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Consolidation potential analysis of coal village based on the background of city construction land Increase and rural residential land Decrease——Take a coal mine in Huainan city as a case

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Abstract. The supply of construction land index is difficult in coal villages migration, especially the construction land index in urban and rural, lacking of construction land index becomes the bottleneck of village migration. In order to ruduce the pressure of the contradiction between supply and demand of land used for construction purposes. This paper combines with the actual situation of coal villages, taking Huainan as an example, starting from the connotation and significance of the policy of linking the increase in land used for urban construction with the decrease in land used for rural construction, based on the analysis of the current situation of the city construction land use, making predictions on the potentiality of village land readjustment in coal mining areas, the potentiality of the rural residential areas hook readjustment and the potentiality of linking the increase in land used for urban construction with the decrease in land used for rural construction, the results show that the overall hook potentiality is larger.

Connotation and significance

The connotation of Increase and decrease hook. The so-called the Increase and decrease hook of urban and rural construction land is linking the increase in land used for urban construction with the decrease in land used for rural construction, according to the general land use planning, and requirements of the land saving and intensive use, adopting scientific engineering technology, some rural construction land plots will be proposed for cultivated land after reclamation and some will be used for the urban construction blocks composed a new and old project, cultivated land doesn't reduce, quality does not reduce, finally make the project realize the total amount of construction land without increasing, through constructing the new block and tearing down the old block and land reclamation, the urban and rural land layout more reasonable[1.2].

Existing problems of village residential points in coal mining areas.villages' scattered distribution, taking up a large area, the low efficiency of land use. Villages' distribution is scattered in Huainan coal mining areas, their scales are small, it is hard to improve rural infrastructure level, affact villagers living conditions' improve, limit the new rural construction and process of urban[3].

Village residential points are influenced largely by mining collapse. Huainan is a city of ample mineral resources, due to a large number of mining coal resources, lead to ground subsidence and environmental pollution. By the end of 2006, coal mining subsidence area took up about 3.8% of the total area of land in Huainan. Almost 30000 residential points are influenced by mining collapse, influenced the local village construction and villagers' production and living seriously, produced a large number of abandoned villages[4].

The significance of implementation of the increase and decrease hook for villages in coal mining areas. The implementation of the increase and decrease hook, helps the acceleration of rural urbanization, the process of modernization. On the one hand, through the consolidation of rural construction land, will effectively promote" Industrial projects focus to development zone, farmers reside to towns and central villages, basic farmland focus to reserve areas "[5]; on the other hand, the new cultivated land area, making equivalent replacement to constructed towns, expanding space for urban construction development[6].

Residential areas land use and consolidation in Huainan coal mining areas

Due to a large number of mining coal resources, lead to ground subsidence and environmental pollution[7]. By the end of 2010, coal mining subsidence area reached 17000 hm^2, took up 6.7% of the total land in Huainan, 311000 residents were influenced by subsidence area, account for 13% of the city's population. Subsidence is at a speed about 1500 hm^2 every year in Huainan, affected the local people's production and life seriously, And left a lot of waste villages.

Residents land use scale situation in Huainan coal mining areas

According to <<Land reclamation and utilization of special planning of coal mining subsidence villages in Huainan>> (2011), per capita land condition of villages in coal mining areas by the end of 2011 is shown in the list table. We can see that each area county per capita coal village settlement land area is higher than those of the country in <<The standards of towns' planning>> (GB50188293), as is shown in table 1.

Table1 Per capita land condition of villages in Huainan coal mining areas by the end of 2011

Administrative region	village settlement area in coal mining areas（hm^2）	Population	Per capita land (m^2)
Fengtai County	298.79	20487	145.84
Panji District	362.36	24736	146.5
Xiejiaji District	167.93	8862	189.49

Consolidation potentiality formula of villages in coal mining areas

Make use of urban and rural construction land increase or decrease hook is one of the important works in the guess and estimating of the potentiality of village land readjustment in coal mining areas, from the perspective of village settlement area land constitutes, consolidation potentiality is mainly :a. Surpass the national standard of rural homestead; b. Coal mining damaged villages; c. A large number of idle block in the damaged villages in coal mining areas; d. The villages no one lives or few people lives in coal mining areas[8].

According to the rural residential area per capita construction land index and the present situation of the agricultural population in<< The standards of towns' planning >>, The paper uses the method of per capita land standard prediction to measure the potentiality of village land readjustment, the results can reflect the size of the whole city's potentiality of village land readjustment theoretically[9]. The method of per capita land standard prediction, the calculation is shown:

$$\Delta S=S_{now}—Bt\times Qt \quad (1)$$

In the formula:

ΔS——The potentiality of village land readjustment(hm^2);

S_{now}——Village settlement area in coal mining areas(hm^2);

Bt——Planning per capita land standard(m^2);

Qt——Planning target village population size.

Coal villages consolidation potential analysis in Huainan

The current average population density of urban land use in Anhui is 12467 people/km^2. That is to say that the per capita area is 80.2m^2,compared with the national per capita urban construction land of 130m^2, the population density is too large and the land is tight. Therefore, we can see that the potential space of increase and decrease linked in urban and rural construction land is very large. According to land use status, the land demand of socio-economic development as well as the principle of land saving and intensive use, coal village lands for settlements in the status quo are more than 80 m^2. Calculated in accordance with the standard of 80m^2, the coal villages of rural residential land reclamation potential in 2011 is 396.4hm^2.

According to the coal mining plan and coal village settlements to arrange, the consolidation potential at the end of the period is shown in table 2.

Table2 Coal village removal population and the residential area（2011-2015）

Time	The area of coal village（hm^2）	The population of coal village
2011	829.08	54085
2012	527.36	29230
2013	399.03	34329
2014	384.46	40494
2015	302.21	34569
Total	2442.86	192707

According to《The standards of towns' planning》, in the implementation of strict farmland protection, on the basis of strictly controlling the total scale of construction land, we should insist on saving and intensive use of land and per capita fixed targets. Combined with the actual situation of the city, using high, medium and low 3 sets of programs predicts the 2011-2015 coal village land use scale. Then the area during the period of consolidation potential can be derived through using the status quo area minus the forecast area[10]. Finally, to calculate the arithmetic mean value (one-third of the sum of high, medium and low 3 sets of programs reclamation potential) can get 2011-2015 years of the rural residential land reclamation potential, which is 420.77 hm^2, and it is shown as table 3.

Table3 Rural residential land consolidation potential in 2011-2015

Program	Per capita land (m^2)	2011—2015		
		Coal village population(10^4people)	Planning coal village settlements' area（hm^2）	Residential settlements reclamation potential（hm^2）
High	110	19.2707	2119.77	323.09
Medium	105	19.2707	2023.42	419.44
Low	100	19.2707	1927.07	519.79

The increase and decrease linked to consolidation potential of coal village settlements

According to the actual situation of the coal village settlements land, Huainan is located in the high phreatic surface. Due to the impact of coal mining in part of the surface, so part of the village subsidence of land can generally be reclaimed (non-dynamic reclamation) for a certain percentage

of arable land and other agricultural land[11]. According to the actual situation of the coal village settlements land, village settlements consolidation status quo, socio-economic development as well as strictly maintaining the dynamic equilibrium of the total arable land by the government. Through estimating, the added farmland coefficient of the coal village settlements is 66%. Therefore, in accordance with the high, medium, low three sets of programs, the target year's settlements finishing for arable potential in 2015 are 213.24hm^2, 276.83hm^2, 343.06hm^2. However, the area is not the rural settlements areas hook finishing supply potential, because planning target years has an indicator of rural residential land consolidation for the cultivated land. After deducting the indicator, we can see rural residents hook finishing supply potential.

According to the content of 《Special Plan (2011-2015) of Coal Mining Subsidence village land reclamation and utilization in Huainan》, the target of coal village residential land consolidation to increase the arable land (standard arable land) is 139.35hm^2 in 2015. According to the above analysis, it can be concluded that:

$$P=S\times M-N \quad (2)$$

Among them:

P——the rural residential hook consolidation potential(hm^2);

S——rural residential land consolidation potential(hm^2);

M——the added cultivated coefficient of rural residential land reclamation potential;

N——the added arable indicator of planning coal villages residential land consolidation (hm^2).

According to the programs of high, medium and low, the city's rural residential hook consolidation potential can be worked out, namely: 73.74hm^2, 137.04hm^2, 203.56hm^2, they are shown in Table 4. In the implementation process of the coal village's the increase and decrease linked, hook potential measurement is the basis of the land layout planning, therefore we need to choose a more reasonable way to embody this indicator. Now, using a hook potential coefficient embodies the size of the hook potential. The hook potential coefficient is linked to the ratio of the rural residential areas hook supply capacity and urban construction land demand hook area, and the greater the ratio, the greater the hook potential. Therefore taking the same high, medium and low three sets of programs, we can predict fully forecast the potential quantity and the level of satisfaction. As we can see from Table 4, in the planning target year, the city's hook potential is very large. It also shows that the degree of the coal village settlements' intensive and saving use land is rather poor.

Table 4 The increase and decrease linked of the urban and rural construction land of the city's coal village

Per capita land(m^2)	2015		
	hook supply potential(hm^2)	hook demand(hm^2)	hook potential coefficient
110	73.74	95.08	0.77
105	137.04	95.08	1.44
100	203.56	95.08	2.14

Conclusion

Based on Huainan City as an example, from the meaning and significance of the increase and decrease linked of the coal villages and the urban and rural areas, focusing on the city's coal village residential land status, the rural residential land reclamation potential, the rural residential areas hook finishing potential as well as the potential of the increase and decrease linked of urban and rural construction land are predicted. The result shows that the overall hook potential of the city's coal village is quite large. The results of the analysis, can provide useful decision-making reference for Huainan city’s coal village residential area consolidation and relocation. At the same time, the approach adopted in this paper can be generalized to other coal village areas, to improve the scientific forecast of land consolidation potential. However, the process of the theoretical potential into actual potential also need to go through a correction of the natural, social as well as economic conditions, such as a series of factors. Ultimately we can draw more realistic calculation results.

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