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Освещено современное состояние изучения линейной эрозии и создаваемых ею форм рельефа. Сформулированы проблемные вопросы и задачи исследования оврагов и овражной эрозии, над решением которых должны работать украинские ученые и практики в ближайшие десятилетия.

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The authors analyzed the current state of the study of linear erosion and landforms created by it. The most problematic aspects of the problem and the study of gullies and gully erosion on a solution that should work Ukrainian researchers and practitioners in the coming decades.

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JUSTIFICATION OF GEOINFORMATION SYSTEM ON LAND SOILS QUALITY MONITORING

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In article the making components necessary for creation of system of geoinformation monitoring of soils and development of conceptual model of complex GIS of a qualitative condition of soils are analyzed. Components of bank of geospatial data of monitoring of quality of lands of agricultural purpose are proved.

Problem statement. Earth as a key component of the biosphere, in conjunction with other forms of natural resources environment, felt the negative impact of the intensification of human activity. Systematic use of land resources in agriculture as the main means of production, leading to increased erosion, decreased soil fertility.

Among the components of the biosphere soils are the most conservative component of the environment. Under the influence of external factors, it changes more slowly than the other components, and these changes can not always be traced. Restoring soil fertility also is slow, and hence to correct the negative effects needed for decades. Some changes are irreversible soil, why soils require careful treatment and careful monitoring of their condition [1].

Observations of the soils in the current legislation provides for monitoring, which is one of the tools of decision support in the field of land, since the main task of monitoring of land is the prediction of environmental and economic impacts of land degradation in order to prevent or remedy of negative processes.

However, soils can not be regarded as a separate element of the environment, but it needs to take into account a set of heterogeneous information. To solve the problems associated with the study of soils, it is necessary to create an information

structure that can provide solving multivariate spatial-temporal analysis.

Analysis of recent researches. The value of monitoring soil was first highlighted at the 1st international environmental conference in Stockholm (1972). Even then, was justified by the need for a new approach in monitoring the state of natural resources and soil as their most important component [2].

The issue of assessment of soil processes including physical, chemical, physicochemical degradation, were devoted to labor V.V. Medvedev, S. Bulygina, S.O. Balyuk, V.A. Grekov, R.S. Truskavets and others [3—5]. Value problem of monitoring the state reflected in laws and regulations.

Along with convincing evidence of the need for monitoring of soils, the latter has not yet received full development in Ukraine. Do not developed the typical structure of state and regional databases.

Article purpose — the analysis of components that form the basis of incoming information system for monitoring soil and develop a conceptual model of an integrated geographic information system (GIS), the quality of the soil.

Main material. The need for monitoring soil is a general need for timely information on the quality of soil covering. This will predict the further development of these changes in the future and develop a set of measures for restoration of soil fertility.

Motivated to develop a system for monitoring soil are:

need for control and prevention of adverse development of such processes as re — humification, decalcification, agrophysical soil degradation, salinization and alkalinization, water erosion, deflation;

need for restoration of soil fertility, increase return on assets, the use of reclamation and other production costs, aimed at increasing crop yields, productivity grasslands, pastures, forests and other types of land;

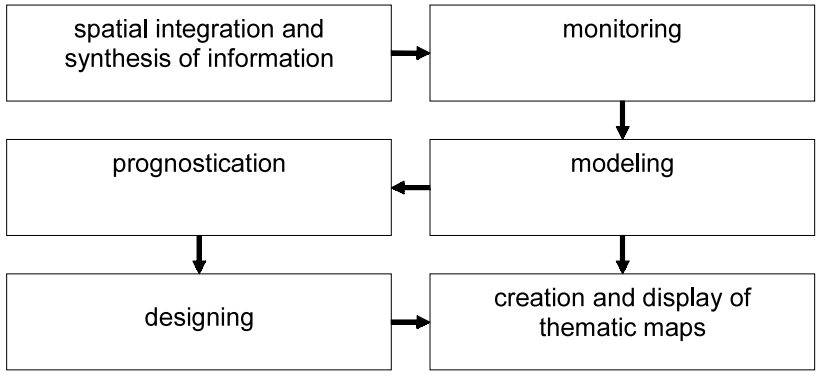
inability generalized estimating the current state of the soil covering Ukraine by the existing fragmented information;

inability to attract and management of investment due to lack of adequate assessment of the current status of soils of agricultural lands.

Geoinformation ensure comprehensive monitoring soil. Monitoring soil — is «an organization of quantitative and qualitative evaluation of changes in soil over time, controlling the flow and content in soils of all types of pollutants (heavy metals, radionuclides, nitrates, pesticide residues and other chemical contaminants inorganic and organic origin)». Thus, the components of soil monitoring should include a significant amount of information. Today — a 18 determinants for each elementary area by rounds of surveys carried out in 5—10 years [6]. With the need to develop technology that would combine in one system arrays agrochemical tabular data from their spatial mapping agrochemist met long ago. With the adoption of the Land Code of Ukraine, soil quality component was not just passport field, but also part of the state land cadastre. Before the commencement of the land market in Ukraine qualitative indicators of soil gaining increasing importance as they indicate land productivity in agriculture, and thus influence the price of land.

Practical implementation of this task has become possible in the last 10—15 years due to the development of computer GIS technology [7].

The challenge of using GIS in assessing the status of soil can organize for basic functionality as follows (pic. 1).



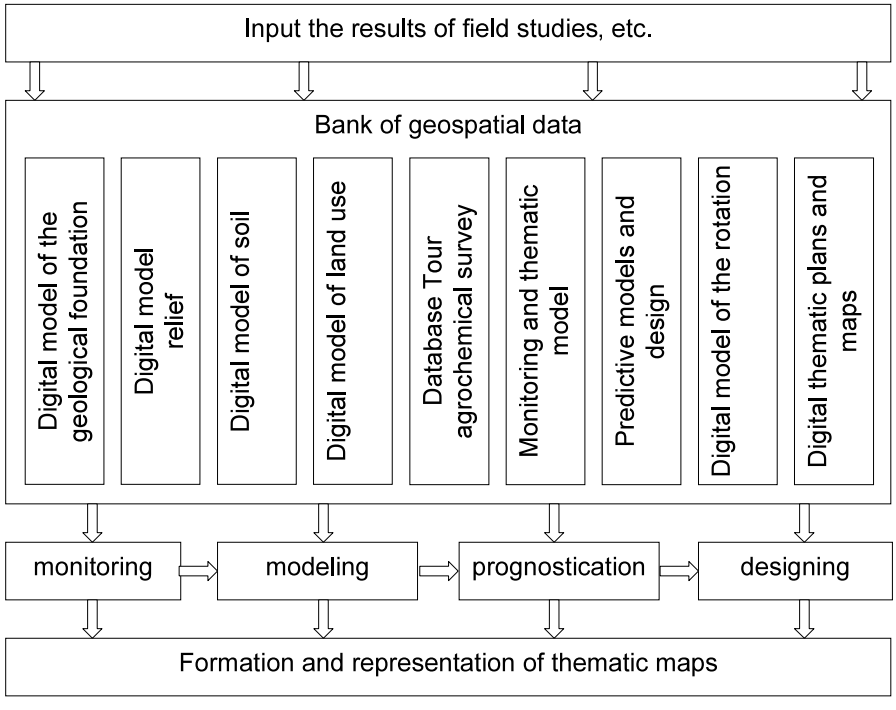
Pic. 1. The challenge of using GIS in the evaluation of soil

Implementation and interaction of all tasks is based on building an integrated bank geospatial GIS data quality soil (pic. 2), which accumulate input data and results of modeling and design.

The key for GIS monitoring is the spatial integration of all data, which is achieved primarily through the use of a single basic set of geospatial data [8]. The structure of such a set of GIS in soil include: digital elevation model (DEM), digital model of land use, state agroresurs, soil cover, and others.

Digital model of the geological basis to determine the area (geological foundation, complex landforms), tract (mezoforms of relief), Fazio tract (homogeneous lithology of surface rocks). This model also describes the factors of soil formation.

Digital elevation model provides an opportunity to build a 3D model of the



Pic. 2. Conceptual model of an integrated GIS quality of soils

terrain, identify watersheds and waterintakes, steepness and slope exposure, washout zones, transport and accumulation of substances to determine facies. Relief is a factor in the formation of soil structure.

Digital model of soil contains data types and subtypes of soils, genetic nomenclature list and granulometric composition of soils, soil beyond the farming groups, the presence of the degradation process and the type, quality indicators of soil.

Digital model of land use reflect geospatial data land boundaries, land uses and economic activities landholder, cell shape, which determines the impact of human activities on soils.

Database Tour agrochemical survey contains information about ongoing agrochemical research that enables to establish the state of soil fertility and its changes and develop recommendations on the use of fertilizers. Agrochemical survey is the source of data for qualitative land evaluation and development agricultural activities to protect soil from degradation processes.

Digital model of the rotation reflects geospatial location data of crops, crop rotation, land uses and economic activities landholder, and ownership. This model allows us to determine the spatial distribution of crops.

Digital thematic plans and thematic maps containing data that can expand knowledge of impacts on soils: CROT activities, land management schemes, cartographic materials protection and rational use of land resources, etc.

Monitoring and thematic models describe the relationship between database information, processes, phenomena and physical quantities that are associated with it, and help to numerically and qualitatively express the changes that affect the final result.

Forecasts and design models allow to analyze changes in space and time, and based on observations to construct prediction of the further course changes.

Geoinformation modeling based on multilayer creating electronic maps in which the support layer describes geospatial data given territory and each other — one of the aspects of this area [9]. Geoinformation modeling is the foundation soil monitoring, forecasting and development (design) safety, environmental protection and sustainable use in agricultural production. Integration and synthesis of information on spatial characteristics, as well as preparing and submitting geo Image related to the fundamental properties of GIS. When geoinformation modeling as they apply to incoming data and the results of forecasting and planning. Compile and build models of the spatial distribution of phenomena based on the standard procedures of approximation and interpolation, the definition of spatial statistical and morphometric characteristics of objects.

It is an indisputable effectiveness of GIS in all tasks for a preliminary analysis of the input data, spatial integration of information from various sources, the formation of 3D — daytime models and other thematic reliefs buffer, network and over layer GIS analysis and modeling of operational presentation of results in a visual cartographic form.

Conclusions. Analysis of the components necessary for the creation of geo soil monitoring and development of conceptual models of complex GIS quality of soil. The prospect for further research is to develop an integrated GIS techniques the quality of soil.

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У статті проаналізовано компоненти, необхідні для створення системи геоінформаційного моніторингу ґрунтів та розроблення концептуальної моделі комплексної ГІС якісного стану ґрунтів. Обґрунтовано складові банку геопросторових даних моніторингу якості земель сільськогосподарського призначення.

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В статье проанализированы составляющие компоненты, необходимые для создания системы геоинформационного мониторинга почв и разработки концептуальной модели комплексной ГИС качественного состояния почв. Обоснованы составляющие банка геопространственных данных мониторинга качества земель сельскохозяйственного назначения.