

# Study on Soil Pollution Control Technology of Land Remediation Project

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**Abstract:** The problem of soil pollution in China is becoming increasingly serious, which has brought potential threats to the surrounding ecological environment. The harmful substances in the soil will enter the human body with agricultural products or food chains, affecting human health. Based on the current situation of soil pollution in China, this paper analyzes the existing problems of farmland soil pollution, and puts forward effective soil pollution control technologies in order to provide technical support for the current soil pollution control.

**Keywords:** Land improvement, Soil pollution, Cultivated land protection, Governance technology.

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## 1. Introduction

The problem of soil pollution is relatively serious in China, and soil pollution exists in most areas. With the rapid development of rural economy, agricultural pollution caused by the large use of agricultural inputs such as pesticides, chemical fertilizers and plastic mulch, as well as livestock and poultry manure, industrial "three wastes", and imperfect domestic waste treatment, has become increasingly prominent. The total area of these pollution is large and widespread. With the rapid development of industrialization and urbanization and the intensive utilization of agricultural resources, the environmental problems caused by cultivated land pollution are very prominent. In addition, the mode of agricultural production is constantly changing. Modern farming tools have been used in agricultural production in many regions, and a large number of cultivated land has also produced a lot of pollution due to the local policies being transformed into construction land, which is widespread in various regions.

## 2. Analysis on the Current Situation of Land Pollution

In recent years, great changes have taken place in China's rural areas, with rapid economic development, but the ecological environment of agriculture has also been damaged more seriously. The cultivated land is polluted by pesticides and sewage, and the land occupied by solid waste is generally destroyed. In addition, the food loss caused by heavy metal pollution cannot be calculated. As the rural soil needs to use inorganic fertilizers for a long time, it is easy to increase the content of nitrogen, phosphorus and nutrients

It accelerates soil acidification, destroys soil structure and causes soil salinization. Agricultural soil contains lead, mercury, zinc and other heavy metals and metal substances. This is because there are heavy metals in the fertilizer itself. When applying fertilizer, heavy metals invade the soil with the fertilizer, causing heavy metal pollution in agricultural soil. In addition, industrial wastewater and urban wastewater will be directly discharged into farmland if they are not treated, which will easily cause heavy metal pollution in farmland. The long-term enrichment of these harmful substances has greatly affected the environmental quality of

the soil, causing food pollution or yield reduction. Another inducement of agricultural soil pollution is organic pollution caused by organophosphorus and organochlorine pesticides. The herbicides and pesticides often used by farmers also affect the agricultural soil environment. The output and use of pesticides in China are in the forefront of the world. The current situation of pesticide use in China is large use and low utilization rate. Although the use of pesticides has eliminated pests and diseases to a certain extent, the pesticide residues in the soil still affect the ecology and stability of the soil. Pesticides that remain in the soil for a long time will also produce compounds with strong toxicity, causing serious damage to the soil.

## 3. Study on Soil Pollution Control Technology

### 3.1. Phytoremediation technology

Phytoremediation refers to the treatment of contaminated soil with the help of plant functions. Plants absorb nutrients in the soil through photosynthesis during their growth, and also enrich pollutants in the soil, realizing the transformation or transfer of pollutants in the soil, so as to achieve the purpose of soil remediation. Phytoremediation technology has great advantages in practical application. In the process of pollution control, there is no impact on the ecological environment and the treatment cost is low. However, the application of this repair technology also has some limitations. It has specific repair objects, long repair time and low repair efficiency. Plants absorb pollutants in the soil and need to be disposed accordingly. There is a problem of secondary pollution caused by poor disposal, so the remediation technology is limited in practical application.

### 3.2. Animal repair technology

A variety of animal types, such as protozoa, annelids, invertebrates, etc., live in the soil and rely on the soil and plants for their daily activities, which will form a governance role in the process of their activities. Through the excavation and utilization of the physiological characteristics of soil animals, the function of the soil is adjusted to achieve the purification effect of the soil. For example, the common earthworm has the function of plowing the soil and improving the soil conditions, and also has the effect of controlling the

heavy metals in the soil. First, earthworms can be eaten directly and have good tolerance to heavy metals, which can form enrichment effect. The second is the indirect effect. Earthworms enhance the activity of heavy metals in their daily activities and promote their enrichment and absorption by plant roots.

### 3.3. Microbial remediation technology

From the perspective of microorganisms themselves, they have good reproductive capacity and can reproduce in large quantities in a short time. The number of microorganisms in each gram of soil has reached several hundred million, or even tens of billions, making them play an important role in soil pollution control. The first is adsorption. In order to survive and reproduce, microorganisms need to absorb the nutrients in the soil and use their own adsorption to absorb pollutants in the soil. The second is degradation. Fungi and bacteria play a major role in degrading organic matters in soil to achieve pollution control effect. The third is precipitation and dissolution. Microbes carry out metabolic activities in the soil, producing a large amount of organic acids, thus dissolving and precipitating pollutants in the soil. At present, there are two types of bioremediation technologies based on microorganisms. One is in-situ remediation, which makes full use of microorganisms in the soil, uses biological stirring, agricultural methods, etc. to control soil pollutants. If the pollutants in the soil are special, it can also use bacterial dosing to increase the microbial content in the soil, to enhance the repair effect. The other is the ex situ repair, mainly including land filling method, preparation bed method, etc.

### 3.4. Joint repair technology

Plant and animal remediation technology has some limitations in the treatment of soil pollutants. Phytoremediation technology is disturbed by natural environment and climate conditions in practical application. The healthy growth of plants has certain uncertainty, which will affect the final soil purification results. Therefore, soil bioremediation technology needs further research and development to constantly improve the level of bioremediation technology. At present, the plant+microbial remediation technology has been adopted, integrating the advantages of the two bioremediation technologies, and playing a better purification effect. In the process of plant growth, its root system releases a lot of nutrients, providing carbohydrates for microorganisms to survive. The activities of microorganisms in the soil are conducive to soil development and fertility improvement, creating a favorable environment for the healthy growth of plants. The technology has a good purification effect on heavy metals in soil. The key to the application of the technology is the screening of strains. Strains can be extracted from heavy metal contaminated soil, cultured, and put a large number of strains in heavy metal contaminated soil to ensure the soil remediation effect of plants+microorganisms. At present, a mixed strain has been developed, which further improves the application effect of this technology.

For the problem of soil pollution, comprehensive remediation technologies such as soil information detection technology, leaching method, crop rotation system, recycling of residual film, development of green pesticides, harmless treatment of wastewater, etc. can be adopted to increase soil environmental capacity and achieve the purpose of purification. In recent years, China has made great efforts to develop clean energy, mainly by adopting bioengineering and ecological restoration projects to achieve comprehensive treatment of soil pollution. In a word, as the problem of soil environmental pollution has been paid more and more attention by social groups, the scope of application of comprehensive treatment of various types of soil pollution has become wider and wider, initially curbing the trend of increasing soil pollution.

## 4. Concluding Remarks

Soil is an important resource in China. However, with the continuous development of economy and society, the problem of soil pollution has become increasingly serious, and agriculture, industry, life and other fields have been affected to varying degrees. Especially in the context of the country's vigorous promotion of sustainable development strategy, solving the problem of soil environmental pollution has become an important concern at present. It is necessary to systematically analyze and sort out the main sources, current situation, main factors and causes of soil pollution, so as to create favorable conditions for efficient soil pollution remediation in the next step. Therefore, in view of the current situation of soil pollution, the key is to actively carry out the construction of soil pollution remediation demonstration sites, further strengthen the scientific and technological support role of soil pollution treatment, and form a scientific and reasonable soil remediation investment mechanism. At the same time, we should strengthen the control of heavy metal pollution, biological pollution, radioactive material pollution and other fields, so as to achieve the goal of comprehensive soil treatment.

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