



Development of Comprehensive Natural Resource Survey Informatization based on Ecological Civilization

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Abstract. In the context of ecological civilization, comprehensive natural resource survey informatization is crucial. This involves establishing data platforms for integrating and sharing survey data. Uniform data standards ensure consistency and interoperability. Advanced data analysis techniques improve data utilization efficiency and accuracy, identifying resource conditions and trends. Cutting-edge technologies like remote sensing, GIS, and GPS enable precise monitoring. Artificial intelligence and big data analysis enhance survey accuracy and efficiency. Interdisciplinary training is essential for developing comprehensive skills. Policies and systems regulate information management. A robust funding mechanism ensures increased investment and efficiency. International cooperation and exchange elevate informatization. Government leadership, corporate involvement, and societal collaboration are vital for implementation, supporting ecological civilization construction.

Keywords: comprehensive natural resource survey; informatization; development directions; construction pathways.

1 Introduction

The establishment of comprehensive information systems for the survey and digitization of natural resources in the context of ecological civilization holds great significance for sustainable development. This encompasses the creation of a data platform to integrate survey data and facilitate data sharing and interaction ^[1-5]. It also entails the formulation of standardized data formats and protocols to ensure data consistency and interoperability ^[6-10]. The improvement of data utilization efficiency and accuracy through data analysis and exploration will help uncover the state and trends of natural resources. Additionally, the incorporation of advanced technologies such as remote sensing, Geographic Information Systems (GIS), and Global Positioning Systems (GPS) enables precise monitoring and investigation of natural resources. Leveraging techniques like artificial intelligence and big data analysis allows for in-depth exploration and analysis of survey data, thereby enhancing survey precision and efficiency. Furthermore, there is a need to strengthen interdisciplinary training for professionals equipped with comprehensive skills in natural resource survey and information technology ^[11-15]. The establishment and refinement of legal and regulatory frameworks

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will effectively govern the management and usage of information systems for comprehensive resource surveys. Adequate funding mechanisms must be put in place to increase investments and optimize fund utilization. Active engagement in international cooperation and knowledge exchange facilitates the adoption of international experiences and technological achievements, ultimately enhancing the level and capabilities of information systems for comprehensive resource surveys [16-20]. By collectively driving these development directions and pathways, with government leadership, corporate involvement, and societal collaboration, we can provide a solid scientific foundation and decision-making support for the construction of ecological civilization [21-25].

2 Technological Innovation and Application

By integrating advanced information technologies such as remote sensing, GIS, and GPS, natural resource monitoring and investigation can achieve precise results. Techniques like artificial intelligence and big data analysis enhance the efficiency and accuracy of resource surveys through in-depth exploration and analysis of survey data.

Advanced Information Technologies and Tools: Remote sensing provides high-resolution image data for monitoring land use, vegetation cover, and water bodies, while GIS and GPS assist in determining geographic locations and supporting resource survey and management.

Utilization of Artificial Intelligence and Big Data Analysis: Artificial intelligence automates the extraction and interpretation of natural resource information from remote sensing imagery, while big data analysis uncovers patterns and correlations, offering a scientific foundation for decision-making.

Promoting Integration of Technology and Application: Collaboration between government, research institutions, and businesses facilitates the integration of technological innovation and application. This leads to the development and adoption of software and hardware tools for comprehensive resource surveys. Supportive mechanisms for technological innovation incentivize collaborative research, accelerating technology transfer and application.

3 Professional Talent Cultivation and Team Building

Strengthening the cultivation of professionals in natural resource survey and informatization is essential for interdisciplinary skill development and practical training. This ensures effective utilization of information technology tools for resource surveys and data analysis, providing scientific support for ecological civilization construction.

Enhancing Talent Cultivation: Collaboration between government, higher education institutions, and businesses is crucial for cultivating professionals with interdisciplinary skills in natural resource survey and informatization. Relevant disciplines, graduate courses, and vocational training programs should be established to enhance theoretical and practical capabilities.

Establishing Training Systems: A comprehensive training system should provide systematic courses and practical opportunities, improving information technology skills and overall qualities of survey personnel. This includes designing training courses, organizing field surveys, internships, case studies, and teamwork, catering to personnel at different levels and professional fields.

Strengthening Practical Skill Development: Emphasis on practical skill development is vital. Survey personnel should participate in field surveys and data collection, gaining proficiency in on-site operational skills. Collaboration with research institutions, businesses, and industry experts offers guidance and practical experiences.

Incentive Mechanisms and Career Development: Establishing incentive mechanisms, like salary incentives, promotion prospects, and recognition, motivates survey personnel. Providing favorable career development paths and opportunities encourages contributions in comprehensive resource survey informatization.

4 Policy Support and Regulatory Management

To ensure the compliance, efficiency, and reliability of comprehensive natural resource survey informatization, it is crucial to establish and improve relevant policies and systems, enhance information management mechanisms, strengthen supervision and evaluation, and promote publicity and training.

Policy System Enhancement: The government should enhance policy systems to manage and regulate comprehensive natural resource survey informatization, ensuring compliance, accuracy, and reliability while safeguarding data security and privacy.

Establishment of Information Management Mechanisms: Robust information management mechanisms need to be established, including data collection, storage, transmission, and sharing. This ensures data security, integrity, and reliability while promoting standardization and interoperability.

Supervision and Evaluation: Strengthening supervision and evaluation is vital, allowing for regular inspections and prompt issue identification and rectification. This involves monitoring the data collection process, ensuring data quality, and overseeing data usage to maintain scientific accuracy.

Enhanced Publicity and Training: Dissemination of laws, regulations, and standards improves the legal awareness and compliance of personnel involved. Training activities enhance the information literacy of survey personnel and related practitioners, ensuring their adherence to norms and management requirements.

5 International Cooperation and Exchange

Active international cooperation and exchange are vital for enhancing comprehensive natural resource survey informatization. By learning from international experiences, collaborating with relevant organizations and countries, promoting data sharing and standardization, and participating in policy dialogues and cooperation platforms, resource survey and management can be improved.

Learning from Experience and Technological Advancements: Collaborating with international experts and institutions helps explore cutting-edge technologies and methods to enhance survey capabilities, drawing on successful cases and best practices from other countries.

Collaborative Projects and Research: Joint research initiatives with international organizations and countries enable addressing transboundary issues and sharing resources to develop technologies and methods that enhance survey accuracy and efficiency.

Data Sharing and Standardization: Promoting the sharing and standardization of comprehensive survey data among countries facilitates international collaboration while safeguarding data security and privacy.

Policy Dialogue and Cooperation Platforms: Active participation in international policy dialogues and cooperation platforms allows for sharing experiences, understanding global trends, and contributing to policy-making and technical standardization processes.

By actively engaging in international cooperation, leveraging global experiences, and collaborating with others, comprehensive natural resource survey informatization can be advanced worldwide.

6 Multi-stakeholder Collaboration

Establishing a favorable development environment for comprehensive natural resource survey informatization requires active government leadership, corporate participation, and engagement from all sectors of society. This collaborative approach enables precise, efficient, and sustainable resource survey and management.

Government Leadership: The government should provide guidance through policies and plans, invest in resources, and strengthen management and supervision to ensure successful implementation and data security.

Corporate Participation: Corporations should focus on research and development, promote innovation, and provide products and services that meet survey and management needs. Collaborative projects and partnerships with the government and research institutions foster joint solutions.

Participation of Various Sectors: Active involvement of diverse sectors is crucial. Effective publicity and education initiatives enhance awareness and understanding. Discussions and research involving experts, scholars, organizations, and the public contribute to valuable insights and recommendations.

By fostering government guidance, corporate innovation, and social support, a collaborative development environment can propel comprehensive natural resource survey informatization, benefiting society as a whole.

7 Conclusion

In the context of ecological civilization, the development of comprehensive natural resource survey informatization holds significant strategic significance. By establish-

ing data platforms, standardizing data norms, improving data utilization efficiency and accuracy, incorporating advanced technologies and tools, and strengthening talent cultivation and regulatory frameworks, we can effectively achieve comprehensive surveys and monitoring of natural resources, providing a scientific basis for ecological civilization construction. The advancement of comprehensive natural resource survey informatization requires not only government leadership and corporate participation but also collaborative efforts from all sectors of society. Additionally, active international cooperation and exchange are crucial for leveraging international experiences and technological achievements, enhancing informatization levels and capabilities, and propelling China's comprehensive natural resource survey work to new heights. By promoting the construction of comprehensive natural resource survey informatization, we can gain profound insights into resource conditions and trends, facilitate scientific resource management and rational utilization, and advance the objectives of ecological environment protection and sustainable development. Therefore, strengthening the construction of comprehensive natural resource survey informatization is an essential requirement for building a beautiful China and achieving sustainable development. Only through the joint endeavors of the government, corporations, and society can we comprehensively implement comprehensive natural resource survey informatization, thus making positive contributions to the construction of ecological civilization and sustainable development.

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