

Feasibility Evaluation and Analysis of Rural Land Remediation and Supplementary Cultivated Land Project

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Abstract

The implementation of comprehensive land consolidation in the project area is conducive to promoting the rational flow of labor, funds, and technology, fully attracting rural idle labor to participate in comprehensive land consolidation, driving the development of related industries such as construction, building materials, transportation, etc., increasing employment, reducing social problems caused by rural idle labor, and promoting social stability.

Keywords

Cultivated Land; Soil Pollution; Heavy Metals; Repair Measures.

1. Introduction

After decades of development, China has achieved remarkable development results, but at the same time, according to the results of the third national land survey, China is facing the dilemma of reducing the total amount of arable land resources, insufficient retention of high-quality arable land resources, and multiple pollution of arable land quality. About 70% of the existing arable land area is medium to low yield farmland. Cultivated land resources are the material guarantee and basic carrier for human agricultural production activities, and an important reliance for ensuring China's food security. The cultivated land resources are facing various impacts from industry, agriculture, ecological environment, and other aspects, resulting in soil pollution of cultivated land, which poses a significant threat to the stability of human living, human health, and food security. In addition, in the process of agricultural cultivation, the lack of necessary land safety knowledge and scientific management system among local people has also led to problems such as low utilization rate of rural land resources, unreasonable application of pesticides and fertilizers, and soil pollution caused by rural household waste discharge. As a major agricultural production and consumption country, the importance of soil safety in cultivated land is self-evident. Polluted soil can not only make large areas of arable land unusable, but also reduce the quality of arable land, causing large-scale crop reduction or crop failure. More seriously, some soil pollutants carry toxic side effects, which can seriously harm human health after entering the human body through biological circulation. Therefore, how to fundamentally understand the sources of soil pollution in arable land and develop effective soil remediation measures will be a key research direction to improve and improve soil pollution in arable land in China.

2. Basic Information of the County Where the Project is Located

Fufeng County is located in the middle and west of Weihe Basin in Guanzhong Plain, the second step of China's topography, between Xi'an City and Baoji City, in the west of central Shaanxi Province. It borders Yongshou County and Qianxian County in the northeast, Wugong County and Yangling Demonstration Area in the east, Zhouzhi County and Meixian County in the south, Qishan County in the west, and Linyou County in the north. It is located between 107 ° 45 ' - 108 ° 03 ' E and 34 ° 12 ' -34 ° 37 ' N, with a total area of 720 km².

3. Natural Conditions

Landform: Fufeng County is longer from north to south than from east to west, and the terrain inclines from northwest to southeast, high in the north and low in the south. The territory naturally forms four distinct geomorphic and topographical units from north to south, including low mountains and hills, piedmont alluvial fans, loess plateau, and Weihe River terraces, with a stepwise drop from north to south. The highest altitude is 1579.8m, and the lowest is 438.4m, with a difference of 1141.4m.

Climate: Fufeng County has a continental humid monsoon climate. The four seasons are distinct and the rainfall is abundant. The annual average temperature is 12.4 °C, the extreme maximum temperature is 42.7 °C, the extreme minimum temperature is -19.5 °C, the average annual precipitation is 592mm, and the frost free period is 209 days.

Soil: The soil in the county belongs to 9 soil categories, 42 soil genera, and 107 soil species. Loess accounts for 60.83% of the total soil area, while Huangmian soil accounts for 28.2%. The two main types of high-quality soil account for 90% of the total soil area, accounting for over 95% of the arable land area.

Hydrology and water resources: the total water resources of Fufeng County is 4.986 billion m³, of which the transit flow of Weihe River and Qishui River is 4.656 billion m³. The exploitable capacity is only 330.18 million m³, and the remaining resources are temporarily difficult to develop and utilize. The exploitable amount accounts for 6.6% of the total resources, with a per capita resident volume of 786 m³. There are 5 large-scale rivers within the county, with the watershed from Waganling to Liujialiang. There are 3 rivers that flow northward into the Qishui River, including Moshigou, Heigou, and Jijiagou. There are 2 rivers that flow southward into the Wei River, including Qixing River and Meishui River. The water volume is small and variable.

4. Land Use Situation

The total existing land area of the county is 70529.53hm², of which arable land area is 27169.81hm², accounting for 38.52% of the total area; The garden area is 11265.38hm², accounting for 15.97% of the total area; The forest area is 20015.71 hectares, accounting for 28.38% of the total area; The grassland area is 562.26 hm², accounting for 0.8% of the total area; The land area for industrial and mining storage is 744.33hm², residential land is 5364.74hm², and transportation land is 2586.91hm², accounting for 3.67% of the total area; The land area for water bodies and water conservancy facilities is 1438.38hm², accounting for 2.04% of the total area; The land area for public management and public services is 438.83 hm², special land area is 415.21 hm², and other residential land area is 334.35 hm². The land type in the proposed project area is mainly degraded forest land, with poor economic benefits and low willingness of farmers to operate and cultivate. In order to change the agricultural production conditions within the proposed project area, improve land use efficiency and output rate, it is objectively necessary to carry out comprehensive rectification of the project area. Therefore, the project needs to be implemented urgently to solve the increasingly prominent contradiction of land requisition and compensation balance in Fufeng County, and also to facilitate the rational, scientific and effective use of land resources.

5. Investigation of the Proposed Project Area

The proposed project area meets the requirements of policy documents in terms of land type, has avoided the ecological red line protection range, natural reserve range, urban development boundary, 25 degree slope range, forestry data, and reported range over the years. The village group has strong willingness and enthusiasm for project construction, and has the conditions for project implementation. After on-site investigation, the current land type is mainly

degraded forest land. The aging of degraded forest land is severe, with uneven fields and irregular ridges. Farming is inconvenient, and some plots have poor ventilation and water permeability. The planting structure in the project area is single, and the land output is low. The project area has been renovated into a standardized farmland with complete infrastructure through measures such as demolition engineering, land leveling engineering, cultivation and soil conservation engineering, irrigation engineering, and field road engineering. Land remediation scale area 66.8780 hectares² (equivalent to 1003.2 acres). The current land types in the project area mainly include orchards and adjustable gardens, and the thickness of the cultivation layer meets the requirements for crop cultivation. Measures such as excavation of aging trees, root removal, soil leveling, construction of ridges (ridges), land plowing, and soil improvement engineering have been implemented to transform low yield and low economic benefits gardens into high-yield farmland, achieving field leveling, convenient cultivation, water and soil conservation and fertilizer conservation.

Based on the actual situation on site and local water conservancy conditions, irrigation and drainage facilities will be installed in areas with irrigation conditions in the project area. According to the terrain and terrain characteristics of Fufeng County, the north is the hilly area of Yehe Mountain, and the central south is the plain area of Weihe River terrace. After preliminary identification of the cultivated land types around the project area, it is determined that the irrigated land of the project is mainly distributed in the central and southern areas with good traffic conditions and basically complete irrigation and drainage facilities nearby. Through engineering measures such as repairing damaged channels, the irrigation area is expanded, the irrigation assurance rate is improved, and the grain production capacity of cultivated land is increased. Only a few towns near the northern mountainous areas such as Famen Town and Tiandu Town rely on the weather for food, and can only be converted into dry land.

The external transportation in the project area is very convenient, with "village to village" hardened cement roads connecting the towns and villages, as well as between villages and groups. However, the field roads leading to the interior of the fields and some long-term unmanned and inefficient gardens cannot be reached, and the internal road system of some plots is not perfect, resulting in low road quality. This plan is to build a field production road, which is based on the existing road skeleton and reduces land occupation. It is planned in a coordinated manner with fields, channels, and forest belts, and organically combined with rural main roads to form a unified rural road network.

6. Estimated Investment

According to the "Budget Quota Standards for Land Development and Consolidation Projects", the project budget consists of engineering construction costs (direct costs, indirect costs, profits, material price differences, unpriced material costs, and taxes), other expenses (including preliminary work costs, engineering supervision fees, completion inspection fees, compensation fees, owner management fees), and unforeseen expenses.

The estimated investment for this project is 12 million yuan, including 3.5 million yuan for engineering construction, 1.5 million yuan for engineering management and protection, 6.5 million yuan for compensation, and 500000 yuan for other expenses.

7. Analysis of Project Implementation Benefits

After the implementation of this project, the cultivated land area in the project area has significantly increased, agricultural infrastructure has been improved, agricultural production conditions and ecological environment have been improved, and agricultural industrial structure adjustment has been coordinated. It will greatly improve the agricultural production

conditions in the project area. Improving the suitability of the land and adjusting the planting structure in a timely manner according to market demand after rectification will greatly increase the income of local farmers and significantly improve the economic benefits of the cultivated land in the project area.

The construction of the project area has improved the level of intensive land use and significantly improved the ecological landscape of the project area.

During the project implementation process, the soil of the cultivated land will be improved to improve soil environmental quality, improve farming conditions, facilitate crop growth, and further optimize the ecological environment of the project area. At the same time, the implementation of this project can effectively prevent the erosion of development and consolidation plots by river floods during the flood season, effectively prevent soil erosion and water and fertilizer conservation of farmland. The implementation of the project can also effectively control farmers' blind deforestation and land reclamation, which is more conducive to the protection of the local ecological environment.

After the implementation of the project, the area of cultivated land has been effectively increased, which can alleviate the pressure of large population and less land, and is of great significance for realizing the Dynamic equilibrium of the total amount of cultivated land in the county; Improving labor productivity, making the majority of farmers truly feel the superiority of this policy, is conducive to further promoting the comprehensive development of land consolidation work; Fully attracting the participation of rural idle labor is conducive to social stability.

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