

Effects of Land Reclamation on Cultivated Land Benefit and Grain Yield

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Abstract: The land improvement project takes the land development project construction as an opportunity to improve the current situation of land use in the project area and improve the land utilization rate through scientific planning, layout of fields, construction of ridges and ridges, etc., and soil conservation of the farming layer. The project implementation can significantly improve the social, ecological and economic benefits of the project area.

Keywords: Land improvement, Cultivated land benefit, Grain output, Cultivated land quality.

1. Introduction

Land is a non renewable resource and asset, which is the most basic material condition for human survival, social progress and sustainable economic development. It is a major issue related to the survival and development of future generations to effectively protect cultivated land and achieve the balance between occupation and compensation of cultivated land. It is also an important system for protecting cultivated land determined by the Land Administration Law of the People's Republic of China and the Implementation Regulations of the Land Administration Law of the People's Republic of China. The economic development of our province has entered the fast lane. It is inevitable to occupy cultivated land for construction. The pressure of "double protection" for ensuring development and protecting cultivated land is increasing. The balance between the occupation and compensation of cultivated land has been achieved to solve the contradiction between land supply and demand, which not only guarantees the red line of 1.8 billion mu of cultivated land, ensures food security, but also maintains the momentum of sustainable socio-economic development. On the premise of protecting the ecological environment, strengthen its development and consolidation, increase the area of cultivated land, improve the farmland shelter forest network and traffic road facilities, increase farmers' income, and ensure the sustainable development of agriculture.

2. Project Overview

The project area is located in Gaozhuang Village, Zhaoxian Town, Linyou County, with coordinates ranging from $107^{\circ} 34' 14''$ to $107^{\circ} 38' 52''$ E and $34^{\circ} 45' 34''$ to $34^{\circ} 47' 27''$ N. The natural precipitation in the project area has obvious seasonal characteristics and uneven distribution in time and region. Drought in spring, cool in summer, waterlogging in autumn, and cold in winter have become the main limiting factors for land use and agricultural production development. Planting trees and grass, increasing vegetation coverage, reducing wind and sand hazards, containing water and soil loss, ensuring full infiltration of water, increasing soil moisture content, and promoting sustainable use of regional water resources from the perspective of resources and water conservancy are the main measures and fundamental way to

solve drought. The maximum annual rainfall in the project area is 987mm, the minimum annual rainfall is 374.5mm, and the average annual rainfall is 680mm. Affected by altitude and vegetation, the higher the altitude, the greater the precipitation. Since April every year, the precipitation has increased rapidly and decreased significantly in October. July, August and September are relatively rainy. The annual precipitation from April to October over the years is 292.6mm~889.6mm, accounting for 81.19%~97.0% of the annual precipitation. The intensity of concentrated rainfall is large, which is easy to cause water erosion. The main soil erosion mode in the project area is water erosion and soil erosion caused by human activities. Through land leveling, soil improvement and farmland shelterbelt construction, the project has optimized the physical and chemical properties of soil, enhanced the soil erosion resistance, built a water and soil loss protection system, increased the coverage of underlying surface, effectively curbed the occurrence and development of water and soil loss, and weakened or even eliminated the restrictions of water and soil loss on land use. The soil around the project area is derived from the parent material of loess, which forms a certain cultivation layer after long-term cultivation. The accumulation of humus and organic matter is not high, and planting crops in the project area can significantly improve the soil. The first is to improve the soil texture. After the plant residues remain in the soil, they are transformed into organic matter through decomposition. For sandy soil, organic matter can increase the adhesion between sand grains and eliminate the bad properties caused by excessive sand in the soil; Secondly, the soil pH was improved. After the land in the project area has been renovated, it will be thinner and thicker, and the soil layer will be thicker, so that single planting can be changed into multiple planting, so as to improve the yield of agricultural and economic crops, increase farmers' income, and accelerate production development; By increasing the application of organic fertilizer, the soil structural properties in the project area will be improved, the farmland ecological virtuous cycle will be promoted, which will play a good role in maintaining and improving the biodiversity in the project area, and the development of multiple crop planting.

3. Construction Objectives

Through land development, unified planning and rational layout, it is expected to effectively increase the area of cultivated land and improve the quality of cultivated land,

turn the existing slope land in the project area into terraced fields, complete the construction of terraced fields in the project area, improve the infrastructure such as field roads and farmland protection, control water and soil loss, improve agricultural production conditions and ecological environment, and realize the coordinated development of the quantity, quality and ecology of cultivated land. Finally, the project area will be built into a middle-class terrace suitable for cultivation. At the same time, by developing other grasslands, the project can realize intensive and large-scale agricultural production, accelerate agricultural production and increase people's income.

The main objectives of the project construction are to complete the construction tasks of land leveling, field roads, farmland protection and ecological environment conservation within the project area, specifically:

(1) The slope land will be changed into horizontal terraced fields, the field blocks will be reasonably planned, the land will be leveled, the field surface will be leveled, the effective cultivated land area will be increased, and the earthwork will be minimized to save investment; The land improvement area is 19.5077 hm², and the newly increased cultivated land is 17.6961 hm²; 119 flat fields, 39015m³ topsoil stripping earthwork, 61088m³ pushing earthwork, 39015m³ topsoil backfilling earthwork, 32369m³ ridge compaction earthwork, 16740m ridge construction length, 2511m³ ridge construction; Soil ploughing 17.7hm².

(2) The roads in the project area shall be planned. Field roads shall be planned and constructed between the project area and the residential area to facilitate the access to the project area. Production roads shall be planned and constructed between the fields to achieve the goal of connecting the plots and facilitating agricultural production. The designed road width is 3.0m, the plain soil pavement is used, the compaction thickness is 30 cm, the subgrade is compacted in layers, the compaction coefficient of rolled soil reaches 0.94, the subgrade is arched, and the cross slope is 3%. 2475m production road (plain soil road) is planned to be built in the project area.

(3) Determine the layout, tree species and quantity of farmland protection forest, plant 975 red leaf plum trees along both sides of the existing road into the project area, and sow 9754m² grass seeds on the slope of the field ridge.

Through the comprehensive development of fields, water, roads and forests, the agricultural production conditions have been greatly improved; Reasonably allocate land resources, promote the adjustment of agricultural structure and increase farmers' income; Through the project construction, the arbor forest land and shrub forest land will be transformed into

cultivated land, and finally the land productivity will be comprehensively improved, and the ecological environment will be significantly improved.

4. Benefit Analysis

4.1. Social benefit evaluation

Through the implementation of the project, firstly, terraces are built to develop the original barren slope land into terraces, increasing the area of cultivated land, promoting the level of agricultural mechanization, promoting the increase of local crops and farmers' income, thus improving the living standard of local farmers; The second is to improve the ecological environment of the area through farmland protection and ecological environment conservation projects, effectively curbing water and soil loss in the project area.

At the same time, through the implementation of the project, the land use structure will be changed, which is bound to increase farmers' income, promote agricultural development, accelerate the process of agricultural modernization, improve farmers' living standards, and play a significant role in building a new socialist countryside.

After the implementation of the project, the awareness of the masses of the villages and towns involved in the project, governments at all levels and land management departments to rationally use land and effectively protect cultivated land has been enhanced.

4.2. Ecological benefit evaluation

After the development of cultivated land in the project area, farmland shelterbelts will be arranged along the road to form shelterbelts, conserve water sources, increase vegetation coverage, which will certainly change the microclimate in the project area, reduce wind speed, reduce evaporation, increase humidity, effectively resist the invasion of dry and hot wind on agricultural products, have great resistance to natural disasters, give full play to ecological benefits, and improve the regional ecological environment. After land reclamation, the existing barren slope land can be improved into high-quality dry farmland, and the barren area of land will be greatly reduced. The land in the project area will be protected, and the soil quality will be improved.

4.3. Economic benefit analysis

After the implementation of the project, the newly increased cultivated land area is 17.6961hm², and the yield of corn per hectare in dry land is 7500kg. The benefit calculation of one crop per year is shown in the following table.

Table 1. Benefit Calculation

crop	Proportion of multiple cropping	multiple crop index	New cultivated land area(hm ²)	Dry land yield(kg/hm ²)	Unit Price (yuan/kg)	output value (10000 yuan)
Corn	90%	0.90	17.6961	7500	2.2	26.28

After the completion of the project, corn will be planted with a multiple cropping index of 0.90. During the normal production period, the annual output value of the project area will increase by 262800 yuan.

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