A Summary of the Significance of Soil Materials Research on Land Ecologicalization

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Abstract. With the development of human society, a large number of land problems have emerged. These land problems seriously endanger human health and the ecological environment. Land engineering is based on solving land problems. The core is the study of soil organic remodeling. A key research direction of soil organic remodeling is material research. It can provide necessary support for the harmonious development of human-land relations and land ecologicalization.

1. Land problems and their hazards
Due to the long-term over-development of human construction activities and production activities, the social attributes or service functions of the land have been emphasized, and the bearing capacity of the land itself has been neglected, leading to the emergence of many land problems such as land degradation, desertification, salinization and pollution. And these problems are getting worse.

Many land problems have brought harm to the ecological environment and human health. If the quality of the land is inferior and its improper use will accelerate the formation of haze weather, the smog pollution particles will settle into the soil and water body, and then pass along the biological chain, enrichment, and ultimately endanger human health. In China, due to the lack or accumulation of chemical elements in the land, the endemic diseases are widely distributed, threatening the health of up to 420 million people; natural radioactive elements, iodine deficiency leading to local cretinism, arsenic poisoning, Kashin-Beck disease, Excessive levels of fluoride in the natural environment lead to endemic fluorosis. The world has entered a stage of rapid urbanization, with a world urbanization level of 53%, and a city that accounts for 2% of the Earth's area consumes 80% of the Earth's resources. The urban surface hardens, the land loses its original permeability, and the internal disasters are frequent; the “garbage siege” seriously affects the living environment of urban people; the “urban heat island” effect is significant, the green area is reduced, the function of absorbing harmful substances is almost lost, and people's lives are Comfort and health levels are impaired. The harm caused by land issues is numerous and must be increased by humans.
2. Development of land engineering disciplines

Land engineering is the use of engineering and technical means to solve land problems. The uncoordinated development of human-land relations and the growing problem of land; land health is the foundation of the life system and ecological environment of the earth, and land engineering is an effective means to ensure the safety of the ecological environment.

The land engineering discipline is based on the organic reconstruction of the soil, and consists of a complete and systematic discipline system consisting of land resources and land information, land remediation projects, land use and protection. Land resources and land information: Through various methods of land resource and land information acquisition, various meaningful data related to land are processed to evaluate the current status and potential of land resources utilization, and provide a basis for the development of land engineering projects. Including land resource surveys, cadastral management and surveys, and land engineering big data. Land remediation project: The main project includes engineering soil mechanics, soil remodeling materials research and application, soil section level reconstruction, soil remodeling chemistry and nutrient supply, soil-biological system nutrition guarantee, water and soil resources utilization, etc. And other supporting projects, such as irrigation drainage, forest network construction, road construction, etc. Land use and protection: It is an important means to realize land ecological civilization. Including land economy and culture, land law and policy, land ecology, land planning and evaluation. The land engineering discipline system involves all aspects of human survival and has an important impact on agricultural production, urban construction, and even border stability.

The organic remodeling of soil is to study the soil with a certain depth as the research object. By studying the materials, structure and biological nutrition of the soil, the soil structure is replaced by technical means such as replacement, compounding, increase and decrease. Reconstruction, improve the quality of the land, improve the soil environment, and regenerate or reconstruct the degraded, polluted, damaged, inefficient and other unrecognized or unutilized soil.

There are certain differences between inorganic and organic remodeling. From the service object, the main inorganic service object is the above-ground building, the organic reconstruction is the service of the organic living body, the research object of the inorganic reconstruction is the characteristic of the soil carrying the building, and the organic reconstruction is the physical body of the living body. Characteristics; for research objectives, inorganic reconstruction is the basis for constructing the building on the ground, organic reconstruction is the construction of the soil life system and succession mechanism; inorganic reconstruction does not involve nutrient management, and organic reconstitution mainly includes soil nutrients, plant nutrition, microbial nutrition, etc., all the nutrients needed for life.

3. Soil organic reconstitution materials

To carry out the construction of land engineering disciplines, it is necessary to carry out complete and systematic scientific research on natural materials and synthetic materials based on the study of soil organic reconstituted materials. Research on soil materials, including research and screening of natural materials, including the development of synthetic materials. In daily life, the natural materials we can obtain include vermiculite, strontium sandstone, grass charcoal, shale, straw, etc.; synthetic materials are plastic, nanomaterials and PAM polyacrylamide.

In the typical arid regions of northern China, it has been found through research that the sandstone is rich in montmorillonite and powder, and has the characteristics of waterless and hard as stone, and it is soft and muddy. It can be used as a new type of soil-forming material to effectively maintain water retention. And sand fixation, continuous improvement and improvement of the quality of cultivated land, the goal of regional land ecologicalization is basically achieved. It is also possible to study the organic reconstitution effect of different soil-forming materials. The main material is clay, and the target natural materials are vermiculite, perlite, shale, sandstone, etc., which are introduced into the living body. Study the soil effects of materials and materials combined with living organisms. It is again possible to study the proportion of different materials added to the soil. The addition of material
proportions has important guiding effects on soil structure, crop growth and control of land engineering costs. It is also the focus of research on whether the materials are added to the soil and the thickness of the addition, whether it is mixed or layered.

The research and development of materials is a focus of future research. Try to use cheap, obtained basic materials, using the principle of free radical polymerization, using reversed-phase suspension polymerization, using natural polymers as the outer shell, containing clay with more nutrient content, the preparation of multi-functional core-shell type soil structure improver, in order to achieve sustained release and fertilizer control capacity, and can absorb water and retain water.

4. Realization of land ecologicalization

Through the study of soil organic reorganization and the engineering practice experience of land ecological management, we can clearly recognize the relationship between land engineering and ecological civilization construction. First of all, the construction of ecological civilization is a long-term plan that concerns the well-being of the people and the sustainable development of the Chinese nation. Facing the grim situation of China's resource consumption, ecological degradation and environmental pollution, establishing an ecological civilization concept of respecting nature, adapting to nature and protecting nature is a major progress and a new choice for the concept, road and model of human civilization development. Second, land quality is an important guarantee. Land resources are an important material basis for human survival and development. The quality of land directly affects the living conditions and development capabilities of various living organisms. Creating and protecting healthy and clean land is an important guarantee for the sustainable development of human beings and the construction of ecological civilization. Finally, organic remodeling of soil is an important scientific support. The rationality and scientific nature of soil organic reorganization directly determines the quality of land quality, and is an important scientific support for whether land resources can achieve safe, healthy and efficient use.

After understanding the relationship between land engineering and ecological civilization construction, we must use materials with good environmental compatibility according to local conditions, and use engineering methods to make the land a suitable agricultural land or construction land, providing an ideal space for human production and residence. Adhere to ecological construction as the ultimate goal of land engineering. In this process, land projects must follow the laws of nature, lay a solid foundation for the construction of ecological civilization, and expand the living space for human civilization.

In the process of realizing land ecologicalization, we must rely on some scientific means. Big data can promote the realization of land ecologicalization. It is an important means to provide scientific decision-making for land ecological realization. It can improve the data acquisition capability and factor integration ability of land engineering; improve the calculation and simulation ability of land use process; enhance the decision support ability of land management; and improve the comprehensive display ability of land management results. These are the land data big data platforms independently developed by us. We can search land data, provide decision support for land project implementation, simulate and simulate unknown land issues, and also implement research on various land types, such as: Unutilized land, degraded land, and research for urban land use, etc.

In order to realize the ecologicalization of the land, we must take certain measures. The first is to establish and improve the discipline system of land engineering; the second is to strengthen the research on materials and structure, and build a world-class engineering science; the third is to build a discipline team and build a first-class talent team; the fourth is to build a discipline platform; the fifth is to implement land engineering. The strategy of scientific and technological innovation; the sixth is to actively carry out cooperation and exchanges to deepen the study of land ecologicalization; the seventh is to build a boutique demonstration project and accumulate experience in land ecological engineering; and the eighth is to expand the social influence of land ecologicalization.

At the G20 summit, President Xi Jinping mentioned: "Protecting the environment means protecting productivity; improving the environment means developing productivity", which shows the
importance of the ecological environment; plus "the atmosphere ten", "water ten", "soil ten" and For the successive introduction of the three red lines of natural resource utilization, we realized that there is no substitute for the ecological environment. In order to realize the ecologicalization of land, land engineering shoulders important responsibilities, and we have a long way to go. We must move forward.

Land engineering is inseparable from the realization of land ecologicalization. We must base ourselves on land issues, support the land project big data means, take the construction of the land engineering discipline system as the leading factor, respect the natural laws, promote the practice of land engineering, provide healthy land for human settlements and crop growth, and make the harmonious development of human relations. To achieve land ecologicalization.

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