STRATEGIC PRIORITIES OF ECONOMICAL PROVISIONS FOR REPRODUCTION OF SOIL FERTILITY

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Abstract. The article addresses strategic priorities of economical provisions for reproduction of soil fertility, including: suspension of humus-content decrease and regaining its deficit-free balance in soil; enrichment of soils with nutrients; protection of soils from erosion; restoration of acidic and solonts soils. Conceptually basic ideas of improving economical mechanism of soil fertility reproduction in agriculture are validated. Strategic aspects of formatting the pricing, financial- and- credit, tax, insurance and investment mechanisms of soil fertility reproduction in agricultural industry of Ukraine are represented.

Key words: economical provisions, strategic priorities, economical mechanism, soil fertility, reproduction, economical incentives, sanctions, environmental and economical benefits.

Introduction

One of priory vectors of present-day Ukrainian agricultural policies should address economical problems of rational use, protection, preservation and restoration of soil fertility, and prevention of degradation processes, – which all are important factors in progress to sustainable development, enhancing the competitiveness of agrarian enterprises and their products for a long period, as well as ensuring environmental, power and food security of the nation. Thus enumerated problems cannot be solved without generating, among manufacturing enterprise rulers, a sustainable economical interest to implementing soil protection technologies and vitalization of innovative investment soil-protection projects. Instead, analysis reveals poor results and low efficiency of now-existing economical mechanism of resolving problems of soil preservation and soil fertility restoration, along with this mechanism’s incapability of providing favorable conditions for agro-business ecologization. Major drawbacks of the now-valid economical mechanism of soil preservation and soil fertility restoration are: firstly, the fact that a great number of its economical incentives and sanctions are deprived of their specific practically implementable tools; secondly, the current economical mechanism fails to urge the agro-business agencies to get interested in conducting soil-protection measures of investment input and innovation efforts; thirdly, basic provisions of this mechanism are poorly correlating with other effective levers of economical activities, including budget support to agricultural products’ suppliers (Baljuk, Kucher, Anisimova, 2013). Therefore, problem of developing an effective Ukrainian economical mechanism of rational use of soils, soil conservation, soils and fertility restoration and updating its effective tools, is an issue of urgent importance. Economical aspects of soil fertility renovation and rehabilitation are being explored in their papers by: O. Anisimova (2013), S. Baliuk (2012, 2013), V. Borissova (2003), S. Dem’yanenko (2011), A. Dvoretskyi (2011), S. Johannes (2009), O. Korchynska (2014), A. Kucher (2013), V. Pechenkina (2013) and others. However, many aspects of this multifaceted problem are still not resolved and require specific studies as yet.

Method

Therefore, the aim of our study is to justify the strategic priorities of economical provisions for soil fertility restoration in agriculture of Ukraine. The dialectical method of cognition and systematic approach to the study of economical phenomena are methodological keystones for this investigation. To hit this goal, abstract-logical, monographic, computation and expertise methods were used as research techniques.
The NSC «Institute for Soil Science and Agrochemistry Research named after O. N. Sokolovsky» has developed the «Strategy for Sustainable Use, Restoration and Management of Soil Resources of Ukraine» which defines a fundamentally new type of sustainable (i.e., thrifty) land use for the country, ensuring a harmonious relationship between the natural soil potential and the anthropogenic stress hereon, up to soil restoration and its full-value productive and ecological functioning (Baljuket. al. 2012, pp. 10). Main goals of the strategy are: creating preconditions for sustainable evolution of soil cover and suspending negative processes that are now taking place overland the Ukraine. To achieve the strategic objectives of agricultural sector-development in terms of sustainable use of Ukrainian soil resources, while preventing their degradation along with soil fertility recovery, a whole package of measures has to be implemented; said measures are prompted as strategic governmental priorities in view of the present-day status of soil cover and dynamics of its positive renovation (Baljuket. al. 2012, pp. 10-12):

- suspending the humus-content decrease and regaining its deficit-free balance sheet. Calculations show that humus recovery needs application of zoogenic mull in amount of 8-9 t/ha of crop-rotation area; or about 250 mio tons for the whole country, whereas in reality, its actual output now shows 20-25 mio tons. Key measures that promise to enable suspension of soil dehumification and optimizing the organic matter contents-recovery in soil, are: rearrangement of crop-rotations towards increasing the share of total sown crops and perennial grasses; utilization of post-harvest residues and stubbly straw of cereal crops as organic fertilizers; application of organic and mineral fertilizers; utilization of peat, sapropel, green manure, pond sludge and other carbon-containing materials; improving conditions for plant residues and fertilizers humification by optimizing the soil tillage technologies; soil upturning depth-adjustment;

- enriching the soils with nutrient substances. Among measures aimed at enriching the soil with nutrients, the major one is a returning to annual fertilizers' application-amount (up to the level of 150-160 kg of dry matter per ha). In order to increase payback from mineral fertilizing, technologies of their usage need changing, so as either to distribute minerals into rows while sowing, or to apply them locally at pre-sowing cultivation and, moreover, at periodical plant-food fertilization during plants' growing season. Thus, payback return from harvest-yield increments due to applied fertilizers shall increase by 2-3 times. Mandatory application of micro-nutrients into soil is also an important measure. At the same time, getting a benefit from natural potential of Volyn-Podolsk, Kharkiv, Donetsk, Kiev and Odessa regional deposits of phosphates, to reduce the phosphate fertilizers' production deficit, is also necessary. To obtain gross yields of crops as is envisaged by the Nation-wide project «Grain of Ukraine» and agri-branch programs «Oil & Fat Complex», «Sugar Beet», «Potato Farming», «Vegetable Farming», «Fruit and Berry Cultures», amount of mineral and organic fertilizers application should be increased up to scientifically-validated norms that would ensure equilibrium non-deficit balance of nutrients and humus and

- soils protection from erosion. To maintain operational availability of anti-erosion facilities, their repair and restoration are necessary. To increase effectiveness of anti-erosion measures, the strategy «to combat soil erosion» must be changed by «control on erosion-accumulative processes» strategy achievable by anti-erosion land-management through innovative program activities. In this regard, a prime action is to reduce arable land area to 40-50 %. Provided if about 8.6 mio hectares of unproductive and degraded lands are withdrawn from cultivation, ratio of arable lands and envirosustainable areas will be optimized, whilst intensity of erosions shall dramatically go down. An equally important action is employment of minimal and, specifically, zero-tillage methods. In Ukraine, they can be implemented over millions of hectares. Along with these radical anti-degradation actions, we need to use traditional anti-erosion and land treatment approaches, such as: soil slotting, planting of crop culture on land strips,-greatly improving forage grassland pastures;

- rehabilitating acidic and solonets soils. In modern-time economical conditions, comeback to traditional continuous chemical restoration technology is impractical, due to its over-costly nature and high losses. Now we need fundamentally novel approaches to solve problems of acidic and solonets soils amelioration, with inevitable transition to resource-saving technologies. In early steps of chemical melioration revival in Ukraine, the most appropriate actions shall include «back-up» liming to hinder soil acidification processes. Due to this technology, only 1-1.5 tons of lime per ha are applied instead of 5-6 tons. A separate and very important link of resource-saving technologies on acidic soils is phyto-restoration that involves selection and placement, in crop rotation, of cultures tolerant to acid reaction of soil environment. Employment of thus proposed resource-saving technologies across the Ukraine would help saving energetic and material
resources by 50-60 %, while improving the yield- capability of acidic and solonets soils by 35-40 %. The deep plowing plantage approach must be returned to, with its significant efficiency and aftereffect duration.

According to forecast computations, realization of thus proposed actions to conserving and restoring the soil fertility would require 3.1 billion USD in 2015, and ~ 4.2 billion USD by 2020 (Table 1).

**1. Projected costing of expenses (mio. USD(*) for first- priority actions for land- protection and soil fertility rehabilitation in Ukrainian agriculture**

<table>
<thead>
<tr>
<th>List of activities</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral fertilizers application</td>
<td>2927.4</td>
</tr>
<tr>
<td>Organic fertilizers application</td>
<td>162.4</td>
</tr>
<tr>
<td>Acidic soils liming treatment</td>
<td>35.5</td>
</tr>
<tr>
<td>Solonetz soils gypsum treatment</td>
<td>7.6</td>
</tr>
<tr>
<td>Plantage plowing</td>
<td>0.9</td>
</tr>
<tr>
<td>Repair and upkeep of anti- erosion</td>
<td>1.5</td>
</tr>
<tr>
<td>structures &amp; facilities</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3135.3</strong></td>
</tr>
</tbody>
</table>

(*) NOTE: The above data were calculated per official exchange rate of Ukrainian Hryvnia against foreign exchange rates as of 23.06.2014 (i.e., 11.64 UAH per 1 USD) as declared by the National Bank of Ukraine, see electronic resource address: http://www.bank.gov.ua/control/ua/schedule/currency?period=daily.

Funding for these activities would be carried out mainly by agricultural producers, including: acquisition of mineral fertilizers – at own expenses of agricultural producers, possibly with partial (10 %) reimbursement of their costs by the State; liming and gypsum treatment of soils, requiring governmental financial support of up to 20% of their total cost; plantage plowing, to be done by agrarians from their own funds; up to 50 % of costs for repair and reconstruction of anti- erosion structures and facilities, to be compensated for from the State budget of Ukraine.

Implementing the key provisions of sustainable use, restoration and management of land resources strategy of Ukraine will provide for: a step-by-step planning and implementing the soil- protection actions (2015-2025), conduct of a large-scale soil cover survey (2015-2020), followed by consecutive uptaking the survey- results (2021-2025), that would allow: suspending basic forms of soil degradation and achieving recovery of soil fertility by 2020; gaining an expanded recovery of soil fertility and enabling, up to 2025, a gradual rehabilitation to sustainable land use status.

Implementation of strategic goals of sustainable Ukrainian soil resources use and restoration will ensure obtaining projected gross yields of crops as envisaged by relevant agro-branch programs and the «Strategy of agricultural sector development up to 2020». An estimated annual economical benefit from increased crop yields by 40 % promises a 3.1 billion U.S.D additional income, which is achievable with rational use of fertilizers by agricultural enterprises of Ukraine. Given the crop production profitability of 11.3% achieved in 2013, annual profit can amount to 311.3 mio USD. The ecological- and- economical effect is, however, of paramount importance, that is: suspending main forms of soil degradation, gaining plain recovery of soil fertility, and preventing from (or minimizing) ecological and economical losses annually in amount of 2.4 billion USD, including: a) regaining the deficit- free balance of humus and nutrients (1.4 billion USD); b) reduction of economical losses from crop yields’ shortfall due to soil erosion (1.0 billion USD).

An economical platform of sustainable use, restoration and management of land resources’ strategy of Ukraine shall be an eco- socio- economical approach that would consolidate key aspects of sustainable development with concepts of agricultural industry poly- functionality. According to this approach: firstly, employment of soils to meet the present- day needs should not jeopardize oncoming prospectives for our future generations to meet their own natural needs; secondly, natural potential capacities of soil should be considered in terms of their ability to withstand anthropogenic stresses thereon, while ensuring recovery of this potential, along with normal ecosystem functioning; thirdly, ecologically safe and effective use of soil resources has to ensure ecological balance upkeep, preserving agricultural landscapes and creating the conditions for decent life and well- being of rural population. Implementing this approach involves a merge- together of environmental, societal and economical components of agricultural sphere development for the benefit of people, businesses, government and society.

Economical mechanism is a tool for implementing strategic goals of the State in terms of sustainable use
of soil fertility and recovery, via organizational and regulatory support thereto, using various economical means which, under certain conditions, help adjusting market regulators’ impact on economical development and business activities.

Main components of the economical soil fertility preservation and recovery system include: economical incentives and sanctions; the price mechanism; the finances and credit mechanism; the taxation mechanism; the insurance mechanism and the investment security mechanism. Each part of this economical complex mechanism for sure deserves an independent study and analysis. In addition, even a brief description of any group of economical regulators reveals certain individual «problematic spots» of the State policy in realm of Ukrainian land resources management.

Economical stimuli and sanctions are system-formatting items of said mechanism. Conceptually, upgrading the economical mechanism of soil fertility preservation and recovery shall be based on considering some specific ideas manifesting that: harmonization of entrepreneurial motivation with economical concern for implementing soil-protection technologies and projects; combination of efficient administrative influential methods with marketing-regulatory mechanisms; stimulate concentration of land sites in hands of successful landowners, land users and farmers; plain and expanded recreation of soil fertility should be encouraged; «If you pollute soil or use wastefully natural resources – be sure to repay by Law!».

One of the strategic priorities for modernization of price mechanism of soils fertility recovery includes updating methodology and techniques of measuring production costs and self-costs of per-unit agricultural production. These are now assessed by recommendations focused on situational & accounting self-cost parameter which, economically speaking, has a number of serious flaws. So obviously, it’s worth agreeing with scholars (Ohrimenko, 2009) who offer including costs of fertilizers into framework of products self-cost that would allow compensation for removal of NPK and maintaining the humus balance. This requires a verbalization of regulatory & reproductive self-cost parameter as a basis for calculating the minimum price amount. In addition, differentiation of prices for organic, conventional and eco-polluted agricultural products should be scientifically justified, because the very cost-up allowances and additional payments or, alternatively, discount sale prices can help achieving the stimuli for production of organic agrarian products.

An effective financial mechanism must be created, one of whose main elements should be introduced into appropriate programs of governmental support for agricultural producers (i.e., an obligatory requirement for grant-applicants) concerning sustainable use of soil resources, that is, the land management where soil-fertility is upkept, at least, never worse than anytime before. A mechanism of providing concessional medium- and long-term loans (with annual rate of charge for credit in the range of 5-7 %) for implementation of innovative investments into soil-safety projects, should also be elaborated.

Now, under-efficiency and inconsistency of current taxation policy, as a component of economical soil fertility protection and recovery mechanism, is manifested particularly in inefficient control of funds raised, in terms of payments for land-use and fixed agricultural tax (FAT). Costs-inflow from collection of land-tax should be considered legally as a major source of funding for activities on soils conservation and their fertility recovery, as it had been previously provided by the Law of Ukraine «On Payment for Land». Since, according to Article 282 of the Tax Code of Ukraine, land-use tax payers are exempt from FAT pays for land being used for agricultural products supply, whereby subject to FAT are agricultural land sites, it is logically plausible to re-direct its formally defined and approved portion to funding the use and protection of land resources’ activities. Despite the fact that now-valid legislation provides tax holidays to individuals and legal entities who, at their own expense, carry out measures provided by nationwide and regional programs of use and protection of land, the only mechanism of tax holidays realization is expressed by a single rule (i.e., Part 1.2 of Article 238, Tax Code of Ukraine), relating to … «exemption from land-use tax for agricultural land sites being in temporary preservation or at stage of initial agricultural reclamation».

Man-caused stress on land resources may be relieved with such economical tool as adoption of a legal mechanism of voluntary or compulsory insurance of soil-resources quality in agricultural enterprises. An insurance risk may regard to deterioration of soil-fertility below norms declared in a land-site certificate, for which reason the relevant authorities should conduct land resources – quality analysis within area of certification. An insurance event may be the deterioration of major soil-quality indexes certified, due to geoclimatic processes, natural disasters, force-majeure by illegal actions of third parties, etc. The Insurance Reserve Fund should be used: for recovery of soil resources quality (to be paid to land-owners or land-users as an insurance compensation in case of an insurance event), for their consistency in keeping with agro-
technological requirements of farm crops cultivation; to reproduction of soils fertility; to prevent deterioration of ecological status of agricultural land sites; for measures to recovery of degraded and contaminated soils, for soil fertility enhancement by insurers (Borysova, 2003, pp. 19-20).

Given the important role of investment resources in shaping a sustainable, ecologically balanced use of soil resources and seeing that financial capacities of the State to support land investments are very limited, a strategic priority to improve the mechanism of investment- security should be formed up by creating an attractive investment climate, and development of innovative soil- safety projects that promise inflow of investment resources into sphere of land- use. Solving this problem is impossible without determining and observing, at the State level, basic principles of investment policy and legislative measures for land investments protection from political and other risks.

Conclusion.

The strategic Government priorities of sustainable use, restoration and management of soil resources of Ukraine include the following: suspension of humus- percentage reduction; regaining the humus deficit-free balance; enrichment of soils with nutrients; protection of soils from erosion; amelioration of acidic and solonets soils. Economical mechanism of Ukrainian soil fertility recovery is focused on implementing these priorities, requiring reconsideration and elaboration of a novel integral economical system capable of effectively solving the task of soil fertility preservation and rehabilitation in conditions of sustainable-development strategy vitalization; because many now- active economical and legal tools are only based on outdated regulatory & methodological framework. Ecological and economical effectiveness of key strategic vectors of sustainable use and restoration of soil resources in Ukraine implies prevention from environmental and economical losses in amount of 2.4 billion USD annually, including: those in amount of 1.4 billion USD to provide a deficit- free balance of humus and nutrient substances; those in amount of 1.0 billion USD to reduce economical losses from agri-products yield- shortfall due to soil erosion. Owing to well- balanced combination of forcible and restrictive measures with measures of stimulating and compensatory nature, favorable conditions for implementing soil protection technologies and environmentally friendly agrotechnical actions, in order to improve the competitiveness of agro- business in Ukraine, can be created.

Reference


