

Concept of „green” land accounting within the context of the state-of-the-art rent theory

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Abstract

Growing interest of the global community to environmental imperative of sustainable development poses a problem of recording the systemic interrelation between natural environment resources and economic results both at the macrolevel within the system of national accounts, and at the microeconomics level – within the accounting system of an individual organisation. However, at the moment there is no accounting of the impact of separate organisations on land resources used in economic activity and natural capital of the whole country based on environmental and anti-environmental land rent. The article offers a concept of „green” land accounting in the context of the state-of-the-art rent theory within the framework of which the following is substantiated: the methodological principle of direct dependence of an organization’s equity on its contribution to re-production of a country’s natural capital as a part of its national wealth; the essence of environmental and anti-environmental land rent as objects of accounting; the necessity to apply the dynamic theory of balances provisions for land accounting; the method for determining, accounting and re-reporting of environmental and anti-environmental land rent. The proposed system ensures creation of an information base for rational and inexhaustible land use management of an organisation meeting the requirements of sustainable development.

Keywords

business accounting, land, environmental land rent, anti-environmental land rent, natural capital employed, additional environmental (anti-environmental) capital

Introduction

Land is an important natural and economic resource which efficient use and protection to a large extent determine social, economic and ecological situation in a country. Rational use of natural resources and conservation of healthy environment is a priority direction in sustainable development of contemporary society. At the same time it should be noted that there is no accounting of economic activity impact on the state of natural resources. This causes a contradiction between strategically important necessity in intensive use of natural resources for the purpose of food, energy, and economic security of a country and adverse changes in the environment which arise at their use and lead to reduction of natural and economic potential of territories and creation of environmental threats.

The aim of investigation is development of land accounting concept which will enable forming information on changes in land value as environmental assets (environmental depletion, environmental growth), availability of environmental (anti-environmental) capital as contribution to the reproduction of a country's natural capital with the aim of preventing adverse development of economic activity de-ecologization and ensuring efficient inexhaustible nature management. The aim of investigation – accounting environmental aspects of land use. Methods and results of the research - analysis of scientific papers, system approach, analysis, synthesis, logical generalization, simulation, comparison.

Approaches to „green” accounting. Many native and foreign authors stress the necessity of evaluation and accounting of environmental aspects in an organization's activity. Publications analysis allows to draw conclusion on the one hand of the focused attention of the global community to the necessity of accounting the impact of an organization's activity on the state of natural environment, and on the other hand, of diverse attempts on accounting ecologization (different in targets, objectives, criteria of research, type of data evaluation and method of their reporting).

Thus, one of directions are suggestions on segregation in accounting of capital investment on environment-related activity, environmental costs and liabilities with the purpose of forming information on an organization's environment-related activity. This position is upheld by Christophe (1994); Fichter et al. (1997); Ilyicheva (2010); Latypova (2003); Saenko (2005) and others. Integrated balance sheet with accounting for natural assets and natural capital is proposed by Shevliukov (2009), Shirobokov and Altukhova (2010), specifically recommending to assess natural capital by replacement value. The research of the following group of authors is focused on product life cycle analysis, which enables to determine the amount of environmental damage on different stages of this cycle. Such analysis implies development

of material and energy balances for the cycle stages. This approach is reflected in the work of Lamberton (2000); Müller (2010); Klöpffer and Grahl (2009); Vire et al. (2009); Boenke (2009). For this purpose the most often used are quantitative evaluations. Using quantitative valuation of environmental indicators is provided for by the Global Reporting Initiative (GRI) and proposed by such scientists as Schaltegger (1990); Gonzalez (2009), Houdet (2009). Some scientists, for instance, recommend to assess pollution and consumption of exhaustible resources in eco-points (Müller-Wenk, 1978; Braunschweig, 1988).

International organizations (UNO, World Bank, Organization for Economic Cooperation and Development and others) devote much attention to research on the issues of environmental and economic indicators integration at the level of macroeconomics, suggesting new approaches to the measurement of national wealth of countries after adjustment of economic indicators to the value of depletion of natural resources and environment pollution damage. However at the microeconomics level development of accounting methodology for the most important environmental resource – land, ensuring reporting the impact of separate organizations on land resources used in economic activity and natural capital of a country in general based on environmental and anti-environmental land rent with the aim of formation of information arrays of a totally new level for rational inexhaustible natural resource management, formation of accurate information for calculation of microeconomic indicators of adjusted net savings, environmentally adjusted domestic product and other integrated indices of a country's sustainable development, is an uninvestigated direction of accounting development within the context of noosphere concept and sustainable environmental management.

1. „Green” land accounting within the context of the state-of-the-art rent theory

For the purpose of solving the indicated problem we suggest a concept of land accounting methodology within the context of the state-of-the-art rent theory. From the perspective of system approach within the framework of the proposed concept the conducted research enabled.

To provide scientific grounds for the methodological principle of direct dependence of an organization's equity on its contribution to reproduction of a country's natural capital as part of the national wealth. With respect to land the specified methodological principle envisages overall accounting of environmental impact of land

use (positive and negative) on the basis of environmental and anti-environmental land rent.

To substantiate the essence of environmental and anti-environmental land rent as accounting items (Vegeera, 2011). Environmental land rent is a cost indicator of environmental improvement of a land plot due to improving its environmental characteristics as a result of economic management and corresponding changes in a real property item cost. However as profit on the change in a real property item cost it can be obtained only at the sale of the land plot, which directly influences the procedure of its recording in accounting.

Environmental land rent at exploitive economic management of land as a result of anti-environmental policy of an economic agent can modify into anti-environmental rent, which as an accounting item presents environmental degradation (depletion) of a land plot and leads to reduction in a real property item cost. The excess profit gained due to anti-environmental policy of an economic agent in the amount of environmental degradation (depletion) of a land plot at its sale or other retirement should be reimbursed to the state or other owner at the expense of the net profit of the economic agent that implemented anti-environmental land use.

Environmental and anti-environmental rents do not only form accurate information on environmental results of land use of an organization, but also present a basis for macroeconomic calculations of indicators of a country's environmentally sustainable development (net domestic product, adjusted net savings index).

To substantiate application of dynamic theory of balances provisions for land accounting. Taking into account the specific character of land as the most important environmental resource of any nation, as a mandatory spatial and operational basis for allocation of economic agents, basic means of production in agriculture, special item of property which absolute ownership does not apply to, the necessity to proceed from the provisions of the dynamic accounting theory and to account for all land plots in an organization's balance sheet irrespective of the form of legal control over them (availability of the right of ownership) at recording of land plots as accounting items is substantiated.

In this respect it is recommended to post land plots on the right of lease, in permanent or temporary use to a separate control account „Land plots”, sub-account – „Land plots not belonging on the basis of the ownership right” within the account group „Fixed assets”. It is substantiated that on the liabilities side of the balance sheet natural capital employed operates as a source of such assets of an enterprise, which is recommended to post to the account of the same name, where information on the amount of natural capital employed on the right of lease, in permanent or temporary use.

In the Republic of Belarus at present there is no mature land market and consequently no fair market value of many land plots. In this respect we consider it expedient at the moment of land market development and for the purpose of accounting for land plots on the right of lease, in permanent or temporary use, to apply cadastral land value. This value is at the same time a basis for establishing the land tax rate, rent, a basis for redemption value of land plots with commercial real estate and industrial enterprises, and therefore it can serve as a basis for formation of value of the stated land plots in accounting.

Accounting for land plots in an organization's balance sheet (both belonging on the basis of the ownership right and used on the basis of the right of lease, permanent or temporary use), is an important element in formation of an integral noospheric system of land accounting focused on reproduction and sustainable land resource management, as well as implementation of a scientifically grounded principle of direct dependence of an organization's equity on its contribution to reproduction of a country's natural capital as a part of its national wealth.

To develop a method for determining, accounting and reporting of environmental and anti-environmental land rent. The essence of the proposed method is in assessment, accounting and reporting of the impact of environmental land use results (land degradation or improvement) on the land value and value of an organization's equity with the aim of ensuring motivation in rational natural resource management for every economic agent.

It has been established that for adequate recording of environmental and anti-environmental rent in the accounting system simultaneous solution of two interrelated tasks is required:

- development of analytical accounting on the basis of physical indicators that reflect environmental processes of land use in quantitative and qualitative terms;
- definition of value indicators of environmental and anti-environmental land rent.

We propose to implement the solution on the basis of local monitoring data. Recorded change in environmental characteristics results in the change of land value due to creation of environmental or anti-environmental rent respectively. Land value does not change only in case when environmental characteristics are preserved, i.e. an enterprise sustains simple environmental land rehabilitation. This is schematized on the slide.

Taking into consideration that in the course of monitoring some characteristics of a land plot can improve (which monetary value is the environmental rent $R_{\text{эп}}$), and others – deteriorate (which monetary value is the anti-environmental rent $R_{\text{аэ}}$),

a resumptive value, in our opinion, will be the overall environmental and economic land use result (E), which is proposed to be defined as follows:

$$E = R_{9p} - R_{a3}. \quad (1)$$

Based on the economic essence of anti-environmental land rent scientifically grounded in chapter one, its converse expression is the environmental and economic damage. In this respect as a basis for determination of anti-environmental land rent we offer to use the current method for assessment of compensation for damage caused to the environment, developed by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus approved by the Council of Ministers of the Republic of Belarus dd. 17.07.2008 No 1042 in revision of the Resolution of the Council of Ministers dd. 31.12.2010 No 1940 (hereinafter referred to as Resolution No 1042). These methods takes into consideration types (land pollution by chemical and other substances, water and wind erosion, deterioration in land clearing condition of agricultural lands, etc.), indicators (exceeding the rate of maximal permissible concentrations and approximate permissible concentration of chemical and other substances, reduction of fertile (humic) soil layer depth etc.), and degree (low, medium, high, very high) of degradation.

2. Methods for measuring environmental and anti-environmental rent

The research enabled to elicit that methods being developed at the present time in regulatory documents and special economic literature are focused on revealing and measuring environmental harm. However an efficient system of environmental management should fulfill not only fiscal but also motivating function. From the point of view of the principle of direct dependence of an organization's equity on its contribution into reproduction of a country's natural capital as a part of its national wealth, scientifically grounded previously, not only negative but also positive contribution of each organization should be assessed. Therefore, measuring environmental land rent is of special relevance and practical importance.

Based on the method for measuring environmental damage in effect in the Republic of Belarus, that is based on revealing and monetary evaluation of degradation of land condition indicators, it seems expedient to supplement the specified method with a calculation of improvement indicators assuming as a basis degradation types, indicators and their limits, developed by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus. The proposed method for measuring environmental and anti-environmental land rent is presented in the tab. 1.

Tab. 1. Proposed method for measuring environmental and anti-environmental rent

Method for measuring anti-environmental land rent	
$R_{\text{aэ}} = \sum_{i=1}^n U_i' \quad (2)$	<p>where:</p> <ul style="list-style-type: none"> - $R_{\text{aэ}}$ – is the amount of anti-environmental land rent in roubles; - U_i – is the amount of environmental and economic damage according to degradation type i, in roubles; - n – number of degradation types
<p>It is proposed to measure the amount of environmental and economic damage (U_i) on the basis of the method for establishing environmental and economic damage currently in effect according to degradation type i, developed by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus approved by Resolution No 1042</p>	
$U_i = \max(U_{1i}, U_{2i}), \quad (3)$	<p>where:</p> <ul style="list-style-type: none"> - U_{1i} – is the amount of environmental and economic damage according to the first calculation variant; - U_{2i} – is the amount of environmental and economic damage according to the second calculation variant
$U_{1i} = T \cdot P_i \cdot K_u \cdot B, \quad (4)$	<p>where:</p> <ul style="list-style-type: none"> - T – rates in basic amounts for one square meter, hectare; - P_i – quantitative indicator of the area of degraded lands (including soils) respectively in square meters, hectares; - K_u – coefficients depending on the distance of a land plot from the city boundary, functional purpose of land, etc.; - B – basic amount value, fixed as of the date of drawing up an act on establishing the fact of damaging the environment, in Belarusian roubles
$U_{2i} = C \cdot K_n, \quad (5)$	<p>where:</p> <ul style="list-style-type: none"> - C – cadastral value of a land plot based on the cadastral appraisal report; K_n – corresponding coefficients: at low degradation degree of such lands - 0,25; medium degree - 0,5; high degree - 0,75; very high degree - 1
$R_{\text{эп}} = \sum_{i=1}^n \Pi_i' \quad (6)$	<p>where:</p> <ul style="list-style-type: none"> - $R_{\text{эп}}$ – is the amount of environmental land rent in roubles;

<p>- Π_i – is the amount of environmental and economic growth according to improvement type i, in roubles; - n – number of improvement types</p>
<p>It is proposed to measure the amount of environmental and economic growth (Π_i) by analogy with the method for establishing environmental and economic damage currently in effect (formulae 3, 4, 5), but based on indicators which characterize not degradation but improvement of a land plot</p>
$\Pi_i = \max(\Pi_{1i}; \Pi_{2i}), \quad (7)$ <p>where: - Π_{1i} – is the amount of environmental and economic improvement according to the first calculation variant; - Π_{2i} – is the amount of environmental and economic improvement according to the second calculation variant</p>
$\Pi_{1i} = T \cdot S_i \cdot K_u \cdot B, \quad (8)$ <p>where: - S_i – quantitative indicator of the area of improved lands (including soils), in square meters, hectares</p>
$\Pi_{2i} = C \cdot K_v, \quad (9)$ <p>where: - K_v – corresponding coefficients: at low improvement rate of such lands - 0,25; medium rate - 0,5; high rate - 0,75; very high rate - 1</p>

Source: own research.

Accounting environmental and anti-environmental rent allows to account for not only environmental disruptions and to deduct losses caused by them: both from financial results of an organization (microeconomic level), and from GDP, gross domestic saving, net domestic product and other indicators (macroeconomic level), but also for extended reproduction of natural capital. If economic development does not cause environmental disruption and also improves environmental conditions, negative values of environmental disruptions reverse to positive indicators that show natural capital growth in terms of environmental improvement.

In accounting the expression of environmental and economic land-use result defined on the basis of environmental and anti-environmental land rent, we offer to record on the assets side of the balance sheet as environmental degradation or environmental improvement on the account „Land Plot”. Based on the duality principle on the liabilities side of the balance sheet, in our opinion, environmental and eco-

nomical land-use result should be expressed as additional environmental (anti-environmental) capital, which we offer to post to the account of the same name „Additional Environmental (Anti-environmental) capital”.

Presence of additional environmental capital of an organization should become the most important motivating factor in a noospheric national economy. In our opinion, this indicator should have significant impact on decisions related to obtaining credit resources, tax benefits, reduction of rental payments, conclusion and extension of land plot rental agreements, etc.

At sale of a land plot „Additional Environmental (Anti-environmental) Capital” should be written off to increase or respectively to reduction in retained profit. This is determined by the fact that rent is considered as a result of natural resource management accumulated over the period of a land plot use which can change with the changes in environmental policy of an enterprise. Therefore we offer to write off environmental (anti-environmental) capital through retained profit considering this process as restructuring of the owner’s capital.

Conclusions

The proposed concept of land accounting will contribute to solving the problem of asymmetry in information of economic agents with regard to environmental aspects of land use, ensuring sustainable nature management, preservation of environmental soils functions and implementation of measures to deal with their degradation and pollution, and will be a motivating economic mechanism enabling inexhaustible rational use and protection of lands in conditions of land relations development.

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Koncepcja środowiskowej wartości nieruchomości w kontekście teorii the-state-of-the-art

Streszczenie

Wzrost zainteresowania zagadnieniem rozwoju zrównoważonego przyczynił się do uwypuklenia problemu związanego z interakcją zasobów środowiska naturalnego i ekonomicznych efektów gospodarowania w systemie rachunków narodowych w ujęciu makroekonomicznym oraz prezentowania tych aspektów w ewidencji księgowej i sprawozdawczości jednostki w ujęciu mikroekonomicznym. Aktualnie brak jest satysfakcjonujących rozwiązań w zakresie wprowadzania wartości zasobów naturalnych do ksiąg rachunkowych w kontekście aktywów niematerialnych. Należy bowiem odróżnić wartość księgową od wartości ekonomicznej oraz wartości unikalnych walorów przyrodniczych i naturalnych. Nie można bowiem literalnie traktować zapisów ustawy o rachunkowości, ale trzeba zwracać uwagę na sens ekonomiczny wyceny i wprowadzania pozycji do ksiąg rachunkowych. W artykule przedstawiono rozwiązanie ujęcia tego problemu zgodnie z teorią renty w koncepcji *state-of-the-art*: metodologiczne zasady bezpośredniej zależności kapitału własnego przedsiębiorstwa od udziału w reprodukcji krajowego produktu jako bogactwa narodo-wego; istotę renty środowiskowej nieruchomości jako przedmiotu rachunkowości; konieczność stosowania dynamicznej teorii bilansowych zabezpieczeń w rachunkowości nieruchomości; metodę ustalania, księgowania i raportowania renty zasobów środowiskowych nieruchomości. Zapropionowana koncepcja zapewnia stworzenie systemu służącego racjonalnemu wykorzystaniu nieruchomości jako dobra narodowego w ewidencji księgowej firmy zgodnej z zasadą zrównoważonego rozwoju.

Słowa kluczowe

rachunkowość organizacji, grunt, renta gruntowa środowiskowa, renta gruntowa anty-środowiskowa, kapitał naturalny, dodatkowy środowiskowy (antyśrodowiskowy) kapitał

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