

The Place and Role of Ecology in Geographic Information Systems

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Annontation: We all know that the word "geography" is not only "spatial" or "territorial" as a result of the introduction of geoinformatics and geographic information system (GIS) under the influence of information technologies, that is, in natural sciences. First of all, this concept expresses the complex and systematic characteristics of the research approach. To date, geographic information systems are used in several areas. In particular, it can be widely used in the field of ecology.

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We all know that the word "geography" is not only "spatial" or "territorial" as a result of the introduction of geoinformatics and geographic information system (GIS) under the influence of information technologies, that is, in natural sciences. First of all, this concept expresses the complex and systematic characteristics of the research approach. To date, geographic information systems are used in several areas. In particular, it can be widely used in the field of ecology.

The purpose of the research work is to create a database with the help of geographic information systems and to create eco-models and thematic ecological maps for the purpose of researching the ecological situation, preventing pollution of natural conditions, protecting the environment, conducting ecological monitoring and developing measures. In the case of the Republic of Uzbekistan.

To date, geographic information systems are used in several areas. In particular, it can be widely used in the field of ecology. The use of geo-information systems in ecology allows to obtain ecological information in a quick way and to display it on the basis of a map, as well as to assess the state of ecosystems and make a prediction of its development in advance.

The possibilities of using GIS in ecology are as follows:

Input, collection, storage and processing of digital cartographic and environmental information;

- Based on the received information, draw up cards related to the topics reflecting the current state of ecosystems; Makon (fazoviy) va zamon (vaqt) davomida ekologik holatning o'zgarishlari dinamikasini tadqiq qilish, tegishli grafiklar, jadval va diagrammalarni tuzib chiqish;
- Modeling the development of the ecological situation in different habitats and studying the condition of ecosystems depending on climatic conditions, describing the sources of pollution, determining the concentration values of pollutants;
- Comprehensive assessment of the state of objects and conditions of the natural environment based on various data and obtaining information.

Existing environmental problems require quick actions, the effectiveness of these actions directly depends on the speedy processing and presentation of information.

In the complex approach typical for the field of ecology, one usually relies on generalizing descriptions of the environment, and as a result - even in the conditions where the initial volume is considered to be sufficient, their volume is required to be unequivocally large. In the opposite cases, the possibility of substantiating the existing circumstances and solving the given issues is in doubt. However, the simple collection of data is unfortunately not enough. It is required that this information be easily obtained and systematized in accordance with the consumer's requirements.

If you want to connect, compare, analyze data with different descriptions, simply look at them in a convenient and clear way, for example, create the required and necessary tables based on this data. , if it is possible to create schemes, drawings, maps and diagrams - this is a very good situation. Grouping the data in the desired form, separating them based on relevant images, summarizing and analyzing them generally depends on the skill level and talent of the researcher, as well as on the research methods chosen for the purpose of interpreting the collected information.

The stage of processing and analysis of the collected data is important, in which the level of technical support of the researcher in the first place is important, that is, computer devices and software tools suitable for solving the specified tasks are important. is the owner.

The geographic information system is widely used in the creation of nature protection maps. These maps are used to determine the extent and intensity of the crisis of the flora and fauna in the next stages of obtaining new information. The introduction of remote sensing data, including satellite data and data from routine field observations, enables monitoring of local conditions as well as large-scale anthropogenic impacts. It is considered appropriate to include information about the increase in the level of anthropogenic influence in the maps for the division of territories into zones, including the separation of territories from the point of view of nature protection, the designation of parks and reserves. Assessment of the state and pace of degradation of natural environments can be done by highlighting test areas on all map layers.

With the help of the geographic information system, modeling of the spread and impact of pollution based on anthropogenic or natural sources in local areas, atmospheric and hydrological networks is carried out. As a result, it becomes possible to quickly assess the near-term and future state of extreme conditions of this type, including in this way anthropogenic and large areas under the influence of oil and other harmful substances, as well as with permanent effects. determination of the effect of harmful substances with a polluting effect is carried out. Geographical information systems also have the ability to collect and manage information about protected areas, where data is collected by nature reserves and national parks. Full monitoring of plant species and rare animal species is carried out within the protected areas.

Also, the state of anthropogenic impacts related to tourism, construction of roads and construction of power plants, planning and implementation of nature protection works are carried out. At the same time, it will be possible to determine the solution of practical tasks, such as the prediction of the productivity of cultivated fields in agriculture and the management of fodder stocks in pastures where livestock are grazed. GIS solves such tasks based on scientific principles, that is, it solves the specified tasks with minimal impact on wildlife.

It is observed that structures implementing regional and local management use GIS capabilities on a large scale to find optimal solutions to issues related to the use of land resources based on distribution and control, as well as rational resolution of conflicts between landowners and tenants.

In the use of land, it is important to compare the areas of the current plots and divide the land into zones, to solve the issues of developing plans for their future development in a prospective manner. In addition, GIS capabilities are widely used in determining the limits of land use in agriculture, provided that the requirements of wildlife are not violated. For example, in some cases, it is necessary to allocate special corridor (corridor) areas to ensure the process of migration of wild animals through areas of developed land, including in areas located near nature reserves and national parks. The continuous collection and updating of information about the boundaries of land use is necessary for the protection of nature, including in this direction, in the appropriate order, the administrative and legal measure - drawing up the norms of activities, establishing their use, GIS is very helpful in making timely changes to existing laws based on environmental principles and concepts.

GIS is an effective tool for studying natural conditions and, in general, studying the distribution of particular species of flora and fauna over space and time. For example, if the distribution area of a certain animal species, including grazing areas, the breeding place of this animal species, the types and reserves of suitable food resources in the relevant order, water sources, the required level of cleanliness of the natural environment, i.e. the clear vision of the environment if there is information about the values of the indicated indicators, then, based on the development of GIS combinations of relevant indicators, determine the boundaries of the areas closest to the optimal conditions for the survival and recovery of the indicated animal species solves the task easily.

The development of one of the main areas of GIS use in the case of the expansion and deepening of nature protection measures is directly determined by the clear observation of the results of the processes carried out at the local and regional level in this direction. As sources of information updates, photos taken from the surface of the earth or taken from a distance, photos taken from the air, as well as from space are important. The effectiveness of using GIS in monitoring the natural environment and ecological conditions is high, including assessing the consequences of favorable and unfavorable effects on ecosystems and their components, developing measures and measures, and solving problems such as their prevention.

Creating maps using GIS is carried out in the following sequence.

- Preparatory works.
- Compilation of the thematic layers of the created card and corresponding tables, their analysis.

Creating a database:

- Entering the table (attributes) and text data into the computer memory with classification of objects.
- Development of a conditional sign system.
- Placing thematic layers of maps, creating a cartographic image and analyzing them.
- Development of the composition of the card and its preparation for publication.
- Publish the card.

As a result of the research, it will be possible to obtain information about the ecology of the area using geographic information systems in a quick view and display it on the basis of a map, as well as to create eco-models, to research and update them.

The use of geographic information systems in ecology can achieve effective results in the ecology of natural conditions and environmental protection. This makes it possible to assess and predict the state of ecosystems. In addition, it serves as the main source for the socio-economic development of the region.

Foydalanilgan adabiyotlar

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