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The impact of high-standard farmland construction on arable land and grain productivity

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Abstract

High-standard farmland construction projects are an important way to transform and improve the original low-utilization land, as well as an important measure to improve the productivity of farmland and ensure my country's food security. High-standard farmland construction projects have a significant impact on farmland grades and grain productivity , which can significantly increase food production.

Keywords

High-standard farmland; arable land classification; grain productivity; impact.

1. Introduction

The reserve resources of cultivated land in my country are becoming less and less, and it is urgent to strictly protect the existing cultivated land resources. Through high-standard farmland construction and engineering measures, the irrigation and drainage, soil, roads and other agricultural production conditions can be improved, so as to improve the quality of cultivated land, or the renovation of farmland water conservancy facilities to transform dry land into irrigated land. . The implementation of the arable land quality improvement project not only fulfills the requirement of arable land occupation and supplement balance, protects arable land, guarantees the overall quantity of arable land, but also maintains the quality. to increase farmers' income, increase agricultural efficiency and rural development.

2. Basic information of the project area

The project area is located in the east of Guanzhong Plain, Shaanxi Province, with Weinan in the east, Gaoling in the west, Lantian in the south, Yanliang in the north, and Sanyuan in the northwest. The geographic coordinates are 109°5'49"~109°7'50" east longitude and 34°16'49"~34°44'11" north latitude.The landform characteristics of the project area belong to the Weibei plain area, with open ground, deep soil layers and fertile soil. The soil characteristics are grayish-yellow, and the main soils are pseudo soil and loess soil. The altitude is between 350 and 370m.The climate of the project area is a continental warm temperate semi-arid monsoon climate, with four distinct seasons of cold, warm, dry and wet. The annual average temperature is 13.5℃, the extreme minimum temperature is -17℃, the extreme maximum temperature is 41.9℃, the maximum permafrost depth is 28cm, and the annual average rainfall is 575.82mm. The rainfall has a strong seasonality, mostly concentrated in the three months of July, August and September. The average annual evaporation is 1035.7mm, the sunshine hours are 2154.7h, the monthly average relative humidity is 68.6%, and the average wind speed is 2.6m/s.

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3. Basic measures of the target area

3.1. Current status of water conservancy projects

Water source project: There are 11 irrigation wells in the project area, of which the supporting wells are not perfect, so they cannot be used normally and can not give full play to their benefits.

The field works in the project area are mostly earth canals for water delivery, which takes a long time for irrigation and causes large leakage. Secondly, some channels are cultivated and cannot be irrigated. Most villagers use water hoses for irrigation, which is labor-intensive. Without the supporting buildings in the field, the normal use of the channel cannot be met, and the amount of water resources is wasted seriously. The roads in the fields are smooth but narrow, and machinery cannot enter into farming, which affects farmers' enthusiasm for farming.

3.2. Agricultural machinery and agricultural machinery service facilities

The street office where the project area is located has an agricultural machinery station with 8 staff, mainly including large and medium-sized tractors, agricultural trucks, irrigation and drainage power machinery, and combine harvesters. To meet the needs of agricultural modernization development in the project area.

3.3. Transportation and Electricity

The transportation of the project is very convenient, and the infrastructure such as electricity and communication is developed and complete. The main roads of the villages lead in all directions, and the village roads are directly connected with the Gaoyou Road, which provides extremely convenient transportation conditions for the implementation of the project. The power supply in the project area is sufficient, the power load is sufficient, and the power supply guarantee rate is high, which can meet the power consumption requirements of the project implementation and irrigation seasons.

3.4. The quality of cultivated land in the project area

The total cultivated area of the project area is 1000.0000 hectares, all of which are irrigated land. The national natural grades of cultivated land in the project area are 7th and 8th grades, of which 948.1681 hectares of 7th grade land and 58.8319 hectares of 8th grade land.

4. Data collection

4.1. Basic data collection

Collect and sort out the feasibility study, design and completion acceptance data of various types of land consolidation projects, comprehensive agricultural development, and farmland water conservancy construction projects accepted in the project area, as well as project arable land quality assessment data. Focus on investigating the attribute values of factors such as the grading of cultivated land irrigation guarantee rates within the scope of land consolidation and comprehensive agricultural development projects, and further improve the grading factor map of cultivated land.

4.2. Collection of natural condition data

(1) Topography: Obtained from the arable land slope results of the 2018 Land Use Status Change Survey;

(2) Climate: Collect meteorological statistical data from meteorological stations in Lintong District, focusing on the extraction of monthly average temperature, accumulated temperature ≥0℃, accumulated temperature ≥10℃, precipitation, evaporation, frost-free period, disaster climate, etc.;

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(3) Hydrology: collect information such as the type of irrigation water sources (surface water, groundwater), water quantity, irrigation guarantee rate, water quality and water resources distribution map in Lintong District;

(4) Soil: Collect data sets and maps for the second soil census, mainly including effective soil layer thickness, surface soil texture, soil salinization degree, soil organic matter content, soil pH value, soil profile configuration, soil erosion degree , surface rock outcrop, soil composition analysis report and soil map and other information.

5. Cultivated land classification and production capacity verification

5.1. Cultivated land rating

The high-standard farmland construction project in the project area has no new cultivated land, no reduction of cultivated land, and 1,000.0000 hectares of high-standard farmland construction cultivated land. In 2019, the high-standard farmland construction project in Lintong District will construct 1,000.0000 hectares of arable land, all of which are irrigated land.

(1) Natural classification results of high-standard farmland

According to the calculation method of the natural index of cultivated land, it is calculated that the national natural index of cultivated land in Lintong project area is distributed between 3272 and 3422. According to the equidistant method, every 400 points is one grade, and the natural grade of arable land is 7th grade.

(2) Classification results of cultivated land use for high-standard farmland construction

According to the calculation method of cultivated land utilization index, it is calculated that the national utilization index of cultivated land in Lintong project area is distributed between 1732 and 1806. According to the equidistant method, arable land is divided into 2 national utilization grades, 6 and 7 grades, every 200 points.

(3) Economic classification results of high-standard farmland construction cultivated land

According to the calculation method of economic index, it is calculated that the national economic index of cultivated land in the project area is distributed between 1364 and 1412. According to the equidistant method, every 200 points is divided into 2 national economic levels, 8, 9 and so on.

5.2. Farmland Productivity Assessment

In the dynamic supervision system of cultivated land occupation-compensation balance, the grain production capacity of cultivated land is calculated from the cultivated land area and cultivated land quality and utilization, and the unit is kilograms. The identification of the type and area of cultivated land shall be conducted by the county-level agricultural and rural department in conjunction with the natural resource management department during the project acceptance inspection and identification.

The formula for calculating the productivity of cultivated land:

New production capacity = increased production capacity from new cultivated land + increased production capacity from high-standard farmland construction

Increased productivity of newly-added cultivated land = (D - average quality of newly-added cultivated land) × newly-added cultivated land area × 15 × 100

In the formula, D refers to the capacity calculation constant, D≤16 (when the capacity is 0, D=16).

Increased production capacity of high-standard farmland construction = (average quality of cultivated land before high-standard farmland construction - average quality of cultivated land after high-standard farmland construction) × high-standard farmland construction area × 15 × 100

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The average quality grade of cultivated land, the average quality grade before high-standard farmland construction, and the average quality grade after high-standard farmland construction: grades all refer to national use, etc., with one decimal place;

15: means 1 hectare = 15 mu;

100: Indicates kg/mu.

More about this source textSource text required for additional translation information

Under normal circumstances, the soil environment can slowly decompose the pollutants that enter its interior, which has a self-purification function to a certain extent. However, when the heavy metal enrichment is too much, which seriously exceeds the bearing capacity of the soil itself, the balance of the soil environment will be broken. , resulting in a large amount of soil pollution, greatly

Change the nature of the soil itself, so that its function gradually disappears, soil fertility declines, and crops will also decrease in yield or even die. Crops grown in this environment will have a great impact on human health. Therefore, great attention should be paid to the problem of soil heavy metal pollution and its remediation technology.

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