Research Progress of Land Use Change at Home and Abroad

Li Qi[1, 2, 3, 4], Siqi Liu[1, 2, 3, 4]

[1]Shaanxi Provincial Land Engineering Construction Group Co., Ltd., Xi'an, 710075, China

[2]Institute of Land Engineering and Technology, Shaanxi Provincial Land Engineering Construction Group Co., Ltd., Xi'an, 710075, China

[3]Shaanxi Provincial Land Consolidation Engineering Technology Research Center, Xi'an, 710075, China

[4]Key Laboratory of Degraded and Unused Land Consolidation Engineering, Ministry of Natural Resources, Xi'an, 710075, China

Abstract

The transformation of the natural environment by human beings is, to a certain extent, the use of land. This study analyzes the research progress of land use at home and abroad, and summarizes the past experience of land use, in order to provide a reference for further research on land use.

Keywords

Land use; Domestic and foreign; Model.

1. Introduction

The transformation of the natural environment by human beings is, to a certain extent, the use of land. Due to the diversity and limited quantity of land as a resource, and the increasing demand for land by humans, land use change has become a popular land use trend. Today, land use type change is a hotspot in geoscience research. In the field of global environmental change research, land use type change has become more and more important to the degree of ecological environment change. Since the 21st century, land use/cover change has become a research topic of scholars. popular topic. With the rapid development of society and economy and the continuous growth of the population, the small amount of land resources is becoming more and more tense, and the pressure of land use and utilization intensity is increasing. changes happened. The change of land use type is usually closely related to the way of land use, the benefit of land use and the intensity of land use. Land use mode mainly refers to the type of land use or the spatial layout of land resource use. The changes of different land use types are closely related to human activities. Rational human activities will promote the development of land use in the direction of rationalization. Unreasonable activities will hinder the full play of land functions and make land use unreasonable. It will cause waste of land, and even cause the quality of land to decline, thus threatening the survival of human beings. Therefore, land use methods can be divided into extensive and intensive types. In order to better deal with the limited and scarce land quantity and economic supply and human The contradiction between the expanding demand for land, and now many countries are transforming the way of land use to intensive. The intensity of land use refers to the degree to which human beings change the type of land use in order to meet the needs of their own survival and development. The direct expression of land use intensity is the change in the degree of land cover, and the indirect expression is the bad change of the environment caused by the change of land use type. For example, deforestation to open up wasteland and reclaiming land from lakes can meet human needs for food, and urban expansion can meet the needs of regional social and economic development. had an impact. Therefore, the calculation of land use intensity is affected by the

following factors. One is the degree of influence of land use on land use types, that is, land use ecosystems. For example, reasonable land use will improve the land use ecosystem, whereas unreasonable land use will hinder the land use ecosystem, such as returning farmland to lakes, returning farmland to grassland, etc.; tolerable limit. The limit does not include the limit of the quantity of land that can be used, but also the limit of the degree of land use (Zhang Guangyu, 1999). There are two research methods for land use intensity: type model and quantitative index system. Among them, the quantitative index system usually uses an indirect index system. Land use benefit refers to the benefit obtained from the input of resources, labor value and capital. Land use efficiency is an indicator that can measure the level of land resource utilization (Wang Yuqing, 2006). Studying land use/cover changes provides a basis for rational planning of land use, and at the same time, it can promote the rational development and utilization of land resources, thereby bringing abundant land use. Utilization benefits, natural ecological benefits and social and economic benefits.

2. Research Status at Home and Abroad

Since the reform and development, my country's industrialization and urbanization have been accelerating, and the contradictions between population problems, resource problems, environment and social and economic development have become increasingly prominent. With the increase of land use, the degree of desertification of land increases, and the reduction of cultivated land, forest land, grassland and other land types directly threatens the living environment of human beings. From a global perspective, the same problem has become increasingly prominent. Changes in land cover will affect material circulation and life processes on the land surface, such as water and heat exchange, material physical and chemical circulation, and sustainable utilization of resources. In 1995, two major international organizations, the International Geosphere Biology Program and the Man and the Environment Program, jointly developed and implemented the "Land Use/Land Cover Change Scientific Research Program (LUCC)" in response to the global problems brought about by land change.

The research contents of research scholars on land use change/land cover change mainly include the analysis of driving forces, the analysis of changes in ecological landscape patterns, and the analysis of spatial changes in land use. The earliest model used for land use change/land cover change is the CLUE-S model. The application research of this model has become increasingly mature and has been successfully applied to Malaysia, Ecuador and other countries. Mainly used to predict and model the spatial location of land use/cover changes. The CLUE-S model's positioning of land use types is mainly determined by the quantitative characterization of natural and human driving factors that affect land use type changes. Therefore, the CLUE-S model can spatially multi-dimensionally and quantitatively describe land use type changes in space. This model can simulate changes in land use types within a certain period of time (usually twenty years) in an area. The non-spatial human demand analysis for land types and the spatial land use type allocation ratio analysis are two parts of the CLUE-S model. Among them, the non-spatial human demand analysis for land types is based on the human driving force factors of land use type changes to obtain human demand for various land types; the spatial land use type allocation ratio analysis is based on the combination of various human driving factors. The spatial location of each land use type is allocated (Huang Qiuhao, 2005). Wu Guiping took Zhangjiajie as the research area to study the dynamic simulation of land use type changes, and modified some coefficients of the CLUE-S model to make the model more in line with the situation of the study area. Therefore, the spatial goodness of fit of the land use types in the study area and the accuracy of the fitting results have been greatly improved. The fitting results of cultivated land, forest land and residential industrial and mining land show that the accuracy It is an improvement over the unimproved CLUE-S model (Wu Guiping, 2010).

The SLEUTH model was developed under the leadership of Professor Clarke from the University of California, USA. The function of the SLEUTH model is to analyze and predict the urban expansion and changes in land use types and functions from a macro or meso scale. The SLEUTH model includes 3 modules: quiz, proofreading, and outlook; the SLEUTH model sets 4 growth regulations, namely, spontaneous growth, urban center growth, boundary growth, and road-driven growth. In addition, in order to better simulate land use types Variation, with new additions of Initial Variation, Diffusion Variation, Reproduction Variation, and Patch Recession. In order to control these growth factors, five control factors including expansion, reproduction, extension, slope resistance and road driving force were set (Clarke K CH S, 1997). The SLEUTH model obtains parameter indicators that reflect the change trend and overall characteristics of land use types in the study area through initial calibration, fine calibration and final calibration. Different land use change scenarios can be formed by modifying the limited expansion layer and traffic layer. At the same time, the model can perform self-regulation, that is, the cell transformation speed exceeds the critical value, and the control coefficient is multiplied by a value greater than 1 to form a more prosperous change scenario, otherwise, it is multiplied by a value less than 1 to form a more depressed scenario (Silva EACKC , 2006). Tu Xiaosong used the SLEUTH model to study the dynamics of land use change in Wuxi City, Jiangsu Province, revealing the change scenarios of land use status in Wuxi City under different degrees of protection, and predicting the future prospects of land use change in Wuxi City: urban expansion brings The area of dry land, paddy field and forest and grassland has been reduced; with the increase of protection intensity of dry land, paddy field and forest and grassland, urban expansion and occupation of cultivated land have been effectively controlled (Tu Xiaosong, 2008). With the urgent demand for land resources in the economy and society, the supply of land resources is increasingly in short supply.

After the sustainable use of land was proposed in foreign countries, my country has also expanded the research direction of land use—the direction of sustainable use. The main progress is: (1) Sustainable use and management of agricultural land. (2) Research on sustainable use of urban land: Zhang Ytterbium, Nie Yong and Lv Xiaofang believe that through the analysis of urban land use patterns under the dynamic balance of total cultivated land, the relationship between urban land use and agricultural land protection, and the most effective use of urban land use A series of main researches on coordinating urban development and agricultural production can provide a scientific basis for coordinating the relationship between urban development and cultivated land protection. Recently, Yan Yongtao and Feng Changchun conducted in-depth research and analysis on the spatial structure of urban land use intensity in Beijing (Li Ping, 2005). In the process of urbanization of the study area, countermeasures and measures are put forward to realize the sustainable development of the most sensitive areas of each case city. After 1996, the new land management law clearly pointed out that the overall urban planning should be linked with the overall planning of land use, and the use structure and spatial layout of all land (urban and rural land) within the administrative jurisdiction is the focus of the overall land use planning. The focus of urban planning is the land use layout and resource allocation in urban planning areas at all levels, which is one of the important contents of the former. However, with the rapid development of society and economy, the reduction of agricultural land and the expansion of non-agricultural land have deepened the contradiction between the two plans. In addition, there are many inconsistencies in research and statistics between the two plans, which also makes the connection between the two more difficult. This has also become a major problem in the research of land use in my country.

With the development of information theory, control theory and system theory, computer technology and aerospace technology have been rapidly updated and developed. In the 1980s, remote sensing technology has developed rapidly. Due to the advantages of remote sensing technology with a wider observation area, fast information update speed, comprehensive

information acquisition and comparability between information, and less cost, researchers began to Using remote sensing satellite images to analyze land use change, by interpreting the satellite images, the dynamic characteristics of the land use landscape pattern can be obtained through the spatial analysis function provided by GIS software, which saves more labor and material resources than traditional methods, and is beneficial to Improve efficiency. Li Xia used remote sensing data to analyze the spatial changes of the landscape pattern of land use types in the Pearl River Delta in the past 30 years, and concluded that with the reform and opening up, the economy is developing day by day, and the demand for land use is changing. Fewer and fewer. At the same time, due to the different degrees of development of each city, the land use pattern shows a certain differentiation law (Li Xia, 2004). Liu Jiyuan used satellite remote sensing data to combine land use types in the whole country, studied the temporal and spatial change characteristics of land use types in China, and analyzed the changes of land use intensity and land use dynamics (Liu Jiyuan, 2000).

3. Conclusion and Outlook

The research on land use can be roughly divided into two stages. Land use research is mainly to meet people's production and living needs, It mainly focuses on land use survey, land evaluation and land planning. noodle. Recent land use studies have put more emphasis on sustainable land development, Research on the law of succession and globalization. But in the land use ecology Risk is still relatively weak, multi-disciplinary such as land engineering and soil remediation There is also a lack of comprehensive research studies. future land use research The research needs to be more refined, and the comprehensive benefits of regional economy, society and ecology should be improved. Conduct a comprehensive analysis, considering the spatial succession of the region, provide a scientific basis about utilization and sustainable development to " 3S" technology should Use as the main means to establish big data of land resources, land resources "One "Map" project, promoting the spatial planning system from the perspective of ecological civilization construction Innovation.

References

[1] Huang Qiuhao, Cai Yunlong. Review of several domestic land use change models [J]. China Land Science. 2005(05): 25-30.

[2] Liu Jiyuan. Macroscopic survey and dynamic research of remote sensing of resources and environment in China [D]. Beijing: China Science and Technology Press, 1996, 142-145.

[3] Liu Jiyuan, Liu Mingliang, et al. Spatial pattern analysis of recent land use change in China [J]. Science in China (Earth Science. 2002(12): 1031-1040.

[4] Li Ping. Research on land suitability evaluation of Suanling City based on GIS. [D]. Changsha: Hunan Agricultural University Library, 2005.

[5] Li Xia. Spatial analysis of the characteristics of land use change in the Pearl River Delta Development Corridor from 1988 to 1997 [J]. Journal of Natural Resources. 2004(03): 307-315.

[6] Tu Xiaosong, Pu Lijie, etc. Scenario simulation of urban land use change in Wuxi based on SLEUTH model [J]. Yangtze River Basin Resources and Environment. 2008(06): 860-865.

[7] Wu Guiping, Zeng Yongnian, et al. Improvement of CLUE-S Model and Dynamic Simulation of Land Use Change: Taking Yongding District of Zhangjiajie City as an Example [J]. Geographical Research. 2010(03): 460-470.

[8] Wang Yuqing, Song Ge. Comprehensive benefit evaluation and case study of urban land use [J]. Geographical Sciences. 2006, 26(06): 743-748.

[9] Silva E A C K C. Calibration of the SL EU TH urban grown model for Lisbon and Porto ,Portugal[J].Computers ,Environment and Urban Systems. 2001, 26(6): 525-552.