



## **On the Grading Evaluation Process of Cultivated Land Quality for High Standard Farmland Construction Projects**

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**Abstract:** National High Standard Farmland Construction Plan (2021-2030): 1.2 billion mu of high standard farmland will be built by 2030, and the average productivity per mu of newly increased standard farmland will increase by about 100 kg; The No. 1 Document of the Central Government in 2021 proposed that 100 million mu of farmland with high yield and stable yield should be built in 2021. In order to promote the pilot results of new cultivated land and new production capacity in the construction of high standard farmland projects, the Provincial Department of Agriculture and Rural Affairs and the Provincial Department of Natural Resources carried out the identification of the number of new cultivated land and new food production capacity in the construction of high standard farmland projects across the province. This paper mainly introduces the farmland quality grading assessment process of standard farmland construction projects.

**Keywords:** High standard farmland; quality grade of cultivated land; capacity; assessment; technological process.

### **1. Project Background**

The CPC Central Committee and the State Council attach great importance to the

protection of cultivated land and the improvement of land capacity, unswervingly focus on the construction of high standard farmland, and improve the construction standards and quality. The General Secretary pointed out that "it is necessary to build high standard farmland, and truly achieve the goal of ensuring the harvest of drought and flood, high and stable yield". Building high standard farmland is a key measure to consolidate and improve grain production capacity and ensure national food security. In 2021, the Fourteenth Five Year Plan and the Outline of Vision Goals for 2035 put forward that 1.075 billion mu of concentrated high standard farmland will be built; According to the National High Standard Farmland Construction Plan (2021-2030), 1.2 billion mu of high standard farmland will be built by 2030, and the average productivity per mu of newly increased standard farmland will increase by about 100 kg; The No. 1 Document of the Central Government in 2021 proposed that 100 million mu of farmland with high yield and stable yield should be built in 2021.

In accordance with the spirit of the Guiding Opinions on Promoting the Construction of New Cultivated Land and New Production Capacity on High standard Farmland issued by the Provincial Department of Agriculture and Rural Affairs and the Provincial Department of Natural Resources, The Provincial Department of Agriculture and Rural Affairs, together with the Provincial Department of Natural Resources, prepared the Technical Guidelines for New Cultivated Land and New Production Capacity of High Standard Farmland Projects in Shaanxi Province (Trial), and took the lead in carrying out pilot work in Guanzhong, Weibei and Northern Shaanxi. In order to promote the pilot results of new cultivated land and new production capacity in the construction of high standard farmland projects, the Provincial Department of Agriculture and Rural Affairs and the Provincial Department of Natural Resources prepared the Notice on the Overall Promotion of New Cultivated Land and New Production Capacity in the Construction of High standard Farmland, and comprehensively carried out the identification of the number of new cultivated land and new food production capacity in the construction of high standard farmland projects across the province. This paper mainly introduces the farmland quality grading assessment process of standard farmland construction projects.

## **2. Assessment principle**

### 2.1 Principle of compliance with laws and regulations

Strictly follow the basic ideas, technical routes, methods and steps of the "Regulations on Grading the Quality of Agricultural Land" (GB/T 28407-2012) and the "Work Manual for the Annual Update and Evaluation of Cultivated Land Quality in Shaanxi Province at the County Level" and other regulations and specifications, and carry out the assessment of the quality of cultivated land for high standard farmland construction.

## 2.2 Inheritance principle

Make full use of the existing cultivated land quality grading results, and the basic parameters, grading factor index system, grading standards, and grading factor weights used in the grading of high standard farmland construction cultivated land are consistent with the existing cultivated land quality grading results, so as to ensure the comparability of the results.

## 2.3 Comprehensive principle

The influence of light and temperature, climate, landform, soil, human activities and other factors on cultivated land quality shall be comprehensively considered.

## 2.4 Stability principle

Considering the characteristics of the new cultivated land in the high standard farmland project, the quality of cultivated land in the high standard farmland project area shall be assessed according to the long-term cultivated land conditions with relatively stable fertility, so as to ensure the scientific, current and comparable results.

# **3. Evaluation technical route and method**

## 3.1 Assessment route

The technical route of this assessment mainly focuses on the objectives and tasks of farmland quality grading of high standard farmland projects. According to the Grading Procedures for Agricultural Land Quality and the Technical Guidelines for Work on New Cultivated Land and New Production Capacity of High Standard Farmland Projects in Shaanxi Province (for Trial Implementation), the land plots that are cultivated land in the 2018 land use change survey and 2020 land change survey results in the project area are taken as the assessment units, Carry out the farmland classification assessment of high standard farmland projects. Analyze the basic situation of the project area, find the index area of grading factors in Jintai District, as well as the standard farming system and designated crops, and determine the light temperature (climate) potential productivity index, maximum yield, yield ratio coefficient, maximum "yield cost" index, grading factors and their weights, and the scoring rule table of "designated crops grading factors natural quality score"; According to the collected project design report, completion data and other basic data, combined with the field survey, calculate the natural quality score, land use coefficient and economic coefficient of the cultivated land in the project area, calculate the natural index, utilization index and economic index, and divide the natural index, utilization index and economic index in the province; The index conversion coefficient of Shaanxi Province is adopted to determine the national natural index, utilization index and economic index, and to divide the national natural index, national utilization index and national economy; The area weighted average method is adopted to calculate the

national average utilization of cultivated land in the project area; Check and verify the results of cultivated land classification assessment in the project area, finally determine the results of cultivated land classification of the project, prepare the report of cultivated land classification assessment of high standard farmland projects, establish the database of cultivated land classification assessment, and compile the distribution map of cultivated land classification.

### 3.2 Evaluation method

According to the Grading Regulations for Agricultural Land Quality and the Technical Guidelines for New Cultivated Land and New Production Capacity of High standard Farmland Projects in Shaanxi Province (Trial), based on the updated assessment results of cultivated land quality in Jintai District in 2018, and in combination with the project implementation plan, design drawings, completion acceptance and other relevant data, comparative analysis of changes in plot factors caused by engineering measures is conducted, To determine the basic parameters, evaluation factor index values, factor grading standards and corresponding weights required for the evaluation of the quality of cultivated land for high standard farmland construction, and use the "factor method" to evaluate the quality of cultivated land in the high standard farmland project area.

The so-called "factor method" refers to determining the classification of agricultural land based on its own natural factors, land productivity level and management factors through the calculation of relevant parameters of each grading unit. The relevant data involved in the "factor method" grading, such as soil, terrain, cultivated land yield, production cost, etc., are easy to obtain, the calculation program is simple, and the method is easy to master. It is a commonly used method in agricultural land grading.

## 4. Working procedures

### 4.1 Data collection

Relevant data such as land improvement and annual updating of cultivated land quality shall be collected when evaluating cultivated land quality of land improvement projects.

### 4.2 Determination of evaluation unit

Based on the current land use map and as built map of the land improvement project area, if the cultivated land in the project area is relatively concentrated and contiguous, the land type is consistent, the current status difference is small, and the ownership location is consistent, the project area will be used as the evaluation unit for evaluation; For projects with large differences in cultivated land conditions or scattered cultivated land in the project area, each cultivated land spot reflected on the as built survey map can be used as the evaluation unit, and the selected evaluation unit boundary shall not span the land use coefficient equivalent area or the land economic coefficient

equivalent area.

#### 4.3 Determination of index parameters

Find the indicator area, grading factors, weight, designated crops and their grading factor scoring standard table of the county (city, district) where the land improvement project is located according to the Regulations or the Manual.

#### 4.4 Field investigation

In combination with the project planning and design, as built drawings, self inspection reports and other data, field survey was conducted for each land improvement project evaluation unit. The survey contents include: scope of the project, surface soil texture, thickness of cultivated layer, soil profile configuration, field road conditions, field size, irrigation and drainage facilities, ecological environment, etc.

#### 4.5 Grade calculation

According to the field survey results and the existing results, the factor attributes of the assessment unit in the project area are obtained respectively, and then converted into the assessment factor score through the farmland quality grading factor scoring standard table, and the assessment unit grade and the average farmland quality grade in the project area are calculated respectively.

### **5. Result verification**

Self check whether the calculation process and results of cultivated land quality and other indicators in the project area are correct, and whether the classification results and area statistics are correct. Compare the calculation results with the adjacent plots of the same land type, and check whether the evaluation factor attribute values are correct and exist.

### **6. Preparation of achievements**

Form the Report on Gradation Assessment of Cultivated Land Quality of Land Renovation Projects and the Result Table of Gradation Assessment of Cultivated Land Quality of Land Renovation Projects, and establish a 1:10000 cultivated land quality grading database in the project area. The assessment results are as follows: (a) Written achievements: cultivated land quality grade assessment report of land improvement project; (b) Data table results: the result table of cultivated land quality grading evaluation of land improvement projects and the information table of cultivated land quality grading evaluation unit of land improvement projects; (3) Map results: average grade map of cultivated land quality of land improvement projects, and grade map of cultivated land quality of land improvement projects; (4) Database results: cultivated land quality classification database of land improvement project.

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