

Development and Analysis of Agricultural Land Use Geographic Information System

Wang Zhan, Yuan Zhanliang

*School of Surveying and Land Information Engineering, Henan Polytechnic University Jiaozuo,
454003, China*

Keywords: Agricultural land, Geographic information system, Development analysis

Abstract: With the continuous development of information technology, geographic information system (GIS) has been widely used in many fields, which has promoted the continuous improvement of social production level. In local land management, it can improve the land utilization rate and give full play to the value of land. This paper introduces the general situation of GIS, and based on GIS technology combined with the actual situation of regional land use, expounds the application of GIS in regional land use decision-making, which is beneficial to the popularization and application of GIS, and has particularly important reference value for technicians engaged in related work.

1. Introduction

With the continuous development of information technology, it has been widely used in many fields, and GIS plays an important role in the geospatial field. We will continue to improve our data processing capability and our production level in the fields of planning, transportation and agriculture. In the process of land use, a large amount of data information needs to be processed at the same time, which puts high demands on data processing ability. The organic combination of GIS and regional land use management is conducive to improving the level of land information collection and processing, so as to meet the needs of land use decision-making, and to conduct systematic and comprehensive analysis and research. Formulating the decision of all kinds of information reasonably and providing scientific and reasonable basis.

2. Overview of Geographic Information System.

Geographic information system is a very comprehensive and practical technology, which integrates geography, surveying and mapping, remote sensing, computer science, environmental science, information science, management science and other disciplines. Title. The system has a series of APP applications integrating computer hardware, software and huge geographic database, which can complete data collection, storage, processing, analysis, simulation and decision-making. There are many kinds of GIS data sources, which can be divided into field survey data, remote sensing image map, GPS positioning data and scanning input corresponding to various resources. Because of the different data sources, the scale and coordinate system used are also different. For further analysis, it is necessary to preprocess the original data [1]. In the practical application of GIS,

the target graphics can be generated according to the needs of different users, and the graphics can be displayed in all directions according to the preset symbols, annotations and filling effects, so that users can search and use them. It provides convenience for users and improves work efficiency. With the cooperation of computer software and hardware system, GIS not only completes the collection and analysis of geographic data, but also establishes the corresponding spatial model according to the requirements of data processing, thus realizing the dynamic change of the whole regional geographic information. In case of abnormal situation, targeted countermeasures should be taken immediately. GIS not only provides scientific and reasonable basis for public decision-making and management, but also promotes the continuous improvement of land management. GPS can quickly and accurately locate the spatial position, and facilitate the change measurement and control measurement of land resource management. GIS technology can make full use of computer database to analyze and compare the acquired data information comprehensively, store and query the data quickly and in time, which provides important decisions for subsequent resource management, and can store and catalog the basic information in the investigation of land industry. RS can provide users with parameter changes of information related to land features and environmental protection in real time and quickly, and can also facilitate the rapid acquisition of land information in land resources investigation and management, thus ensuring that the control effect of land information resources management is improved in an all-round way. Several GIS technologies can directly monitor land resources in real time, and the computer information system can be used for positioning control, which can quickly import the acquired data information, browse and query it online, and timely and effectively count and process the data, thus reducing the workload of land resources investigation and improving the effect of land resources investigation and management. GIS has powerful data processing ability, and can collect and input regional land data, graphic boundary and terrain data. On the basis of GIS analysis, according to the actual situation of local land, different soil layers are formed by different properties and data, and geographic information data are combined scientifically and reasonably, and analyzed according to the specific requirements of different categories, thus gradually forming the management mode of organic soil layers and forming various GIS analysis modes. With the rapid development of information technology and geographic detection technology, the geographic information system is constantly improving. At present, the geographic information model of the land in this area is established by image virtual visualization technology.

3. The Application of Gis in Regional Land Use Decision

3.1 Land Use Planning

As the long-term development of China's capital construction, land use planning has very important practical significance. The state needs to pay full attention to the land use plan. With the deepening of urbanization, higher requirements are put forward for the professionalism, professionalism and accuracy of land use planning, especially for land use, especially for land use. In the process of land use, land use planning should be used to manage and rationally distribute, so as to achieve land use objectives and realize land use structure and layout. Its planning contents mainly include current situation analysis, land adaptability evaluation, farmland planning, special land use planning, etc. GIS provides advanced technical theory, accurate data analysis and clear planning map for the smooth implementation of land use planning, and provides reliable basis for decision makers to make scientific and rational land use planning [3].

Land adaptability evaluation is a systematic and comprehensive evaluation of land use under a specific production and use condition. Secondly, the suitability and limitations of different land use types in the same land unit, the suitability of land types and the unfavorable factors in land use

procedures are clearly defined, which provides a scientific and reasonable theoretical basis for land use planning. The mathematical model of land geography established by means of GIS, combined with land spatial data, makes it clear that the land may be single or multi-factor, which is suitable for comprehensive evaluation of land types, thus improving the economic value of land. The practical application of GIS should also pay attention to the organic combination of land use planning knowledge, further improve the maturity of GIS application system, and effectively guarantee the rational use of land resources. Spatial prediction model land planning is a comprehensive and systematic work, and a large amount of land data needs comprehensive analysis. Combined with spatial information data, land use planning should be analyzed systematically and comprehensively. Visualization is of great practical significance in land planning. In the planning process, we should comprehensively consider the influence of land demand, population, land and other factors on land. GIS can process the parameters of land model in space, and select the corresponding model to make scientific and reasonable prediction according to the data characteristics and land planning objectives, so as to ensure that the results of land use planning are very scientific. Planning Through the analysis and application of GIS, the planning can be diversified, dynamic and modeled, and the land information can be transformed, processed and graphically expressed with the help of spatial analysis and data management functions. The scientific nature of the land planning scheme has been further improved. Combining regional land data with remote sensing images and social economy organically, establishing GIS database and formulating various planning schemes. In practice, through the analysis of land use, the best scheme of land planning is obtained, and the existing land planning information is input into GIS for comparative analysis, so as to clarify the whole dynamic change process of land use structure [4].

3.2 Land Use Management.

Land is the natural resource on which people live, and it plays a decisive role in the development of human society. We should attach great importance to the development and utilization of land resources, and adopt advanced technologies to strengthen the effect of land resources management and control. GIS technology, including remote sensing technology, geographic information system and global positioning system, has a very strong ability to process positioning information, which can conduct comprehensive exploration and detection of surface resources and improve the control effect of energy resources. Detailed analysis and explanation of GIS technology in land resources management can ensure more scientific and efficient land resources management and provide accurate data reference for social and economic development. In the investigation of land resources utilization in China, the adoption of artificial technology is not only very backward, but also unable to meet the requirements of accurate detection and dynamic management, resulting in a serious decline in the control effect of land resources investigation and management [5]. With the rapid development of GIS technology, it is widely used in the field of land resources. Through in-depth analysis of the specific application of GIS integration technology in land resources management, it can ensure accurate exploration and comparison of the specific actual situation of land resources and fully understand the distribution of land resources. Using GIS technology can also make statistics on data results conveniently and quickly, and strengthen the control and management of land resources. The specific application of GIS in land use management is divided into three aspects: land evaluation, cadastral management and land rating. The application of GIS in land use management is mainly embodied in the scientific and reasonable unique database and the classification and mapping of land remote sensing images, thus providing important basic data for formulating land use decisions. GIS embeds many advanced processing technologies such as relational database management, efficient graphic algorithm and network analysis, which provides

technical support for the comprehensive development of spatial analysis and greatly reduces the difficulty of data analysis. GIS itself has achieved the basic goal of spatial analysis and has good spatial analysis function. Using various spatial analysis methods, the original data in the database is systematically and comprehensively processed to provide users with the latest information. The data processing method supported by data is provided to realize the decision-making of rational land use. In land resources management, GPS technology can make use of computer data information, analyze the change of land resources utilization quickly and in time, analyze the spectral characteristics of RS image changes in the same area at different times, and make clear the current situation of land development and specific changes. Both GPS and RS integrated technology can analyze according to remote sensing images and current image information, and use land resources for superposition, which is convenient for manual analysis. GIS and GPS need to be unified planned by computer technology. In land resources investigation and management, GIS can quickly obtain relevant geographic information and import it into GPS system, which can realize on-site graphic recording and map spot editing, effectively avoid manual management of map spot attributes and spatial information classification and storage, ensure that the whole information processing process is greatly simplified, reduce error probability, and effectively control and facilitate the overall improvement of land resources investigation effect, thus having very significant application value. In the integration of GPS and GIS system, GIS is used to measure data information, while GPS system can quickly edit graphics and arrange them in the database. By combining RS and GIS technology, we can realize the complementary information between them. RS can not only quickly discover the change of land resource utilization in a large area, but also ensure more timely information transmission. However, the overall data volume is relatively large, and it can only reflect the geometric features of image information from a macro perspective, and cannot guarantee 100% information control [6]. After the RS image is acquired, it is impossible to restore the change of land resources utilization. GIS has the characteristics of accurate positioning and timely measurement, but its measurement efficiency is significantly reduced. By organically integrating GIS and RS technology, it can ensure that the efficiency of land resources survey management is significantly improved and the survey results are more accurate.

4. Conclusion

Land is an important foundation for the development of human society. Only attaching great importance to the rational development and protection of land resources can we promote the sustainable development of social economy. GIS technology is dynamic, which can ensure a more comprehensive and efficient land survey. It can also realize dynamic processing according to the corresponding changes of data information and graphics, which is an advanced land resource management technology at present. The application of GIS technology in the new period can promote the management of national land resources, realize the scientific and dynamic development of informationization, build corresponding models for different urban areas, promote technological innovation, and effectively save manpower, material resources and financial resources.

References

- [1] Seimi Zhang, Long Jiangping. Discussion on the teaching of forestry geographic information system and remote sensing -- Taking DEM analysis of Lutou Forest Farm as an example [J]. Education and Teaching Forum, 2021(38):152-155.
- [2] Zhang Jiachen, Dang Yiwen, Chen Yaheng. GIS-based ecological suitability regionalization of *Prunus armeniaca* in Beiliuhe area of Fuping County [J]. Journal of Southwest Forestry University (Natural Science), 2021, 41(05):98-104.
- [3] Sun Yong, Tan Wen'an, Zou Ziya, Guan Yue. Case design of GIS development practice competition under the background of new engineering [J]. Journal of shanghai second polytechnic university, 2021,38(03):231-238.

- [4] Zheng Ye, Guo Renzhong, He Biao, Martin, Li Xiaoming, Zhao Zhigang. Visual query method of distributed regional objects using mapping-reduction [J]. *Journal of Wuhan University (Information Science Edition)*: 1-10[2021-10-13].
- [5] Chen Haiyu, Qian Xiang, Zhao Ran. Study on the Construction of Geographic Information System of Local Historical Documents in Collection -- Taking Qingshuijiang Documents as an Example [J]. *library journal*, 2021, 40(09):88-96.
- [6] Liu Yanxiang, Ouyang Yongzhong, Xiu Yirui, Liu Liang, Yi Dongyun, Gao Ying, Huang Bin. Development and Thinking of Marine Information Technology [J]. *Marine Development and Management*: 1-5[2021-10-13].