

ENVIRONMENTAL POLICY AND LAND MANAGEMENT IN RURAL AREAS OF UKRAINE

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Abstract

The research studies the issue of ecological stability of rural territories that is the most important component of the national environmental policy of Ukraine. A special attention is paid to degradation of arable lands as the main ecological problem of land management. On the example of Lviv region, the authors calculated the index of ecological nonconformity of current use of arable lands, proving a considerable excess of permissible ploughing of lands in the region. The carried analysis confirms that no measures were performed concerning land protection, including conservation that in the recent years. In this context it is necessary to improve land resources management on the basis of sustainable development. Integration is considered to be the main principle of land resources management. The research proves that solution of ecological problems of land management requires achievement of a set of coordinated targets concerning development of rural territories, land resources management and national environmental policy based on the principles of suitable development. The targets include: planning of land use outside settled areas on the landscape and ecological basis; land inventory; formation of the land bank of agricultural lands; development and support of alternative kinds of activity on rural area; development of an efficient mechanism to encourage performance of land protection measures; improvement of environmental responsibility of population and development of ecological education.

The methodological basis of the research is the concept of sustainable development, which expects support for a continuous character of development in order to meet the current needs along with ensuring the needs of future generations. The fulfilment of the task requires examination of scientific works on the issue of sustainable management of land resources and an ecological component of rural territory development.

Key words: degraded and unproductive arable land, rural development, land protection, sustainable land management.

Introduction

Important components of the state regional policy of Ukraine include development of rural territories and establishment of an efficient system of environmental protection. The two targets are substantially connected, because an area of agricultural lands occupies 70.8 % (among the total of agricultural lands, arable lands take 78.4 %) in the structure of land fund of Ukraine. It makes a considerable impact on ecological conditions of the environment within the rural territories, i.e. the territories outside the towns. Rural territories in addition to agricultural lands include water bodies, swamps, forests, shrubs, constituting together 90% of the land fund of the country (Rozvytok silskyh terytorii ..., 2011).

National environmental policy of Ukraine is focused on stabilization and improvement of the environment by integration of that policy into social and economic development and introduction of an ecologically balanced system of land management (Pro Osnovni zasady ..., 2010). On the way, the important stage is to make space planning of the territory development, which expects the measures focused on formation of stable communities by means of physical organization of space according to the general strategy of the region development with maximum consideration of natural potential of the territories (Parsova V., Stoiko N., Kryshenyk N., 2018).

For this reason it is needed to regulate the relations in the field of nature management through the Integrated natural resource management (INRM) secured by the state, self-government and public institutions, which perform organizational and managerial, coordinative, advisory, controlling and other functions in the direction of efficient employment and protection of natural resources (Meine van Noordwijk, 2017; Lovell C., Mandondo A., Moriarty P., 2002). Such management is carried out both at the regional level and at the level of separate communities.

On the rural territory of Ukraine, land is the principal natural resource of economic and social value. Since 1992 it has become the object of property right. Consequently, denationalization of agricultural

lands and parcelling of collective farms has caused the situation when agricultural lands are divided into more than 10 million land parcels, transferred to private ownership. The state has introduced economic mechanisms of land relations regulation by payment for land, land assessment and economic responsibility during land use or for violation of land laws. Nowadays one can observe establishment of land market and circulation of agricultural lands (Natsionalna dopovid ..., 2015).

However, such social and legal changes in Ukraine have still little influence on development of well-being, firstly, of rural population. Moreover, one sees a permanent tendency of deterioration of ecological conditions of land resources. According to the data of the Food and Agriculture Organization of the United Nations (FAO), degraded and unproductive arable lands take above 20 % of the total area on Ukraine. Depending on the degradation degree, 300-600 million tons of soil are lost annually due to soil erosion. It causes fall of yields of agricultural crops, but losses due to products deficiency account for 20 billion UAH (approximately 759 million USD) annually (FAO kicks off project..., 2018).

For Ukraine, it is important to stop land degradation, improve stability of ecosystems and reduce anthropogenic load on the environment in the regions. Thus, the strategic goals of the national environmental policy include reduction of the area of arable lands, consideration of environmental requirements in land use, introduction of the system of management of agro-landscapes by means of forest-melioration methods on the basis of sustainable development (Pro Osnovni zasady ..., 2010).

Minimization of land degradation, reclamation of degraded land, support for sustainable employment of land resources can be secured by implementation of Sustainable Land Management (SLM). Sustainable Land Management is considered as “the use of land resources (including soils, water, animals and plants) for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions” (Sustainable Land Management..., 2017).

Such use of land meets the changing human needs (agriculture, forestry, conservation) and ensures long-term socioeconomic and ecological functions of the land (Dumanski, J., Gameda, S., Pieri C., 1998). It is a system of technologies and/or planning, which aims to integrate ecological principles with socio-economic and political ones in the management of land for agricultural and other purposes in order to achieve intra- and intergenerational equity’ (Dumanski J., 1994).

The aim of the article is to demonstrate how the national environmental policy and land resources management can support sustainable development of land management in rural territories of Ukraine. To reach the goal, the following tasks were performed: the analysis of ecological conditions of arable lands and their protection on the example of Lviv region; the description of the main principles of land resources management on the basis of sustainable development. Consequently, a set of strategic targets is proposed for improvement of ecological stability of land management in rural territories.

Methodology of research and materials

The methodological basis of the research is the concept of sustainable development, integrating three components, particularly economic, social, ecological. The work considers one of the principles of the concept of sustainable development, i.e., to ensure a sustainable and long-term character of development to meet the needs of the present generation, while simultaneously securing the possibility of the future generation to satisfy their needs (Jonathan M. Harris, 2000; Sustainable use ..., 2005). The stress is put on greening of land management by combination of the tasks of sustainable land resources management, environmental policy and development of rural territories.

The abstract and logical method, theories and hypotheses about sustainable development and greening of land use have been used to solve the issues of improvement of ecological stability of rural territories, to develop conclusions and give recommendations on their basis. The monographic method was applied for the analysis of negative ecological phenomena in agricultural land use. The method helped to analyze current conditions of arable land use and to specify potentially dangerous factors of land degradation, as well as to apply the obtained results while developing recommendations for improvement of ecological stability of land use in rural area. The graphic method was used for visual presentation of the data which constitute the studied statistical aggregate, and for depiction of their linear dependence.

Ecological aspects of land management on rural territories were investigated on the examples of Lviv region located in the west of Ukraine. It occupies 3.6 % of the territory (2183.2 thousand ha). In the structure of its lands the largest share is taken by agricultural lands, i.e., 58 % of the territory, forests – 32 %, built-up lands – 5 %. The index of the territory reservation accounts for 7.2 %. In spite of the fact that anthropogenic load on land resources is less in Lviv region than generally in Ukraine (ploughing of land in the region constitutes 32 %, while in Ukraine the average figure is 54 %), the processes of land degradation still occur in the region. The common kinds of degradation of arable lands include erosion (24.3 % of the total area) and blowout (18.1 % of the total area). In the territory of the region there are also 12,040.61 ha of deteriorated lands, 8,273.68 ha of low-productive lands, 736.5 ha of industrially polluted lands, 2,236.30 ha ravines¹.

Anthropogenic load on landscapes causes a reduction of biodiversity and deterioration of ecological balance (Matson P.A. et al., 1997). Arable lands are the most ecologically sensitive among all agricultural lands. For optimization of land management it is reasonable to determine the index of ecological nonconformity of current use of arable land (I_{in}) and excess of permissible ploughing (E) (Kanash O., 2013). The authors of the article performed calculations on the example of Lviv region (Table 1) according to the following formulas:

$$I_{in} = T_a / A \quad (1)$$

$$E = (I_{in} - 1) \cdot 100 \quad (2)$$

Where T_a – is the total (recorded) area of arable lands, ha; A – is the area of lands, available for arable farming, ha, calculated by the formula:

$$A = T_a - (D + S_d) \quad (3)$$

Where D – is the area of degraded and low-productive arable lands, ha; S_d – is the area of soil, which can be easily subjected to degradation under intensive employment, ha (arable land parcels with medium-washed soils on $> 3^\circ$ slopes).

On an average in Ukraine, the index of ecological nonconformity of current use of arable lands constitutes 1.17 (Dobriak D., Kuzin N., 2016). Comparison of the indicator with Lviv region proves that excess of permissible ploughing in the region is by 36% more than the average in Ukraine. The higher the index of ecological nonconformity of current use of arable land (I_{in}) is, the more the excess of permissible ploughing (E) is. In Peremyshliany district the indicators are the highest and constitute 3.2 and 221.2, while in Stryi district, they are the lowest, i.e., 1.1 and 9.4 respectively.

Excess of permissible ploughing in Lviv region is described by a linear dependence $y = 1.3219x + 47.124$ (Fig. 1). The study of the dependence of excess of permissible ploughing (E) on the index of ecological nonconformity of current use of arable lands (I_{in}) confirms that the structure of arable lands includes a considerable area of degraded lands, which have lost their model properties due to excessive anthropogenic load (eroded, secondary salted and alkali, waterlogged or dried), or low-productive lands, which have been employed in agricultural production under conditions of extensive arable farming, regardless their poor fertility (too light or heavy soils by their granular content, skeleton, salted and alkali, waterlogged and overwatered).

Thus, in Lviv region, excess of land ploughing constitutes 53.5 %. It grounds the need to introduce the measures concerning protection of arable lands. The authors of the article consider that in that case it is important to perform the measures of land conservation as well as phyto- and forest- melioration. However, the analysis of implementation of the regional program of use and protection of lands in Lviv region argues that since 2012 measures of land conservation have not been performed². It is a

¹ According to data of the Main Department of State Office of Ukraine on the issue of geodesy, cartography and cadastre in Lviv region as of 01/01/2017

² According to data of the Main Department of State Office of Ukraine on the issue of geodesy, cartography and cadastre in Lviv region as of 01/01/2012

negative practice because conservation is an important measure of environmental protection (Spencer R. Meyera et al., 2014).

Discussions and results

In 2014 Ukraine initiated the process of power decentralization and establishment of amalgamated territorial communities. Thus, the issue of land protection is of an urgent importance because efficient development of the territories is possible under conditions of comprehensive employment of land resources. The authors of the article consider that interruption of soil degradation and performance of the measures concerning land protection require improvement of the system of land resources management on the basis of sustainable development and integration of the system into social and economic development of the communities. Inter alia, land resources management should be based on the following principles:

- integration (to combine social and economic tasks with ecological problems of the territories at the state, regional and local levels);
- subsidiarity (land resources management should be “bottom-up” organized, i. e., all problems, which can be efficiently solved at the local level, should stay within the competence of municipal authorities);
- inter-sector character (to consider the needs of all sectors of activity, e.g., agriculture, recreation, environmental activity, etc.);
- generation approach (to employ land resources by the present generation, considering the needs of future generations); inter-generation approach (to consider the needs for land resources by different social groups);
- publicity (to secure a free access to the information about land resources conditions).

Table 1

Calculation of the index of ecological nonconformity of current use of arable lands within the boundaries of Lviv region³

Administrative district	Total area of arable lands, ha (T _a)	Area of degraded and low-productive arable lands, ha (D)	Area of the soils, which can be easily subjects to degradation under intensive employment, ha (S _d)	Area of lands, available for arable farming, ha (A)	Index of ecological nonconformity of current use of arable lands (I _{in})	Excess of permissible ploughing of lands, % (E)
Brody	42,381.2	5,563	10,525	26,293.2	1.61	61.2
Busk	36,008.5	2,381	4,477	29,150.5	1.24	23.5
Horodok	36,871.1	242	11,511	25,118.1	1.47	46.8
Drohobych	3,722.6	291	12,054	24,876.6	1.50	49.6
Zhydachiv	44,187.1	1,281	11,854	31,052.1	1.42	42.3
Zhovkva	56,490.4	1,740	17,531	37,219.4	1.52	51.8
Zolochiv	46,170.4	2,296	10,156	33,718.4	1.37	36.9
Kamianka-Buzka	40,090.1	971	4,864	34,255.1	1.17	17.0
Mykolaiiv	22,518.5	2,187	3,936	16,395.5	1.37	37.3
Mostyska	45,038.6	3,169	19,571	22,298.6	2.02	102.0

³ According to data of the Main Department of State Office of Ukraine on the issue of geodesy, cartography and cadaster in Lviv region as of 01/01/2012

Administrative district	Total area of arable lands, ha (T _a)	Area of degraded and low-productive arable lands, ha (D)	Area of the soils, which can be easily subjects to degradation under intensive employment, ha (S _d)	Area of lands, available for arable farming, ha (A)	Index of ecological nonconformity of current use of arable lands (I _{in})	Excess of permissible ploughing of lands, % (E)
Peremyshliany	37,865.1	1,354	24,723	11,788.1	3.21	221.2
Pustomyty	47,705.7	724	14,813	32,168.7	1.48	48.3
Radekhiv	49,464.8	11,555	8,513	29,396.8	1.68	68.3
Sambir	44,593.5	14	12,619	31,960.5	1.40	39.5
Skole	12,891.8	86	4,341	8,464.8	1.52	52.3
Sokal	63,668.7	6,004	20,916	36,748.7	1.73	73.3
Staryi Sambir	38,338.1	2,445	16,684	19,209.1	2.00	99.6
Stryi	31,761.5		2,717	29,044.5	1.09	9.4
Turka	21,635.8	334	10,346	10,955.8	1.97	97.5
Yavoriv	35,790.8	469	10,172	25,149.8	1.42	42.3
Total in the region	790,693.3	43,106	232,323	515,264.3	1.53	53.5

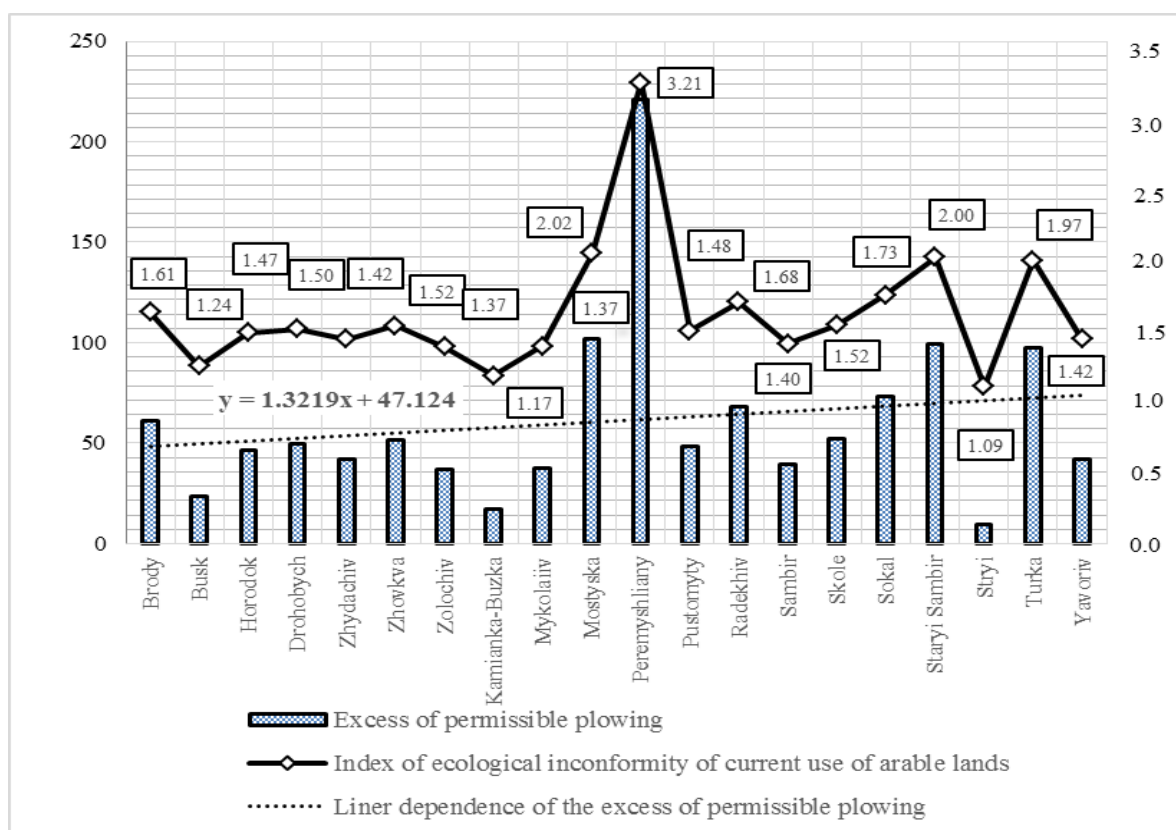


Fig. 1. Liner dependence of the excess of permissible ploughing on the index of ecological nonconformity of current use of arable lands (developed by the authors).

The system of land resources management should secure the decisions which would be beneficial for: land-owners and land-holders (profit from land use); local self-government (a land tax); the state generally (food and ecological safety). In its turn, all subjects of land relations should focus their efforts to support sustainable land management. However, an important position is occupied by a combination of managerial functions in the field of land relations with the tasks of development of territorial communities and national environmental policy (Fig. 2).

It is proposed to make planning of land use outside settled areas on landscape and ecological basis, i.e., landscape and ecological zoning of lands, to improve ecological stability of rural territories in Ukraine. Such zoning will help to define types of land use according to ecological and economic suitability for different kinds of land use. Each type of land use is characterized by territorial restrictions in land use according to the standards and norms in the field of land protection, as well as technological parameters of soil-protective arable farming. Such a step will determine the land areas, which require land protection measures, particularly phyto- and forest-melioration, including withdrawal for permanent conservation.

A considerable share of degraded lands is in private property in the forms of land parcels (shares). It makes the process of extraction of such lands more complicated and requires introduction of an efficient mechanism of performance of land protection measures.

Concerning the fact that in Ukraine a considerable share of land fund is employed in agricultural use, demonstrating incorrect land management that is the principal reason of land degradation, particularly soil erosion, it is important to motivate land-owners and land-holders to make conservation of the agricultural lands using the principles of good will and stimulation. Referring to the foreign experience (Stoiko N., 2014), conservation easement, i.e., agro-protective agreement between landowners and the state or local authorities, is an efficient instrument in the direction. Conservation easement expects restriction of some kinds of land use or suspension of any activity on the land for an indefinite period (mainly a long-term one) or forever only on the basis of a good will. Land can be transferred for protection free of charge, as well as can be sold by a landowner with a determined compensation. Such easements help owners to keep the right of private property, to live on their own land, to carry environmentally safe use of their own land and get tax privileges.

For Ukraine it is important to introduce the methods of indirect economic stimulations for business entities concerning implementation of the measures of land protection as well as their conservation. Such methods can include granting of payment for the land parcels, which are at the stage of revival or intended for phyto- or forest belts, granting of payment for the land parcels, which are under temporary conservation; tax privileges for the land parcels under permanent or long-term conservation, tax privileges by means of accelerated depreciation. Those methods do not need considerable funds from the state or local budgets.

Local authorities should initiate land inventory for obtaining of reliable information about quantity and quality conditions of lands, as well as for control of land use and protection. The land inventory will make a basis for the register of unproductive lands and development of the measures concerning their perspective employment (growing of energy crops, re-naturalization of lands, etc.). It is also necessary to develop an economic mechanism in order to stimulate performance of land protection measures, for example, the tax breaks for farmers, who keep to the requirements concerning land protection, who run organic arable farming or develop animal breeding. A substantial attention should be paid both by local authorities and by the state to development and support for alternative kinds of activity on rural territory (rural tourism, ecological tourism, fishing, hunting and others).

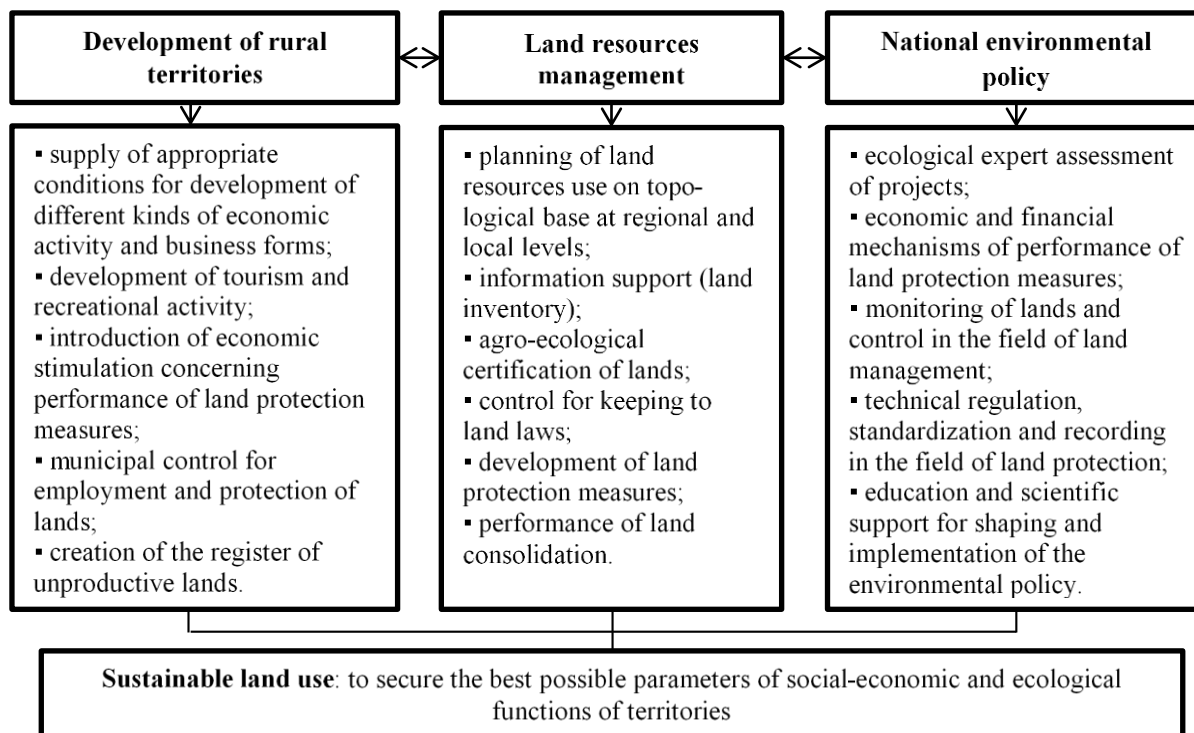


Fig. 2. Strategic goals concerning improvement of ecological stability of land use on rural territories (developed by the authors).

The national environmental policy should be focused on organization, regulation and control of activity of the society and the state for an efficient combination of the functions of land use and protection to secure appropriate living environment for the current and future generations. The main targets of environmental policy in the field of land use should include: control for keeping to the standards and rules of rational use and protection of lands (while a law-breaker pays a fine and compensates the harm committed to land resources and environment); introduction of an efficient mechanism to encourage and support performance of land protection measures by development of state and regional programs of land protection with a rigid control for the intended use of the funds appropriated for such measures; improvement of ecological responsibility of population and ecological respect to nature management by separate landowners, land-users and communities.

It is proposed to develop programs concerning protection and reclamation of land resources by means of land conservation. The programs should be coordinated by the Ministry of Ecology and Natural Resources of Ukraine. They can be various, but the principal goal is to reproduce the valuable vegetation layer in order to prevent soil erosion, to improve the quality of water, to reduce losses of living environment for wild animals and birds, to support appropriate conditions of forests and water-swamp lands.

Conclusions and proposals

1. In Ukraine degradation of agricultural lands, mostly arable ones, is a serious challenge for sustainable development of rural territories. It is caused by a high level of economic use of the territory. On average in Ukraine, the index of ecological inconsistency of the current use of arable land constitutes 1.17. In the studied region, i.e., Lviv region, the indicator is by 36 % higher and constitutes 1.53.
2. Sustainable development of land use in rural territories of Ukraine requires introduction of the tools of sustainable management of land resources, which would integrate the targets of environmental policy into social and economic development of territorial communities. The authors of the article consider that planning of land use outside the settlements on the topographic and ecological basis is an important instrument, which expects specification of ecologically sensitive land parcels and setting of territorial restrictions concerning their employment.

3. It is stressed that land conservation, including degraded and low-productive arable lands, is an essential measure for improvement of ecological stability of rural territories. It is recommended to apply the methods of indirect economic stimulation (tax privileges and granting of payment for land) to motivate business entities to introduce the measures of land protection and conservation.
4. The state environmental policy should plan development and introduction of the target environmental programs of agro-ecological focus, which would be coordinated by the Ministry of Ecology and Natural Resources of Ukraine.

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