A Study on Ecological Environment Evaluation in Western Region Based on GIS

Siliang Li¹* and Xin Li²

¹Dingxi Municipal Ecological Environment Bureau, Dingxi, Gansu, China, 743000
²Lanzhou Beishan Ecological Construction Bureau, Bailongjiang Forestry Administration, Gansu, China, 730000

*Corresponding author e-mail: siliang@dingxi.gov.cn

Abstract. Rapid development of science and technology makes GIS technology widely used in China, especially in ecological environment evaluation. Application of GIS technology can not only deeply, scientifically and systematically study the elements in different environments, but also improve the standardization and reliability of environmental evaluation research. By using the common application of GIS in various ecological environment evaluations, this paper studies its ecological environment evaluation in western region.

Keywords: Western GIS, Ecological Environment, GIS

1. Introduction
At present, the state strongly advocates environmental protection, and environmental impact assessment is more and more widely used in engineering construction. Only by strengthening the accuracy of environmental impact assessment can the effect of environmental protection be improved. As the progress of science and technology, the application of GIS technology in environmental impact assessment has gradually begun. GIS technology is to use computer technology to analyze all kinds of data, to provide accurate information for urban planning and construction, and to meet the requirements of rational use of the environment. Application of GIS technology can not only improve the shortcomings of traditional environmental impact assessment, but also improve environmental quality to a certain extent. Global information development is coming quietly[1]. GIS technology plays an important role in many fields. At present, all kinds of environmental problems in our country make people realize the importance of strengthening environmental protection and create a sustainable development society in harmony between man and nature. By applying GIS technology in environmental evaluation, it provides scientific environmental monitoring, environmental management and environmental impact assessment analysis data, effectively improves the quality of environmental management, and returns people to clear the mountains and build a harmonious society between man and nature.

2. GIS technology overview

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2.1. GIS concepts
GIS, also known as GIS technology, integrates computer, remote sensing, geography and map. GIS technology can integrate all the information in the space, analyze and organize the geographic information data through the computer, support the electronic map, and people can find the required information quickly through the computer. This technology is a new comprehensive subject in recent years[2].

2.2. GIS main functions
The most obvious feature of the GIS system is the graphical user interface. The user can directly watch and operate the map data by using the GIS system, which is mainly the use of the GIS engine and the core link in the system. GIS system works in a wide range. GIS is the collection and collation of spatial data, and the use of computers for processing. GIS can also output the results of spatial data analysis in the form of two-dimensional and three-dimensional graphics, and the output range is wide. At the same time, this function can also provide users with intelligent graphical interface, which is convenient for users to carry out their work. GIS can make thematic maps for users according to their actual needs. GIS are also widely used in drawing, and some users can use GIS technology to meet the analysis of special geographical environment[3]. As the progress of science and technology, the GIS are also developing. Besides providing graphical interfaces, geographic object topology can be established and analyzed, for example, GIS can establish related connections between multiple geographic objects. Establishing spatial topology can see the data attributes and geographical location of GIS database objects as a whole.

2.3. Technical component
GIS technology covers a wide range of knowledge, for efficient data processing needs hardware equipment, software and related systems support, but also a large number of professional technical personnel. Not only that, the development of technology is for the better application of users, so it also needs the participation of users, as the object of GIS service, the problems of technology in the operation process need to be timely feedback to the technicians. In order to better solve.

2.4. Technical classification
First of all, according to the classification of the subject system, the subject geographic information system is a service with specific purpose, and has clear design service purpose and professional characteristics[4]. The application of the system in many fields shows strong function and effect. The system can distinguish and adapt to different conditions with strong technical ability, and can make corresponding data analysis and collection clearly, accurately and efficiently under different conditions, especially for; For example, for water resources management, mining resources and other specific directions of information systems. According to the criteria of regional division, regional GIS services are carried out in administrative regions, natural regions or study areas. China is rich in land, because the two major basins of the Yangtze River and the Yellow River nourish the heavy history of Chinese people and China for more than five thousand years. Therefore, the GIS established in China's Yellow River Basin Information system has great practical significance for the analysis of China's geographical environment and even the tracing of Chinese civilization. If it is divided according to the national unified natural and socio-economic elements, it is a more comprehensive service to provide a full range of GIS information for the whole region.

2.5. Working principle
Since the analysis of geographical conditions should be carried out in real cases, it is necessary to make a more clear exploration of geography with hierarchical superposition. Therefore, in the design of GIS technology, the method of hierarchical analysis is used to place different feature objects into different levels. Such hierarchical connections can not only clearly analyze the relationships between layers, but also be observed through 3D graphics of the user interface of the GIS engine[5]. In the analysis of water resources and mining resources, the distribution layer of water resources and the cross section of mining
resources can be vividly displayed through three-dimensional images. It can also manage spatial data through the connection between levels, which greatly facilitates the analysis of geographical conditions.

3. Ecological environment assessment

Ecological environment impact assessment is to analyze the site and surrounding environment of the project, and take corresponding measures to solve the problem of ecological environment impact. Ecological environment evaluation started late in engineering construction in China and is still in the stage of continuous improvement and development. Ecological environment evaluation includes the contents and methods of ecological environment evaluation. The content of ecological environment evaluation mainly includes natural, social, quality of life and other environmental aspects. With the progress of science and technology, the method of ecological environment evaluation is constantly improved. The purpose of implementing ecological environment evaluation is not only to improve the environment, but also to promote the economic development in the region, to promote the upgrading and transformation of the industrial structure of regional economy, and to provide guarantee for the sustainable development of regional economy[6]. Figure 1 is a schematic diagram of the structure of the ecological environment assessment system.

![Figure 1. Outline of the structure of the eco-environmental assessment system.](image)

4. Advantages of GIS in ecological environment evaluation

GIS technology can be widely used and recognized globally because of its multi-directional superiority.

4.1. Professional

Environmental impact assessment is a professional evaluation work, environmental survey can not only stay on the surface, it is important to understand and analyze the deep situation. While the development of the information age has allowed other commercial software to make some breakthroughs in spatial analysis and data management, compared with professional GIS technologies, these technologies remain on the surface, showing the building environment on the surface through satellite positioning, information relay and forwarding, but cannot be explored underground. However, the software itself is not designed to explore the underground, and the professional depth is not really deep, so GIS technology is irreplaceable for the management and analysis of spatial and attribute data, GIS technology has established the embryonic form of digital earth and has a broad development prospect. At present, it has a good enough application effect for environmental impact assessment, regardless of geographical scope, complex or single analysis environment, whether land, forest, Water or mining have made outstanding achievements.

4.2. High efficiency

Environmental evaluation information system established by GIS technology has the characteristics of high efficiency and speed in digital analysis. It can not only display and analyze real-time data, but also realize automatic evaluation and output of data. The output results are more scientific and intuitive. GIS technology combines many disciplines, has the advanced nature of scientific digital equipment and the scientific authenticity of environmental survey, organically combines modern theory and practice with
the powerful function of computer, and makes computer calculation and analysis. The traditional survey
data calculation process is greatly simplified, making full use of effective tools to maximize work
efficiency and improve work quality.

4.3. Sharing
GIS technology provides users with dynamic data display, transparent data processing, efficient and
convenient use of integrated systems to complete various functions, user operations are also very
covenient because of the excellent design of the GIS engine. The rapid development of network
transmission makes network sharing extremely easy. The generality of data is easy to share data and
results with the popularity of network connection. Data sharing promotes learning and discussion among
interested persons. Even between the various departments of project decisions, sharing the release of
exploration results.[7]

5. Application of GIS technology in ecological environment evaluation in western region
The ecological environment assessment work is divided into different types according to the different
objects of work and the different needs, including regional, project and cumulative environmental
impact assessment. Different emphasis on the application of GIS technology is also different. The view
function module of GIS technology can transform the environmental parameter data into electronic map
with quality and quantity, and display the environmental foundation and possible changes in the
evaluation area in a visual way. This contributes to the development of environmental impact
assessment and is one of the important applications of GIS technology in environmental impact
assessment. The flow chart of ecological environment evaluation and analysis in western region is
shown in figure 2.

![Figure 2. Flowchart of ecological environment assessment in western region.](image)

5.1. Application of GIS technology in eco-environmental assessment of specific projects in western
region
The environmental impact assessment of construction projects is a kind of environmental impact
assessment for specific construction projects. The goal is to evaluate the possible negative
environmental impact of the project and to provide help for the sustainable development of the project.
In the environmental impact assessment of the project, it is necessary for the EIA staff to evaluate the
environmental foundation of the project site and the possible negative impact of the construction project.
GIS technology can help EIA personnel to collect information such as air, soil, water resources,
topography, population, economic base and industrial structure of the project site, and lay the foundation
for the environmental impact assessment of the project; help EIA personnel to collect data on the
construction location, peripheral sensitive targets and environmental factors of the construction area, and provide basic data for the environmental impact assessment of the construction project to ensure the quality and accuracy of the environmental impact assessment results.

5.2. Application of GIS technology in cumulative environmental impact assessment

Cumulative environmental impact assessment is a new project of environmental impact assessment, which aims at the long-term impact of regional construction activities and project construction on the local environment. In the traditional environmental impact assessment work, due to the limitation of technology, the error of the environmental impact assessment results with too long time will be very large, which cannot meet the needs of the environmental impact assessment. It is a loophole and deficiency in environmental impact assessment. Application of GIS technology can help EIA personnel to continuously stack the parameters of EIA objects and constantly stack different environmental negative effects on the environmental basis, so as to integrate the environmental impact data of different time, different regions and different sources, and analyze the environmental impact caused by them, so as to improve the quality of long-term cumulative environmental impact assessment results and improve the accuracy of EIA work.

6. Conclusion

The above GIS can be seen from the study of ecological environment evaluation in Northwest China that GIS plays an irreplaceable role in environmental monitoring and evaluation protection and contributes greatly to the environmental protection at the present stage. In the process of continuous development and perfection of science and technology in the future, the development of technology will make a contribution to environmental protection to drive innovative development. With the joint efforts of people, we believe that the environment on which we live will be more healthy and beautiful.

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