

Development of land management science in Ukraine: history, modernity, prospects

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Goal. Retrospective analysis of the directions of institutionalization and development of land management science in Ukraine during the 60 years of functioning in Ukraine of specialized research and design and survey institutions, as well as the determination of promising directions of development of modern land management science. **Methods.** The dialectical method of knowledge — to study the state and development of modern land management science; monographic method — to elaborate scientific works and scientific and technical publications, normative legal framework, statistical information; abstract-logical — to theoretically generalize and formulate conclusions. **Results.** The main historical preconditions of institutionalization of land management in Ukraine are investigated. The most important scientific works, as well as work with land management, rational use, and protection of land, are executed by the land management institute from the moment of its foundation to modernity. The priority tasks of land management science at different stages of development, as well as the task of the medium-term perspective, are considered. **Conclusions.** Institutionalization of land management science thanks to the creation of a specialized research and design and survey institution over the past 60 years made it possible to form a reliable foundation for the development of the Ukrainian land management scholarship, the study of objective laws of nature and society in the use of land resources, solving the scientific basis of socio-economic and environmental land-use problems, including global challenges. The priority tasks of scientific support become a digital transformation of land management, the development of progressive tools for land use planning, as well as protection of land in conditions of market land relations.

Key words: land management, rational land use, land management institute, land protection.

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Land management as a set of socio-economic and environmental measures aimed at regulating land relations and rational organization of the territory of administrative-territorial units, economic entities, carried out under the influence of social and industrial relations and the development of productive forces, has always been an inexhaustible source of researchers inspiration.

Historically, land management has undergone various stages of development, ranging from the simplest operations for measuring and dividing land and ending with a complex system of measures for the organization of rational use and protection of land, which requires in-depth scientific and practical knowledge [1]. Academician P.M. Pershin introduced the economics of land management as a doctrine of socio-economic relations, adaptation of land area to economic and organizational use of its production properties, noting that land management as a social complex is part of the general system of economic knowledge [2]. Modern land management has become a science that

studies the manifestations of the objective laws of nature and society in the use of land, reveals on this basis the laws of rational organization of this process [3].

The key moment of institutionalization of land management science in Ukraine should be considered the formation of the Republican Project Institute for Land Management "Ukrzemproekt", which took place on April 24, 1961 pursuant to the resolution of the Council of Ministers of the USSR of February 28, 1961 № 240. The organization of the institute was conditioned by a single scientific and technical policies in the implementation of land management work aimed at the rational use and protection of land, especially agricultural land, as well as the needs for appropriate regulatory and methodological and technical support of land management design. In 1989, Ukrzemproekt was transformed into the Ukrainian Research and Design Institute for Land Management (UkrNDIzemproekt), and a year later by order of the Southern Branch of VASGNIL of December 29, 1990 № 231 institutes of UkrNDIzemproekt, its branches and the Kyiv branch were included scientific institutions of the Ukrainian Academy of Agrarian Sciences. In 1992, the UkrNDIzemproekt Institute was renamed the UAAS Institute of Land Management, which became the only state research institution on land management issues. .

Subsequently, the Decree of the President of Ukraine of February 17, 2003 № 134/2003 "On measures to create a unified system of state registration of land, real estate and rights to them in the state land cadastre" instructed the Cabinet of Ministers of Ukraine together with the Ukrainian Academy of Agrarian Sciences measures to transfer the Institute of Land Management and its branches to the management of the State Committee of Ukraine for Land Resources, which resulted in a reorganization. As a result of this decision, the Institute of Land Management of UAAS was reorganized into the state enterprise "Main Research and Design Institute of Land Management", and its branches - into state enterprises - regional research and design institute of land management. The reorganizations led to a further significant reduction in the late 2000s in the share of both basic and applied land management research in the structure of land management institutes and their transformation into ordinary commercial state-owned enterprises specializing in land surveying and land valuation.

Realizing the need to resume systematic research in the field of land management, ensuring the formation of a new strategy for land relations, development of models and mechanisms for rational use and protection of land, inclusion of land resources in economic circulation and their capitalization, at the initiative of Academician Leonid Novakovsky in 2018 the Presidium of the National Academy of Agrarian Sciences of Ukraine adopted an extremely important decision for the national land management science on the establishment of the Institute of Land Use of NAAS as the only specialized academic scientific institution in the country. Today, among the important tasks of the institute is the development of technologies for the formation of digital spatial, statistical and administrative data on land use and ensuring the transition to a digital model of the economy.

The aim of the article is a retrospective analysis of the directions of institutionalization and development of land management science in Ukraine during the 60-year period of operation of specialized research and design and survey institutions in Ukraine, as well as identification of promising areas of modern land management science.

Materials and methods of research. In the course of the research a dialectical method of cognition was used to study the state and development of modern land management science; monographic method - for the purpose of processing of scientific works and scientific and technical publications, normative-legal base, statistical data; abstract-logical - for theoretical generalization and formulation of conclusions. The main historical preconditions of institutionalization of land management science in Ukraine, its current state and prospects of development are investigated.

Results of the research. Until 1961, land management in Ukraine was performed by production units of the former departments of land management and crop rotation of regional departments of agriculture, as well as Kyiv and Kakhovka land management expeditions, which provided land management support for the construction of hydroelectric power plants on the Dnieper. Soil surveys

were conducted by independent expeditions and parties. Some scientific schools of land management in the USSR were mainly formed in higher education.

Immediately after the formation of the Ukrzemproekt Institute, its staff was formed mainly of employees of the regional departments of land management and crop rotation. For many years the institute was located in adapted premises in different districts of Kyiv, and its main base in the first years of its existence was the historic building of the former Kyiv Hippodrome, which now houses the Presidium of the National Academy of Agrarian Sciences of Ukraine. We should pay tribute to the first director of the institute Ivan Kolomiyets and his chief engineer Borys Kharchenko, who in extremely difficult conditions began to form a working team, achieved the creation of appropriate conditions for its work, ensured the tasks set before the institute. In addition to management units, the organizational structure of the institute at that time included production departments: agro-economic, land use, comprehensive surveys, geodesy and cartography, master plans and long-term planning, and the total number of employees was 48 people.



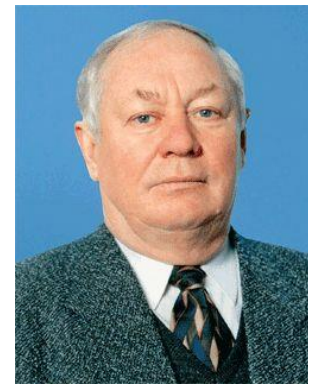
Ivan Kolomiyets,
director of the
institute in 1961-
1964.



Mykola Dobrotin,
director of the institute
1964-1974



Leonid
Novakovsky, director
of the institute in
1974-2003,
Academician of NAAS
of Ukraine



Dmytro Dobryak,
director of the institute
in 2003-2006,
Corresponding
Member of the NAAS
of Ukraine

In July 1961, by order of the Ministry of Agriculture of the USSR, regional land management expeditions of the Ukrzemproekt Institute were organized on the basis of the production part of the former departments of land management and crop rotation of regional agricultural administrations, expeditions and parties for soil survey and Kyiv expedition.

On October 1, 1969, land management expeditions were transformed into branches of the institute, and the Kyiv branch of the institute was established on the basis of Kyiv and Kakhovka land management expeditions. The organizational structure of the central institute has changed, a number of existing production divisions have been reorganized, new departments have been created: perspective design, land management design, scientific and technical information, mechanization of design works and project release, land reclamation, engineering surveys and cartography. The material and technical base of the institute and branches was strengthened - the need of branches in production facilities, motor transport, geodetic equipment was met, engineering and laboratory buildings of most branches and the central institute were built, resort house "Gorny" in Crimea, houses for workers.

In 1974, Leonid Novakovsky, a well-known land surveyor, was appointed director of the Republican Project Institute for Land Management. Under his leadership, a significant amount of work was performed on survey and mapping of soils, land management, protection of land resources, economic assessment of agricultural land, implemented in practice contour and reclamation organization of the territory and more. Subsequently, he developed the basic provisions

of land reform, solved a wide range of tasks of scientific support for soil valuation, monetary valuation of land, the formation of land legislation of independent Ukraine.

Improving the economic mechanism of management in the agro-industrial complex of Soviet Ukraine, the course of saving material, natural and financial resources necessitated a constant increase in the efficiency of land use. However, the main condition for the intensification of land use to a greater extent was to guarantee the stability of the entire soil-biological ecosystem. Implementation of the republican target program "Agrocomplex" and the Work Plan for the development and implementation of soil protection system of agriculture with contour-ameliorative organization of the territory for 1987-1990, other measures required appropriate scientific support. This led to the transformation in 1989 of the Ukrzemproekt Institute into the Ukrainian Research and Design Research Institute for Land Management (UkrNDIzemproekt). It is noteworthy that, at that time, of all the design institutes for land management of the former Soviet republics, the transformation of the design institution into a research and design was carried out only in Ukraine.

It is worth noting that one of the initiators of the transformation of the Ukrzemproekt Institute into a research institution was the former President of the Ukrainian Academy of Agrarian Sciences, and at that time - Head of the Main Department of Scientific and Technological Progress in AIC Derzhagroprom of Ukraine, Mykhailo Zubets. The changes made it possible to organize a scientific unit, which united research departments of land management, ecology of land use, automation of land management and design. The Institute has become the main institution for the study of land management problems and the general design organization for the development of scientific and technical documentation on the rational use of land and protection of soils from erosion..

The main tasks of land management science, which were coordinated with the directions of work of UkrNDIzemproekt, at that time were:

- development and implementation of ecologically balanced land use systems capable of ensuring the stability of soil-biological systems, restoration of soil fertility, constant increase of agricultural productivity on the basis of resource conservation;
- improvement of regional models of landscape nature management, based on the contour and reclamation organization of the territory;
- scientific substantiation of ways to prevent the reduction of agricultural land areas with the development of systems for environmental protection of valuable lands and monitoring of land resources;
- creation of a republican automated system for collecting, storing and using information on the quantitative and qualitative state of the land fund and land valuation for the needs of forecasting, planning and designing measures to improve the use and protection of land resources;
- drawing up general and regional schemes of land use and protection, anti-erosion measures, land reclamation, development of collective gardening, as well as relevant sections of national and sectoral programs;
- development of land management projects, planning and construction of rural settlements, organization of collective gardens, construction of anti-erosion hydraulic structures, terracing of slopes and land reclamation, land of unproductive lands, creation of protective forest plantations, etc .;
- conducting land assessment, topographic and geodetic, engineering-geological, soil, geobotanical research and surveys.

The inclusion of UkrNDIzemproekt and its branches in the network of scientific institutions of the Ukrainian Academy of Agrarian Sciences and renaming to the Institute of Land Management UAAS allowed to radically expand research in land relations, land management, land cadastre and effectively implement scientific developments in land management. Scientific and experimental work of the institute's departments during this period was headed by well-known scientists, and in particular, the Department of Land Relations - Doctor of Economics, Professor, Academician of

UAAS Leonid Novakovsky, Department of Land Management - Doctor of Economics, Professor, UAAS Corresponding Member Dmytro Dobryak, Department of Land Cadastre - Dr. of Economic Sciences, UAAS member Anton Tretyak. Departments were headed mainly by candidates and doctors of sciences, and a significant part of specialists worked on candidate and doctoral dissertations..

In the 60 years since the establishment of the Institute of Land Management, together with its branches, it has performed a large amount of research, design, land valuation and survey work aimed at the rational use and protection of the land fund of Ukraine. Conceptual principles of land management have been formed, in particular, the concept, tasks, content, organization and procedure for its implementation have been defined, especially in the conditions of land reform. Scientifically substantiated and introduced a single stage of land management design - the main link of land management. Division of land management design into three stages: forecast, pre-design developments; project development (land management projects for land tenure and land use of economic entities); working projects for individual measures for the use, improvement, protection of land, etc., fully justified itself in practice. The merit of the Institute of Land Management was the preparation and publication in 1973, 1983 and 1989 of the "Handbook of Land Management", which used in their work similar institutions of all union republics [5-7]¹.

In 1963-1965, work was carried out to create an experimental (trial) land cadastre in six regions of Ukraine. Based on it, methodological and technical approaches to soil quality and land valuation were developed.

Among the most important land management works performed by the institute are the General scheme of land use of Ukraine for 1976-1990, regional land use schemes, district land management schemes, schemes of reclamation of disturbed lands in some coal and iron ore basins, working projects of crop production for all farms, projects for the establishment of water protection zones and coastal strips throughout Ukraine, projects for the organization of the road network in agricultural areas, etc. In-farm land management projects were developed for each agricultural enterprise.

The staff of the institute has always focused on the issue of land protection, because the land fund of Ukraine is characterized by a high level of agricultural development and plowing. The conducted scientific researches, the practice of experimental anti-erosion design confirmed that the definition of specific norms that would establish the relative areas of arable land, meadows, forests and waters, as well as the nature of economic activity, the need for which pointed out prominent scientist V.V. Dokuchaev, remains relevant to this day.

Complex anti-erosion design in Ukraine dates back to 1962, when the institute on the Slovechansko-Ovruch ridge of Zhytomyr region drew up a scheme of anti-erosion measures, as well as developed working designs, the main elements of which were implemented in kind. Later, regional schemes of anti-erosion works on ravine-beam systems were developed: Middle and Small Kuyalnik (Odessa region), Seversky Donets (Kharkiv region), Sinyukha (Kirovograd and Cherkasy regions), as well as schemes of complex use of Lower Dnieper sands. A special effect, as practice has shown, was achieved where in the complex with agrotechnical and forest reclamation measures the construction of hydraulic structures was carried out.

Projects with contour and reclamation organization of the territory in 2445 agricultural enterprises on 9.3 million hectares were drawn up. In 948 farms on the area of 3.8 million hectares the contour boundaries of fields were fixed in kind by forest strips, earth embankments of various constructions, strips of perennial grasses. In general, the construction of anti-erosion hydraulic structures according to the projects was completed by 42%, and the creation of protective forest plantations - by 65%.

¹ The fourth, revised and supplemented edition of the Handbook of Land Management edited by Leonid Novakovsky, prepared by leading industry specialists, was published by Agrarian Science in 2015.

With the adoption on December 18, 1990 by the Verkhovna Rada of the Land Code of the Ukrainian SSR and the resolution "On Land Reform", the institute and its branches focused entirely on the development of scientific and methodological and technical documents on land reform and land management related to land reform. Scientific and technical activities during the land reform of the institute included:

- conducting research and developing on this basis scientifically sound measures aimed at implementing the provisions of land legislation of Ukraine on the rational use and protection of land and the creation of a favorable ecological environment and improvement of natural landscapes;
- development of scientific forecasts, concepts, main directions of land management development, state and regional programs of rational use of land resources and land protection;
- development of draft new legislative and other normative acts of land legislation, preparation of proposals for the implementation of existing land legislation;
- development of theoretical foundations and scientific support for land reform in Ukraine, land monitoring, land cadastre, land management, etc.;
- scientific and methodological substantiation of development of land management projects, determination of boundaries of territories with special nature protection, recreational reserve regime, conservation of lands that have been affected by anthropogenic impact, organization of agricultural lands on radioactively contaminated lands;
- creation of a state automated system for collecting, storing and using information on the qualitative and quantitative state of the land fund of Ukraine, as well as land valuation for the needs of forecasting, planning and designing measures for the rational use and protection of land resources.

Important scientific results of land management academic science were the development of theoretical foundations of grading and scales of quality assessment of soils of Ukraine, study of the dynamics of humus content in the main soils and natural-agricultural regions of Ukraine, substantiation of theoretical and methodological and methodological bases of land reform. land tenure and land use in the conditions of existence of various forms of land ownership, automation of schemes of primary division of lands into land shares (shares) for their allocation in kind, development of methodical bases of monetary valuation of lands, methodical recommendations on conservation of degraded and unproductive lands of other agricultural and other agricultural purposes developments.

Scientific developments of the institute allowed to form the foundation of modern land law of Ukraine. Among the most important legislative tasks should be noted: the Land Code of 1992, the Land Code of 2001, the Laws of Ukraine "On Forms of Land Ownership", "On Payment for Land", "On Peasant (Farming) Economy", "On Land Protection", "On Land Management", etc.

Land reform was the impetus for scientific substantiation and implementation of new types of work, because during its implementation made about 9.1 thousand land management projects for the organization of land shares (shares), formed more than 15 million new land plots, distributed 27 million hectares of agricultural land - in fact, there was the largest redistribution of land among European countries. Payment for land tenure and land use was introduced as a financial basis for local self-government, a normative monetary valuation of lands of settlements and agricultural lands was carried out, the foundations for territorial organization of power in Ukraine were laid by establishing boundaries of administrative-territorial units. glad. 8.5 thousand land management projects have been drawn up to establish and change the boundaries of cities, towns and villages.

The protection of the most valuable part of the land fund - nature reserve fund, lands of health, recreational and historical and cultural purposes is provided. 865 land management projects on organization of territory and establishment of borders, 5.2 thousand working projects of land

management of protection direction, 2.1 thousand land management projects on land management and organization of crop rotations [4].

The institute became the center of formation and development of the Ukrainian scientific land management school. Under the guidance of Academician Leonid Novakovsky, members Dmytro Dobryak and Anton Tretyak, more than 50 candidate and doctoral dissertations were defended. Postgraduate studies and a specialized scientific council have been organized. Scientists and specialists - natives of the Institute of Land Management - at the beginning of land reform formed the basis of the staff of state bodies of land resources, one of the heads of the Institute - B.M. Chepkov headed the State Committee of Ukraine for Land Resources. Leading scientific and pedagogical workers of land management faculties and departments of higher education institutions of Ukraine, in particular, the National University of Life and Environmental Sciences of Ukraine, the National Aviation University, Bila Tserkva National Agrarian University and many others became employees of the Institute.

Currently, the Institute of Land Use of NAAS of Ukraine has taken over the function of the Academic Center of Land Management Science and Tradition of Ukrainian Scientific Land Management School. improving the land cadastre system in Ukraine, forming mechanisms and tools for spatial planning of sustainable rural development, improving the assessment of land resources and their capitalization in order to increase social, economic and environmental efficiency of land use, land protection, land relations reform in the context of decentralization and circulation of agricultural land plots in Ukraine, information and analytical support of land resources management at all levels of state power, local self-government and economic entities, formation of land monitoring tools and development of appropriate classifiers.

Priority is given to research aimed at ensuring the national interests of Ukraine, such as food and environmental security, land use planning as an important basis for sustainable development, protection of land resources, support for land use for research and innovation, increasing the competitiveness of domestic agricultural producers, protection of citizens Of Ukraine. International experience in rethinking the land management paradigm should be taken into account [9].

Important in the activities of the Institute of Land Use NAAS is the use of modern methods of scientific research, including economic and mathematical modeling, geodetic software, computer programming, development of databases and geographic information web platforms, the use of spatial data processing tools, including remote sensing and aerial photography. implementation of digital processes in land management, land cadastre and monitoring and soil quality. In this regard, the Institute relies on advanced modern world experience, which shows the acceleration of communication and information technology processes, as well as the need to use new algorithms and tools for processing big data and artificial intelligence. The results of scientific research by specialists of the Institute of Land Use are implemented in management and production.

The Institute has developed the Concept of creating an Automated Management system (AMS) of the Land and Property Complex of the National Academy of Agrarian Sciences of Ukraine, which, in particular, includes issues of topographic and geodetic components, updating spatial and attributive data, digital management and organizational processes AMS software and hardware. The software of geospatial data infrastructure, mechanisms of its filling with necessary data and models of electronic system of accounting and management of land and property complexes of state institutions and enterprises of NAAS have been developed. Concepts and technical tasks of creation of the automated information system of monitoring of lands and quality control of soils at the national level are developed.

Among the important medium-term tasks of land management science performed by the Institute of Land Use of NAAS, it should be noted:

- development of technologies for the formation of digital spatial, statistical and administrative data for the transition to a digital model of the economy;
- research in the field of "Land Use Planning and Land Management of Rural Areas";

- research in the field of "National Infrastructure of Geospatial Data and Automated Systems in Land Management";
- further development and filling of the model "Automated Land Management System of NAAS";
- development of quality management systems for services in the field of land management, land cadastre, topographic and geodetic works.
- improvement of land inventory technologies for the purpose of forming communal lands.
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Conclusions

Institutionalization of land management science through the creation of a specialized research and design research institution over the past 60 years has formed a solid foundation for the development of Ukrainian land management school, the study of objective laws of nature and society in the use of land resources, scientific solutions to socio-economic and environmental land use issues, including responding to global challenges. The development of modern land management science in Ukraine should be based on the scientific network of the National Academy of Agrarian Sciences and scientific and pedagogical teams of land management universities, with the priority tasks of scientific support is the digital transformation of land management, market land relations.

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P.S. The authors dedicate this article to the 60th anniversary of the Institute of Land Management, which will be celebrated on April 24, 2021, and the significant contribution of land surveyors of Ukraine in ensuring the rational use and protection of land as the main national wealth of the Ukrainian people, market land relations and land reform.