

Confirm high standard basic farmland area: a case study in Huaihua city

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Abstract. Accelerate the construction of a high standard of basic farmland is the primary task of the implementation of the National Land remediation planning, delineation of the high standard of construction of basic farmland in key areas is an important content of the high standard of construction of basic farmland. According to the delineation of high standards in the key areas of the construction of basic farmland contiguous focus on the infrastructure, people in local government, actively cooperate with the principles and the actual situation of Huaihua City, the use of multi-factor comprehensive evaluation method, select the new arable land potential, infrastructure conditions, soil quality, hydrological conditions, incline level, focus on contiguous rows and people ranking disposable financial resources, the seven pairs of high standards of construction of basic farmland in key areas delineated factors have a greater impact as the evaluation index, the use of AHP to determine the index weights. Huaihua City counties (cities, districts) evaluation to quantify and to finalize a comprehensive evaluation score and score high five counties (cities) is classified as a high standard of construction of basic farmland in key areas Huaihua City, and by means of GIS implementation of the high standard of construction of basic farmland in key areas on the map to determine its spatial distribution.

Introduction

Cultivated land resource is very precious, but being susceptible to damage, as an agricultural country, China's development cannot leave the cultivated land, cultivated land occupies the important position in China, is an important guarantee of people's life, but because of various reasons, the quality and quantity of cultivated land in constant decline and reduce. Pressing against China's arable land use situation this situation, *The National Land Renovation Plan (2011-2015)*, put forward the construction of high standard basic farmland.

High standard basic farmland must first confirm the construction of high standard farmland area, this is the first step in the construction of high standard farming takada, also is the core content of construction of high standard basic farmland. Based on agricultural land grading results, analysis of the construction of high standard basic farmland potential, USES the multi-factor comprehensive evaluation method, set up a perfect evaluation index system, combining with using the method of the combination of qualitative and quantitative methods, high standard basic farmland construction, Huaihua city, determine the layout of the key areas. Through the screening process evaluation index system of high standard basic farmland looks remarkably, ensure the good quality, in the later period strictly protect arable land quality has far-reaching significance, and can achieve high standard basic farmland conversion from quantity management to quality management.

Although the home on the policy emphasizes the high standards for the construction of basic farmland, but there is currently no unified specification of high standard basic farmland construction standard. Such as Li Geng(2006), starting from the connotation and characteristics of basic farmland, build the delimit the evaluation index system of basic farmland ^[1], Xiang-bin kong and others (2008) on the basis of agricultural land use, etc. Don't work, combined with using cluster analysis and

geographic information system and means for the protection of basic farmland demarcated and study [2]. Related research and the definition of the characteristics of the fringe area of basic farmland function and delimit method research, the use of GIS technology in the county land use planning revision work defined fields of basic farmland, based on basic farmland demarcated agricultural land consolidation planning, etc. [3-4]. Domestic scholars mainly made a research of basic farmland demarcated method, however, there is little literature is the study of how to delimit the construction of high standard basic farmland area.

Geographical position

Huaihua city is located in the west of Hunan province, mountain peaks overlapping, complex terrain, show more word pattern. In southeastern south ridges constitute a barrier of nanling, successful circular entrenched xuefeng mountain, from west to the northeast of wuling mountains in northwest. 70.62% were mountain, covers an area of 1946479.00 hm², and hills, downland and plains, area of 492822.00 hm², 112456.00 hm² and 117417.00 hm², respectively, 17.88%, 4.08% and 4.26% of the total land area, basin area at least, only 16262.00 hm², accounts for only 0.59%.

Methodology

Analytic Hierarchy Process(AHP). The method is to decompose the elements related to into goals, rules, plans and so on level. Based on this to construct judgment matrix, calculate a level to other level a related index weight after normalization processing [5].

High standard basic farmland demarcated evaluation model.

1) According to high standards of key areas defined on the basis of basic farmland construction, and combining the Huaihua city mountain area than the big, wide distribution of farmland, incomplete infrastructure, the actual situation of the uneven distribution of water resources, this article selects the new cultivated land potential, infrastructure conditions, soil quality, hydrology conditions, grade level, concentrated degree, and per capita disposable financial resources as a key area of high standard basic farmland construction evaluation index.

2) Various counties (city, area) comprehensive evaluation score is equal to the added cultivated land potential score multiplied by the weight multiplied by the weight and infrastructure conditions and soil quality score multiplied by the weight and hydrological conditions score multiplied by the weight and grade level multiplied by the weight plus concentrated degree score multiplied by the weight and the per capita disposable financial resources score multiplied by weight.

3) Using ArcGIS technology as key areas for the construction of high standard basic farmland by the space analysis, high standard basic farmland construction, to focus on regional distribution.

Data

This information includes: *the National Land Renovation Plan, High Standard Basic Farmland Construction Norms, Huaihua City Land Use Planning (2006-2020), Huaihua city land renovation plan*, various counties (city, area) of the farmland classification technical report, Huaihua city, as well as social and economic statistical data assembly. Huaihua city land utilization data and social economic data, various counties (city, area) the land survey data and achievements of farmland classification data. Including Huaihua city land utilization and land reclamation plan. Due to dispersion of the collected data is need to gather the data extraction need further. And access to the map data is MapGIS format, and the key areas of high standard basic farmland construction work for ArcGIS software platform, so the need for data format conversion, convert MapGIS format of the data to ArcGIS SHP format of the data.

Results

Result of AHP. Using special software Yaahp which is used to deal with analytic hierarchy (AHP), combined with judgment matrix, the related results are shown in table 1.

Table 1 The evaluation index weight table

Index	The new cultivated land potential	Infrastructure conditions	Soil quality	Hydrological conditions	Grade level	Concentrated degrees	Per capita disposable financial resources
weight	0.08	0.04	0.08	0.19	0.19	0.39	0.03

Huaihua city high standard basic farming takada construction key areas. According to the mentioned method in section 3, combined with high standard basic farmland demarcated evaluation model, it is concluded that shown in table 2:

Table 2 Various counties (city, area) comprehensive evaluation score

County	New cultivated land potential score	Score infrastructure conditions	Soil quality score	Hydrology score	Grade level score	Concentrated degree score	Per capita disposable financial score	Comprehensive evaluation score
Hecheng District	80	100	60	60	100	73.85	95	77.25
Hongjiang city	80	80	90	60	80	93.63	95	82.76
Zhongfang county	80	100	80	80	80	82.67	65	81.39
Chenxi county	100	80	100	60	100	87.52	85	86.28
Mayang county	80	80	90	100	60	63.74	75	74.30
Yuanling county	60	60	70	100	80	89.00	65	83.65
Xupu county	80	100	100	80	100	96.85	70	92.47
Jingzhou county	80	100	90	80	60	78.47	85	77.35
Zhijiang county	60	80	60	80	60	42.02	65	57.73
Huitong county	100	60	70	80	40	46.86	100	60.07
Tongdao county	100	60	80	60	40	58.68	75	60.93
Xinhuang county	80	60	60	60	40	59.45	70	57.88
Hongjiang area	60	80	60	80	80	72.46	70	73.56

Combined with the actual situation of Huaihua city, and ultimately determine the comprehensive evaluation scores greater than 80 points, Huaihua city, county (city, area) for high standard basic farmland construction key areas. Filter the results for Xupu county, Chenxi county, Yuanling county, Hongjiang area, Zhongfang county. So defined the five counties (cities) the key area for the high standards of basic farming takada, Huaihua city construction.

Conclusions

In this paper, we diagnosed Confirm high standard basic farmland area in Huaihua based on the methodology presented in section 3 using ArcGIS. Main results are concluded below:

(1) The construction of evaluation index system combining with the principle of draw, and give full consideration to the study the characteristic of natural conditions and land use area, so as to improve the scientific of the evaluation results. Based on the principle of the key areas of high standard basic farmland construction, and considering the uneven distribution of water resources, serious pollution, Huaihua city, mountain area is in the majority of cases, the final selection of new coefficient

of cultivated land, infrastructure conditions, soil quality, hydrology conditions, grade level, concentrated and per capita disposable financial resources as evaluation indexes.

(2) Determined by a weighted sum comprehensive evaluation score of each county (city, area), through comprehensive evaluation score higher in merit of county (city, area) in the key area for the high standard basic farmland construction, high standard basic farmland construction of Huaihua city is divided into Xupu county, Chenxi county, Yuanling county, Hongjiang area, Zhongfang county areas.

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