

RECOVERY OF LOSSES FOR INAPPROPRIATE USE OF LAND

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Abstract

The article justifies theoretically-methodological principles of economic mechanism to ensure environmental security of land-use, based on use of economic methods and levers and their interaction with the legal framework. The aim of the paper is a clear definition of damage, caused to the state due to non-compliance of norms of sustainable land management. The main tasks are to develop economic instruments of determination of sanctions for violation of norms of sustainable land management. The State and the territorial communities are losing considerable resources from non-payment of land fees at various levels, through unauthorized and misappropriation of land, degradation of the quality of the fertile soil, etc. Inappropriate use of land plot violates the principle of the targeted use of land and causes losses, which are defined as, firstly, the loss of income that a person might have earned from the use of the land and, secondly, the improper generation of additional income from unauthorized actual use of the land; that doesn't meet its target. Compensation for damages caused by a violation of the land law does not relieve the offender(s) of the need to compensate real damages, i.e., to carry out, at his own expense, measures to eliminate the consequences of the violations in the shortest period of time, including demolition of buildings, houses and structures, as well as site restoration. Such principles of land law should be taken into account when justifying the harm caused by the diversion of land, as priority of agricultural land use; purpose-oriented land use; stability of land use; principle of rational land use. The basis for determining the amount of damage caused by the inappropriate use of land is the sum of relevant loss of the normative average annual income from the targeted use of land and the excess annual average income from actual functional use of land, which does not meet its target.

Key words: *environmental security, economic mechanism, economic methods, purpose of land-use, state control.*

INTRODUCTION

Current state and use of land comes to be the root cause of many negative phenomena of both ecological and economic nature.

As a result of these offences the state and territorial communities lose significant funding because of lack in budget of different levels of payment for land as a consequence of its unauthorized misuse, degradation of fertile layer of soil.

In particular, resolution of Cabinet of Ministers of Ukraine from July, 25 2007 № 963 "Determination of loss amount, caused by unauthorized occupation of a land plot, inappropriate use of land plots, removal of the ground cover(fertile layer) without special permit" methodology approved.

This Methodology aimed at determining the extent of damage, caused to the state, territorial communities, legal and natural persons, on all categories of land in a consequence of

unauthorized occupation of land plot, inappropriate use of land plot removal of the ground cover (fertile layer) without special permit.

The loss amount is determined apart in each offence.

The aim of the paper is clear definition of damage, caused to the state due to non-compliance of norms of sustainable land management.

The main tasks are to develop economic instruments of determination of sanctions for violation of norms of sustainable land management.

MATERIALS AND METHODS

The important task in the process of state control of land use and protection is a clear definition of damage, caused to the state as a consequence of:

- failure to comply with the conditions of removal, saving and coating a fertile layer of ground;
- failure to comply or poor-quality compliance of compulsory event, that approved by project documents in accordance with the law for removal, saving and coating of fertile layer of ground, that caused it's damage or destroying;
- non-use of land plot or its actual use, that does not respond its purpose, established for transfer of land to ownership or land allotment, or rent, and failure to comply with regime for the use of land plot or it's part in case of restrictions (enhancement) (Martyn, 2007; Martyn, 2008);
- unauthorized occupation of a land plot by a guilty person and it's use without legal basis, that is without established right to property or another right to land under current law, for example, lease for a land.

Sometimes unauthorized occupation of land is supposed to be its owning for violation of established land allotment, without land allotment in nature (in a location) and without obtaining a document certifying the right to private ownership of land - excerpt from the State Register of Real Property Rights.

Unauthorized occupation of land plots, inappropriate use of land plots, and removal of ground (fertile layer) without a special permit are considered to be offences, which damage to legal landowners, territorial communities and the state.

Thus, owing to unauthorized occupation of land plots their owners or users lose legal right to use the land plot to manufacture certain products or receiving certain economic benefits. An intruder of the land law, that committed unauthorized occupation of a land plot, in turn, illegally profits from use of its useful profits.

Therefore, a landowner of a land plot or land user, according to the civil law, should obtain compensation of lost profit - profit, which could be received from that land plot under normal conditions, but it should be understood,

that this compensation must not be less, than profit, received by the intruder.

It means, that in fact the following must be compensated: a) losses caused by not using the land for the intended purpose; b) additional income, which was received illegally as a result of land plot use not according to the stated purpose, in comparison with the one, that is typical for targeted use of land.

The right to compensation of losses, caused by unauthorized occupation of land, belongs to persons, whose right to use land has been violated – landowners and land users. State and territorial communities become the subjects of law in case of unauthorized occupation of land, that is state and communal property (The Code of Administrative Offences of Ukraine, 1984). When land is not used for the intended purpose, and removal of ground (fertile layer of ground) without special permit, that was complied with land users (including persons, who committed illegal seizure of land plot), relevant losses should be compensated to the state and local councils, which, in accordance with the law, dispose of land on behalf of the Ukrainian people and territorial communities.

It should be noted, that the described kinds of damage, owing to unauthorized occupation of land plots, inappropriate use of land plots, and removal of ground (fertile layer of ground) without special permit do not include the costs for converting land plots to suitable state for the intended use, because such costs are specific for each particular offence and their cost cannot be rationed.

State regulation of land management is a system of measurements, established to ensure the rational and efficient use of land, it's protection, recreating and increasing of soil fertility, preserving and establishment of a favourable environment, right to protection of property rights, ownership and use of land, ownership and use of land through the implementation of a set of organizational, legal, economic actions.

The right for a land plot, under article 111 Land Code of Ukraine, may be restricted by law or agreement by setting (Land Code of Ukraine, 2002):

- 1) Prohibition on the sale or other seizure by certain persons within a specified period of time;
- 2) Prohibition on leasing (subleasing);
- 3) Right to an overwhelming purchase if it's sold;
- 4) Condition of inheritance, determined by a beneficiary only;
- 5) Condition to start and finish development of land plot within specified period of time;
- 6) Prohibition on certain activities;
- 7) Prohibition on a change of targeted use of land, landscape and exterior of real estate;
- 8) Condition to implement construction, repair or maintenance of a road or a section of a road;
- 9) Condition for compliance of environmental requirements or performance of certain work;
- 10) Condition to give a right for hunting, fishing, gathering of wild plants on one's own land plot within prescribed time and in accordance with the established procedure;
- 11) Other duties, restrictions or conditions.

Consequently, the restrictions for land use, that were defined by law can be clearly divided into the ones, that concern land management as real estate and the ones, that determine a special regime for land plot use or it's part as a valuable nature object, or location of a building, which demand a special attitude.

Deep ground degradation was caused by regional approach to land use, lack of awareness in its global framing and social role, deficiency of state policy about land protection (Leonets, 2001).

In exercising legal protection of land, the State has four main functions: regulatory, promotional, monitoring and punitive functions.

The regulatory function of legal protection of land is to establish rules for the management of land resources.

The promotional function of legal protection of land is to provide economic incentives for rational land management and protection.

The control function of the legal protection of land is the exercise by the relevant State and local government bodies of State control over the use and protection of land (Dyptan, 2009; Dyptan, 2008).

The punitive function of legal protection of land is in the imposition of sanctions for

infringement of the rules of rational use and protection of land and their attachment to violators of land legislation.

The system of economic regulators of land relations under condition of transition to a market economy includes: land tax; rental charge for land; land market price; bond land price; compensation payments for land seizure; compensation payments while land conservation; payment for improved land quality; penalties for environmental damage; civil land taxation; payment for the right to lease etc. (Budziak, 2008; Dobriak and Babmindra, 2006).

Economic mechanism of regulation of land relations should respond the following demands: ensuring equal start for the reproductive process for all land subjects; use of land rents as a basis for the formation of a system of economic regulators, interaction of rent regulators with other economic instruments (prices, interest charge, income tax etc.); taking into account the interests and equal rights of different social groups for the realization of land ownership rights and different forms of land use; promotion of rational location and specialization of agricultural manufacture; strengthening environmental protection of land (Budziak, 2008; Dobriak and Babmindra, 2006).

It should be also noted, that on the basis of indicators of normative land valuation it is possible to determine rented income from a land parcel for a specific purpose, rather than income at all (Dobriak and Vitvytska, 2009). Rate of return should be used to move from rented income to total income, in particular – Assumption that the cost of generating a certain income (economic benefit) is offset by that income with a certain excess, which is the rent. It means, that according to a coefficient of rate of return (ratio of income to costs) where 1.35, which is used for standard costing, total income from land can be determined by formula (1):

$$I = R/1.35 \quad (1)$$

where:

I - total income from used land, UAH/ha;

R - rental from used land, UAH/ha.

Excess average annual income from actual land use, which does not respond their purpose, describes excess average annual income as a consequence of actual functional use of land over the ones, which respond their purpose.

Functional use of land plots are specifications of environmental and socio-economic functions of land plots according to their purpose, that are determined by certain part of landholdings and kinds of economic activities, according to the data of the quantitative land register in the State land cadastre under the Order of the State Statistical Committee of Ukraine of № 377 “Approval of forms for State statistical reporting from land resources and instructions for the completion of State statistical reporting on land accounting (forms №№ 6-land, 6a-land, 66-land, 2-land)” (registered in Ministry of Justice of Ukraine 14.12.1998 № 788/3228) (Official Gazette of Ukraine, 2002).

RESULTS AND DISCUSSIONS

Actual functional use of land plots for the purpose of unambiguous diagnosis while verifying compliance with the requirements of law should be carried out in such directions:

- 1) Agricultural production (planting of crops, including perennial grasses and pure fallow lands, greenhouses and perennial plantings);
- 2) Current construction work, exploration, prospecting and other activities;
- 3) Constructing of industrial facilities, roads;
- 4) Development of residential buildings, boarding houses, commercial and trade objects, sports facilities, camping, camp sites, guesthouses, rest houses, garden and country houses with economic buildings and yards;
- 5) Open mines, quarries, mines and related facilities;
- 6) Landfill sites of all kinds.

The noted directions of functional use of land plots or their parts can be clearly qualified by state control inspector after use and protection of land in nature (in a location), it is also possible to determine their consistency with the intended purpose of land, established on the basis of relevant decisions of State and local government bodies .

Calculation of the excess annual average income resulting from the actual functional use

of land that does not meet its intended purpose is considered to be the difference between the average annual income from actual functional use of land and normative annual average income from land use of this category on the main purpose.

Actual calculation is based on formula 2:

$$EAInt = NAInt - NAIt \quad (2)$$

where:

EAInt - excessive average annual income resulting from the actual functional use of land from non-targeted use of land, UAH/ha;

NAInt - normative average annual income from actual functional use of land plots, which fit targeted use, UAH/ha;

NAIt - normative average annual income from targeted use of land, UAH/ha.

The methodological problem of such approach is calculating of excess average annual income as a result of actual use of land plots for agricultural needs, as calculating of average annual income from their use is less, than normative average annual income from all other categories of land, and excess normative income, respectively, should have negative value. It is obvious, that in this case, the technique used in the current regulatory framework should be applied, which is used in the current normative basis, in particular, for evaluating of forested land in steppe area, where the responding rent has negative value, and the income is equal to a known rate – cost for cultivation of forest. It means, that in our case it may be considered possible to equalize excess average annual income to known rate - normative average annual income (Ievsiukov and Openko, 2014; Martynet et al., 2019).

Estimated average annual income from land development by industry, roads is accepted as equal to normative average annual income from industrial land, transport, communication, power industry, defence and other purposes.

Estimated average annual income for other categories of land is taken with the application of a procedure coefficient of normative monetary evaluation of non-agricultural land (except land in built-up areas), that was approved by State Geocadaster (State Land Committee of Ukraine), Ministry of Agrarian Policy and Food of Ukraine, Ministry of

Construction, architecture and housing and communal services of Ukraine, State Forest Resources Agency of Ukraine, State Agency of Water Resources of Ukraine, National Academy of Agrarian Sciences of Ukraine of 27.01.2006 № 19/16/22/11/17/12, such as:

- commercial and another highly profitable use - 2.5;
- current constructing, minerals research – 0.5;
- open development, carriers, mines and related buildings - 1.2;
- landfills and waste dumps - 0.65.

Excessive income as a result of actual functional use of land appointed for industry, transport, communication, power industry, defence and others for unauthorized building development of industries, taken for the used approach, must be zero, it is appropriate to adopt half of the normative average annual income in this category.

In determining the extra-normative income, regional differences should also be taken into account in its formation, since the above figures are averages for Ukraine, and in certain regions there may be significant differences in the persistence of the land, compared to the national average.

Such differences must be taken into account according to the relevant coefficient (Table 1). According to Land Code of Ukraine (2002) such territories with special regime are allocated:

- protective zones around valuable natural sites;
- protective zones around objects of cultural heritage;
- protective zones around hydro meteorological stations;
- special valuable agricultural land;
- around sanitary (mountain-sanitary) protection, on territories of areas of health resorts and spas;
- coastal protection strips along rivers, around reservoirs and on islands;
- coastal protection strips along seas, bays and lakes, estuaries and other reservoirs, and on islands in inland waters;

- water protection zones along seas, around lakes, reservoirs and other bodies of water ;
- protection zones of surface, above-ground and underground pipelines;
- protective zones along air and underground cable lines, which pass outside built-up areas, as well as around broadcasting facilities and radio relay lines;
- protective zone along air and underground cable of power lines;
- defensive, protective and other zones with special conditions use around military and other defensive objects;
- exclusion and unconditional (compulsory) removal zones, which have been exposed to radioactive contamination as a result of the Chernobyl disaster;
- a sanitary protection zone around facilities with underground and open water supply sources, water and wastewater treatment plants, water and sanitation facilities;
- sanitary protection zones around objects which are sources of harmful substances, odors, elevated noise levels, vibrations, ultrasonic and electromagnetic waves, electronic fields, ionizing radiation etc.;
- frontier line along the State border of Ukraine;
- territories without particular use of land.

The main aim of setting up such territories is protection and defence of valuable natural and other objects from adverse, anthropogenic influence or opposite - protection of land from objects, causing adverse effect on the environment (Table 1).

For the coefficient, that takes account of the restrictions (encumbrances), which determine the particular use of the land (Co), it is appropriate to base an expert assessment of the severity of the damage, caused by inappropriate use of land (Table. 2).

Table 1. Calculation of coefficients that take into account regional differences in the generation of excess annual average income resulting from the actual functional use of land that does not meet its intended purpose

No	Administrative-territorial entities	Index area of land (except housing and public land), thousand ha	Approximate normative average annual income (excluding housing and public land), thousand UAH	Approximate normative average annual income (excluding housing and public land), UAH/ha	Ratio of the estimated normative average annual income by oblast to the average for Ukraine
1	Autonomous Republic of Crimea	2541.8	6905972.9	2716.96	1.26
2	Vinnyska	2556.9	4990765.4	1951.89	0.90
3	Volynska	2016.7	4971674.9	2465.25	1.14
4	Dnipropetrovska	3067.2	6839934.5	2230.03	1.03
5	Donetska	2521.2	6905579.8	2739.00	1.27
6	Zhytomyrska	2891.6	6296532.0	2177.53	1.01
7	Zakarpatska	1374.9	3389939.8	2465.59	1.14
8	Zaporizka	2687.2	5407956.9	2012.49	0.93
9	Ivano-Frankivska	1587.2	4403686.3	2774.50	1.28
10	Kyivska	2705.1	5932685.1	2193.15	1.01
11	Kirovohradska	2396.1	4648680.8	1940.10	0.90
12	Luhanska	2454.7	5438944.4	2215.73	1.02
13	Lvivska	2199.6	4874531.5	2216.10	1.02
14	Mykolayivska	2390.8	4399580.8	1840.21	0.85
15	Odeska	3249.1	6381475.0	1964.08	0.91
16	Poltavska	2825.0	5942269.5	2103.46	0.97
17	Rivnenska	2019.4	4400116.3	2178.93	1.01
18	Sumska	2418.6	4402692.6	1820.35	0.84
19	Ternopil'ska	1437.7	2849319.5	1981.86	0.92
20	Kharkivska	3059.4	6269290.0	2049.19	0.95
21	Khersonska	2805.2	5401843.9	1925.65	0.89
22	Khmelnyska	2273.7	3935535.0	1730.90	0.80
23	Cherkaska	2028.4	4395002.9	2166.74	1.00
24	Chernivetska	837.7	1386442.5	1655.06	0.76
25	Chernihivska	3224.8	6052724.0	1876.93	0.87
26	Kyiv	94.6	1637047.1	17304.94	7.99
27	Sevastopil	107.8	935052.5	8673.96	4.01
	Total (average)	59772.4	129395275.5	2164.80	1.00

Source: own calculations.

Table 2. The coefficient, that considers the limitations (strains), which define a special regime of land use

Territories with special regime of land use	The severity of harm, caused by inappropriate use of land	Expert value of coefficients that take account of restrictions (encumbrances) that determine the particular use of the land (Co)
Sanitary protection zone around facilities with underground and open water supply sources, water and wastewater treatment plants, water and sanitation facilities	Extreme damage: there is a risk of deterioration of drinking water sources, irreversible loss of water facilities	6
Coastal protection strips along seas, bays and estuaries and islands in inland waters		5
Coastal protection strips along rivers, around reservoirs and on islands		4.5
Protection zone around objects of cultural heritage	Substantial harm: a risk to	4

Around sanitary (mountain-sanitary) protection, on territories of areas of health resorts and spas	lose valuable natural objects , endangering the country’s sovereignty	4
Protection zone around valuable nature objects		3.5
Frontier line along the State border of Ukraine		3
Especially valuable agricultural land	Moderate harm: there is a risk of loss of particularly productive soils, accidents, disruption of the State observation system and radiation safety	2.5
Protection zones of surface, above-ground and underground pipelines		2.5
Protective zones around hydro meteorological stations		2
Exclusion and unconditional (compulsory) removal zones, which have been exposed to radioactive contamination as a result of the Chernobyl disaster		2
Water protection zones along seas, around lakes, reservoirs and other bodies of water		1.5
Protective zones along air and underground cable lines, which pass outside built-up areas, as well as around broadcasting facilities and radio relay lines	Low damage: there is a risk of deterioration of water bodies, deterioration of health of people who are regularly on land plots, tasks of harm to national security	1.5
Protective zone along air and underground cable of power lines		1.5
Defensive, protective and other zones with special conditions use around military and other defensive objects		1.5
Sanitary protection zones around objects which are sources of harmful substances, odors, elevated noise levels, vibrations, ultrasonic and electromagnetic waves, electronic fields, ionizing radiation, etc.		1.5
Territories without particular use of land		No particular damage

Source: own suggestions.

Thus, extent of the damage, caused by inappropriate use of land plot, is determined by formula (3), (Openko et al., 2019; Openko et al., 2020):

$$DIU = Siu \times 0.33 \times (NAIAU + EAIAU \times Kr) \times Krp \times Ki \quad (3)$$

where:

DIU - damage extent, caused by inappropriate use of land plot, UAH;

Siu - area, where land plot was identified to be used inappropriately, ha;

0.33 - coefficient, which takes into account the part of the normative average annual income that is redistributed through the State and local budgets.

NAIAU - normative average annual income from appropriate use of land, UAH/ha;

EAIAU - excessive average annual income due to the actual functional use of land that does not meet its intended purpose, UAH/ha;

Kr - coefficient that takes into account regional differences in the generation of excess average annual income resulting from the actual functional use of land that does not meet its intended purpose;

Krp - coefficient that takes into account restrictions (encumbrances), that determine the particular use of the land;

Ki - indexation factor of the normative monetary valuation of land.

CONCLUSIONS

As a result of these offences, the State and the territorial communities are losing considerable resources from non-payment of land fees at various levels, through unauthorized and misappropriation of land, degradation of the quality of the fertile soil, etc. Inappropriate use of land plot violates the principle of the targeted use of land and causes losses, which are defined as, firstly, the loss of income that a person might have earned from the use of the land and, secondly, the improper generation of additional income from unauthorized actual use of the land; that doesn't meet its target.

Citizens and legal entities are subject to civil, administrative or criminal liability in accordance with the law for failure to comply with the requirements concerning the targeted use of land. Under article 56 of the Law of Ukraine “On the Protection of Land”, damage

caused by a violation of the legislation of Ukraine on the protection of land is subject to full reparation.

Compensation for damages caused by a violation of the land law does not relieve the offender(s) of the need to compensate real damages, i.e., to carry out, at his own expense, measures to eliminate the consequences of the violations in the shortest period of time, including demolition of buildings, houses and structures, as well as site restoration.

Such principles of land law should be taken into account when justifying the harm caused by the diversion of land, as priority of agricultural land use; purpose-oriented land use; stability of land use; principle of rational land use.

The basis for determining the amount of damage caused by the inappropriate use of land is the sum of relevant loss of the normative average annual income from the targeted use of land and the excess annual average income from actual functional use of land, which does not meet its target.

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REFERENCES

- Budziak, V.M. (2008). Establishment of agricultural land market. *Ekonomika AIC*. Vol. 8, pp. 118–122 (in Ukrainian).
- Dyptan, S.A. (2009). Scientific principles of a mechanism for monitoring land use and protection. *Zemleustriyikadastr*. Vol. 2, pp. 80–83 (in Ukrainian).
- Dyptan, S.A. (2008). Establishment of state control over use and protection of land in Ukraine and its current tasks. *Scientific Bulletin of National Agricultural University*. Vol. 128, pp. 54–59 (in Ukrainian).
- Dobriak, D.S., Babmindra, D.I. (2006). Ecologically-economic principles of reforming under market conditions. Kyiv: Urozhai, 336 p. (in Ukrainian).
- Dobriak, D.S., Vitvytska, V.M. (2009). Conceptual principles for the development of a methodology for resource monetary valuation of land plots as an important component in improving market-based land relations at the regional level. *Zemleustriyikadastr*. Vol. 1, pp. 41–51 (in Ukrainian).
- Land Code of Ukraine (2002). *Visnyk Verkhovnoyi Rady Ukrainy*. Vol. 3–4. Art. 27.
- The Code of Administrative Offences of Ukraine (1984). *Visnyk of Verkhovnoyi Rady Ukrainy*. Vol. 51. Art. 1122.
- Leonets, V.O. (2001). Current problems of land management and protection. *Zemlevporiadnyvisnyk* Vol. 1, pp. 41–45 (in Ukrainian).
- Martyn, A.G. (2008). Modern classification of land plots by target. *Zemleustriyikadastr*. Vol. 2, pp. 12–36 (in Ukrainian).
- Martyn, A.G. (2007). Modern problems of classification and setting of target for land plots. *Zemlevporiadnyvisnyk*. Vol. 6. pp. 28–34 (in Ukrainian).
- Official Gazette of Ukraine. (2002). Approval of forms of State act on the right to ownership of a land parcel and of a State act on the right to permanent use of a land parcel: Decision of the Cabinet of Ministers of Ukraine of 2 CEVNI. Vol. 14. Art. 753.
- Ievsiukov, T., Openko, I. (2014). An Inventory Database, Evaluation and Monitoring of Especially Valuable Lands at Regional Level in Ukraine. Abstracts. *3rd International Geography Symposium, Geomed 2013*. Volume: 120 Pages: 513-523. DOI: 10.1016/j.sbspro.2014.02.131.
- Martyn, A., Openko, I., Ievsiukov, T., Shevchenko, O., Ripenko, A. (2019). Accuracy of geodetic surveys in cadastral registration of real estate: value of land as determining factor. *18th International Scientific Conference. Engineering for Rural Development, 22-24.05.2019 Jelgava, LATVIA*. pp. 1818–1825.
- Openko, I., Shevchenko, O., Zhuk, O., Kryvoviaz, Ye., Tykhenko, R. (2017). Geoinformation modelling of forest shelterbelts effect on pecuniary valuation of adjacent farmlands. *International Journal of Green Economics*. Vol. 11, issue 2, pp. 139–153.
- Openko, I., Shevchenko, O., Tykhenko, R., Tsvyakh, O., Stepchuk, Ya. (2019). Economic analysis of deforestation impact on the yield of agricultural cultures in Ukraine. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*. Vol. 19, Issue 4, pp. 233–237.
- Openko, I., Shevchenko, O., Tykhenko, R., Tsvyakh, O., Moroz, Yu. (2020). Assessment of inequality to forest resources access in the context of sustainable rural development. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*. Vol. 20, Issue 1, pp. 405–410.