

Analysis on the Present Situation of Land Engineering Science and Technology Work

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Abstract

Land is the material basis for human survival. With the rapid development of human society, the demand for land is higher and higher, and the subject of land engineering is born. In order to understand the development status of land engineering, this paper expounds the basic situation of the current land engineering science and technology work from the development of land engineering industry, the status quo of scientific and technological achievements and the status quo of scientific and technological workers, and appeals for more land engineering science and technology workers to give play to their innovative ability, solve land problems, and provide high-quality and sustainable land resources for social and economic development.

Keywords

Land engineering; Scientific and technological achievements; Scientific research talents.

1. DEVELOPMENT HISTORY OF LAND ENGINEERING INDUSTRY

Land is the basic support system for human survival and development. It is the production and reproduction conditions that can not be transferred. Land is extremely important for the sustainable development of social economy. However, with the in-depth development of industrialization, urbanization, marketization, informatization and internationalization, the contradiction between resources and environment is rapidly aggravating, the situation of sustainable utilization and management of land resources is grim, and the land resources suitable for high-intensity development and utilization are relatively limited, the regional distribution is extremely unbalanced, land degradation and land use are serious. Quality decline and ecological deterioration have become important obstacles to the sustainable utilization of land resources and the sustainable development of national economy.

In 1986, China's first "land management law" was born, which provided for the development of state-owned barren hills and wasteland and the reclamation of damaged land in production and construction; The newly revised land management law in 1999 clearly stipulates that "the State encourages land consolidation" [3]; In 2003, the Ministry of natural resources (formerly the Ministry of land and resources) issued the "national land development and consolidation plan", which defined land consolidation, land reclamation and land development, macro-control

and guide land development and consolidation activities, so as to make them develop healthily and orderly; In 2008, the Third Plenary Session of the 17th CPC Central Committee put forward that "land consolidation should be carried out on a large scale, with good planning, overall arrangement and continuous promotion" [5]; In 2010, the Fifth Plenary Session of the 17th CPC Central Committee stressed the need to speed up rural land consolidation and Reclamation [6]; In 2012, the national land consolidation plan (2011-2015) was formulated, which unified land development, consolidation, governance and other activities into land consolidation for the first time. It clearly pointed out that "land consolidation is the activity of harnessing the inefficient, irrational and unused land, and recovering the land damaged by production and construction and natural disasters, so as to improve the land utilization rate, Including agricultural land consolidation, land development, land reclamation, construction land consolidation, etc." [7]; In 2013, the Key Laboratory of degraded and unused land remediation engineering of the Ministry of natural resources (formerly the Ministry of land and resources) and the Special Committee on land of the Chinese society of natural resources held a high-level academic seminar on land engineering in Beijing. More than 20 academicians and experts from the Chinese Academy of Sciences, the Chinese Academy of engineering, the Ministry of land and resources, and the Ministry of water resources attended the seminar. The experts agreed that the establishment of a discipline of land engineering should be strengthened, It is urgent to promote land science and technology innovation, establish land engineering technology system and improve relevant laws and regulations; The monograph "Introduction to land engineering" published in the same year first proposed the construction of land engineering discipline system, discipline foundation, research methods, etc., defined the scope of land engineering research, and laid the foundation for the construction of land engineering discipline and the development of the industry [9]. The 2015 edition of "the people's Republic of China occupational classification dictionary" officially listed "technical personnel of land consolidation engineering" as a national occupation for the first time, and marked as a green occupation. In March 2017, the Ministry of education of the people's Republic of China issued the notice on publishing the record and examination and approval results of undergraduate majors of ordinary colleges and universities in 2016 (JG [2017] No. 2), which approved the establishment of new undergraduate majors of land consolidation engineering in Chang'an University and China University of Geosciences (Beijing), marking that land consolidation engineering was officially included in the undergraduate program of national education. At present, there are more than 100 colleges and universities setting up land related majors in China, among which more than 10 colleges and universities, such as China Agricultural University, Chang'an University and Hehai University, have successively set up undergraduate majors of land consolidation engineering in recent years. In the report of the 19th National Congress of the Communist Party of China in 2017, the strategy of Developing Rural Revitalization was put forward, including giving priority to the development of agriculture and rural areas, adhering to the dominant position of farmers, adhering to the comprehensive revitalization of rural areas, adhering to the integrated development of urban and rural areas, and adhering to the harmonious coexistence of human and nature; In 2019, the Ministry of natural resources issued a notice on carrying out the pilot work of comprehensive land improvement in the whole region, requiring the overall development of agricultural land, construction land consolidation, rural ecological protection and restoration, etc., and the implementation of comprehensive land and space management in idle, inefficient utilization, ecological degradation and environmental damage areas [10]; In 2020, the national "fourteenth five year plan" proposes that we should not only "give priority to the development of agriculture and rural areas and comprehensively promote rural revitalization", but also "optimize the land spatial layout, promote regional coordinated development and new urbanization", and implement the "two wheel drive" of new urbanization and Rural Revitalization.

2. PRESENT SITUATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS IN LAND ENGINEERING

With the development of land engineering, the national land science and technology workers concentrate on the comprehensive implementation of science and technology innovation strategy, in order to meet the growing needs of the people's beautiful ecological environment. According to statistics, from 2000 to 2017, it won 15 first prizes and 43 second prizes of national science and technology progress awards, mainly involving soil improvement, degradation restoration, ecological restoration, quality improvement, land reclamation, etc. In 2019, the project of "key technology and engineering application of soil formation and farmland construction by mixing Pisha Sandstone and sand" aims at soil formation, water saving and sand fixation, and explores the technology and mode of ecological conservation sandy land regulation. After more than 10 years of scientific research and development and practice, it is found for the first time that Pisha Sandstone can be used as a new material for soil formation by mixing with sand, the mechanism of soil formation water saving sand fixation by mixing Pisha Sandstone with sand is explored, the new theory of "organic reconstruction of soil" for sand regulation is established, and the core technology of soil formation by mixing Pisha Sandstone with sand is developed. In view of the lack of materials and technology for large-scale reclamation of sandy land, this paper systematically carried out the research and engineering application of the mechanism and key technology of compound soil formation of Pisha Sandstone and sand, which played a positive leading role in promoting the scientific and technological progress of China's land engineering industry.

From 2008 to 2018, there were 105 first prizes, 5 land ecological improvement projects, 584 second prizes and 15 land ecological improvement projects. The first prize of science and technology award of Ministry of natural resources mainly includes pollution control, sand improvement, mining area, homestead reclamation, etc; The second prize winning projects are mainly land development and consolidation project budget, mining area reclamation, land development mode, etc "Based on the summary of the existing research on land productivity", this paper defines the concept of cultivated land productivity, and divides the cultivated land productivity into three levels: theoretical productivity, realizable productivity and actual productivity. At the same time, the paper puts forward the accounting method of linking the relative difference of cultivated land quality with cultivated land production capacity and quantifying cultivated land production capacity at different levels scientifically. This research result provides an important method and achievement support for the implementation of the CPC Central Committee's strategy of "storing grain in the land, storing grain in technology", carrying out high standard farmland construction, and building and protecting green production capacity.

3. CURRENT SITUATION OF SCIENTIFIC AND TECHNOLOGICAL WORKERS IN LAND ENGINEERING

Scientific and technological workers refer to those who master relevant professional system knowledge in the field of natural science, engage in the research, development, dissemination, promotion and application of science and technology, and are specialized in the management of science and technology work [11]. They are not only the main body of promoting science and technology in human society, but also an important force for the integration of science, technology, economy and society [12]. The number of academic papers can reflect the research strength and personnel composition of scientific and technological workers to a certain extent. Therefore, the number of papers published in a field is usually considered as an important indicator to measure the influence of scientific and technological workers in this field. Due to the wide coverage of land engineering, the phrase "land engineering" has low international

recognition, and the retrieval results of this phrase in the "web of science" database are very few, There are 32534 authors around the world who have written articles on "land restoration". The authors with the most achievements are from Denmark. The high-yield authors from other developed countries are from Korea, the United States, Australia or Spain, and three Chinese authors are among the top 15 high-yield authors [13].

The connotation of land engineering is deepening and the extension is expanding. General secretary Xi Jinping made an important conclusion in the National Conference on science and technology innovation that "marching towards the deep part of the earth is a strategic science and technology issue we must solve". The Ministry of natural and soil resources has strengthened the leading role of strategic science and technology, formulated the scientific and technological innovation strategy of "four in one" of deep exploration, deep-sea exploration, deep air to ground observation and land engineering science and technology, and paid more and more attention to land. However, to speed up scientific and technological innovation, we rely on the millions of scientists, scientific and technological workers and market players fighting on the front line. Therefore, we call on more scientific and technological workers of land work to stimulate innovation and creativity, so as to make scientific and technological innovation achievements continuously emerge, so as to provide high-quality and sustainable land resources for economic and social development.

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