

Measurement method and influencing factors of the field ridge coefficient

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Abstract

This paper briefly introduced the concept, measurement method, influence factors and the influence of slope on the field ridge coefficient.

Keywords

Ridge coefficient, sampling points, influence factor.

1. Introduction

National land survey, as an important national condition and national strength survey, aims to find out the national land use situation comprehensively, master the real land basic data, and implement information and network management to the survey results. Arable land is the most basic agricultural production resources and one of the most important basic data in the national land survey. Accurately grasp the cultivated land quantity, distribution, basic farmland survey of the situation, the basic farmland above, registered in the Shanghai, catalogue, implement the strictest arable land protection system is the fundamental premise, is to monitor, evaluation of cultivated land and basic farmland protection target completion, guarantee an important part of the national grain production capacity.

In field investigation, ridges and ridges with width greater than or equal to 2m in the north and 1m in the south are collectively referred to as Tiankan [1]. Tiankan width refers to the bottom width of Tiankan, namely, the width of Tian Kan area. Fields less than the above width shall be regarded as part of the cultivated land. Cropland coefficient refers to the ratio between cropland cropland area and cropland cropland pattern area. Cropland cropland pattern area refers to the cropland area after deducting other lines and other areas that should be deducted. Organization of the Text

2. Measurement method of field and slope coefficient

2.1. Measurement Method

(1) Measurement on large scale drawings. Within the range of selected sample points, the width and length of the field canes are measured one by one, and then the area values of all the field canes are calculated, and then the total area of the selected sample points is measured on the drawing. The percentage of the ratio between the two is the field canes coefficient.

(2) Measurement on aerial film. The digital orthophoto (DOM) is measured directly by using the full digital photogrammetry system after preprocessing, editing, correcting and embedding. Firstly, select sample points on aerial film, open the image map in digital mapping module to enlarge to a certain multiple, measure the total area of sample points and the area of each field ridge within the range, and then get the field ridge coefficient.

(3) Analytical calculation. The total station closed wire is arranged in the sample point range, or GPS RTK is used to measure the inflection point coordinates of the sample point range. Then the total area of the sample point is calculated according to the vertex coordinates of the polygon. The area of all the fields within the sample point is calculated one by one, and the ratio of the two is the field coefficient.

Finally, the average value of each point was taken as the deduction coefficient of this type of farmland.

2.2. Selection principles of sample points and sample areas

Sample points refer to typical cultivated land map spots selected in different landform types and different ground slope grades for the purpose of measuring field slope coefficient [2]. Generally can be selected on the spot, can also be selected indoors. In the field selection process, due to the wide field area and the limited field of vision, it is very difficult to select sites in the field. Therefore, pre-selection sites can be carried out according to the collected data to avoid "blindness" in the field process, so as to greatly improve work efficiency.

In the selection process of sample area where sample points are located, the following principles should be observed [3].

(1) The sample area must be reasonably distributed in space and evenly distributed in the provincial administrative region.

(2) The sample area must reflect the distribution characteristics of cultivated land in the province, the characteristics of crop planting and the level of cultivation, and have typicality.

(3) The sample area must cover all provincial slope levels.

(4) The sample area must be able to represent the economy, all kinds of cultivated land and cultural characteristics of the whole province.

(5) The sample area must cover the main types of geomorphology, soil and other factors in the province.

(6) The sample area should be able to make full use of the existing DRG, DOM, DEM and other data, so as to adopt more advanced survey methods and improve the quality of survey results and work efficiency.

3. Factors affecting Tiankan coefficient

There are many factors affecting the field and slope coefficient, mainly including climate and precipitation, parent rock and soil, cultivation level, topography and landform [4].

3.1. Climate and precipitation

Climate and precipitation affect the quality and yield of crops, affect the level of cultivation, and thus affect the tendency of the variation of the field slope coefficient.

3.2. Parent rock and soil

A wide variety of sedimentary rock, volcanic rock and metamorphic rock in the process of long-term geologic development, become the parent rock of the development of soil on the hill slope, exposed rocks on the surface of the earth because of weathering denudation and development become the weathering crust and low-lying areas in the basin, river valley, as the sediment accumulation of material, formed in these areas, rivers, plains, terrace, etc., The surface material

has been transformed into various types of soil by biological processes, and different soil parent materials have different effects on the field and slope coefficient. Generally speaking, the parent rock contains more quartz particles. The soil permeability is good, but the viscosity is poor, so the field coefficient is large, and vice versa is small.

3.3. Cultivation level

Because of the different geographical location and the imbalanced economic development, the level of farming is also obviously different. The influence of tillage level on farmland coefficient is not the same. The regions with more developed economy and high level of agricultural intensive and institutionalized production have relatively larger patches of land class map and smaller tian-kan coefficient, and vice versa.

3.4. Topography and geomorphology

Landform and geomorphology have a great influence on the Tiankan coefficient. Generally speaking, the Tiankan coefficient is small in basins and valleys, while the Tiankan coefficient is large in hills and mountains.

4. The relationship between slope and slope coefficient

Slope is a measure of the steepness of the cultivated land. The steep and slow slope not only directly restricts the degree of soil and water loss, but also affects the difficulty of agricultural mechanization and farmland infrastructure construction. It is generally believed that the cultivated land on gentle slope less than 3° has no erosion harm and little influence on mechanized operation. If the slope is greater than or equal to 3° , all the influences will increase accordingly. Therefore, the slope has a great influence on the utilization status of cultivated land. Generally, because of the large scale of farmland cultivation, the rural roads and ditches are more regular, and the farmland is smaller in plain area, the farmland coefficient of gully road and ditch is smaller than that of mountain area.

At present, it is mainly through sampling measurement and statistical analysis of sloping farmland in terraced fields with different slopes to get Tian Kan coefficient and Tian Kan area change law, and then regression analysis of the obtained Tian Kan coefficient and its slope value, so as to get the equation relationship between slope and Tian kan coefficient. According to a large number of existing measurement data, the relationship between slope and slope coefficient can be summarized as follows:

- (1) The greater the ground slope is, the greater the land slope coefficient is, and the relationship between them is significantly positive.
- (2) The correlation between soil slope coefficient and ground slope is significant, and the regression relationship between soil slope coefficient and ground slope is better than that of comprehensive soil slope coefficient; However, the relationship between the stone slope coefficient and the ground slope is not significant, indicating that the soil has the ability to cover the stone, which makes the correlation between the comprehensive field slope coefficient and the ground slope reach a significant level. There is a certain difference between the soil and the stone field, the former coefficient is large, the latter coefficient is small, that is, the soil field is wide, the stone field is narrow, which is consistent with reality.
- (3) In addition to being closely related to the slope and texture of the land, the field slope coefficient is also closely related to the size of the field slope. In the case of the same ground slope, the field slope and the field slope coefficient have a very significant negative correlation, the larger the field slope, the smaller the field slope coefficient.
- (4) When the slope of the ground is flat or slight, the error of Tiankan coefficient is large.

5. Conclusion

Although the calculation of Tiankan coefficient is only a small part of the national land survey, it directly affects the cultivated land area, and cultivated land is an important content of ensuring national food security, safeguarding farmers' rights and interests, coordinating urban and rural development, and building a harmonious society, which is the top priority of the second national land survey. Visible Tiankan coefficient of the importance of measurement.

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