

GAT-BASED OPTIMIZATION OF LAND ACCOUNTING: INNOVATIVE APPROACHES

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Abstract: The article examines the role and potential of geographic information technologies (GIS) in land resource management. GIS systems are an effective tool for analyzing soil conditions, selecting crop types, monitoring resources, and improving the land cadastre system. The possibilities of optimizing land resources and ensuring sustainable development using drones, sensors, artificial intelligence, and GIS systems are analyzed. The article also includes recommendations for improving GIS technologies.

Keyword: Geographic information technology (GIS), land resource management, land accounting system, soil condition, crop selection, resource monitoring, GIS systems, drones and sensors, artificial intelligence (AI), innovative approaches, high-precision monitoring, soil fertility

Introduction: Geographic Information Technologies (GIS) are an important tool for land management and resource optimization, especially in ensuring environmental sustainability. With the help of GIS technologies, the processes of collecting and analyzing data on soil, irrigation systems, crops, and land cadastre are significantly simplified, which allows for effective management. As in other areas, the integration of these technologies in agricultural and land management systems allows for more effective results in practice. This article presents the necessary directions, methods, and recommendations for improving the land accounting system based on GIS.

Land accounting system based on GIS GIS systems play a very important role in the effective management of land resources. These systems allow the collection, storage, analysis and visualization of geographic and spatial data of the land. With the help of a GIS system, effective methods can be used to monitor the state of land resources, ensure environmental sustainability and increase economic efficiency.

Soil condition analysis Using GIS, it is possible to determine the condition of the soil, measure its fertility, structure, pH level and water permeability. This helps in selecting crops and predicting their development. It allows you to quickly identify changes in the soil and take the necessary measures.

Crop selection and monitoring GIS technologies can be used to monitor crops and their development and select crop types in response to climate change. For example, crop yields in agriculture may change due to climate change. GIS systems are an effective tool for monitoring changes in crop types.

Resource management: GIS systems are essential for monitoring the state of land resources and analyzing their potential for effective use. GIS technologies help determine the efficiency of irrigation systems, manage surface water resources, and protect soil from erosion.

Land cadastral system: The land cadastre system will also be improved with the help of GIS. It will be possible to check and update the legal status of land plots, which will help determine legal requirements for land..

Functions	Description
Soil analysis	Determining soil fertility, composition and water permeability.
Resource monitoring	Monitoring the condition of water, soil and plants.
Crop selection	Selecting crops suitable for climatic and soil conditions using GIS.
Cadastre system	Checking and updating the legal status of land plots.

Methods for improving land accounting based on GIS Several new methods and techniques can be used to improve GIS technologies. These include:

Monitoring using drones and sensors Drones and high-tech sensors can monitor soil conditions and crop development in real time. This method is especially effective for managing large areas of land. Drone images and sensors can provide accurate information about soil moisture, pH levels, and other parameters.

Forecasting using AI and machine learning Artificial intelligence (AI) and machine learning technologies can be used to optimize land resource analysis and forecasting processes. These technologies can, for example, improve soil fertility or predict crop yields.

Development of GIS systems Geoinformation tizimlar (GIS) yordamida yer resurslarining holatini tahlil qilish, ularning geografik taqsimotini aniqlash va shu orqali eng samarali boshqaruv strategiyalarini ishlab chiqish mumkin.

Method	Explanation
Drone Monitoring	Real-time monitoring of soil conditions and crops using drones.
Sensor Measurements	Measurement of soil moisture, pH and other physical parameters.
GIS Systems Development	Further expansion and optimization of geoinformation systems.
AI and Machine Learning	Analysis and forecasts using artificial intelligence and machine learning

Improved capabilities of the GAT system The development of GIS technologies can improve the efficiency of land resource management. The following opportunities arise:

Accuracy and speed GIS systems can quickly measure land resources and soil conditions with high accuracy, which allows for timely decision-making in agriculture and other sectors.

Ensuring environmental sustainability GIS systems create effective monitoring capabilities to prevent soil erosion, monitor the condition of irrigation systems, and prevent other environmental problems.

Effective management With the help of GIS, it is possible to effectively organize the process of land resource and crop management. This helps to ensure not only economic benefits, but also environmental sustainability.

Imkoniyatlar	Tavsif
Accuracy and speed	Obtaining information about land resources quickly and accurately using GIS systems.
Environmental sustainability	Obtaining accurate information to combat soil erosion and climate change using GIS.
Effective management	Analyzing data and optimizing it for taking necessary measures.
Database development	Creating and maintaining a new data and resource system.

Summary Geographic Information Technologies (GIS) are creating great opportunities in modern land resource management and monitoring. This article examines the role of GIS technologies in improving the land accounting system and ways to use them effectively. GIS systems perform important functions such as soil condition analysis, crop selection and monitoring, resource management, and improving the land cadastre system. With the help of GIS technologies, it is possible to monitor land resources and soil condition with high accuracy and speed. Real-time monitoring of the state of land resources using drones, sensors, and artificial intelligence helps ensure environmental and economic sustainability. With the help of GIS, it is possible to improve soil fertility, select crops in accordance with climate change, and increase the efficiency of irrigation systems. The methods and techniques presented in the article include innovative approaches to land resource management, such as GIS systems, AI and machine learning, monitoring using drones and sensors. With the help of these technologies, it is possible to obtain accurate results in the analysis and forecasting of land resources. In addition, the development and integration of GIS systems will significantly increase the efficiency of land resource management. The potential of these systems can be maximized by applying new technologies and training specialists. In conclusion, the use of GIS technologies in land accounting marks a new stage in land resource management. They not only increase economic efficiency, but also play an important role in ensuring environmental sustainability and maintaining soil health. An improved land management system based on GIS will ensure the efficient use of resources and lead to sustainable development in agriculture in the future.

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