UDC 631.45

V.V. Medvedev,
Academician NALI, Doctor of Biological Sciences, National Scientific Center "Institute of Soil Science and Agrochemistry named after O.N. Sokolovsky's

Land reform and fertility of soil

Discuss the reasons for reducing the soil fertility of the country in terms of land reform and suggest effective ways to save it. Methods. Comparison of the organization and control over the use of soil fertility in European countries and Ukraine. Results The main conditions for the effective use of soil fertility is the balanced, high-tech agriculture and the inadmissibility of any action that causes damage to the soil. Conclusions In order to improve the practice of soil fertility utilization in Ukraine, a complex set of measures of organizational, technological, legal and social content is necessary.

Key words: land reform, soil fertility, European experience.

The formation of Ukraine as an independent state coincided with the termination of all programs for increasing the fertility of soils - forest, hydro and chemical melioration. The reduction of livestock caused a sharp decrease in harvesting and bringing to the soil manure. For this reason, the deficit-cited balance of organic carbon and nutrients has stabilized. Along with the inevitable dehumidification, other problems of soil degradation - propensity to erosion, overcoming, over-structuring, and pollution. Soil scientists and agricultural chemists of Ukraine repeatedly appealed to the country's leadership with a number of proposals for changing the situation. It was submitted on reasoned items in the various legislative and executive authorities to adopt the National prohra¬my soil, creating Service for soil protection, the problem of missing in Ukraine phosphate fertilizers, increasing the fertility of most soils the Non-poorer areas, the productive The use of fertilizers on the basis of local raw materials, the conduct of a highly re-grounded survey, the development of monitoring, etc. However, none of the listed or other proposals was approved. Nowadays, from the scientific point of view, chernozem can be called high-density soil at least because the content of nutrients in it is 2.5-3 times lower than in the soils of Western Europe. This is understandable, because the era of chemicalization there has been going on for over 150 years, unlike Ukraine, where this period was no more than 25 years (1965-1990) and was not so effective. The country has a well-developed science of soil, a fully effective technology of cultivating crops, and a high level of supply of soil resources. Soil fertility as a priceless, exhaustive, hard-to-recover resource, which requires systematic care, did not become a priority in the new state. An example of complete indifference to the fate of soil fertility is the green reform, in which (spent more than 20 years) fertility was not even mentioned, not to mention at least a small real support for it. The purpose of the land reform was to form a full-fledged landowner, who would not only receive a high yield, but also take care of the soil fertility. However, it should be acknowledged that this goal has not been achieved. The crop, according to various estimates, is much lower than possible, and the soil fertility decreases. The key issues in land reform were property issues, not technology and soil fertility. The latter generally went to the background. Moreover, in Ukraine, in fact, there is no organization that would be interested in the issue of soil fertility. The Ministry of Agrarian Policy and Food of Ukraine is concerned with the production of products, the State Land Agency - land inventory, and the Ministry of Ecology and Natural Resources of Ukraine in general has been relieved from resolving these issues. The Ministry of Agrarian Policy of Ukraine, which is in the subordinate position of Ukraine, has become even less able to influence the state of affairs on this issue. As a result, a bunch of unresolved issues has accumulated in Ukraine. Sediment to the nutrients of black earth, erosion rages, many abandoned, degraded and clogged lands, do not give rewards to reclaimed land. Land degradation should be seen as a result of the unfavorable state of society around non-harmonized relations between its various layers, insufficient knowledge and

nevmin¬nya organize relevant work, and as a result of a failed land reform. The question of optimal soil management in the present Ukraine becomes practically impossible. Thanks to land reform, millions of peasants, who lacked the knowledge and ability to use the technology of cultivating crops and preserving soil fertility, received land. In fact, new landowners do not have land, most of them lease them and are not in a position to control the quality of land use in these diaries. In addition, the lease, apparently, because of the monopoly and dictate of agroholdings became very cheap. Let's say, in Poland, renting land is 10-15 times more expensive than in Ukraine. It is clear that a quick fix will not succeed. You need a systematic work and a new strategy. It is worth mentioning that in the work of V.V. Doku-chayeva "Our First steppes and now" [2] which was published 120 years ago, can be found ana¬liz causes adverse soil conditions (nero¬zumna, ruthless exploitation, plundering of natural resources) and the direction of recovery - through enlightened Look and love to the earth. Under the enlightened sight of VV Dokuchaev had uva¬zi use of soils under physical and geographical, historical and economic conditions, the agricultural division of the territory on silskohos¬podarski areas with different specialization, in-stosuvannya reclamation and, most importantly, deep and do¬slidzhennya Union science and production. And under the love of the land - the concern ("victim") of the state and the good will of the land user. Scientists on-sterihav that an agricultural activity can not be liken to reckless speculation, because it sometimes (in years with favorable weather) can provide great benefits, and more - leading to financial and moral collapse.

The purpose of the work is to consider in detail the consequences of the land reform, which led to the decrease of soil fertility, and to substantiate the content of the new soil management strategy. Research methods. The comparison of the organization and control over the use of soil fertility in European countries and Ukraine has been applied. Research results. Consider the reasons for reducing the fertility of soils from the standpoint of the present. The main reason is that the initiators of the land reform aimed at the immediate change of ownership of land, rather than the creation of sustainable land use, which is based on fertile soil, high organizational and technological disciplines. In the conditions of lease (now the leading form of land use) the problem of preservation of fertility is prescribed very generalized or not written at all. Not only the owner but also the state is actually removed from the process of managing the use of soils and their fertility. A peasant, who, apparently, has a plot of land, receives a small rent and does not have an income, because he does not use the land. In the leading agrarian states, on the contrary, state institutions actively promote the farmer (this is the very form of land use that has long been the leading one). In the EU, 30-35% of farmers' income comes from the budget, in Norway, Japan and Switzerland - even 60-80%. In France and Spain, farmers are compensated for the reduction in crop yields in the first years of the introduction of soil zero-level cultivation. In the German budget of 2004, the subsidy to farmers was directed at 1.2 billion euros (the total expenditure on agriculture in that year amounted to 5.2 billion euros). In Spain, Italy and Greece, effective mechanisms for supporting new technologies for farmers, especially farmers with small farms, have been worked out, training seminars, training credit programs and more are in place. Let's say, in Spain, the project MEORATE has been implemented, which has helped reduce the transition period to new agrotechnologies and reduce the risk of failure. This project has opened up opportunities for poorer farmers in the south to buy inexpensive equipment and protective equipment to accelerate the introduction of new technologies. In addition, the draft contained advice on the use of key elements of the technology, technology and herbicides. Funding from state and local budgets, various grants, funds, and even funds from private investors is used to support the implementation of soil conservation research. This is especially popular in Germany, where investors receive tax benefits [6]. It is very important that the country has found mechanisms of rational land use and preservation of soil fertility in the conditions of private ownership of land. This issue is highly relevant to Ukraine, where, despite the existence of safeguards and rational use of land, the structure of agricultural lands, crop rotation and agrotechnologies are not only not soil protection, but actually contribute to the rapid degradation of arable soils.

In Ukraine, from year to year, the support of the village is decreasing. Moreover, the support for the production of vineyards, berries, hops is initially announced, and then the corresponding decree does not

actually come into force. At the same time, an income from these industries is levied, in 2013 it amounted to about 1 billion USD, although by law these funds should be directed to modernization of the same industries. In 2013, even when the economic situation in the country was not as difficult as now, the direct financial support of the village amounted to UAH 97 million, which is 10 times less than in 2012, when the support of the village would have been Be at least 10-12 billion UAH. Under such conditions it is impossible to develop farming and adhere to high technology. After all, only 30 billion UAH annually is needed to maintain a deficit-free nutrient balance in the soil, which is unlikely without state support. In this aspect, the new form of land-use - agroholdings - by the way, not provided by neither the Land Code nor the land reform, seems positive, because it was thanks to them that new machines and tractors, varieties and other Innovative components. The main thing is that they do not violate the crop rotation to agree on market priorities. In such countries, such gross violations are impossible, firstly because private land ownership prevails, and the owner is not interested in deteriorating the fertility of his land. Secondly, if, say, a Norwegian farmer violates the rules of land use, he will immediately deprive the state of financial support. And it is 125 euros / hectares annually. The same and even more in Germany. And in the Netherlands, where land ownership is state-owned, it is not accepted to do what the landowner-caretaker wants to do on the land. Even with the size of the land of 50-60 hectares and the prevalence of winter wheat, it is possible to maintain crop rotation, because neighboring farmers negotiate between soybeans and sow crops alternately. This can be compared with Ukrainian practice, where effective short-rotation crop rotations are processed by NAAN institutions for any soil-climatic conditions, but where they can be seen in production. By the way, in Ukraine there are much more soil protection laws than in the Netherlands. A special support in the West European countries is a farmer who pledged to implement innovative technologies. Thus, a Swedish farmer will design a de-drain on his repossessed plot without charge, will grant a reduced (at a rate of 3%) a loan for at least 3 years and any free advice. Behind him is a permanently assigned employee extension service area (lane). And if a worker is young, he has benefits even more (say, an interest-free loan), because the state is interested in having more young people working on the ground, which would not try to go to the city. Compare with Ukrainian practice, where the interest rate on a bank loan is 20-25%. It is clear that the farmer and any other land user can not take such a loan to pay for works aimed at preserving soil fertility. It is precisely these financial conditions that dictate the banks, which hinder the development of farming, entrepreneurship, the formation of the middle class and, in general, a self-sufficient state. Reducing the cost of loans can intensify the work on increasing the fertility of soils on farmland, just as it occurs in some countries, in particular Sweden. Surprisingly, a Western European farmer who completed only 6-month courses and received a license for the right to engage in agrarian activities is very familiar with technology, technology, means of protecting cultivated crops, and market conditions. Our graduate of agrarian high school is simply an academician compared to a European farmer. However, where does this academic work? Unfortunately, it's not just in the village. It is very important to note how the working conditions of Western European and Ukrainian farmers will vary. In European countries there is a worry about farmers (although very few of them), their way of life. Landscapes, forests, surface waters and the attractiveness of the countryside are carefully guarded. An example of this can be Germany, when its composition was joined to the eastern lands of the former GDR. Large cooperative farms that were dominant and effective have not been reformed. Even today, the average size of an economy in this part of the country - 500-600 hectares - is almost 10 times larger than in the western part. In addition, under new conditions and substantial state support, they were much more effective [6, 8].

Different conditions of using soil fertility gave different results. If in western European countries, for almost 150 years from the days of Y. Liebich, one can observe an era of successful chemistry, then the provision of soil with nutrients has reached the optimal level for cultivated crops. According to the English researcher C.J. Dawson, in one of the six studied fields, the content of available phosphorus in the soil was not lower than 15 mg / 100 g of soil, and averaged almost 40 mg / 100 g of soil [7]. The appropriate parameters of our best chernozems are less than 8 mg / 100 g of soil [4], the optimal is about 15 mg / 100 g of soil [5]. It was during the time of the land reform that the following negative changes occurred in the

arable soils [1, 3, 4]: dehumidification at a rate of 0.5-1.5 t / ha per year with a tendency to inhibit losses by the end of the 80's of the twentieth century; In 2005-2009, dehumification occurred at a rate of 0.42-0.51 t / ha per year; Growth of deficit of the balance of raw nutrients, especially nitrogen and potassium (according to -41.5-56.4 kg / ha in 2001 and -32.9 -64.2 in 2009); Acidification of chernozem soils, which is especially noticeable in Cherkassy and Sumy regions (ArN = -0.3-0.5); Transpression, which is especially noticeable in the Forest-steppe of the West and is generally distributed on 40% of the arable land, the destruction of the structure, shivering and petiole formation; Erosive reduction of the thickness of the upper layer of soil, which reaches several centimeters in chernozem soils (dissipative data) and in the dried soils of Polissya; Secondary salinization and salinization of irrigated soils, peat bogs. From other negative processes, the development of which occurs locally, it should be noted the contamination of radionuclides and heavy metals, waterlogging, flooding, the formation of soda. One can discuss the reasons for the decline in soil fertility, but it is indisputable that this process coincided with the land reform. Moreover, land reform and artificially accelerated market transformations in the countryside have halted a very positive process of formation of a deficit-free nutrient balance in soils, which began to be created in the late 80s of the last century. Then the Ukrainian soils were really revolutionary in their history, when the fertility of the soil was restored for the first time. For this purpose it was necessary to add to the soil an average of 150-160 kg d.r. Every year. If the developers of the land reform violated the laws of the transformation of soil fertility and the role played in this process of culture and organization of agriculture, then they did not so categorically place the land ownership changes on the forefront. Indeed, the experience of a large number of countries, and not only advanced in the agrarian plan of European countries, proves that the main thing in agricultural production is high technology, and land ownership is the second most important category. By the way, the countries of eastern Europe, where the land transformations coincided in time with our reforms, did not allow such a decrease in the fertility of the arable soils. I had to visit a lot of countries, but nowhere has I seen such a hypertrophic attitude toward land ownership, as in Ukraine. Owning a land plot is, above all, a responsible attitude to its passivity and the inadmissibility of actions that would hurt it. Use of land is required in accordance with the postulate of sustainable land use - actions on the ground so that your heirs also have no trouble with it. The question arises as to how soil fertility decreases, which is stated by various experts and is based on numerous experimental data, with record yields that the country has received in recent years. It seems to be the reason for the generally favorable weather. After all, in recent years almost no wintering of winter wheat was observed on significant plots; in spring, a satisfactory supply of available moisture was formed, which enabled the effective use of its viable crops. It was better to take care of the crops and harvest the crops with minimal losses. Crucial were the newest, more productive varieties that use mineral nutrition better than in previous years. Under favorable weather conditions, active microbiological processes occur, accompanied by the accumulation of nitrogen compounds, the efficiency of which is greatest in the creation of the crop. At the same time, due to insufficient fertilization, plants use nutrition more efficiently at the expense of the soil. Consequently, the larger the yield, the more nutrient elements are depleted. That is why the scarcity of nutritional balance is an extremely undesirable phenomenon, which can not be tolerated.

Prospects for improving the situation with soil fertility in Ukraine under present conditions, unfortunately, are pessimistic. There are several reasons: first, it is irresponsibility. After all, landowners who have received a land plot free of charge and do not actually work on it, do not feel the true price. Land users, having received land for rent also free of charge (for a small rent) and without taking almost any commitment to maintain its fertility, can act at its discretion, violate crop rotation and technology without damaging the negative consequences. Zakhmarna 300 and even (by some estimates) 600 billion UAH (the price of Ukrainian lands), which are popular with economists and publicists, are faithful and turn them into real money, which are absolutely necessary for the village and the preservation of the soil's fertility, it is impossible. The second reason is the non-acceptance by the agrarian sector of Ukraine of innovative soil and resource-saving technologies. This reason is difficult to explain in general. After all, a country that considers itself very ambitious and dreams of becoming a breadbasket of the world, uses

outdated technologies. This is evidenced by the fact that after the appearance in Ukraine of western companies or the acquisition of Ukrainian technologies by western technologies, the yields have increased at least twice. In Ukraine, the plow-based agricultural system continues to dominate, which causes soil degradation, while the latest minimal, zero, precise, supporting, conservative, organic and other technologies are actively propagating in the world, which is based on minimizing the mechanical and chemical load on Soil and its conservation. In the last 20-30 years, significant changes in technological, technical and environmental content have taken place in agriculture in the developed countries. In addition, it has long been emphasized on the production of products with economically justified costs, high quality and mandatory preservation of the achieved fertility level of soils. This is the essence of the new sustainable land-use strategy. Ukraine has signed the relevant international conventions and has to prove its commitment to new trends. Unfortunately, it does not accept the latest soil economies of technology and Ukrainian agrarian science. After nearly 30 years of the spread of zero and precise agriculture, no experiment was made to adapt these technologies to the soil-state conditions of Ukraine. On the contrary, much was done in order to distort the essence (first of all, in terms of their ability to maintain fertility and overcome degradation) and to reject progressive approaches. All these issues should be the subject of active discussion and practical resolution, because otherwise Ukraine faces a serious backlog not only from the developed countries of the agrarian plan, but also from the countries of Latin America and Asia, which until recently were among the developing countries. , And nowadays they are rapidly mastering high technolo gies in agriculture. It is worth mentioning how the budgets are distributed in Ukraine and why such planning (from top to bottom) will never find funds for increasing soil fertility. For only financing of measures to increase soil fertility is possible for budget planning from the bottom up. In the Verkhovna Rada there are no lobbyists to solve local problems concerning the increase of soil fertility, because the solution of this issue can not give a quick return. In the opinion of the well-known Polish reformer Balcerovich, modernization (adding to myself - and in the field of fertility improvement of soils) is impossible for centralizing power and budget. Unfortunately, due to these reasons, the agrosphere is dominated by extensive agriculture, in which such a compulsory component as soil fertility is almost eliminated. The United States, Germany, France, Canada, and China have already come to the understanding that soil protection, the fight against their depletion, degradation and pollution can only be carried out at the state level. The key principle of foreign policy is the inadmissibility of impacts on soils, which leads to deterioration of their quality, degradation, pollution and destruction. The main method for soil fertility control in most European countries is the periodic measurements of soil characteristics in the framework of environmental or soil monitoring. Agrochemical passport-issuance in Ukraine is executed mainly only on request and does not entirely carry out. By the way, the prototype of the Ukrainian method of agrochemical certification and agrochemical maintenance was the experience that has been used in the GDR since the late 50s of the last century. Nowadays, when agro-chemical services are eliminated through the regional agro-chemical center, difficulties have arisen with the implementation of the results of agrochemical certification. They are now needed only as an indispensable attribute in the reports of industry leaders. It is they that sometimes mention the negative balance of nutrients, but there is no real impact on the production of these constants.

Agrochemical certification does not imply the presence of permanent observation areas, but suggests that measurements be made by the route method of virtually every round in different fields. Therefore, because of the apparent stringency of agrochemical indicators, the findings on changes in the nutrient content of soils during the tours are at least incorrect. So that the Soil Protection Institute has been monitoring according to the best European models (like Germany, Sweden or Austria), it needs to be substantially refined. First of all, it is necessary [3]: to form a permanent network of observation sites - in a regular or irregular way, depending on the variegated nature of the economic conditions; To substantially expand the range of analytical work (in addition to the currently measured total carbon content, pH, mobile forms of phosphorus and potassium and other gross forms of some elements, organic and inorganic pollutants, in particular of diffusional origin, of individual physical, chemical and biological Soil characteristics (especially important are the indicators for assessing modern degradation

processes, such as erosion and redevelopment); cover all categories of land instead of surveyed only agricultural Guides; to create databases and information systems (from oblast to national), taking into account the current requirements of geoinformatics. In most European countries, where several monitoring rounds have already been carried out, arable land zoning according to their status has been carried out in order to distinguish between so-called Hot spots "hot spots" with degraded or contaminated soils to introduce a special regime for their use and financing, such zoning done in Hungary, the Czech Republic, Norway and other countries. Let's say, in Norway, certain types of soil use are prohibited, which results in the discharge of surface runoff and pollution of the North Sea, which is controlled by satellite-based means. According to the results of the monitoring, the databases have been created and constantly replenished (in the information and analytical centers in Rome and in Wageningen), a number of software, normative and various di-rective documents have been approved. In Germany, there is a soil protection law, in the UK a biodiversity rehabilitation program that provides for soil protection, in France, an agreement between the government and farmers, according to which a farmer receives financial support if he implements soil protection technologies, the Czech Republic is a long-term preservation program The environment with particular emphasis on measures against erosion and soil contamination, Norway is an environmental act, in Spain, a project that helps poorer farmers in the development of the newest soil protection practices Technologies. Denmark has an environmental protection plan that includes measures to increase the sustainability of agriculture and soil cover. In addition, the European Union has adopted a number of soil protection charter, recommendations and directives. Among the latter are the directives on the permissible concentrations of heavy metals, the control of emissions from enterprises, the use of wastewater and production waste on agricultural land, and others. [9]. In 2006, the EU approved a thematic strategy for soil protection and recommended that it be implemented into national policies for all EU member states (http: // ec.europa.eu/environment/soil/index.htm).

Society of Soil Scientists and Agrochemicals of the country and the National Scientific Center "Institute of Soil Science and Agrochemistry named after O.N. Sokolovsky "have long and persistently proposed the establishment of a Soil Protection Service in the country through the merger of the State Agency of Agriculture and its regional units, related units of other ministries with the Institute of Soil Conservation. Our land would benefit from such an association, and all inventories, cadastre, land management would not have been separated from land use and fertility, as we have today. For a long time, it would have been desirable to start the implementation of the National Land Conservation Program and increase their fertility, to develop similar programs in each oblast, rayon, enterprise, to use funds from the state, regional and local budgets, as well as from other sources. The main source of funds for improving soil fertility should be the current law on land use fees, reproduced in the new tax code. At the new tariff rates of 3% of the land value, this law became one of the best, since it allows you to collect a significant amount of money and clearly states that the funds raised should be spent solely on increasing soil fertility. The incompleteness of the land reform and the absence of a full-fledged landowner lead to a decrease in the fertility of soils. By the way, in countries where the leasehold form of land use dominates (Moldova and Russia), as in Ukraine, there is a decline in their fertility. In the country, it is necessary to create such conditions that the protection of soil fertility was advantageous to the landlord, regardless of the forms of ownership or land use. This requires licenses for anyone who wants to do farming; Subsidies only for those who adhere to soil protection technologies, independent (state) soil fertility control - monitoring, rigorous measures and financial sanctions for violators up to the deprivation of ownership of their land or termination of lease relations. The land agrarian capitalists, the heads of agricultural holdings, which received almost gratuitous huge territories, concluded long-term and very profitable lease agreements, do not complete the land reform, introduce the land market, and de-monopolize agricultural activity. It is they who, through their deputies, are not even allowed to consider this issue in the Verkhovna Rada. For the authorities, proud of the successes of the agrarian sector and the international authority of the country, profitable agroholdings are beneficial, but the village is collapsing, bullet-trained, medical and educational institutions disappear, young people are eager to go to cities. The main thing is that the fertility of the soil decreases, which is a negative result of the so-called land reform.

Conclusions

It is extremely important today to preserve the unique fertile power of the Ukrainian lands and to involve a number of organizational, technological, legal and social mechanisms for this. Soil conservation should become the main strategic direction of land reform, regardless of ownership and land use. In Ukraine, it is necessary to find directions for the harmonization of effective wholesale goods with small-scale farmer type of farming.

Bibliography

1. Bulygin S.Yu. On the method of determining the degree of soil erosion on the slopes / S.Yu. Bulygin, N.M. Breus, T.A. Semynozhenko // Soil Science. - 1998. - № 6. - C. 714-718.

2. Dokuchayev V.V. Selected writings. - M .: Gos. Ed. Liters, 1954. - 708 p.

3. Medvedev V.V. Monitoring of Ukraine's soils. Concept Outcomes Tasks - 2nd revision. And add Ed. - Kh .: KP "City Printing House", 2012. - 536 p.

4. Methodological guidelines for the protection of soils. The state Sci. Techn. Center for soil fertility protection Ministry of Agrarian Policy and Food / VO. Grekov, L.V. Datsky, VA Zhilkin and others. - K., 2011. - 108 p.

5. Nosco B.S. Phosphate soil regime and fertility efficiency. - K.: Harvest, 1990. - 220 p.

6. Conservation Agriculture, Organic Farming and GM crops in Germany. Main focus: Eastern Germany / M. Frie-linghaus, L. Muller, M. Willms, U. Andreas // Report D 1.1. A 6. KASSA Project. CIRAD France, 2006. - P. 1-16.

7. Dawson C.J. Implications of Precision Farming for Fertilizer Application Policies // HayK. Visn NAU - K., 2006. - Vip. 101. - P. 27-42.

8. During R.-A. Conservation Agriculture, Organic Farming and GM crops in Germany. Main focus: Western Germany / R.-A. During, A. Michels // Report D 1.1. A 5. KASSA Project. CIRAD France, 2006. - P. 1-45.

9. Montanarella L. European Soil Protection Strategies. International Soil Tillage Research Organization 17th Triennial Conference. - Kiel, Germany, 2006. - P. 1586-1597.

Released on 2.02.2015.