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ФОРМУВАННЯ СТАЛОГО ЗЕМЛЕКОРИСТУВАННЯ: ПРОБЛЕМИ ТА ПЕРСПЕКТИВИ

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4. Філіпович В. Є. Супутниковий моніторинг територій незаконного видобутку бурштину // Ukrainian journal of remote sensing. 2015. №6. С. 4-7.

Geoinformation modeling of areas affected by amber mining

Abstract. The article considers modern possibilities of geoinformation technologies for geospatial modeling of areas affected by amber mining. Since, as shown by satellite surveys, disturbed lands are constantly expanding, the damage to the state is catastrophic, so there is a need for: satellite monitoring to identify disturbed lands, land inventory.

The purpose of the study is to present a methodology for decoding satellite image materials for geoinformation modeling of the areas affected by amber mining.

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GEOINFORMATION MODELING OF LANDSCAPE ELEMENTS IN LAND MANAGEMENT PROJECTS

In Ukraine, there is a need to automate the planning of land management, the theoretical and practical foundations of which are currently being developed. If automated design systems have become widespread in industry and construction, then in land management this process has found application only in the use of some foreign programs [1, p. 264]. There are very few domestic developments in this regard. The issue of modeling landscape elements and characteristics of agricultural land remains undeveloped [2, p. 296].

Analysis of the latest research and publications related to solving this problem

Well-known scientists are working on the issues of geoinformation modeling and automation of design works and their effective use in land management: Lyashchenko A.A., F. Javier Mesas Carrascosa, JT Al-Bakri, Kokhan S.I. etc. Acquaintance with their scientific works shows significant achievements in the field of land management design using modern information technologies. Nowadays, the development of the scientific foundations of the computerization of land management design using foreign experience is being carried out [3, p. 201].

At the same time, the study of domestic scientific publications shows that little attention is paid to the problem of automation of land management planning and its effectiveness. The theoretical foundations of the automation of land management planning, application programs for the implementation of land management decisions in an automated mode, their models and functionality, scientific approaches to geo-informational modeling of landscape elements and characteristics of agricultural lands, directions for improving the automation of project work in land management have not been developed [4 p. 122].

In this article for the implementation of the new technology of land design, a technique for the development of the following geoinformation models is proposed:

1. Relief model. Advantages of using such a model are to support modern methods of obtaining DMP: laser scanning, digital photogrammetric methods, GNSS surveys.

2. Model of slope steepness. Lets you display the values of slope as a continuous spatial surface. Reflects a discrete value at each point on the surface. There is a derivative from the surface of the relief. The accuracy of the model completely depends on the accuracy of the DIM.

3. Exponential model of slopes. Lets you display the exposure values as a continuous spatial surface and also get a discrete value at each point in the surface. There is a derivative from the surface of the relief.

4. Model of distribution of solar energy on the surface of the territory. Thermal regime of territory. Lets you display the values of solar energy obtained at a certain time (or time period) as a continuous spatial surface. Lets get a discrete value at each point in the surface. There is a function from the spatial coordinates of the point of the earth's surface, the coordinates of the sun and time. Derived from it is a model of thermoregulation of the territory [5 p. 14].

5. Model of agro-industrial groups of soils. Allows you to display the values of soil characteristics at any point of the agricultural land.

6. Model of depths of groundwater. It is possible to formalize in the following formats: raster GRID model, insulin model, vector polygon model TIN. Lets you map the values of depths of groundwater as a continuous spatial surface. Allows you to receive a discrete value at each point of the agricultural land.

7. Agrochemical model of territory. Lets you display agrochemical indicators as a continuous spatial surface. The source of information is agrochemical passport of agricultural territories, or specialized materials of remote sensing.

8. Model of erosion hazard. It is possible to formalize as a raster GRID model. Based on RUSLE soil loss equation. Reflects the importance of soil losses and erosion velocity of water as a continuous spatial surface. Allows you to receive a discrete value at each point of the study area.

Integrated Territory Model. In modern land design design is not used [6 p. 7]. The newest proposed model is a complex geospatial information model. Combines all (or several) of the above elements with the weights determined by the experts, depending on the target function. Lets display the values of the integrated index as a continuous spatial surface. It can be expressed in absolute and relative indicators (scores). Supports modern geoinformation processing technologies (Fig.1).

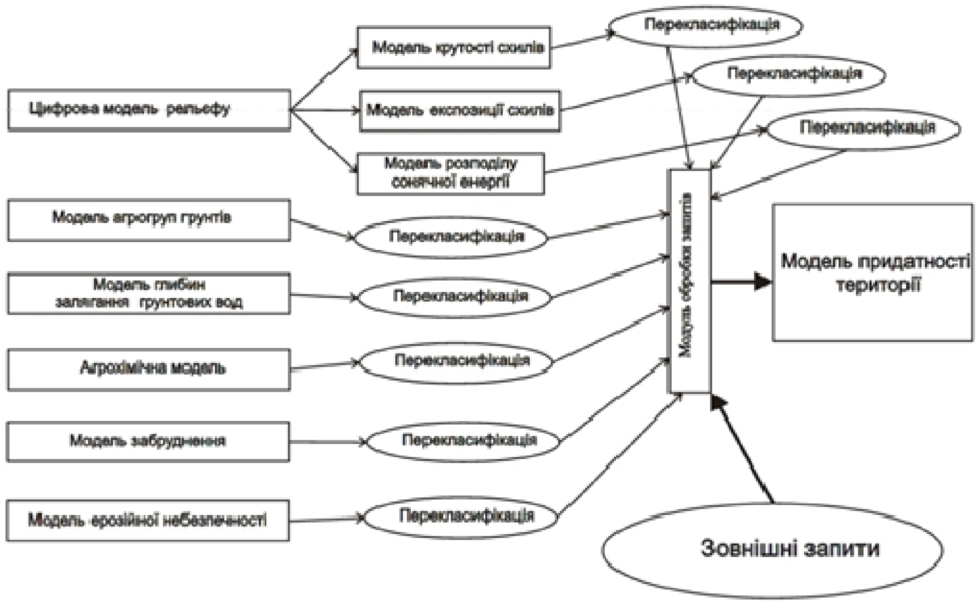

Fig. 1. Scheme of using models of natural landscape elements in geoinformation systems for managing agricultural territories

References

1. Булакевич С. В., Трохимець С. М. Моделі природноландшафтних елементів як інформаційна основа сучасних проектів організації території сільськогосподарських земель. Вісник Національного університету водного господарства та природокористування. 2013. Вип. 3. С. 264 – 271.

2. Булакевич С. В. Технологія визначення ризику водно-ерозійного руйнування земної поверхні в землевпорядному проектуванні. Сучасні досягнення геодезичної науки та виробництва. 2007. I (13). С. 295 – 299.

3. Булакевич С. В., Черняга П. Г. Геоінформаційне моделювання природноландшафтних елементів сільськогосподарських угідь в проектах землеустрою. Сучасні досягнення геодезичної науки та виробництва. 2012. I (23). С. 201 – 204.

4. 5.Brown, Greg, Fagerholm, Nora. Empirical PPGIS/PGIS mapping of ecosystem services: A review and evaluation. Ecosystem services. 2015, 13. 119–133. https://doi.org/10.1016/j.ecoser.2014.10.007

5. Kilic, J; Jajac, N; Marovic, I. GIS-based Decision Support Concept to planning of land acquisition for realization of Urban Public Projects. Croatian Operational Research Review, Vol. 9 No. 1, 2018. P 11-24. DOI: https://doi.org/10.17535/crorr.2018.0002

6. Dorosh Y., Barvinskyi A., Kupriyanchik I., Kolisnyk Hr., Tretachenko D. Problems in conducting land management in agricultural enterprises in the process of land reform. Zemleustrii, kadastr i monitorynh zemel. – 2019. – № 3. – p.4–14.

Геоінформаційний підхід щодо моделювання ландшафтних елементів в проєктах землеустрою

У даній статті запропоновано методику розробки геоінформаційних моделей ландшафтних елементів для реалізації нової технології землевпорядного проектування.

Також розглядається інтегрована модель території як складна геопросторова інформаційна модель, що відображає значення інтегрованого показника як безперервну просторову поверхню.