

Effects of high-standard farmland construction on cultivated land protection

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Abstract

High-standard farmland construction is a key measure to consolidate and improve grain production capacity and ensure national food security. With increasing grain production capacity as the primary goal, we should focus on arable land protection, soil fertility improvement, and efficient water-saving irrigation. This paper studies the impact of high-standard farmland project construction on cultivated land protection, in order to provide reference for cultivated land quality prompts..

Keywords

High-standard farmland; implementation plan; design principles; effectiveness.

1. Introduction

Nowadays, the reserve resources of cultivated land in my country are getting less and less, and it is urgent to strictly protect the existing cultivated land resources. In 2017, the Central Committee of the Communist Party of China and the State Council "Opinions on Strengthening the Protection of Cultivated Land and Improving the Balance of Occupation and Compensation" proposed to include low- and medium-quality cultivated land into the scope of high-standard farmland construction, and implement quality improvement and improvement, so as to ensure the replenishment of cultivated land while improving the quality of cultivated land; The Ministry of Land and Resources' "Notice on Improving Management Methods and Effectively Implementing the Balance of Cultivated Land Occupation and Compensation" pointed out that it is necessary to propose a new mechanism for occupation and compensation based on quantity and production capacity, and improve the quality of cultivated land. The newly added grain production capacity shall be calculated according to the area of cultivated land rehabilitated and the quality of improvement, and shall be included in the production capacity reserve. In 2019, the "Opinions of the General Office of the State Council on Effectively Strengthening the Construction of High-standard Farmland to Improve the National Food Security Guarantee" proposed that the construction of high-standard farmland is to consolidate and improve the food production capacity and ensure the national food security. The key measures for safety are to increase grain production capacity as the primary goal, and to focus on arable land protection, soil fertility improvement and efficient water-saving irrigation.

2. Project area overview

The project construction site is located in Beidoufang Village, Liulin Town, Fengxiang District, Baoji City. There are many highways such as G85 and Dongling Road in the project area, and the transportation is convenient. Geographical coordinates are between 107°12'36" ~107°13'48" east longitude and 34°34'12" ~34°36'1" north latitude. The project area is located in the proluvial sector of Fengxiang District. The terrain is high in the northeast and low in the southwest, with an elevation of 830-1050 m. The fan faces southeast and southwest slowly. The landform units are mainly distributed from the south of the Loess Hills to the north of Yongshui River. It can be divided into four grades according to the composition and distribution form.

The project area is located in the fourth grade alluvial fan, the upper part is covered with thick loess, the fan faces southeast and southwest, the slope of the rear edge of the alluvial fan is 20°-30°, and the front edge of the alluvial fan is 20°-30°. 10°-15°, mainly composed of Quaternary alluvial deposits and loess. The project area belongs to the warm temperate continental monsoon climate type, which is characterized by warm and dry spring, hot and rainy summer, cool and humid autumn, cold and dry winter, and four distinct seasons. The extreme maximum temperature was 40.0°C (June 19, 1996), and the extreme minimum temperature was -19°C (January 31, 1997).

3. Main construction standards of the project

3.1. Construction standards for land leveling works

- (1) Reasonably plan the fields, improve the degree of consolidation of the fields, and realize the relative concentration of the cultivated fields.
- (2) Use fixed ditches, canals and roads in the field as the skeleton to divide the cultivated fields as the basic unit of land leveling. In the field, according to the requirements of convenient cultivation, management and production, and according to the terrain and topography, the strip fields are arranged. The length of the strip fields is 200-300 m, the width is 80-200 m, and the slope is uniform, and the slope is 1/300-1/300 m. 500, and the field height difference is less than ±5 cm.
- (3) The thickness of the tillage layer should be more than 25 cm, the thickness of the effective soil layer should be more than 50 cm, and the soil physical and chemical indicators should meet the requirements of high and stable crop yield.
- (4) When fertilizing the soil, commercial organic fertilizer shall be applied according to the standard of 150 kg/mu.

3.2. Irrigation and drainage engineering construction standards

Irrigation and drainage projects are based on the requirements of "Design Specifications for Irrigation and Drainage Engineering" (GB50288-2018) and "Technical Specifications for Water-Saving Irrigation Engineering" (GB/T 50363-2018), refer to the irrigation system in the area where the project is located, and combine with local hydrology Factors such as meteorology, soil and water resources, crop composition, scale of the irrigation area and economic benefits determine the construction standards of the project's irrigation and drainage works.

- 1) The irrigation system is planned scientifically, the irrigation water is guaranteed, the water quality conforms to the standard of farmland irrigation water, and water-saving measures such as engineering, agronomy, and management are taken according to local conditions, and the irrigation system is scientific and reasonable.
- 2) The irrigation guarantee rate is 75%.
- 3) Aqueducts (pipes), culverts, gates and other buildings and field irrigation facilities are complete, and the performance and technical indicators meet the standard standards. The channel lining should be sturdy and durable, with good anti-freezing and anti-seepage performance.
- 4) For the development and utilization of water resources in the project area, the total amount control is implemented on the macro level, and the water quota management is implemented on the micro level. Actively promote the mode of water user participation in irrigation management, provide necessary water measuring facilities, and collect water fees according to the water consumption and the approved water price, so as to manage and promote water conservation.

5) Flood control standard: designed according to 20-year flood, and checked for 50-year flood.

3.3. Field road engineering construction standards

The land remediation project has low grade requirements for roads. Subgrade and pavement are the main engineering structures of field roads. When planning road projects, it is necessary to follow the principle of "road runs between fields and fields on both sides of the road" to save road land and improve land utilization. The existing road in the project area connects the project area and the residential area, which can meet the functional requirements of the field road. Therefore, the field road is mainly arranged by relying on the existing road; the road subgrade and pavement can be "collected locally", and the local stone and soil materials can be used as the road. Cushion or pavement.

(1) Reasonable and practical construction standards: The construction of field roads in the project area highlights land conservation, and the construction standards are reasonable and practical.

(2) Reasonable layout, straight and smooth: The field road construction should be connected with the township and village roads, with supporting facilities such as road culverts, and the road surface is hardened with sand and gravel materials to ensure smooth weather in sunny and rainy days, and can meet the transportation of agricultural products and the passage of agricultural machinery. Road accessibility is not less than 100%.

(3) Concrete field road: The designed pavement width of the concrete field road is 3 m, and a 30 cm thick plain soil rammed roadbed is set up, and the compaction coefficient of the filling soil is not less than 0.92. After the roadbed is leveled and rolled, the upper part is laid with a thickness of 30 cm: 7 Lime-soil cushion, the pavement adopts concrete pavement, the slope ratio on both sides is set at 1:0.75, and there is a drainage ditch.

(4) Plain soil road: The designed pavement width is 2.5m, the cushion layer is laid with 300mm plain soil, the roadbed is leveled and compacted, and the compaction coefficient of the fill is not less than 0.92.

(5) Mud stone production road: The designed pavement width of the mud stone production road is 3 m, and a 25 cm thick plain soil is set to compact the subgrade, and the compaction coefficient of filling is not less than 0.92. After the subgrade is leveled and rolled, the road surface is laid with 15 cm of mud For the stone surface layer, the slope ratio on both sides is set at 1:1.

4. Major Improvements

In view of the problems existing in the above land use, the improvement measures are proposed as follows:

1. Strengthen the construction of farmland water conservancy projects and enhance the ability of farmland to prevent and resist disasters. Make full use of the large and medium-sized irrigation areas of the water conservancy department to build supporting facilities and water-saving renovation projects, improve and transform water conservancy engineering facilities, and improve the comprehensive utilization efficiency of water conservancy projects.

2. Renovate the roads in the area, and at the same time, build new field roads for some fields that are inconvenient to cultivate, so as to improve the efficiency of agricultural production.

3. Increase the application of organic fertilizers. The types of fertilizers are mainly various farmyard manures, planting green manures and straw returning to the field. Combined with the application of chemical fertilizers, the physical and chemical properties of the soil are improved, and the nutrient elements of the soil are enriched. The high-fertility soil after soil improvement and fertilization In order to ensure that water, fertilizer, gas, heat and other

fertility factors are coordinated with each other, meet the needs of crop growth and development, and increase crop yield..

5. Conclusion

After the project is completed, a relatively complete farmland irrigation and drainage system will be formed, the inconvenience of farming and the situation of relying on the sky for food in the project area will be completely changed, the quality of the cultivated land will be improved in an all-round way, and the cultivated land will reach the land standard of guaranteeing income under drought and flood. In addition, the agricultural production conditions in the project area have been improved, the land utilization rate and agricultural production efficiency have been improved, the agricultural foundation has been consolidated, and the development potential of comprehensive agricultural production capacity has been enhanced, laying a solid foundation for the adjustment of agricultural industrial structure and the increase of farmers' income.

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