

Discussion on the Prevention and Control of Land Degradation in China

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Abstract

With the rapid increase in population, people's living environment and conditions are increasingly restricted by the shortage of land resources and quality degradation. China has a large population and small land, extremely complex geographical conditions, large temporal and spatial changes in geology, geography and ecological elements, serious land degradation problems, many types of degradation, and great harm. Therefore, the analysis and discussion of land degradation problems in China can be a deep land. Provide theoretical reference for degradation management and research.

Keywords

Land degradation; General situation; Governance measures; Classification.

1. Introduction

"Land degradation" was proposed by the United Nations Food and Agriculture Organization in the 1970s. In the 1994 United Nations Convention to Combat Desertification, the definition of land degradation: "'Land degradation' refers to the use of land or due to a kind of operating force (Natural dynamics) or the combination of several types of energies, resulting in rain-irrigated land, irrigated land in arid, semi-arid, and sub-humid arid regions, or reduced or lost the biological or economic productivity and complexity of grasslands, pastures, forests and woodlands, including: (1) Wind erosion and water erosion cause soil material loss; (2) Degradation of soil physical, chemical and biological properties or economic properties; (3) Long-term loss of natural vegetation." Since then, different scholars have given different definitions of land degradation from different angles. In the final analysis, land degradation refers to the decline of land productivity and use value under the influence of unfavorable natural factors and human irrational use of land. There are two key aspects that need special emphasis: one is that the productivity of the land system must have a significant decline, and the other is that this decline is the result of human activities or unfavorable natural events. The concept of land degradation not only defines the causes of degradation, but also contains two aspects of the degree of damage caused by degradation [1].

The problem of land degradation is not a new thing that just happened today. In fact, it is accompanied by the survival and reproduction of human beings, and in the process of positive development and succession of land quality, a reverse degradation process is also occurring at the same time. Only with the rapid increase in the number of people, people's living environment and conditions are increasingly restricted by the shortage of land resources and

quality degradation, that the world has paid special attention to the problem of land degradation. Due to the relatively late start of attention and scientific research on land degradation issues, it is still in the process of understanding and deepening in many aspects [2]. Important sciences such as the concept of land degradation, the causes and classification of degradation, degradation monitoring indicators and methods, evaluation systems and early warning mechanisms, etc. The problem is still in the initial stage of discussion. The academic circles at home and abroad are still at the stage of controversial exploration in many aspects, and no universal consensus has been formed so far.

2. Land Degradation Classification

China has a vast territory, large changes in geological landforms and environmental factors, a large population, highly intensive land use, and extremely complex types of land degradation. The land degradation and classification system proposed by the Nanjing Soil Research Institute, which is generally recognized by the academic community, is relatively comprehensive. It is a secondary classification system that divides land degradation into 6 primary and 19 secondary indicators, and is a series of scientific research on land degradation. Provides an important reference basis. According to the causes and characteristics of land degradation, scholars at home and abroad divide the main manifestations of land degradation into six categories: land desertification, soil erosion, soil salinization, land impoverishment, land pollution, and land damage [3].

Desertification in the Bulletin of the State of Desertification and Sandification in China refers to land degradation in arid, semi-arid, and sub-humid arid areas caused by various factors including climate variability and human activities. It does not include land impoverishment, land pollution, and land damage. And other types of land degradation, so China's land degradation may affect food security more severely.

Soil (land) degradation has existed since ancient times. Because the scientific research on soil (land) degradation is still relatively weak, although the classification of land degradation has become one of the main research directions in the academic circle, there is no authoritative international and domestic research field. Soil degradation classification system. Starting from different perspectives and goals, scholars have established many different classification systems, which are helpful to people's deep understanding and cognition of land (soil) degradation.

2.1. Classification by Dominant Factors

Land degradation is the result of the combined action and superposition of natural and human factors. Destructive natural disasters and their abnormal soil-forming factors (climate, parent material, topography, etc.) cause the natural degradation of the land, such as erosion, desertification, salinization, acidification and other basic and potential factors. Human activities also profoundly affect the natural soil formation process in many aspects, change the direction of soil fertility and soil quality, and affect land productivity and ecological service value. Human activities not only occupy a large amount of land resources, but more dangerous are the blind development and utilization of natural resources such as soil, water, gas, and organisms (deforestation, blind land reclamation of grasslands, overgrazing, planting on steep slopes and other unreasonable agricultural farming), and then It has caused a vicious circle of land degradation and the ecological environment, and has accelerated the process of land degradation. Frequent human activities have accelerated land degradation [4].

2.2. Classification by Performance Characteristics

According to the performance characteristics of land degradation, it can be divided into two types: explicit (sexual) degradation and recessive (sexual).

The so-called phenotypic degradation process (some even short-lived) refers to the obvious degradation results, and its degradation mechanism, process, and results are more intuitive, such as soil erosion, salinization, desertification and other types of degradation.

Invisible (sexual) degradation refers to some land degradation processes that have started or have been going on for a long time, but have not yet led to obvious adverse results. The degradation process is indeed taking place, but the mechanism, process, location and characteristics of the degradation are not yet obvious for the time being. Invisible (sexual) degradation is the main degradation type of modern farmland. Its characteristics (type) and characteristic changes and harmfulness are relatively hidden, and it is not easy to be noticed and valued by people. For example, due to compaction and modern rotary tillage technology, the compaction of the soil under the conservation tillage system, the shallow plough layer, the gleization of the plough layer caused by the long-term field water of the non-rice field, and the general soil body Decrease in permeability and physical degradation such as internal desiccation of soil, acidification, pollution, imbalance of nutrient elements in cultivated layer, decrease of soil base (calcium) saturation, accumulation of reducing substances in paddy soil, decrease of Eh and other chemical degradation, soil organic matter content Decrease in nitrogen, decline in (micro) biological potential, increase in soil-borne diseases, continuous cropping of crops, or accumulation of fruit tree retreat effects, and other functions such as degradation of biological quality, adverse effects determined by poor soil conditions, diminished ability to coordinate environmental factors, and prominent fatigue symptoms [5]. Degenerate. Farmland in various regions "does not increase production without fertilization, and decreases production without fertilization." The problems of "greed for fertility and water", and the high usage of fertilizers and pesticides are extremely common and serious. The root cause lies in ignoring the hidden nature of farmland soil. Degradation issues.

3. Status and Development Trend of Land Degradation

China has many types of land degradation, serious degradation, and a wide range of land degradation due to the basic characteristics of geology and topography and landform types, environmental factors, as well as more people and less land, and prominent contradictions between people and land. One of the most serious problems facing China's agriculture is the number of people and the lack of arable land. In the future, the burden of grain production development will be mainly squeezed on the almost no-choice way out of increasing the yield per unit area.

China's existing land, which can be called high-yield land with level land, deep soil layer, good water supply and drainage, fertile soil and no obvious obstacles, is less than 1/4 of the total cultivated land area. According to the quality and productivity of arable land, high-yield land accounts for 22%, middle-yield land accounts for 37%, and low-yield land accounts for 41%. The area of arable land threatened by destructive natural factors is about 529,000 km², accounting for 40% of the total arable land [6]; The area of cultivated land under soil erosion accounted for 86%, the area of salinization accounted for 9%, and the area of desertification accounted for 5%. Among the destructive factors, soil erosion is the main factor. Water shortage and drought are also an important restrictive factor affecting China's agricultural development. According to statistics, the country's dry and water-deficient arable land area is 424,300 km², accounting for 32% of the total arable land [7].

After consulting relevant information, China's total land degradation area accounts for 40% of the country's total land area, which is equivalent to a quarter of the global land degradation area. Among them, the total area of soil erosion accounts for 1/6 of the total area of the country (and data shows that it is 1/3), and about 500,000 tons of soil are lost every year. The soil nutrients lost are equivalent to 1/2 of the country's total fertilizer production, polluting rivers

and lakes. The loess plateau in the northwest[8], the red soil autumn forest area in the south and the black soil area in the northeast are areas with serious soil erosion; the total area of desertification and desertification accounts for 11.4% of the total land area. The degraded grassland area in the country accounts for 21.4% of the total grassland area in the country, mainly in some agricultural and pastoral areas in the west and northwest; soil environmental pollution is becoming more and more serious. area. Land degradation has not been effectively curbed so far, and its development speed is surprising.

4. Measures and Suggestions to Prevent Land Degradation

(1) Strengthen land degradation status investigation, monitoring, and forecast and early warning research.

At present, the systems, policies, and governance responses to address land degradation are often passive and decentralized. This is also the root cause of failure to address land degradation. Existing national and international policies and governance responses on land degradation usually focus on mitigating the damage that has been caused. Many policies are usually decentralized in nature, only targeting specific and obvious drivers of degradation in specific economic sectors. Consider other drivers. However, land degradation is usually the result of multiple factors, and there are many types of land degradation and complex causes. Therefore, it is necessary to coordinate and cooperate with multiple departments to conduct in-depth investigations on the status of land degradation in China, and establish a research network for monitoring and monitoring of explicit and implicit degradation. , To monitor the type, scope and degree of land degradation in key areas and at different scales to provide a realistic basis for the prevention and control of degraded land [9].

Strengthen the research on the evaluation index system of land degradation and establish a comprehensive evaluation index system, which is conducive to the prevention and control of land degradation and land reclamation and utilization. The targets of land consolidation are unused, unreasonable use, damaged and degraded land. According to the requirements of the management of landscape, forest, field, lake and grass system, land degradation prevention and control work must take into account the increase in the quantity of cultivated land, the improvement of the quality of cultivated land, and the pursuit of conservation, intensive, and ecological protection tasks. On a people-oriented basis, we will further optimize the spatial layout of the land, strengthen the research and development of technologies for the restoration of landscape, forest, field, lake and grass ecosystems damaged by land degradation. At the same time, for degraded land, it is necessary to fully integrate the regional environment and geographical conditions to carry out experimental and demonstration research on key technologies for soil quality restoration and reconstruction and its integrated application, so as to provide decision-making consultation and demonstration models for soil degradation prevention and control.

(2) Strengthen the study of land degradation theory and demonstration construction of degraded and unused land remediation.

The research on the theory and technology system of land degradation is extremely weak, and it is difficult to support and meet the needs for knowledge of the process of land degradation and the need for prevention and control technology. For this reason, it is recommended to increase scientific research investment and make use of relevant key experimental platforms established by the state and ministries. Scientific research on land degradation issues is carried out in various aspects of software and hardware.

(3) Vigorously develop high-standard basic farmland construction and improve the quality of cultivated land.

High-standard farmland is an important material basis for agricultural production. All localities and relevant departments shall, in accordance with the decisions and deployments of the Party Central Committee and the State Council, and the requirements of the "National High-standard Farmland Construction", effectively strengthen the construction of high-standard farmland, improve agricultural production conditions, improve the ability of farmland to resist and reduce disasters, and consolidate the foundation of national food security. Concentrate on the requirements of contiguous contiguous areas, guaranteed yield during droughts and floods, stable and high yield, and eco-friendliness, increase investment and accelerate the pace of construction.

(4) Raise awareness and intensify efforts to further promote the comprehensive improvement of rural land.

We must be problem-oriented, further optimize the rectification plan, and strengthen policy guidance. We must not only make good use of the "baton" of assessment and supervision, but also do a good job in coordination and service guarantee, and fully mobilize the enthusiasm of the town (sub-district) and village. , To form a joint force of work. Expand the scope of remediation work, and expand the remediation targets from homesteads to homesteads, low- and small-sized and scattered enterprises and other village-level stock construction land. Further improve the market-based allocation mechanism for linking increase and decrease of surplus. It is recommended to appropriately increase the proportion of surplus indicators, increase financial support, and further increase the enthusiasm of work and the willingness of the villagers. At the same time, it is necessary to further strengthen the supervision and management of rural land comprehensive improvement projects and speed up the progress of approved projects.

(5) Strengthen ecological protection and restoration.

Focus on governance and highlight ecological and environmental issues. Strengthen the comprehensive management of desertification prevention and control and desertification, carry out the protection and restoration of natural grasslands, implement the "three transformations" of grasslands, promote the comprehensive management of desertified lands in the source areas of rivers and rivers, and increase the construction of shelter forest systems. Strengthen the comprehensive management of soil erosion and rocky desertification, implement the orderly implementation of returning farmland to forests and grasslands, carry out comprehensive management of mountains, paddy fields and forest roads in small watersheds in areas with severe soil erosion, and strengthen the comprehensive management of sloping farmland, erosion ditches and collapsing hills. Carry out the comprehensive improvement project of rocky desertification. Carry out water ecological restoration, promote the conversion of farmland to rivers and lakes in accordance with local conditions, prevent and control water pollution, and strengthen the protection and restoration of natural wetlands.

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