO серии 14000: ответственность за экологическое состояние на предприятии, осуществление экологической модернизации основных фондов, ресурсосбережение, содействие распространению экологически безопасных технологий, высокий профессионализм персонала по вопросам экологической культуры.

Ключевые слова: экологические платежи, загрязняющие вещества, капитальные инвестиции, окружающая среда, отходы производства.

Introduction. The modern type of economic development of the food industry is defined as man-made. This is destructive type of development, because emissions of large quantities of food production include dust, greenhouse gases and other substances that adversely affect the environment, causing air pol-

lution, water management and soil losses. Most production and technological processes and finished product manufacturing highly are resource-intensive and involve formation of a large amount of waste, because of economic and environmental problems are among the most important concerns of our time.

Brief Literature Review. Issues of economic and environmental management at enterprises in the current economic conditions, including the food industry, such foreign researchers investigated: Deryahyna S. E. (2007) [1], Astafiyeva M. N. (2007) [1], Strukova M. N. (2007) [1], Strukova L. V. (2007) [1], as well as the native scientists: Dragan O. I. (2006) [2], Zapolskyi A. K. (2005) [3], Krestinkov I. S. (2013) [4], Lebedevych S. I. (2008) [5], Levandovski L. V. (2006) [6], Maksymiv L. I. (2008) [7], Mischenin E. V. (1998) [8].

However, given the urgency of the economic and environmental challenges for today's business, there is a need for a deeper study of this issue for the food industry, taking into account the specific features of the product.

Purpose: to offer the recommendations to improve the economic and environmental management in the food industry of Vinnytsia region to decide the environmental problems.

Results. The accelerated development of industrial production and the lack of ecological culture of environmental responsibility formation lead to increased level of environmental hazards. Industrial production is a major source of pollution, as environmental business activity should be an integral part of the environmental policy implementation.

The technological processes of various industries are always associated with the usage of natural resources and produce emissions of harmful substances into the environment. At the present stage of industrial development direction, economic problems play a special role, because human impacts on the environment have recently increased leading to increase in energy intensity and resource-intensive products, emissions and waste.

The main environmental problems of food production are the issue of water resources. All the enterprises need a large amount of water used directly in production technology staple brewing, alcohol, sugar, meat processing industry, equipment for washing and other purposes. Most of this water as contaminated waste water is withdrawn from the process and enters the environment. The average amount of wastewater in food industry of Ukraine is: 1 ton of baked goods – 2.9 m³; 1 t. in beet sugar production – 1.7 m³; 1000 dal of beer – 76 m³; pressed to 1t. baking yeast – 170 m³; at 1000 dal of alcohol – 1300 m³; 1 ton of meat – 22 m³ [6].

For example, meat processing plant, located in urban area, according to the annual report from the list of pollutants that are released into the air, shows the following data (Table 1). Thus, economic and environmental management in modern enterprises should play an important role and should be part of the production activities of any company which mission is to be rational with economic natural resources.

In Vinnytsia region in recent years an increase in production of industrial products,

including food, has been evidenced. The region has more than 300 industrial enterprises; the volume of production in the food industry was 53.3% of all sales in 2012 (Figure 1) [9, p. 13].

Analyzing the data in Table 2, we can see that the magnitude of environmental charges, environmental taxes and penalties for violations of environmental laws and paying the charges against the food business in Vinnytsia region remains relatively stable.

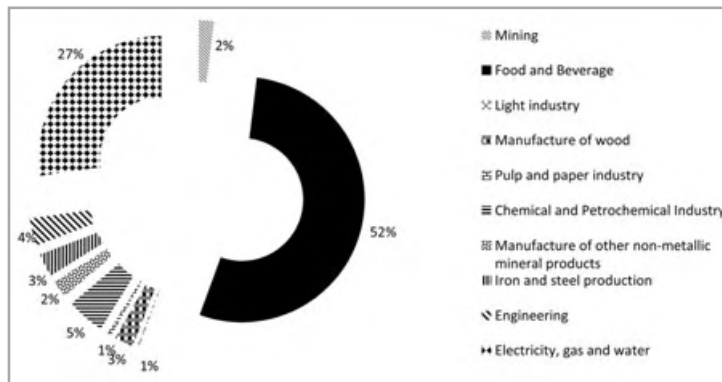


Fig. 1: The volume of sales for the major types of industrial activity in Vinnytsia region, 2012

Source: [9]

Thus, in 2012 compared to 2009, the value brought by environmental charges payable is 99.06% (a decrease of 7.9 thousand UAH), and the value paid environmental charges decreased to 90.39% (a decrease of 71.9 thousand UAH). We can note that in 2012 the amount by which the reduced amount paid to environmental charges brought against amounts to 18.27% in 2011, difference was 27.42%, in 2010 – 9.63%, in 2009 – 10.63% (Figure 2), by analyzing the ratio of paid to environmental charges brought against businesses.

Preservation and restoration of the environment contribute to environmental costs. Environmental costs are divided into current and capital expenditure on all kinds of expenses. Capital investments include one-time costs of creating, updating, replacement of protected plant and equipment and improve production technology, which will reduce the negative impact on the environment and on measures to reduce the negative impact on the environment.

Current costs on environmental protection include costs for services related to the protection of the environment and main-

Tab. 1: The list of pollutants released into the atmosphere for each 5 tons of sausages production (industry average)

No	Contaminants	Emissions, t/year
1	Nitrogen dioxide	0.0196
2	Ammonia	0.0313
3	Hydrochloric acid	0.00005
4	Sulphuric acid	0.001
5	Black	0.073
6	Sulphur dioxide	0.0555
7	Carbon Dioxide	1.5001
8	Dyftorhlormetan	0.050
9	Phenol	0.059
10	Propionic aldehyde	0.0436

Source: [2, p. 279]

Tab. 2: Environmental fees, taxes and penalties for violations of laws in the food business of Vinnytsia region

Year	Environmental charges and environmental tax (since 2011)		Rejection: Paid / Asked for payment	
	Presented for payment, thousand UAH	Paid, thousand UAH	Absolute, + ; -	Relative, %
2009	834,5	747,5	-87,0	-10,43
2010	965,8	872,8	-93,0	-9,63
%				
2010/2009	115,74	116,77	x	x
2011	829,7	602,2	-227,5	-27,42
%				
2011/2009	99,43	80,57	x	x
%				
2011/2010	85,91	69,0	x	x
2012	826,6	675,6	-151,0	-18,27
%				
2012/2009	99,06	90,39	x	x
%				
2012/2010	85,59	77,41	x	x
%				
2012/2011	99,63	112,19	x	x

Note. Exchange Rates of the National Bank of Ukraine: \$1=7,9898 UAH (01.06.2012); \$1=11,775 UAH (01.06.2014).
Source: Compiled by the authors using [10]

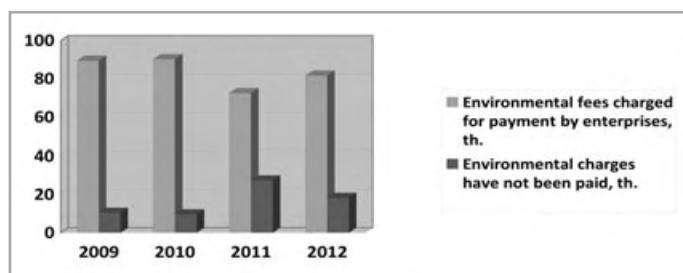


Fig. 2: The value of unpaid environmental charges by the food business of Vinnytsia region during 2009-2012

Source: [9]

tenance costs of environmental operating costs for control over the environmental impact. Table 3 shows the capital investment and operating costs of enterprises in Vinnytsia region on environmental protection for 2009-2012.

Tab. 3: The capital investment and operating costs of Vinnytsia region enterprises on environmental protection in 2009-2012

Year	Name field	Capital investment for all types of costs		Current expenditure thousand		Capital investment for all types of costs/ operating costs, %
		th. UAH	%	th. UAH	%	
2009	Total Regional	29229.7	100	66985.2	100	43.6
	Food, beverages and tobacco products	1097.2	3.76	2647.57	3.96	41.45
2010	Total Regional	36986.5	100	75493.7	100	49.0
	Food, beverages and tobacco products	2868.2	7.76	3566.3	4.73	80.43
2011	Total Regional	62021.6	100	101490.9	100	61.11
	Food, beverages and tobacco products	3421.1	5.52	6883.1	6.9	49.71
2012	Total Regional	31267.4	100	77374.6	100	40.41
	Food, beverages and tobacco products	2708.4	8.67	4999.2	6.47	54.18

Source: Compiled by the authors using [9]

The value of the capital investment costs for all types of businesses of Vinnytsia region is not stable, because in 2012 it amounted to 31267.4 thousand UAH, which was 2037.7 thousand UAH up, more than in 2009 (+6.97%). Comparing of 2012 and 2010, we noted that there was a decrease of 5719.1 thousand UAH (15.46%); comparing 2012 and 2011 all kinds of capital investment in Vinnytsia region, we noticed a decrease by 30754.2 thousand UAH (49.58%). These values indicate a negative trend to reduce capital investment by all companies of Vinnytsia region.

Analyzing capital investment costs for all types of food business in Vinnytsia region, it is evident that this value tends to increase, because in 2012 it amounted to 2708.4 thousand UAH, 1611.2 thousand UAH up, more than in 2009. This suggests that the management of the food industry in the region has one-time costs of creating, updating, replacement of protected plant and equipment and improve production technology that will reduce the negative impact on the environment.

The main source of air pollution in Vinnytsia is industrial enterprises. Quantitative and qualitative composition of the emissions depends on the type of production process, production capacity, the availability of tools to clean emis-

sions, their performance, and lifetime. Almost all of the food industry in Vinnytsia region made emissions of gases, dust, and steam, salt and excess heat that pollute the air condition quality. As a result of the production activity of the food industry in Vinnytsia region, the following substances enter the air: dioxins emissions, nitrous oxide, dioxin nitrogen, carbon monoxide, nitrogen compounds, dust, abrasive metal, methane and more. Emissions of pollutants into the atmosphere in Vinnytsia region are shown in Table 4.

Based at analyzed data, we can conclude that emissions of enterprises of all economic activity during the mentioned period remained relatively stable. Thus, in 2012 compared to 2009 the emissions by enterprises of all economic activity fell by 13032 tons. The lowest emissions by companies in 2011 were 87337.41 tons, the figure also decreased due to the smaller number of firms emissions. In 2009-2012 the number of enterprises that had emissions reduced by 20 units (Figure 3).

Analyzing the emissions, attributable to an average company in Vinnytsia region, it should be noted that this value tends to decrease. Thus, in 2012, the emissions attributable to one company were 288.63 tons, while in 2009 – 308.19 tons, which shows reduction amounted to 19.56 tons during the period. This suggests that the average enterprise in Vinnytsia region takes care of the environment by reducing emissions. Analyzing the emissions by food industry in Vinnytsia region should be noted that emissions for the period tended to increase, though the number of food businesses for the period decreased by 20 units (Figure 4).

Annual emissions increase attributable to one company, in particular in 2009, was 34.77 tons, in 2012 – 53.3 tons. Comparing

2012 and 2011, the increase was 0.63 tons in 2012 compared to 2011, and 12.98 tons compared to 2010.

The situation, which prevailing in the food industry, indicates that the management needs to improve production technology, implement usage in the resource processes a variety of innovative technologies to implement rapid waste minimization, and adhere to the principles of environmental management at the enterprises.

Improving environmental development of the companies in Vinnytsia region, in our view, should include saving resources used in production, reduction of waste, air emissions and waste water pouring into the soil. It is possible by introduction of the

Tab. 4: Emissions of pollutants into the environment in Vinnytsia region for the period of 2009-2012

Economic activity	2009		2010		2011		2012	
	The volume of emissions	% of total	The volume of emissions	% of total	The volume of emissions	% of total	The volume of emissions	% of total
All economic activities	114341.2	100	103048.8	100	87337.4	100	101309.2	100
Manufacture of food products, beverages and tobacco products	2956.1	2.6	3185.4	3.1	3898.1	4.5	3464.59	3.4

Source: Compiled by the authors using [10]

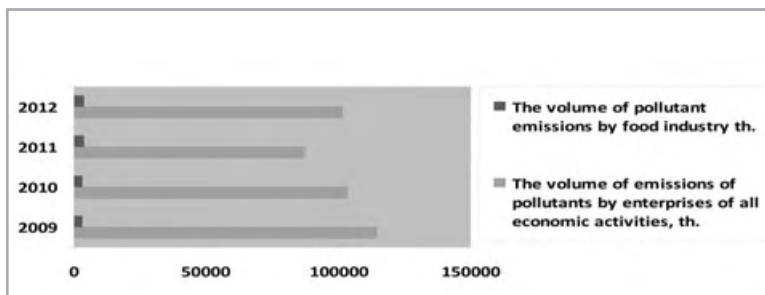


Fig. 3: The volume of emissions of pollutants into the air companies of Vinnytsia region, including the food industry, for the period 2009-2012
Source: [10]

low-waste technology, creation of cleaner production, production of environmentally friendly products, innovative energy-saving technologies and introduction of environmental management standards that will enable to reduce annual emissions. Also, to reduce the negative impact of the food industry, it is necessary to carry out environmental protection measures, including the implementation of measures for disposal and decontamination emissions that cause a negative impact on the environment.

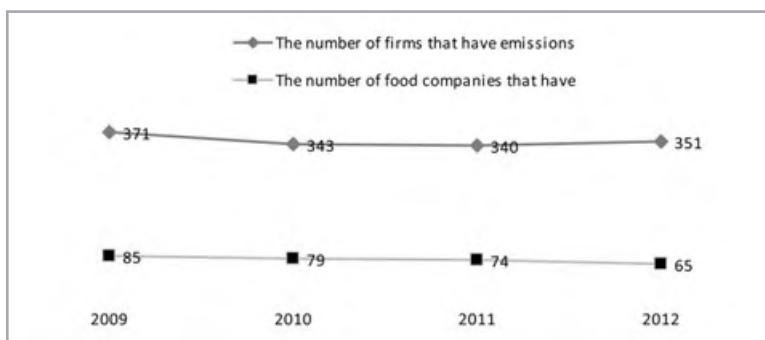


Fig. 4: Number of companies in Vinnytsia region, acting in emissions to the environment in 2009-2012
Source: [10]

Conclusions. The main objectives of economic and environmental management of the food industry in Vinnytsia region, in our opinion, should be the following: definition of the environmental management among the highest priorities of the company, personal liability management for the ecology of the company, improvement of the environmental performance of the company and the positive impact on society; implementation of ecological modernization of fixed assets, resource; environmentally oriented restructuring; greening production; promotion of environmentally sound technologies; professionalism of staff on the environmental issues; optimization of costs for the environmental management implementation according to the international standards ISO 14000; environmental policy coordination with the businesses policy in health care; safety at the workplace, motivated by improving the ecological condition of the workplace; the continuous improvement of environmental management in design of new businesses to consider and plan for cleaner production (modern sewage treatment plant), which meets international standards ISO 14000 series; paying attention to the environmental conditions in the shops and at all workplaces; improvement the performance of eco-industrial enterprise laboratories; gradual replacement of flawed and outdated technologies and industries that are actively polluting the environment; providing the advantages for alternative, environmentally friendly «green» technology.

The realization of these proposals need detailed research of prospective experience of Vinnitsa region's food industry enterprises, which had used own activity in international standards ISO 14000 series for determining time and certain money in the relation to the input of the marked standards at the industry enterprises in the country's scale.

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