Management of Ecological Land Destructions as a Basis for the Formation of Green Marketing

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Abstract: The article deals with the assessment and management of ecological land destruction, taking them into account when determining the market value of land and the formation of green marketing. Based on the research, the authors proposed the use of the concept of ecological land destructions, which reflects any anomalies that occur in the conditions of use of agricultural land. The authors propose a methodology for calculating the integrated coefficient of ecological land destruction, which combines coefficients that take into account the ratio of agricultural land in the landscape, the optimal set of crops in field crop rotation, effective soil fertility, arable land degradation and soil degradation. It is substantiated that the application of the integrated coefficient of ecological destruction has a significant corrective value in the context of determining the market value of land.

Keywords: Ecological land destructions, land resources, green marketing, sustainable land use, market value of land.

1. INTRODUCTION

The agro-industrial complex of the country remains one of the main budget-forming directions of the national economy, and therefore the production of plant products and preservation of productive properties of arable soils should be given special attention by the authorities, science and agricultural producers. At the level of the world community, it was recognized that the issue of soil protection and prevention of degradation and desertification of productive lands is of paramount importance for human existence. In this regard, representatives of the international community at the 1992 United Nations Conference on Environment and Development in Rio-de-Janeiro adopted the Convention to Combat Desertification (UNCCD). The framework of the EU has developed a Soil Framework Directive in order to draw public attention to the need to preserve the quality of land for both current and future generations.

The impact of green marketing on the environment and sustainable development has been actively studied by scientists Chen H., Yang C., 2019; Damania, R., Russ, J., Wheeler, D., Barra, A. F., 2018; Dangelico, R.M., Vocalelli, D., 2013; Herrick, J.E., 2000; Honga, N. T., Tuanb T. T., Van Tub T., Anhc P. T., 2020; Papadas K. K., Avlonitis G.J., Carrigan M., Piha L., 2019; Sugandini D., Muafi M., Susilowati C., and many others, 2020. Involvement of relative indicators in the procedure of obtaining cost indicators of agricultural land valuation was introduced by practicing experts and profile scientists Dekhtyarenko Y.F., Mantsevych Y.M., Palekha Y.M., 2013; Fedorov M.M., 2015; Khvesyk M.A., 2014; Koshkalda I., Bezuhla L., Nihmatova O., Ilchenko T., 2020; Mikhaylov A., Makarova V., 2020; Kapinos N., 2020; Tretyak A.M., 2016;0 and many others Ukrainian and International scientists who by applying correction factors have formed mechanisms for adjusting the value of monetary indicators for the evaluation of agricultural land. However, there is a need to expand the range of environmental indicators that should be taken into account in determining the real value of agricultural land and which will promote environmental (green) marketing among agricultural producers.

The main purpose of the research is to substantiate the content, structure and directions of use of the integrated coefficient of ecological destruction of land in the context of determining the market value of land and the implementation of the concept of green marketing.

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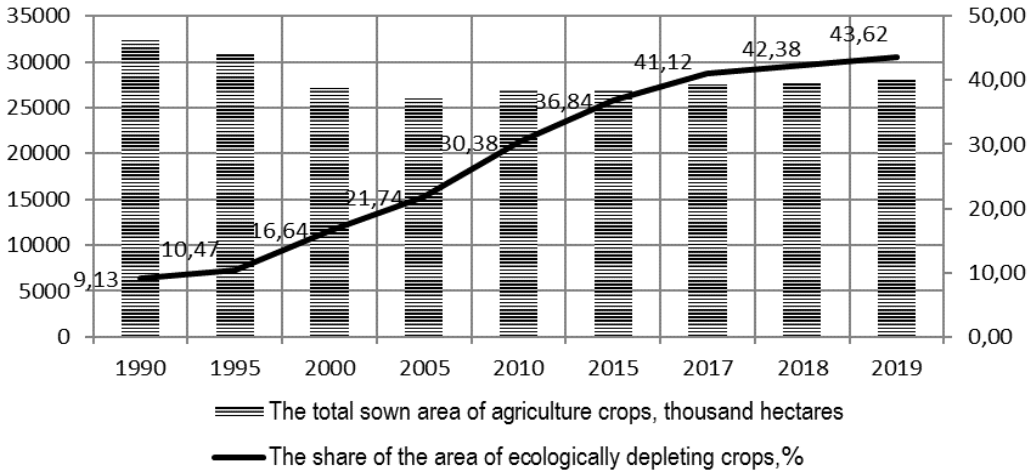

Fig. (1). Dynamics of the share of ecologically depleting crops in the total sown area of agriculture cultures.

Source: Calculated according to the State Statistics Service of Ukraine.

2. METHODOLOGY

The methodological basis for achieving this goal were the following methods: dialectical method - to study the relationship between environmental factors and land value, the formation of the structure of the coefficient of environmental destruction, determining the impact of this coefficient on land value; abstract-logical - was used in the theoretical generalization and formation of conclusions from the study, monographic - to study existing developments on the presented issues.

3. RESULTS AND DISCUSSION

Green marketing serves as the final stage of environmental management, the link between the economy of the enterprise and the environment, the importance of which is enhanced by integrating the principles of sustainable development into the overall development strategy. Green marketing is a process of meeting the needs and requirements of society through the promotion of such goods and services that have minimal negative impact on the environment at all stages of the life cycle, and are created with minimal use of natural resources. Green marketing is an activity of the enterprise aimed at satisfying the interests of the enterprise and consumers, by promoting the product with minimal damage to the environment at all stages of the life cycle (Korostova, 2020)0.

Green marketing provides a number of benefits for agricultural enterprises, including the following:

1. The production costs of the enterprise are reduced by reducing the consumption of energy, water, raw materials and supplies; refusal to use non-renewable raw materials;

2. The volume of waste is reduced due to the transition of production processes to low-waste technologies;

3. Logistics costs are reduced due to the development of logistics schemes from the standpoint of environmental management;

4. Prevention of possible non-staff costs, emergencies and reduction of environmental risks;

5. Use of state benefits for environmentally active enterprises;

6. Opportunity to take part in international and domestic programs to support and develop environmental management and environmental protection;

7. Growth in sales of environmentally friendly products and others.

Green marketing has great potential to become one of the most profitable and successful areas in the long run. Limited natural resources, increased consumption and environmental pollution are the main catalysts for the implementation of green ideas around the world. The growth of the market of ecological goods and services exceeds all projected indicators, and there is no reason to believe that this trend will not reach Ukraine. Ecological marketing can be an effective means of implementing the concept of sustainable development at the local and regional levels. Green marketing is the tool that ensures sustainable development through the spread of environmentally balanced production (Dangelico, Vocalelli, 2017)0.

The benefits of green marketing for agricultural enterprises are obvious, but there are a number of objective environmental factors that hinder the development of this process in Ukraine. In particular, the gradual decline in land fertility, the growing level of land degradation and depletion, etc. Confirmation of these negative trends is the fact that agricultural producers are gradually increasing the sown area under such environmentally depleting crops as corn, sunflower, rapeseed. Thus, for the period 1995-2019 sown area under commercially attractive crops has increased significantly. In particular, the sown area of corn increased by 3771 thousand hectares or 4 times, the area of sunflower - by 4292 thousand hectares or more than 3 times, and the area of rapeseed and colza - by 1192 thousand UAH or 14 times. If we compare the share of the area of these crops in the total sown area of crops, we note a significant increase in the share of these crops (Fig. **1**).

Thus, the share of depleting crops from 1990 to 2019 increased from 9.13% to 43.62% (almost 5 times) in the total

Table1. Methodology for Determining the Components of the Indicator of the Coefficient of Ecological Stability in the Local Agro-Landscape.

Indicators	Method of Calculation	Characteristic
Coefficient of ecological stability in the local agro-landscape (CES):	$C_{ES} = \frac{\sum_{i-1}^{n} C_{ESi} \times A_i}{\sum_{i=1}^{n} A_i} \times Cm_P$	where: CESi – coefficient of ecological stability of lands of the i-th type Ai – available agricultural area lands of the i-th type in the landscape, ha; CmP – coefficient of morphological stability of the relief
Coefficient of anthropogenic load in the agro-landscape (CA):	$C_A = \frac{\sum_{i-1}^{n} A_i \times Б_i}{\sum_{i=1}^{n} AL_i}$	where: Ai – available agricultural area lands of the i-th type in the landscape, ha; ALi – score of anthropogenic load on the land
Coefficient of plowing of lands in the local agro-landscape (CPL):	$C_{PL} = \frac{A_{AL}}{\sum_{i=1}^{n} A_{ES}}$	where: AAL – area of arable land on the territory of the regional agro-landscape, ha; AES – area of ecological stabilizing lands of i-th type in the agro-landscape, ha.

Source: developed by the authors.

structure of sown areas. These analytical data only confirm the advantage of the economic component of land use over environmental.

The ecological crisis that society has faced in recent decades is due primarily to irrational management, which in an unbridled effort to improve economic well-being depletes natural resources, while neglecting the environmental destruction that has taken place in the soils of productive lands. In the general sense, destruction is a deviation from the norm, violation or destruction of the structural organization of the system.

Ecological destructions are any anomalies or distortions that occur in the use of land during the implementation of production activities and are the result of non-compliance with restrictions (recommendations, standards) in the implementation of environmentally safe land use. Taking into account the impact of restrictive environmental standards on the cost of agriculture lands (1) is carried out as follows:

$$Vp = Vm \times ED \implies ED < 1{,}0 \quad (1)$$

Where: Vp – potential value of agricultural land, UAH / ha; Vm– market value of agricultural land, UAH / ha; ED – integrated adjustment factor for the action of ecological destruction, relative units.

The integrated coefficient of ecological land destructions (ED) (2) is determined by the product of specific coefficients, which acquire relative value in accordance with a set of restrictive norms:

$$ED = C_{AL} \times C_{AC} \times C_F \times C_{IL} \times C_{SD} \times C_P \quad (2)$$

Where: CAL – the ratio of agricultural land in the agricultural landscape; CAC – coefficient of set of agricultural crops in field crop rotation; CF – fertility rate of arable land; CIL – coefficient of intensity of agricultural land use; CSD – coefficient of soil degradation of agricultural lands; CP – the coefficient of the current pollution of agricultural land.

1) The ratio of agricultural land in the agricultural landscape.

Optimization of the ratio of land in rural agricultural landscapes is one of the areas of formation of environmentally sustainable land use, in the organization of which the anthropogenic load does not reach a critical and irreversible level. In such setting of urgent tasks concerning ecological support of land use the distribution of areas of different natural features and general purpose of lands (arable lands, fallows, perennial plantings, hayfields, pastures) in the vector of balanced functioning of natural systems becomes important. The balanced organization of land use increases the sustainability of the agricultural system, and the maintenance of a stable landscape structure is a criterion for its environmental sustainability. Therefore, the ratio of agricultural land (C_{AL}) in the landscape is determined as follows:

$$C_{AL} = C_{ES} \times C_A \times C_{PL}, \quad (3)$$

Where: C_{ES} – coefficient of ecological stability in the local agro-landscape;

C_A – coefficient of anthropogenic load in the agro-landscape;

C_{PL} – coefficient of plowing of lands in the local agro-landscape.

The methodology for determining each component of the coefficient is presented in table **1**.

These indicators allow both to control and adjust the structure of agricultural land use, because the existing organization of agriculture is not only chaotic, but also one that has no long-term development. Restoration mechanisms will allow both to stop the intensive destruction of natural ecosystems due to anthropogenic factors, and to improve the structural construction of territorial agro landscapes through the formation of an effective organization of rural areas.

At the same time ecological stabilizing structure of agricultural landscapes by establishing a rational ratio of land in the sustainable construction of the rural landscape will provide an opportunity together with the use of agro technical, agro-ameliorative, agro-rehabilitation, hydro-technical, regenerative and other organizational and agricultural measures to approach agricultural formation.

2) Coefficient of set of agricultural crops in field crop rotation

Table2. Methodology for Determining the Components of the Indicator Coefficient of set of Crops in Field Crop Rotation.

Indicators	Method of Calculation	Characteristic
Coefficient of sown areas of cereals and legumes (CC):	$C_C = \frac{A_{C3}}{A} \times R_N$	where: AC – sown area under cereals in the region, thousand hectares; A – sown area under all agricultural crops in the region, thousand hectares; RN – the rate of supply of plants with nutrients
Coefficient of change of grain production volumes (CVC):	$C_{VC} = \frac{V_G}{V}$	where: VG – volume of grain harvest in the region in the current year, thousand tons; V– volume of agricultural crops in the region in the base year, thousand tons
Coefficient of sown areas occupied by industrial crops (CI):	$C_I = \frac{A_I}{A} \times R_N$	where: AI – sown area under industrial crops in the region, thousand hectares; A– sown area under all agricultural crops in the region, thousand hectares; RN – the rate of supply of plants with nutrients
Coefficient of change in the volume of production of industrial crops (CVI)	$C_{VI} = \frac{V_I}{V}$	where: VI– volume of industrial crops in the region in the current year, thousand tons; V– volume of agricultural crops in the region in the base year, thousand tons

Source: developed by the authors.

In the current conditions of farming, the importance of field crop rotations should not be underestimated, because neither fertilizers, nor reclamation, nor chemical plant protection products will bring such an increase in yields and will not provide the opportunity to get rid of weeds, pests or diseases at crops. This occurs with strict compliance with field crop rotation standards.

Direct rotation of crops provides:

- Reduction of soil depletion and increase of fertility of agricultural lands;

- Saturation of the soil layer of agricultural land with organic matter;

- Prevention of large-scale spread of pests and weeds;

- Reduction of infectious load and number of plant diseases;

- Increasing the yield of major crops;

- Structuring of land, financial and human resources.

To take into account the deviations of agricultural producers from the norms of land management projects in terms of compliance with field crop rotations is not an easy task today, or even impossible. This is due to the lack of land management documentation on the rotation of crops in the field crop rotation, design and regulatory standards that should regulate the activities of economic entities in relation to land resources.

Losses suffered by agricultural crop producers due to attempts to obtain today's benefits without taking into account the benefits that may be obtained in the future; it is advisable to calculate the coefficient (C_{AC}), which determines the degree of supply of plants with nutrients according to the set of crops in the field crop rotation.

$$C_{AC} = C_C \times C_{VC} \times C_I \times C_{VI} \qquad (4)$$

Where: C_{AC} – coefficient of set of agricultural crops in field crop rotation;

C_C – coefficient of sown areas of cereals and legumes;

C_{VC} – coefficient of change of grain production volumes;

C_I – coefficient of sown areas occupied by industrial crops;

C_{VI} – coefficient of change in the volume of production of industrial crops.

The methodology for determining each component of the coefficient is presented in table **2**.

Thus, the total productivity of crop rotation (yield per hectare of crop rotation area) is determined primarily by the share of crops in field crops and the annual production of crops in the trajectory of sustainable agricultural production. Alternation of crops in time and in a certain area makes possible the highest yield per unit of sown area at the lowest cost. Thus, field crop rotations are the central framework of the system of sustainable agriculture and ignoring the planned alternation of crops will sooner or later lead to a critical level of arable land productivity with declining soil fertility and lower crop yields. Neglecting the problem of placing crops in crop rotations sees an increase in the level of environmental danger in agriculture, as well as the loss of diversity of agricultural landscapes for future generations.

3) Fertility rate of arable land;

Soil fertility, as its suitability to meet the needs of plants in nutrients in such quantities that is sufficient for normal crop development, describe soil quality indicators that characterize: the content of humus, nutrients and trace elements, density, particle size distribution and aggregate, moisture content the level of absorption, the content of water-soluble salts, the reaction of the soil solution, etc. Monitoring of these and other qualitative properties of arable lands should not only provide a study of the real state of agricultural lands, but also form a basic matrix of official land fertility indicators in terms of individual regions (administrative regions) in order to adjust the anthropogenic impact of negative or positive effects on quality soils of agricultural land. Under this approach, fertility rate of arable land (C_F), as a component of integrated assessment of the ecological condition of agricultural lands of regions (administrative regions),

Table 3. Methodology for Determining the Components of the Indicator of the Coefficient of Effective Fertility of Arable Lands.

Indicators	Method of Calculation	Characteristic
coefficient of humus content in the surface layer of agricultural land (CH):	$C_H = \frac{H_{cy}}{H_{by}}$	where: Hcy– weighted average humus content in the region in the current year,%; Hby– weighted average humus content in the region in the base year,%.
reaction coefficient of the soil solution in the soils of agricultural lands (CSS):	$C_{SS} = \frac{SS_{cy}}{SS_{by}}$	where: SScy – weighted average indicator of soil solution in the current year,%; SSby– weighted average soil solution in the base year,%.
coefficient of nutrient regime in soils of agricultural lands (CNR):	$C_{NR} = \frac{NR_{cy}}{NR_{by}}$	where: NRcy– indicator of nutrient regime in soils in the current year, kg / ha; NRby– indicator of nutrient regime in soils in the base year, kg / ha.

Source: developed by the authors.

can be calculated according to official data of the State Institution «State Soil Protection» and other public data and determined by the following formula:

$C_F = C_H \times C_{SS} \times C_{NR}$ (5)

Where: C_F – fertility rate of arable land;

C_H – coefficient of humus content in the surface layer of agricultural land;

C_{SS} – reaction coefficient of the soil solution in the soils of agricultural lands.

C_{NR} – coefficient of nutrient regime in soils of agricultural lands.

The methodology for determining each component of the coefficient is presented in table **3**.

Thus, fertility rate of arable land (C_F) determines the transformational transformations (negative or positive) in the quality of soils, which with some degree of reliability occur in the array of agricultural land at the level of individual regions (administrative regions) of Ukraine according to the rounds of large-scale agrochemical survey agricultural land.

4) Coefficient of intensity of agricultural land use;

Each region of Ukraine, depending on the dominance in its territory of certain types of soils, their structure and physicochemical composition, the relief of the local landscape, the direction of production of agricultural producers and other factors, has its own specific economic activities and hence different levels of intensity in use of land resources.

In this aspect, the coefficient of intensity of agricultural land use in the current period (C_{IL}) can be calculated by the formula:

$$C_{IL} = \frac{I_{LVA}}{I_{AR}} \quad (6)$$

де: C_{IL}– coefficient of intensity of agricultural land use;

I_{LVA} – differential income by land valuation area, c/ha;

I_{AR} - differential income by administrative region, c/ha.

If tendencies to change (increase or decrease) of the coefficient of intensity of agricultural land use for the indicated period of time are detected, a comparison of the current coefficient in the studied period and the current coefficient in the base period should be introduced.

5) Coefficient of soil degradation of agricultural lands;

The main causes of physical soil degradation of agricultural lands and loss of useful properties are water and wind erosion, which significantly impair their natural characteristics and lead to: transformations in structural construction, soil compaction, surface flooding, loss of fertile layer, reduction of soil filtration capacity. In addition to natural factors that accelerate the development of degradation processes, factors of anthropogenic origin have a significant impact on the loss of natural properties: lack of organic fertilizers, neglect of crop rotation, use of heavy agricultural machinery, repeated planting of monocultures, deviation from agronomic technologies and agronomic technologies.

The scale of funding for anti-degradation measures in the regions depends on the area of arable land (arable land), which were identified by significant signs of degradation, but to determine the range of such funding, there is a conflict of interest, as land users (land tenants) are reluctant to invest funds in someone's land, landowners (mostly elderly peasants) see no reason to maintain the fertility of agricultural land, because they do not receive crops on them, the state has no funds to support producers in protecting and restoring the productive properties of agricultural land. In this situation, the value of arable land, and accordingly their price equivalent, will be reduced by the value of the delta, which may be due to the corresponding coefficient of physical degradation of land calculated by the formula:

$$C_{SD} = \sqrt[2]{C_{SE} \times C_C}, \quad (7)$$

Where: C_{SD} – coefficient of soil degradation of agricultural lands;

C_{SE} – coefficient of current soil erosion of agricultural lands in the region;

C_C – coefficient of current conservation of agricultural land in the region.

The methodology for determining each component of the coefficient of physical degradation of agricultural soils in the region is presented in table **4**.

Table4. Methodology for Determining the Components of the Rate of Physical Degradation of Agricultural Soils in the Region.

Indicators	Method of Calculation	Characteristic
coefficient of current soil erosion of agricultural lands in the region (C_{SE}):	$C_{SE} = \frac{A_{ES}}{A_{AL}}$	A_{ES} – area of eroded soils of agricultural lands in the region, thousand hectares; A_{AL}– total area of agricultural land in the region, thousand hectares.
coefficient of current conservation of agricultural land in the region (C_C):	$C_C = \frac{A_{con}}{A_{AL}}$	A_{CON} – area of agricultural land in the region in need of conservation, thousand hectares; A_{AL}– total area of agricultural land in the region, thousand hectares.

Source: developed by the authors.

Directly local land degradation coefficients characterize the degree of unfavorable change in soil properties under the influence of external (natural and anthropogenic) factors, which always leads to a significant reduction or complete loss of natural soil fertility and deterioration of plant products. With such potential threats, timely detection of the level of land degradation, their full or partial conservation and subsequent revitalization are almost the only way to preserve the natural fertility of arable land.

6) The coefficient of the current pollution of agricultural land.

Traditionally, the pollution of agricultural land in reference materials on the state of soils on agricultural land in Ukraine is studied in three areas: sources of pollution (industrial facilities, substances, man-made and natural phenomena), the environment of pollution (air, water, soil) and type of pollutant (heavy metals, pesticide residues and radionuclides).

Coefficient of the current pollution of agricultural land (C_P) for the current time period can be determined using official materials State Institution «State Soil Protection» and other materials on soil pollution by the formula:

$$C_P = C_{PH} \times C_{PP} \times C_{RP}, \quad (8)$$

де: C_P – coefficient of the current pollution of agricultural land;

C_{PH} – coefficient of pollution of agricultural lands with heavy metals;

C_{PP} – coefficient of soil pollution by pesticide residual content;

C_{RP} – coefficient of radiation pollution of agricultural soils.

The relative quantitative values of each of the components of the integrated indicator of environmental land destruction can be established on the basis of a detailed analysis of official public data. The practical implementation of the proposed methodological approach to determining the integrated indicator of environmental destruction is presented in table **5**.

Note that the relative values of regional coefficients of ecological destruction are dynamic ecological variables that characterize the algorithm of transformations of qualitative indicators of chemical and physical condition of agricultural lands. The basis of comparison is a variable previous level (calculation by the chain method) or a basic time level (calculation by the basic method). Using an integrated indicator of ecological land destruction, we can adjust the market value of land, thereby changing its value to a qualitative environmental indicator.

Table 5. Determination of the Integrated Coefficient of Ecological Destruction of Lands of Administrative Regions of Ukraine.

No	Administrative Region	Components of the Coefficient of Ecological Destruction (*ED*)						*ED*
		C_{AL}	C_{AC}	C_F	C_{IL}	C_{SD}	C_P	
1	AR Crimea [1]	-	-	-	-	-	-	-
The Value of the Coefficient of Ecological Land Destruction (*ED*) from 0,01 to 0,03								
2	Vinnytsia region	0,57	0,89	0,11	0,90	0,30	1,00	**0,02**
3	Volyn region	0,42	0,70	0,19	0,86	0,33	1,00	**0,02**
4	Dnipropetrovsk region	0,63	0,23	0,59	1,09	0,31	1,00	**0,03**
5	Donetsk region [1]	0,56	0,07	0,69	1,12	0,44	-	**0,03**
6	Zhytomyr region	0,34	0,74	0,69	0,89	0,12	0,98	**0,02**
7	Zakarpathian region	0,12	0,09	1,56	1,16	0.29	0,93	**0,01**
8	Kirovograd region	0,67	0,44	0,29	1,13	0,26	1,00	**0,03**
9	Odessa region	0,73	0,13	0,73	1,19	0,45	0,93	**0,03**
10	Kharkiv region	0,61	0,36	0,41	1,08	0,22	0,99	**0,02**
11	Cherkasy region	0,54	0,39	0,45	0,90	0,26	0,99	**0,02**
13	Chernihiv region	0,53	1,22	0,48	0,75	0,09	0,98	**0,02**
The Value of the Coefficient of Ecological Land Destruction (*ED*) from 0,04 to 0,06								
13	Zaporozhye region	0,65	0,18	1,17	1,29	0,33	0,98	**0,06**
14	Kiev region	0,52	1,26	0,86	0,83	0,13	1,00	**0,06**
15	Luhansk region [1]	0,61	0,34	0,47	1,24	0,33	-	**0,04**
16	Mykolaiv region	0,63	0,39	0,69	1,24	0,22	0,95	**0,04**
17	Poltava region	0,75	0,48	0,47	1,05	0,20	1,00	**0,04**

18	Khmelnytsky region	0,61	0,83	0,29	0,93	0,35	1,00	**0,05**
19	Chernivtsi region	0,47	0,16	2,44	0,84	0,39	0,95	**0,06**
The Value of the Coefficient of Ecological Land Destruction (*ED*) from 0,07 to 1,00								
20	Ivano-Frankivsk region	0,36	0,41	2,03	1,04	0,30	0,99	**0,09**
21	Lviv region	0,48	0,33	2,75	0,84	0,27	0,95	**0,09**
22	Rivne region	0,38	1,05	0,99	0,85	0,31	0,91	**0,09**
23	Sumy region	0,57	1,99	0,57	0,89	0,12	1,00	**0,07**
24	Ternopil region	0,59	1,29	0,46	0,74	0,29	0,97	**0,07**
25	Kherson region	0,60	0,24	1,07	1,36	0,33	1,00	**0,07**

1 Data on the Autonomous Republic of Crimea are missing, data on Donetsk and Luhansk regions may have some inaccuracies.

The results of the calculation of the corrective correction taking into account the integrated coefficient of environmental destruction are presented in table **6**.

Thus, an integrated coefficient of ecological land destruction has been introduced for the current adjustment of the market value of one hectare of agricultural land in the context of their use in a certain area of the region. The obtained results characterize the dynamic transformations of qualitative properties of lands, influence the formation of the real market value of lands, and are also the basis for adjusting the directions of environmental policy of agricultural enterprises.

Note that companies do not always agree to produce products based on environmental requirements. Greening of production processes requires some additional costs. It should be borne in mind that a properly developed strategy for development and greening will return the capital spent and multiply it. Development and implementation of environmentally friendly production technologies, waste-free and low-waste processes, improvement of existing and creation of new treatment facilities, re-profiling and significant change of infrastructure and part of the formed economic relations of enterprises - all this will dramatically affect such an indicator as production cost.

Sustainable agricultural land use involves not only the purposeful provision of food to the population, but also the formation of optimal social, economic and ecological parameters for the functioning of the agricultural sector of the economy. In the absence of effective state monitoring and

Table 6. Calculation of Corrective Amendments Based on the Coefficient of Environmental Destruction in Terms of Regions of Ukraine.

No	Administrative Region	Estimated Components			Corrective Amendment, Thousand UAH
		The Total Area of Arable Land, Thousand ha [1]	The cost of 1 ha Arable Land, Thousand UAH / ha	The Level of the Coefficient of Ecological DESTRUCTION ED,%	
1	AR Crimea [1]	-	-	-	-
Coefficient of ecological land destruction from 1% to 3%					
2	Vinnytsia region	1725,5	26,023	2	898,054
3	Volyn region	672,6	22,581	2	303,760
4	Dnipropetrovsk region	2127,1	36,842	3	2 350,999
5	Donetsk region [1]	1653,1	22,951	3	1 138,209
6	Zhytomyr region	1112,7	25,974	2	578,025
7	Zakarpathian region	199,7	19,565	1	39,071
8	Kirovograd region	1764,5	34,483	3	1 825,358
9	Odessa region	2074,9	24,000	3	1 493,928
10	Kharkiv region	1933,2	26,444	2	1 022,431
11	Cherkasy region	1272,0	33,981	2	864,477
12	Chernihiv region	1419,2	28,634	2	812,747
Coefficient of ecological land destruction from 4% to 6%					
13	Zaporozhye region	1903,8	32,900	6	3 758,101
14	Kiev region	1353,7	62,683	6	5 091,239
15	Luhansk region [1]	981,9	33,333	4	1 309,199

16	Mykolaiv region	1699,2	27,397	4	1 862,119
17	Poltava region	1770,5	33,846	4	2 396,974
18	Khmelnytsky region	1252,7	39,630	5	2 482,225
19	Chernivtsi region	330,8	31,667	6	628,527
Coefficient of ecological land destruction from 7% to 10%					
20	Ivano-Frankivsk region	396,1	24,615	9	877,500
21	Lviv region	764,1	82,353	9	5 663,333
22	Rivne region	656,8	25,000	9	1 477,800
23	Sumy region	1226,3	25,926	7	2 225,514
24	Ternopil region	856,1	23,077	7	1 382,935
25	Kherson region	1777,9	37,273	7	4 638,737
	TOTAL IN UKRAINE				45 121,262

1 Data on the Autonomous Republic of Crimea are missing, data on Donetsk and Luhansk regions may have some inaccuracies.

control over land use, there is plowing of the territories of the nature reserve fund, uncontrolled application of mineral fertilizers, violation of ecological norms of agricultural activities, etc. This does not contribute to the preservation of biodiversity, and the use of land on slopes leads to the development of soil erosion, which destroys it. This process is becoming increasingly large every year, creating a danger to the socio-economic development of the state. Therefore, the government should restore the agricultural inspection or give appropriate powers to the already existing environmental inspection for land use control, contribute to raising the awareness of land users and agricultural enterprises regarding the methods of conducting green agricultural production. Green marketing is typically practiced by companies committed to sustainable development and corporate social responsibility. More and more organizations are making efforts to implement sustainable business practices. They realize that they can make their products more attractive to consumers while reducing costs for packaging, transportation, energy and water consumption, and more.

It is appropriate to use world practices and trends, since it is the development of land administration that receives increased attention from various structures, organizations, developers and researchers in many countries of the world. The promotion and improvement of land administration and land management is facilitated by the activities of the United Nations Economic Commission for Europe, UNECE. A significant contribution to the development of land administration and sustainable land use is made by the International Federation of Surveyors (French: Fédération Internationale des Géomètres - FIG), Paris. The World Bank supports a network of land administration projects. Standardization issues in the field of land administration are decided by the International Organization for Standardization, its technical committee 211 on digital geographic information (ISO/TC211), the European Committee for Standardization (CEN, French Comité Européen de Normalisation), the Infrastructure for Spatial Information in the European Community - INSPIRE. The activities of these and other international organizations are aimed at supporting security of ownership, implementation and improvement of the land registry, real estate markets; it is based on cooperation and exchange of experience between all the countries of the Europe through holding conferences, seminars and workshops, publishing research results and guidelines.

If an agricultural enterprise produces products in an environmentally friendly way, the company demonstrates commitment to the principles of sustainable development and social responsibility. It also helps the reputation of the brand, as it confirms that the company cares about the environment. The conducted research allows drawing a conclusion about the relationship between the environmental policy of the enterprise and the principles of green marketing (Fig. **2**).

The conducted researches allow singling out the following features of adaptation of the Ukrainian enterprises to requirements of green marketing:

- Increasing the responsibility of producers to consumers and society;

- Insufficient level of environmental awareness of producers and understanding of the essence of environmental marketing, low efficiency of marketing tools;

- Lack of marketing research, allowing considering the production with the least damage to natural resources and the environment;

- The need to bring the company's activities in line with environmental and sustainable development requirements.

4. CONCLUSION

Social requirements regarding the satisfaction of the interests of society within the limits of agricultural land use provide for the solution of global environmental problems associated with the symbiosis of tasks related to food security of Ukraine and the preservation of a balanced natural environment. It should be noted that the economic efficiency of the production of agricultural products directly depends on the ecological condition of agricultural land, which is characterized by the productivity of land in ecosystems. At the same

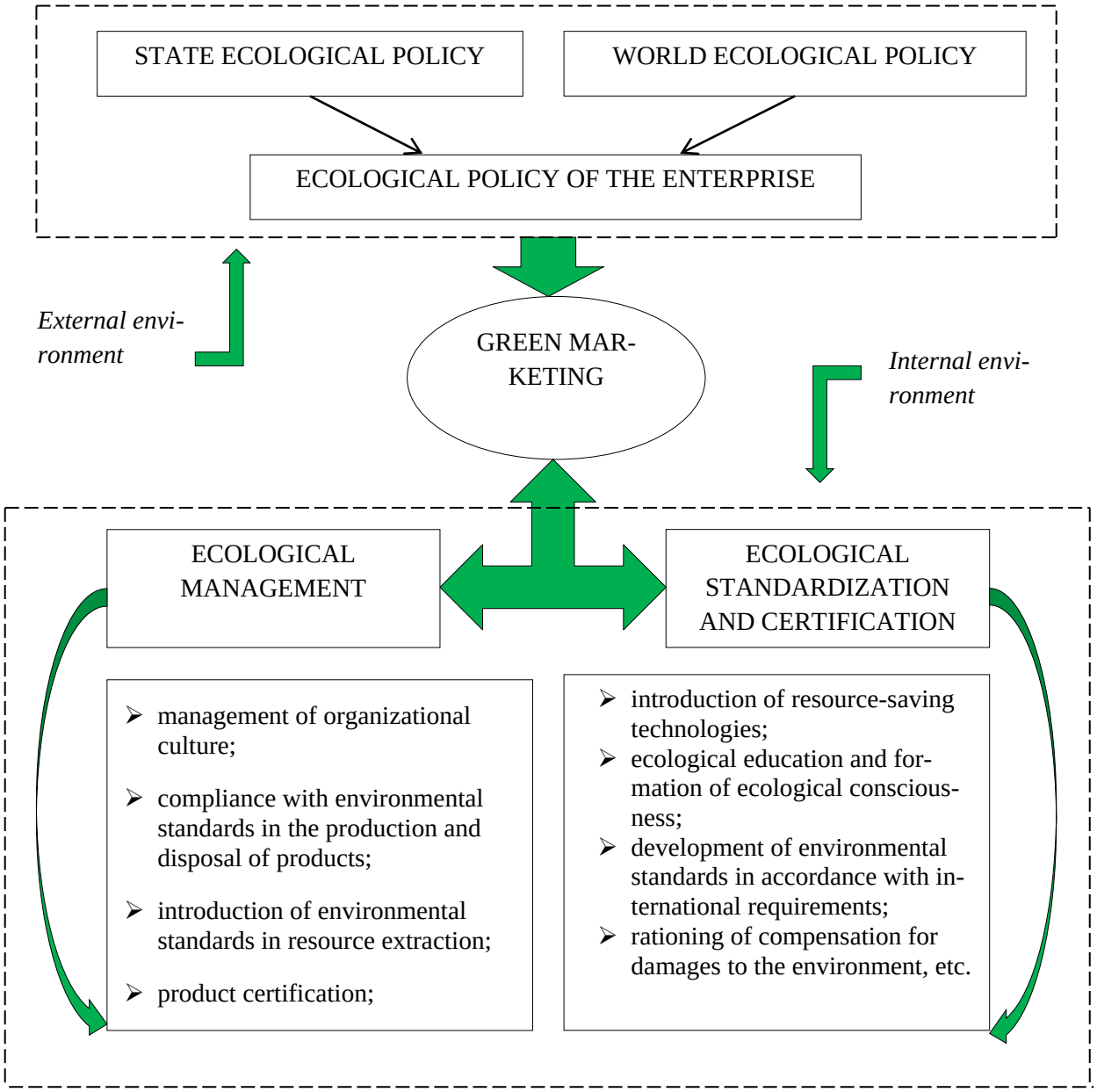

Fig. (2). The relationship between green marketing and ecological policy of the enterprise.

Source: systematized and improved.

time, natural fertility is not a constant value. As a result of erosion processes, such changes lead to soil degradation, reducing its potential properties. Effective fertility at the initial stage of land use can exceed natural fertility due to the investment of capital and labor in the implementation of agro-technological measures. In the absence of these measures in further management practices, the productive qualities of the land will decrease and may have indicators significantly lower than the level of natural fertility values. Therefore, the establishment of legislative or administrative environmental norms, determining the level of fertility, which landowners and land users are obliged to ensure in order to preserve the productive properties of soils in the long term, remains an urgent problem.

The article proposes a methodology for calculating the integral coefficient of ecological destruction, which combines coefficients that take into account the ratio of agricultural land in the landscape, the optimal set of agricultural crops in the field crop rotation, effective soil fertility of arable land, the degree of soil degradation, the intensity of use, and the state of pollution of agricultural land. It is substantiated that the application of the integral coefficient of ecological destruction has a significant corrective value in the context of determining the actual value of agricultural land under the conditions of the opening of the land market.

Green marketing has great potential to become one of the most profitable and successful areas in the long run. Limited natural resources, including land resources, increasing con-

sumption and environmental pollution are the main catalysts for the implementation of green ideas around the world. The growth of the market of ecological goods and services exceeds all projected indicators, and there is no reason to believe that this trend will not reach Ukraine. Green marketing is a tool that ensures sustainable development through the spread of environmentally balanced production and distribution in the face of new environmental needs (the need for environmental safety). The scientific results presented in the article will contribute to the improvement of the system of ecological marketing of agricultural enterprises, but require further detailed research.

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