Discussion on Science and Technology Innovation of Land Renovation Project

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Abstract. With the rapid development of human civilization, the traditional land remediation has been unable to meet the new requirements for land remediation during the current ecological civilization. Therefore, based on the status quo of land remediation and technological innovation, this paper puts forward the concept innovation, basic research innovation and thinking innovation of Land renovation and innovation ideas, and pointed out that from the construction of innovative thinking team, create a spiritual platform, improve the production, learning, research, use, push the combination of innovation system and other aspects to ensure land remediation methods, technology and application of continuous innovation and development mode to ensure that land remediation ecology, Economic and social benefits are maximized.

1. Introduction

Under the drive of rapid industrialization and urbanization, the in-depth development of marketization, information, and internationalization had led to a sharp increase in the contradictions between resources and the environment, and the relationship between people and land is becoming more intense. The situation of sustainable utilization and management of land resources is grave, and issues of food security and ecological security have become increasingly serious [1]. In order to solve the problem of mankind's demand for land resources, land remediation was born. However, with the emergence of a series of problems such as land pollution, degradation, and deterioration of the ecological environment, land consolidation is facing new challenges. Therefore, we must transform the availability of available land resources from quality and quantity to the goal of rectifying the integration of quantity, quality and ecology, strengthen technological innovation in land remediation, ensure the harmony and stability of land ecosystem, and realize the sustainable use of land resources. Based on the current situation of land consolidation and the requirements of scientific and technological innovation, this paper puts forward the innovation ideas and safeguard measures of land consolidation project are to innovate the land remediation technology and realize the quantity of land consolidation from land quantity to quality, and transformation of ecological environment, so as to realize the healthy, ecological and sustainable development of land resources.
2. Land Improvement and Technological Innovation

2.1. Status of land consolidation

Land remediation refers to the production activities of land that is used for inefficient utilization, irrational use, and unutilized, and that is used to restore land that has been damaged by production and construction activities and damaged by natural disasters, in order to increase land utilization [2]. The land remediation project includes contaminated land, damaged land, degraded and unused land, construction land, low-standard farmland, etc. It is a comprehensive renovation project of “land development+”, “land consolidation+” and “land reclamation+”. It is a technical implementation of land engineering. Land rectification in China began in the 1980s. Since the land rectification began, it has received strong support from the country, and it has been highly valued by governments and national land departments at all levels. It has now entered the stage of comprehensive development. According to the 2016 "Land Resources Bulletin" data, in 2016, there were 13, 400 land reclamation projects nationwide with a total scale of 3,337,300 hectares, and a total of 175,800 hectares of new cultivated land. By the end of 2016, the country's total cultivated land area was 135,495,600 hectares. Although land remediation, such as the land remediation method, has effectively guaranteed the red line of cultivated land, the amount of cultivated land has gradually stabilized [3]. However, at present and in the future, the task of land remediation is still very arduous. According to the National Plan for Overall Land Use Planning (2006-2020), by 2020, it will ensure the completion of 26.667 million hectares of high-standard farmland, and strive to build 40 million hectares of high-standard farmland, and the national basic farmland remediation rate will reach 60%; 1.333 million hectares, about 13.333 million hectares of medium- and low-level arable land; about 400,000 hectares of land for rural construction; and 400,000 hectares of urban inefficient land [4]. At the same time, land desertification, soil erosion, and soil pollution are still increasing year by year. There are fewer and fewer resources available for arable land remediation. Under the great environment where the country vigorously advocates “ecological civilization,” land remediation has given rise to new requirements. Traditional land rectification, which is mainly used as the main means, is far from meeting the new requirements for land remediation in the new era. At the same time, compared with the multi-objective remediation requirements for hundreds of billions of projects each year, there is a serious shortage of scientific research and development forces and technological support. Therefore, the land engineering industry urgently needs technological innovation and the land remediation project is even worse.

2.2. The situation of technological innovation

In today's world, especially before the dawn of the Fourth Industrial Revolution, science and technology have become more prominent as the cornerstones and motive force of human civilization progress, and have determined the economic growth, social progress and progress and the happiness of the people more profoundly than at any time in history [5]. In May 2016, the National Science and Technology Innovation Conference, the Academician Meeting of the Chinese Academy of Sciences and the Ninth National Congress of the China Association for Science and Technology were held. At the meeting, General Secretary Xi Jinping called for building a powerful country in the world. In the same year, the Party Central Committee and the State Council promulgated and implemented the Outline of the National Innovation-Driven Development Strategy, establishing the three-step strategic goal of scientific and technological innovation, and clarifying the strategy of “keeping to two-wheel drive, building a system, and advancing the six transitions.” layout. At the same time, the "Scientific Innovation 2030 - Major Projects" proposal and the National Laboratory Establishment Program passed the deliberation of the Party Central Committee. The State Council issued the National Thirteenth Five-Year Plan for Scientific and Technological Innovation to carry out a comprehensive strategic plan for future technological innovation [6,7]. Therefore, the work of science and technology is faced with new situations and new requirements. How to accurately grasp the new situation and requirements, and effectively implement the mission of innovation-driven development, is an urgent need of the current national conditions.
With the accelerating pace of technological innovation, the supporting role and driving force of science and technology will be more prominent in the process of building ecological civilization. In September 2016, the Ministry of Land and Resources issued the "Thirteenth Five-Year Plan for Scientific and Technological Innovation and Development of Land and Resources" (hereinafter referred to as the "Planning"), proposing "deep sea," "deep space," "deep land," and "land." The new term “three deeps and one earth” is referred to as the overall objective of the “three deep” strategy that ranks among the top in the world and the level of land science and technology is significantly improved. At the same time, the "Planning" clearly pointed out that technological innovation should be used to strengthen the protection of cultivated land resources, promote the conservation, intensive and efficient use of land resources, and improve technical measures for land degradation control. In December 2017, experts from the Key Laboratory of the Ministry of Land and Resources Land Remediation Center contacted the Symposium on Land Renovation Technology Collaborative Innovation in Beijing. The meeting proposed to face the country’s new needs for land remediation and respect the research laws of land science. Promote land science and technology innovation. From this, it can be seen that technological innovation in land remediation has attracted much attention.

3. Land renovation technology innovation ideas

3.1. Idea Innovation, Goal Guidance
Science and technology are the first productive forces for human progress. With the continuous advancement and innovation of science and technology, the level and ability of humans to recognize, use, and adapt to nature have been continuously improved. In a sense, the supporting role and driving force of science and technology have promoted the emergence of ecological civilization and played an important role in the construction of ecological civilization. Therefore, in order to ensure national food security, land remediation has become an important way to implement national strategies such as grain collection and land use and accurate poverty alleviation, and it has become an important means to promote the coordinated development of urban and rural areas and promote the construction of ecological civilization. It is implementing land consolidation. The process must be based on innovation as the key to science and technology as a support, adhere to the concept of innovation, goal guidance, solid and in-depth promotion of land remediation technology innovation [8, 9]. Only the innovative theoretical basis for land remediation that meets the requirements of the new era can effectively guide the practice of land remediation projects and stimulate the fresh vitality and powerful motivation of the land remediation workers. At the same time, it is necessary to further expand the connotation of land consolidation, from the arable land quantity to the integration of quantity, quality, ecology, and integration, according to the integrated research thinking, systematic work path, and engineering rectification model, and carefully plan Land consolidation planning, innovation and development, summarizing the formation of a series of key technologies for land remediation; in addition, we must persist in problem orientation, strengthen goal orientation, carry out land remediation in light of land issues, and pay attention to management of brown land and ecological restoration, improvement of land quality, and construction of high-standard farmland. Build ecological land together [10].

3.2. Strengthening basic research and promoting scientific and technological progress
Basic research is to acquire new knowledge, new principles, and new methods of research activities by understanding the natural phenomena of things and revealing hidden natural laws. The major discoveries and theoretical breakthroughs generated by basic research often bred a new knowledge revolution, led to the adjustment and reform of new knowledge systems and structures, and led to the creation and development of new technologies and production. Therefore, basic research can create new demands and development advantages, serve today's creation and lead the future development. Basic research is the source of scientific and technological innovation, and the emphasis on basic research is to promote original innovation [11].
In the land remediation industry, the strengthening of the Lin Huo Life Community and the research on basic theories of optimization of production, living, and ecological space in order to reveal the inherent changes in land resources and ecological environment are the basic prerequisites for a correct understanding of land ecological improvement; structural principles, changes in soil structure, optimization of soil materials, is the core theory of scientific guidance of land ecological remediation; proof of the changes in the ecological environment after land remediation, comprehensive construction of land consolidation comprehensive evaluation system, is the ultimate judging standard for land ecological remediation. Therefore, the basic research of the land remediation industry is still a powerful driving force for promoting scientific and technological progress. Throughout the whole process of land rectification, its new principles, laws, and systems directly affect the creation of new technologies and methods.

3.3. Develop thinking, technological innovation

The implementation of land remediation technology innovation strategy, the focus is to strengthen land remediation technology innovation. Technological innovation refers to the innovation of production technology, including the development of new technologies or the application of old technologies for innovation. The main force of technological innovation is thinking innovation. Only the original thinking of innovation can break through conventions and traditions, and it can create new methods and technologies regardless of the original technical principles. Land-renovation technology innovation mainly focuses on basic researches such as soil organic reconstruction, and strengthens innovation and research and comprehensive integration of technologies for degraded and abandoned land restoration, pollution-damaged land management, and improvement of cultivated land quality; and the strengthening of land consolidation engineering based on remediation application models. Innovative applications of ecological technologies, etc.; focusing on technical specifications, promoting the comprehensive development of technologies such as land survey and evaluation, land saving for construction projects, and building standardized engineering technical specifications. In the end, a complete land remediation technology system will be formed in terms of theory, methods, technology, engineering, models, standards, and other aspects. At the same time, research and development of product technology equipment will be strengthened to promote better transfer, transformation and application of technological results.

4. Land Improvement Innovation Guarantee Measures

4.1. Strengthening the construction of scientific and technological innovation teams with high dedication and innovative spirit

In order to further strengthen the cultivation of high-quality scientific and technological talents for land and natural resources, we can proceed from the following aspects: First, formulate relevant basic research projects and topics for the current urgent needs of society and economy, and encourage young scientists and technicians to apply for basic research topics to encourage and protect their curiosity and desire to explore the unknown world. The second is innovative thinking. Everyone is involved in innovation. Even if there is a 10% chance of technological innovation, we must overcome 90% of the uncertainty and maintain the source of innovation. The third is to maintain the top advantage, radiate all staff innovations, and pay attention to the leading talents of science and technology innovation to the comprehensive training of innovative backbone and innovative team members, and to diverge thinking together. The fourth is to continuously improve the performance mechanism and incentive measures to encourage scientific research personnel to enhance their ability to innovate in science and technology so as to provide sustainable development momentum for the rapid development of society and economy. Under the background of today's big technology era, only by fostering scientific and technological innovation teams and improving innovation efficiency can we improve the core competitiveness of land remediation technology.
4.2. Strengthen the construction of scientific research and innovation platform and improve the ability of scientific and technological innovation

Strengthen land remediation research and innovation platform construction can be carried out from the following aspects: First, improve the basic conditions for scientific research and innovation platform, focus on research hotspots of international and domestic land remediation, and equip high-precision professional instruments and equipment, especially for information research on land remediation. Focusing on innovation capacity building, we will further coordinate projects, human resources, and base construction, and focus on strengthening land consolidation. We will build a number of national key laboratories in major cross-disciplinary areas such as the country’s major needs and emerging frontiers in the current and future period, such as brownfield governance. National key laboratories, such as soil structure, material research, etc.; at the same time, strengthen the sharing of experimental data and field observation research and scientific investigation work to ensure the long-term, continuity, richness, and authenticity of experimental data. The third is to continue to strengthen the high-level design of scientific research platform construction, strengthen support service capabilities and long-term mechanism construction, and implement scientific and technological research and development evaluation methods to meet the country's major strategic science and technology needs. The fourth is to create a good atmosphere for scientific research and innovation, promote questioning and courage to create, tolerate for failure, abandon impetuosity, and create a scientific spirit and research environment to concentrate on research, form a good academic atmosphere of respecting knowledge, respecting talent, advocating science, advocating innovation, and form a platform Promoting the cultivation of talents and the sound development model of talent protection projects.

4.3. To strengthen multi-party cooperation and establish an innovation system combining production, learning, research, use, and push

Integrate the advantages of technology, human resources, and capital in research institutes, universities, land remediation institutions, etc., and promote the organic integration of innovation chain, capital chain, and industrial chain, and build land consolidation integrating production, learning, research, application, and promotion. The innovation system, through the mechanism arrangement and guidance of the land rectification agency, promotes the unified responsibility of the various agencies, further gives play to their respective resource advantages, explores the scientific frontier in the field of land remediation, and accelerates the promotion and application of scientific and technological achievements and industrialization development to lead the entire industry, and promote regional economic development, boosting land remediation and technological innovation to a new level.

At the same time, science and technology innovation is a global innovation activity. We must further expand our opening up, deepen open cooperation in science and technology, and seize the important opportunity for accelerating the flow and restructuring of global innovation resources, and further increase the advanced concepts, technical methods, and high-level talents in foreign countries. The introduction of strength, actively participate in international scientific plans and major scientific projects, support land remediation companies and research institutions to establish R & D institutions overseas, while supporting foreign companies to establish R & D institutions in China. We will intensify the opening and cooperation of national science and technology plans, attract outstanding global scientific and technological talents to contribute to Huawei land remediation, increase the international level of scientific and technological innovation, and jointly promote the construction of a harmonious and beautiful homeland of human ecological civilization.

5. Conclusion

Only by respecting the land and studying the land can we make better use of the land for development. Only in this way can humanity continue to thrive and the earth can sustain humanity forever. Land reclamation engineering science and technology innovation is a technological revolution that is carried out to better respect the land and build ecological land. It is a holistic, global, technical, and systematic
project. Only by opening up sources of innovation, strengthening innovation in technological methods, cultivating innovative talents, and creating innovative platforms can we better promote innovation in land remediation to a new level and become a continuous driving force for promoting the construction of ecological civilization and build a beautiful land.

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