Application of Remote Sensing and Geographic Information System in Dynamic Monitoring of Land Use

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Abstract: strengthening the protection and rational use of land resources has always been one of china's basic national policies. Land resources play an important role in the ecological environment system, however, people's production and living activities and changes in the natural environment may have a certain impact on land resources. As a product of the booming development of science and technology, remote sensing and geographic information system can dynamically monitor china's land resources and present the use of land resources more clearly in front of people, which is of great significance to strengthen the study of regional economic development in the region. On that basis, the sustainable development of land resources in china can be achieved.

1. Introduction

Strengthening the protection and rational use of land resources is one of China's basic national policies. By using remote sensing and geographic information systems, we can make dynamic monitoring of land resources possible to achieve real time monitoring on the use of land resources, realizing effective evaluation of spatial distribution of land resources. The remote sensing and geographic information system mainly use modern science and technology to provide land dynamic monitoring information to the land management department. The land management department can lead the development of the local economy based on the dynamic monitoring information of land resources, which shows that remote sensing and geographic information system plays an important role in the use of dynamic monitoring.

2. Overview of Remote Sensing and Geographic Information System

The main function of remote sensing information technology is to achieve the detection of ground objects from the air, which means the remote sensor device is an indispensable device in remote sensing information technology. When spectrum acts on different objects, the response produced by the objects is different. Under this principle, different objects on the ground can be identified and distinguished. The ability to sense distant things is the main function of remote sensing information technology. The remote sensor device in remote sensing information technology can sense targeted objects on the ground, such as visible light, electromagnetic waves, and infrared rays on the targeted object. Many devices take part in the remote sensing information technology, such as television cameras, imaging spectrometers, microwave radiometers, cameras, synthetic aperture radars, etc. [1]. A variety of high-end devices in remote sensing information technology can significantly improve the resolution of remote sensors, making that technology widely used in civilian and military fields. Remote sensing information technology can be free from interference to a large extend, making all-weather operation possible.GIS, geographic information system, was build on computer network technology. It can analyze the collected geographic information data in real time and effectively as well as make the geographic database credible to make data management more standardized. And many equipment and devices can be involved in geographic information systems, such as graphic output devices, data acquisition devices, central processing devices, and human-computer graphics interactive devices. Geographic information systems can be applied to many fields, such as public health, real estate, military, logistics and transportation. In addition, with the continuous development of China's modern science and technology, mobile electronic devices are further integrated into geographic information systems, which has greatly promoted the technology [2].

3. Analysis of Current Research of Remote Sensing and Geographic Information Systems At Home and Abroad

3.1 Status Quo of Domestic Research

Started from the "Eighth Five-Year Plan" and "Ninth Five-Year Plan" period, China's research on remote sensing and geographic information systems has pushed remote sensing and geographic information systems to higher development platforms based on foreign research results. We have had accumulated a wealth of research experience and began to predict land resources across the country. China is beefing up its research on the use of land resources in particular areas and has realized the scientific prediction of land use changes in the process of in-depth study of the driving conversion mechanism. The use of remote sensing and geographic information systems can better promote the development of China's national economy and further advance towards the goal of sustainable use of land resources. For example, the Ningxia Hui Autonomous Region began to introduce remote sensing and geographic information systems to predict land changes in 2000, as well as Suzhou and Qingdao began to use remote sensing and geographic information systems to analyze land changes in 2004 [3].

3.2 Analysis of Foreign Research

Proposed in Canada in the 1960s, the concept of digital computer processing of land data advocates the use of remote sensing and geographic information systems in the process of map overlay and area measurement. Until the 1990s, land-use change models were gradually constructed with the participation of remote sensing and geographic information system applications, achieving the prediction and analysis of land-use changes. Researchers began to realize that remote sensing information technology can be further researched into land use change models. As research scholars continue to deepen their research on remote sensing information technology, which marks the official launch of land use change projects. The different content and scale analysis models constructed during the period make the land use change model more scaled and integrated. "Change Simulation on Europe and North Asia Land Use", initiated by the United Nations, is the landmark of this research project.Following countries such as Japan, the United States and other countries also started research on remote sensing and geographic information systems, which greatly promoted the development of land use monitoring projects in the world [4].

4. Application of Remote Sensing and Geographic Information System in Land Monitoring

4.1 Application Analysis of Remote Sensing Technology in Land Monitoring

Chinese researchers can use remote sensing information fusion technology to obtain real-time data information on land resource use in dynamic changes in land use and perform real-time dynamic monitoring of land resources. Among them, Professor Pan Yaozhong of Beijing Normal University explored a new method of land resource utilization based on the integration of multi-temporal remote sensing data. Institute of Geospatial Information of Tsinghua University took image design as a theoretical basis and began to design a land remote sensing dynamic monitoring information management system. Li Tianjun integrated land-use dynamic monitoring and remote sensing integrated spatio-temporal information technology into the land-use dynamic monitoring technology scheme. Based on the integrated technology of RS, GIS and GPS, Zhang Xianfeng constructed a land use dynamic prediction model aimed at engineering projects. A new plan for land research was constructed. The most seen items of remote sensing information technology in the application of land dynamic monitoring are high-resolution satellite data application research, SAR, land-use dynamic remote sensing prediction accuracy evaluation

research, and data application research.

4.2 Analysis of Geographic Information System in Land Use

After doing research in remote sensing information technology, we found that there is a special database when using geographic information system technology in land use. Geographic information systems can use specialized databases to classify and map remote sensing images. Geographic information system boasts a strong spatial analysis function, which can process the raw data in the database by using different spatial analysis technologies, making users obtain the latest data set, which can be used for decision-making on land resource. Spatial analysis of geographic information system involves many content which can be extended to spatial information measurement, spatial information statistics, spatial information superposition, buffer and network analysis. With the help of different information analysis technologies in the geographic system, more comprehensive information on land resource use can be obtained, such as the type of land resource use, the amount of land resource use, and changes in the spatial and structural representation of land resources. In addition, the geographic information system can be customer-tailored, which means design personalized electronic maps for them, and then print out the required documents to meet user needs [5].

4.3 Application Analysis of Combination of Remote Sensing and Geographic Information System in Land Dynamic Monitoring

As science and technology booms, remote sensing technology has transformed from qualitative to quantitative, static to dynamic. They can predict instead of unaction. Remote sensing technology enjoys characteristics of real-time, dynamic and macroscopic characteristics, making them widely used in dynamic monitoring of land use. With the support of computer software and hardware, GIS takes its spatial data as the basis, adopts, analyzes, and processes related data to build a new analysis method of geographic models. Two independent systems have an inseparable relationship. Remote sensing technology can provide multi-band, multi-temporal information sources for geographic information systems, and geographic information systems can also provide geographic model analysis functions for data management for remote sensing technologies. The perfect combination of the two can realize real-time dynamic monitoring of land use and make data analysis more accurate [6].

5. Conclusion

In a word, the technology of remote sensing and geographic information system are the product of the continuous development of science and technology, which stands out in dynamic monitoring of land resources. Scholars at home and abroad have a lot of researches on remote sensing and geographic information system technology, and they have found that land resource utilization monitoring can use remote sensing and geographic information system technology. The technology can monitor the use of land resources in real time, which is good to the Bureau of Land Resources Management to manage the land resources scientifically and effectively and promote the sustainable use of land resources.

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