Mykhailo Gazuda

SUSTAINABLE USE AND CONSERVATION OF RENEWABLE NATURAL RESOURCES

Definition of approaches to sustainable use and conservation of renewable natural resources should be referred to as a system of actions aimed to face unbalance challenges in social-economic and economic interests and conserve natural resources from any harmful influence, destruction, wreck or devastation.

A range of laws and other legal acts is directed at determination of legal guarantees of sustainable use and conservation of certain kinds of natural resources in Ukraine. The following Laws of Ukraine refer to this problem: "On lands conservation" [10], "On state control of land use and conservation" [7], "On amelioration of lands" [9], "On pesticides and agrochemicals" [11] and other. In particular, Law of Ukraine “On land conservation” stipulates the system of legal, organizational, economic, technological and other measures, directed at sustainable use of lands, avoiding ungrounded exemption of agricultural lands for non-agricultural needs, their conservation from anthropogenic influence, reproduction and recovery of soil fertility, increasing the productivity level of forest soils, providing special regime for the use of lands for environmental, health, recreational, historical and cultural purposes. Concerning the soil resources, conservation of soils is defined by the law as the system of legislative, organizational, technological and other measures, directed at preservation and reproduction of fertility and unity of soils, avoiding degradation, agricultural production with use of soil-protective technologies and provision of ecological safety of environment.

According to M. Hvesyk, mechanisms for regulating sustainable use and conservation of lands should include:

- granting tax and loan exemptions for those land owners exclusively, who arrange measures on reproduction of soil fertility, improving of quality of soils either at their own or loaned costs (exemption from profit tax of the part of profit invested in soil-protective measures, paying interest for the loans used for soil protective measures at the cost of the state);
- funding budget costs for arranging measures on reproduction of soils, damaged not at the fault of land users, and long-term actions (reconstruction of agro landscapes, transformation of lands with huge territory, construction of hydro ameliorative systems etc.);

– exemption from land tax for users of lands under restoration or reclamation for the whole project period of such measures;
– partial compensation of unearned profits for producers of goods during the period of temporary abandonment of degraded lands; accelerated allowance of capital funds of land and environmental intent; setting mark-ups for ecologically safe products in the amount enough to compensate additional costs spent on soil conservation for land users. In addition, researcher also stresses the need to develop a system of economic and legal sanctions as a punishment for decreasing quality state, violation or damage of soils [14, p. 26].

The Article 164 of the Land Code of Ukraine stipulates the following list of measures for land resources conservation: the substantiation and ensuring sustainable land use; protection of agricultural lands, forest lands, bushes from ungrounded exclusion for other purposes; soils protection from erosion, sill, flooding, waterlogging, resalting, drying, condensation, pollution with industrial wastes, chemicals and radioactive substances, other adverse natural and anthropogenic processes; conservation of natural wetlands; preventing deterioration of aesthetic state and ecologic role of anthropogenic landscapes; abandonment of degraded and low productive agricultural lands [3].

What concerns protection of biological resources in agriculture, the Law of Ukraine "On protection of animals from abuse" was adopted in 2006. The Law is dedicated to wildlife protection and conservation, protection of their natural rights [8]. The basic principles of animals treatment are: inadmissibility of abuse and its inconformity with morality and humanity principles; ensuring life conditions for wildlife corresponding their biologic, specific, individual qualities; deprivation of property rights and other rights for animal species in case of abuse; legal punishment for abuse. In particular, protection of farm animals according to the Law provides for forbiddance of use of painful and harmful measures while keeping and getting products from animals (at milking, shearing, feeding). The changes of breed or habits of animals are not allowed at animal breeding with use of biotechnological methods or genetic engineering in cases where such changes can cause suffering of animals.

Understanding of the sense of sustainable use, preservation and conservation and reproduction of natural resources depends on interrelation of the mentioned elements and forms the bases of the modern model of managing renewable natural resources in agriculture.

Some scholars [4, p. 18] explain sustainable land use a complete involvement of all lands in economic activity and their effective use for the intended purpose, ensuring the most favorable conditions for high productivity of agricultural lands and getting maximal amount of production at the unit of surface with minimal spending of workforce and money. At this, conservation of lands and their extended reproduction are to be assured.

V. Rusan understands sustainable agricultural use as a science-based use of agricultural lands, directed at reaching maximal effect in the process of economic activity with taking into consideration their quality characteristics and certain natural and climate conditions of

production with keeping to ecologic requirements [12, p. 30]. L. Fomenko argues that rational use of agricultural lands expresses the human relations in the course of technological manufacturing processes related to agricultural production with the aim of maximal meeting the food needs of population at ensuring reproduction and growth of productive potential of land resources and supporting increase of ecological level of these both resources and environment as a whole [13].

Table 1
Models of renewable natural resources development *

Natural resources use model
Directions: - Increasing productivity of forests, soils and animals; - Increasing economic efficiency of the use of natural resources; - Increasing fertility of soils, efficiency of forest lands, providing special regime for the use of environmental, health, recreational, historic and cultural lands; - Forming favorable conditions for high productivity of agricultural lands and getting maximal amount of production at a unit of surface with minimal spending of workforce and costs.
Result: ensuring economic efficiency and sustainability in allocation and use of natural resources
Natural resources conservation model
Directions: - Making ecologically and socially oriented decisions; - Prevention of negative results of anthropogenic influence on natural resources, creating safe environment for population and for the environment; - Structural and technological changes and transfer of ecologically friendly manufacturing technologies; - Improvement of growing conditions; - Implementation of new technologies; - Substantiation and ensuring sustainable land use; - Preservation of agricultural lands, forest lands and bushes from ungrounded extinction for other purposes; - Soils conservation from erosion, sill, flooding, waterlogging, resalting, drying, condensation, pollution with manufacturing wastes, chemicals and radioactive substances, other adverse natural and anthropogenic processes; - Preserving natural wetlands; - Preventing of deterioration of aesthetic state and ecologic role of anthropogenic landscapes; - Deterioration of degraded agricultural lands and lands with low productivity.
Result: safety of environment
Natural resources reproduction model
Directions: - Preservation and reproduction of fertility and unity of soils, avoiding their degrading, farming with use of soil-protective technologies; increasing the quality of soils; - Reuse of industrial wastes; - Reproduction of natural fertility of soils, preserving and improving agro landscapes; - Utilization of the system of agro technical, agro chemical, ameliorative, erosion preventive, phyto sanitary measures for preservation and increasing fertility of agro lands; implementation of soil protective technologies.
Result: ensuring simple and extended reproduction of natural resources

*Original development

Generalization of development models of renewable natural resources enables to outline their efficiency through division by the directions of natural resources use (Table 1). The implementation efficiency of the natural resources use models resolves into provision of economic efficiency and sustainability of allocation and use of such resources by means of increasing productivity of land, forest, agricultural resources.

Development of model directed at conservation of natural resources will help in environmentalization of sectors and kinds of economic activity, provision of ecological sanitation of environment that will allow to minimize negative effects of anthropogenic influence on natural ecosystems, agro and forest landscapes in future etc.

Under modern market conditions, the model for reproduction of natural resources gets special topicality. It should result in provision of simple and extended reproduction of natural resources. Such model will be based on preservation, conservation and extended reproduction of natural resources, assuring conditions for self-reproduction of natural environment. It will support development of safe and comfortable living environment for humans, harmonization of "human-nature" relations. Implementation of models for sustainable use, conservation and extended reproduction of natural resources will allow developing safe living environment, food supply security of the state based on growing organic foods, adhering conceptual approaches for balanced use of renewable natural resources.

Basic principles of sustainable use in the sphere of renewable natural resources in agriculture are shown at the Figure 1:

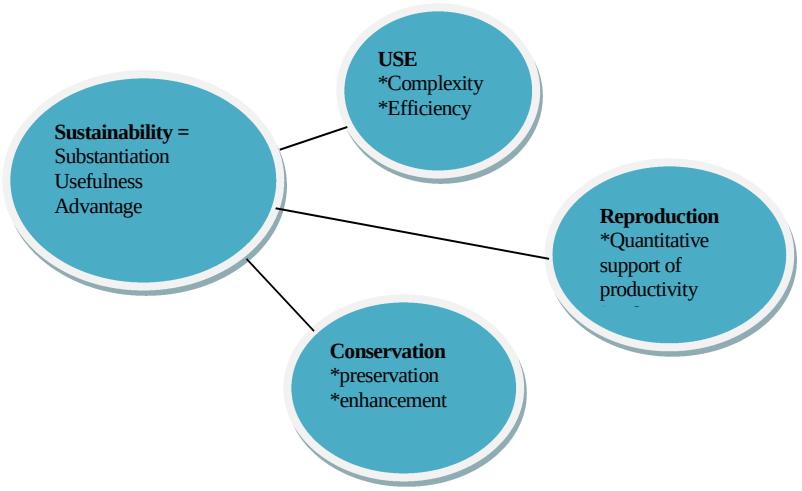

Figure 1.
Main principles of sustainable use of natural resources (original development)

Sustainability is a result of shaped worldview positions of consumers of resources, methods and ways or their transitions. Sustainability is a relative notion. For example, the intensive use of

mineral fertilizers was a common element of sustainable activity in the past. The average level of fertilizers use in Ukraine's agriculture in 1986-1990 was 166 kg per hectare, with the highest amounts of used fertilizers in Zakarpatska, Ivano-Frankivska, Volynska, Lvivska and Rivnenska oblasts [5]. Now the accent was moved to the side of minimized level or their use with the priority granted to the use of alternative organics, which is now considered as a norm of sustainable activity. Not only were the deficit of traditional sources of organic enrichment of soils or sharp changes in understanding of the sense of eco technologies of agro production the reasons for that. Such sustainable behavior was caused by economic parameters. The calculations prove that chaff is the cheapest supplier of organic substances into the soil. Using it for fertilizing with adding 10 kg of nitrogen per one ton of chaff is twice cheaper than using mineral fertilizers and 4-5 times cheaper than using mould [6].

Thus, sustainability characterizes the acts and behavior of the consumer of natural resources, which are undertaken for reaching economic targets compliable to reaching targets of other subjects, who are using natural resources for social and ecological targets. Hence the sense of making use of natural resources sustainable. It is reflected in intention to assure the support of certain conditions aimed at harmonization of economic, social and ecological targets. In case of failure to provide harmonization of interests at the use of natural resources, the need to provide measures on natural resources conservation will prevail. In fact, the modern system of rental land use in agriculture illustrates such example of interest's conflict. Research by Horlatchuk [2, p. 38] favors in this view. The author underlines that the landholder does not provide reproduction of soils, while his maximal influence on managing the fertility of the soil is done by using fertilizers, having not lasting current effect.

Keeping the provisions of sustainable and reproductive use of natural resources largely depends on managerial part. At this improvement of managerial approaches in the sphere of use of renewable natural resources has to be done at all levels, including the level of manufacturing consumption, which has main reserves for saving natural resources; social and economic use of resources based on their economical consumption. In addition, the part of resources is used by the nature itself to create new species. Generally, the process of extended reproduction of natural environment has to be oriented at balancing and harmonization of ecosystems, where losses of natural resources become minimal

Taking into consideration the peculiarities of self-reproduction and needs of consumption of resources, the following models have to be developed based on proportions of their use, where:

1. $\text{CONSUMPTION} > \textit{REPRODUCTION} = \frac{\text{DECREASE OF RESOURCE}}{\text{DECREASE OF REPRODUCTION}}$;
2. $\text{CONSUMPTION} < \textit{REPRODUCTION} = \frac{\text{INCREASE OF RESOURCE}}{\text{INCREASE OF REPRODUCTION}}$;
3. $\text{CONSUMPTION} = \text{REPRODUCTION} = \frac{\text{CONSTANT RESOURCE}}{\text{CONSTANT REPRODUCTION}}$.

Functioning of the listed models can be illustrated with the use of mathematics [1, p. 39-42]:

- 1 model (at CR > RR) → NR + RR – CR = NR – S;
- 2 model (at CR < RR) → NR + RR – CR = NR + B;
- 3 model (CR = RR) → NR + RR – CR = NR;

Note: CR – amount of consumed renewable resources, for certain period;
RR – amount of reproduced share of natural resources, for certain period;
NR – amount of natural resources before reproduction;
B – balance (at CR < RR);
S – share of consumed natural resources (при CR > RR).

The first model, which is oriented at heavy exploitation of renewable natural resources, where decrease of natural resource and decrease of its reproductive abilities takes place, is the most common. The second one, that is increase of reproduction and decrease of consumption, provides for increase of resources and increase of their reproductive abilities. This model could be a precondition for ensuring balance of consumption and of natural resources, which is the base of the third model of renewable natural resources development. The last model concerns simple reproduction and consumption of renewable natural resources, where the resource itself and level of its consumption remain the same for the next period.

The task is to assure optimal balance between consumption and reproduction of such natural resources, when their sustainable use will be based on combination of interests of landholders, authorities, local self-governmental bodies upon implementation of the model of conservation and reproduction of natural resources.

Therefore, reproductive use of natural resources means managing and use of reproductive natural resources within their reproductive abilities aiming to preserve and allocate them, such way of natural resources consumption, which supports increase in consumption level at the cost of increase of resources and their reproductive abilities either. The more difference between reproduction and consumption levels, the more effective processes of accumulation and reproduction (and consumption in future) will be.

REFERENCES

1. Galchyns'kyj, A.S., Yeshchenko, P.S. *Economic theory (Textbook)*. Vyshcha Shkola. Kyiv, 2007.
2. Horlatchuk, V.V. *Conclusive myths about the market of crop products and the efficiency of leased land shares.* Land resources management under market conditions. "Ukrainski tekhnolohii" editorial. Lviv. 2004.
3. *The Land Code of Ukraine*. VELES. Kyiv. 2005.
4. Solovij, I.P., Ivanyshyn, O.T., Lavnyj,V.V. and others. *Land use: ecologic and economic problems, conflicts and planning.* Afisha. Lviv. 2005.
5. Honcharuk, Y.G. *Communal hygiene.* Zdorovya. Kyiv. 2003.
6. Meselj-Veselyak, V.Y., Pashtetskyj V.S.and others. *Transformational changes in agriculture of Ukraine and the Autonomous Republic of Crimea.* Sympheropol.2011.
7. *The Law of Ukraine 'On state control of land use and conservation'* (19.06.2003 № 963-IV). Vidomosti Verkhovnoi Rady, Issue 39. 2003.
8. *The Law of Ukraine'On protection of animals from abuse'* (21.02.2006 № 3447-IV). Vidomosti Verkhovnoi Rady, Issue 27. 2006.

9. *The Law of Ukraine 'On amelioration of lands'* (14.01.2000 № 1389-XIV). Vidomosti Verkhovnoi Rady, Issue 11. 2000.
10. *The Law of Ukraine 'On lands conservation'* (19.06.2003. № 962-IV). Uryadovyj kurier, Issue 144. 2003
11. *The Law of Ukraine 'On pesticides and chemicals'* (02.03.1995 № 86/95-BP). Vidomosti Verkhovnoi Rady, Issue 13. 1995.
12. Rusan, V.M. *Theoretical and methodological aspects of sustainable use of agricultural lands*. Economika APK, Issue 7. 2008.
13. Fomenko, L.V. *Sustainable use of agricultural lands at Western region of Ukraine (Thesis for obtaining degree of Candidate of Sciences in Economics).*Zhytomyr. 2004.
14. Hvesyk, M.A. *Strategic imperatives for sustainable land use in the context of social and economic growth of Ukraine.* Ekonomika APK, Issue 3. 2009.

Mykhailo Gazuda
State Higher Educational Institution Uzhhorod National University, Ukraine

ZRÓWNOWAŻONE WYKORZYSTANIE I OCHRONA ODNAWIALNYCH ŹRÓDEŁ NATURALNYCH

Streszczenie
W artykule rozpatrzono osobliwości kształtowania naukowych podejść do zabezpieczenia racjonalnego użycia, zachowania, ochrony i odtwarzania bogactw naturalnych. Uogólniono modele rozwoju odnawianych bogactw naturalnych, co dało możliwość zarysować ich efektywność na podstawie priorytetowych kierunków użycia. Zarysowano ważność administracyjnego wpływu w zabezpieczeniu zrównoważonego, racjonalnego i odtworzeniowego użycia bogatstw naturalnych na podstawie jego odtwarzania rozszerzonego.

Słowa kluczowe: racjonalne użycie bogactw naturalnych, zachowanie i ochrona bogactw naturalnych, administracyjny wpływ, odtwarzania rozszerzone.

SUSTAINABLE USE AND CONSERVATION OF RENEWABLE NATURAL RESOURCES

Abstract
The paper is dedicated to peculiarities of defining scientific approaches to sustainable use, preservation, conservation and reproduction of natural resources. The models of reproductive natural resources development were generalized; due to what their efficiency are studied basing on priority directions of natural resources use. The importance of managerial element in supporting balanced, sustainable and reproductive use of natural resources on the base of its extended reproduction is substantiated.

Keywords: sustainable use of natural resources, preservation and conservation of natural resources, managerial element, extended reproduction.