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EVALUATION OF EFFICIENCY OF RESOURCE-SAVING DEVELOPMENT MANAGEMENT OF AGRICULTURAL ENTERPRISES IN THE CONTEXT OF ENVIRONMENTAL SECURITY OF THE COUNTRY

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Agriculture is one of the priority sectors of the economy and society in general. However, the agriculture usage of aggressive and harmful production methods, which are aimed at the economic development of the enterprise, increasingly leads to a conflict of interaction between economic activity and the natural system upon the whole [1]. One of the mechanisms of ensuring the greening of agricultural production and increasing the environmental efficiency of all types of resources, including natural, is the introduction of resource-saving management of the enterprise [2].

The effectiveness of management of resource-saving development of

agri-food enterprises of Ukraine is the result of resource-saving measures and rational use of all types of resources, which operates the process of quantitative, qualitative and structural changes and affects the transition to a new quality [3].

The state of solving environmental problems caused by agricultural activities, as well as losses suffered by agriculture activity due to industrial emissions and other factors of environmental degradation in areas of agricultural production, can be assessed by an environmental efficiency system of enterprenurial resource-saving development management. Based on the assessment of listed indicators, it is necessary to ensure the integration of environmental interests and principle development in management decisions.

In order to assess the economic efficiency of resource-saving development management, agri-food enterprises of various ownership forms were selected in Poltava, Zaporizhia and Luhansk regions. The choice of these areas is justified due to the dynamics of agricultural production of enterprises in 2015-2019 (Table 1).

Table 1

Dynamics of agricultural production of enterprises of the Ukrainian regions for 2015-2019, billion UAH [formed on the basis of 4, 5]*

Region, Oblast	2015	2016	2017	2018	2019	Average value
Vinnitsia	18221	21319	51111	56521	57169	40868
Volyn	6434	6559	15835	16321	16541	12338
Dnipro-petrovsk	15141	15183	37617	38618	42468	29806
Donetsk	6938	7513	18422	16662	20261	13959
Zhytomyr	8063	9407	24256	27114	27363	19241
Zakarpattia	4096	3965	8214	8781	8858	6783
Zaporizhia	10056	9928	24466	20952	27137	18508
Ivano-Frankivsk	5697	5795	13512	13686	13301	10398
Kyiv	14154	15545	35902	44498	40802	30180
Kirovohrad	11000	12038	27723	33437	35995	24039
Luhansk	4036	4816	11573	12628	14448	9500
Lviv	9025	9255	22029	22819	23004	17227
Mykolayiv	8951	9714	22888	24280	25976	18362
Odessa	10642	11881	31634	31983	28279	22884
Poltava	16661	17213	36721	45466	43515	31915
Rivne	6409	6723	16452	16861	16753	12639

Sumy	9848	10193	27108	30168	30176	21498
Ternopil	8146	8524	23888	24800	24252	17922
Kharkiv	14680	15648	35373	37525	38463	28338
Kherson	10836	11232	27147	27290	28559	21013
Khmelnny-tsky	11599	12549	36103	37022	35926	26640
Cherkasy	14622	14984	33570	41226	40276	28936
Chernivtsi	4287	4286	10198	10723	10249	7948
Chernihiv	9925	10372	28733	31915	31214	22432

** The data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol and parts of the temporarily occupied territories in Donetsk and Luhansk regions.*

According to the cluster analysis conducted by the authors, all regions of Ukraine are divided into 5 clusters, which are characterized by the average production of agricultural products of enterprises, calculated for 5 years (Tables 2).

Table 2

Distribution by clusters of agricultural production of Ukrainian regions [formed by the authors]

Cluster	Region	Agricultural products
Cluster 1	Vinnitsia, Poltava, Kyiv	>30 billion UAH
Cluster 2	Dnipropetrovsk, Cherkasy, Khmelnytsky, Kharkiv, Kirovohrad, Odessa, Chernihiv, Sumy, Kherson	20-30 billion UAH
Cluster 3	Zhytomyr, Zaporizhia, Mykolayiv, Ternopil, Lviv	15-19,9 billion UAH
Cluster 4	Donetsk, Rivne, Ivano-Frankivsk, Volyn	10-14,9 billion UAH
Cluster 5	Chernivtsi, Zakarpattia, Luhansk	<9,9 billion UAH

In order to conduct an objective assessment of the management effectiveness of resource-saving development of agri-food enterprises of Ukraine for analysis were selected:

- enterprises of Poltava region as a leader in the production of agricultural products (UAH 31915 billion);
- enterprises of Zaporizhia region, which are in the 3rd cluster, according to the indicators of agricultural production, which is characterized as an average level (18508 billion UAH);
- enterprises of Luhansk region, which are characterized as one of the lowest indicators of agricultural production (UAH 9500 billion).

The management of resource-saving development of agri-food enterprises should be represented as a complex process related not only to improving economic and social efficiency, but to the environment, since nature is the contributor of all resources, including material ones. That is why the last group of indicators that characterize the effectiveness of resource-saving development of the enterprise, are environmental indicators (Table 3).

Table 3

System of indicators for assessment of ecological efficiency of resource-saving development of the enterprise of agro-food area [formed on the basis of 6; 7; 8]

№	The name of the coefficient	Characteristics of the coefficient
1	Content coefficient of natural resources	The ratio of the cost of used natural resources to net sales revenue
2	Natural resource efficiency	The ratio of net sales revenue to the cost of used natural resources
3	Coefficient of environmental friendliness	Characterizes the level of harmful effects on the environment per unit of used products or services obtained through this process
4	Coefficient of resource intensity of the process	Characterizes the costs of energy, water, air, land and other natural resources per unit of used products or services obtained by this process
5	Coefficient of environmental friendliness of the object	The ratio of the purely beneficial effect to the used natural resources
6	Coefficient of waste content	The ratio of wasted materials mass reduced to a single volume, considering the differences in the degree of their harmfulness (danger) per unit of output
7	Coefficient of environmental friendliness of production	The difference between the cost of raw materials, which is considered as 1, and the cost of waste generated

The coefficient of nature intensity shows the cost of used natural resources to net income from sales. For enterprises of the examined areas, this indicator is optimal and is at the level of 0.10-0.11. The natural resource efficiency is the opposite to the previous one, so its level is also optimal and is in the range of 9-10 (Table 4).

The coefficient of environmental friendliness indicates the level of harmful effects on the environment, which the company carries out in the

process of economic activity. This coefficient for all groups of enterprises is at the level of 0.01, which indicates the high environmental efficiency of economic entities.

Table 4

Ecological efficiency estimation of resource-saving management of the enterprise development in agro-food area [formed by authors]

Coefficient	Region, Oblast			
	Poltava	Zaporizhia	Luhansk	Normative value
Content coefficient of natural resources	0,11	0,10	0,10	↓
Natural resource efficiency	9,18	9,75	10,16	↑
Coefficient of environmental friendliness	0,01	0,01	0,01	↓
Coefficient of resource intensity of the process	0,05	0,05	0,05	↓
Coefficient of environmental friendliness of the object	1,73	1,81	1,93	≥ 1
Coefficient of waste content	0,14	0,16	0,13	↓
Coefficient of environmental friendliness of production	0,86	0,84	0,87	→ 1

The coefficient of resource intensity of the process helps to determine the parts of water, energy, air, land and other natural resources cost used for production. This coefficient is at the same level - 0.05 for enterprises in Poltava, Zaporizhia and Luhansk regions.

The coefficient of environmental friendliness of the object represents the level of beneficial effect from the usage of natural resources. The highest level of environmental friendliness is characterized by the products of enterprises of Luhansk region, because this indicator is 1.93 and significantly exceeds the minimum allowable factor 1. Enterprises of Poltava and Zaporizhia region do not concede in terms of environmental friendliness and have coefficients of 1.73 and 1.81 respectively. Coefficient of environmental friendliness of production also has high indicators: Poltava region - 0.86, Zaporizhia region - 0.84, Luhansk region - 0.87, which represents an effective resource-saving policy of enterprises in order to improve environmental efficiency. The indicators of environmental friendliness of production and waste content

are interlinked, sequentially it is possible to make similar conclusions about the optimality of the values of the calculated coefficients.

Thus, in modern economic conditions, the activities of agri-food enterprises should be aimed not only at ensuring economic efficiency, but at promoting the conservation of land, water, genetic and other resources for future generations. The conditions for ensuring the environmental security of the country are the usage of environmentally friendly production methods as well as the most efficient usage of resources. A significant factor in ensuring the environmental security of the country is the usage of effective management methods for resource-saving development of agri-food enterprises.

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