

Research on Intensive Utilization of Land Resources in Hebei Province

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ABSTRACT: In order to ease the contradiction between the development of industrial structure and the supply of land resources, people must explore the relationship between the adjustment of industrial structure and the intensive utilization of land resources, realize the organic combination of two sides, and realize the intensive utilization of land resources within all industries. This paper analyzed the interactive relationship between the industrial structure adjustment and regional land resources utilization, introduced the present situation of the land use and development of industrial structure in Hebei province, and put forward concrete Suggestions to realize intensive utilization of land and adjustment of industrial structure.

KEYWORDS: Industrial structure; Land resources; Grey correlation analysis

1 INTRODUCTION

There is a close relationship between adjustment and optimization of industrial structure and the intensive utilization of land resources[1]. The development scale and development focus in industrial structure determines the scale and priorities in land resource use[2]. Spatial layout in land resources changes with the adjustment of industrial structure. Therefore, the adjustment of industrial structure is outstanding performance for the adjustment of land use structure [3]. We should give full consideration to the relevance between them when we are adjusting and optimizing industrial structure.

Land resources use interacts and restricts industrial structure adjustment, land resource utilization is based on the optimization of industrial structure and changes with the industrial structure[4]. Optimal allocation of land creates a broader space and the driving force for the industrial structure optimization.

Land resources is the basic carrier to support regional economy. Industrial structure adjustment is an important way to achieve economic growth[5]. Upgrading of industry and development in the specific space must be based on land. So reasonable configuration of land resources in various industries is important to improve the efficiency of land use and optimize the industrial structure[6]. We must adjust the industrial structure to realize the intensive utilization of land resources. because the development level of regional industrial structure

has a profound impact to regional land resources structure[7].

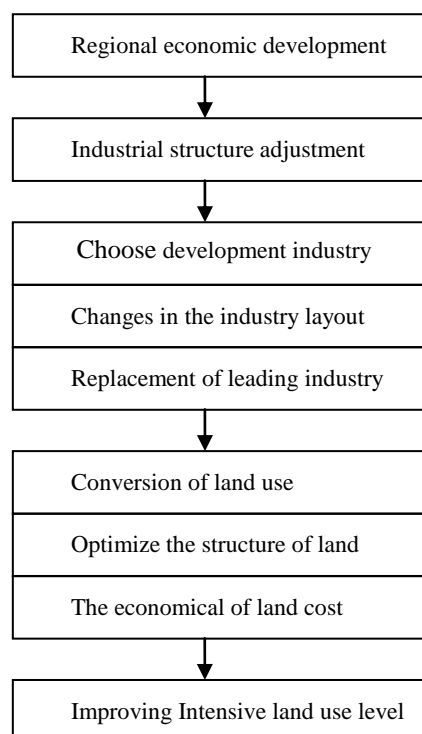


Figure 1. Regional industrial structure adjustment and intensive utilization of land

Figure 1 shows that the adjustment and optimization of industrial structure is reflected by the change of land use. Adjusting the industrial structure and enhancing the level of industrial development

changes the mode of space layout and efficiency in the use of land resources[8].Therefore, the adjustment and optimization of regional industrial structure is a driving force to promote the intensive utilization of land resources.

This article will introduce current situation in land use and development of industrial structure in Hebei province, verify the relations between them, and put forward the measures to optimize the distribution of land and adjust industrial structure.

2 PRESENT LAND USE IN HEBEI PROVINCE

Hebei province is located in the central and southern of north China, external to bohai sea. Tianjin and Beijing is in the inner ring. It is also in the centre of the bohai sea area. The geographical position is very important. Unique geographical advantage makes it have good external development environment.

There are bashang plateau, hills, plains, lakes, sea basin in hebei province. There are vast meadows in bashang plateau, mainly cultivated land and grassland, 9.7% of the total area of the province's land. It is the concentration area of grassland and important livestock production base. Hills are given priority to cultivated land, forest land and unused land. It is about 50.5% of the total area of the province's land. It is the forest concentrated distribution area and the important production base of agriculture, forestry, and minerals. Southeastern plain is mainly cultivated land and urban and rural construction land. It is about 39.8% of the total area of the province's land, it is the concentrated distribution area of town, and is also the important production base of food, cotton, and oil.

Land use is mainly given priority to farmland. Farmland is 69.34% of the total area of land. Construction land is only 9.19%. Land use is not sufficient. Unused area is large. The unused land area is 60.6788 million mu. Town land scale is very small. Urbanization rate is 45.5%, lower 4.5% than the national average rate. Urban construction land is only 18% of urban and rural construction land. Rural land use scale is very large with low level of intensive. Cultivated land is decreasing. Arable land in the province has been reduced from 103.46 million mu in 1996 to 98.43 million mu. The annual decrease is 387000 mu.

3 ANALYSIS ON INDUSTRIAL STRUCTURE

Hebei province makes full use of advantageous resources conditions. Industrial structure adjustment is constantly promoted. Remarkable of economic strength gets tremendous achievements. Gross domestic product increased from 89.641 billion yuan in 1990 to 2.42282 trillion yuan.

The evolution of industrial structure in the province is analyzed from 1988 to 2014. The proportion of first industry continues to decline. The proportion of secondary industry is rising. The third industry gets rapid development in 1985 ~ 1992 and more than the first industry in 1988. Hebei province has realized from the traditional agriculture industrial structure led by the "two, one, three" type to headed by industrial type "two, three, one" evolution. But after 1993 the third industry rises very slowly, in individual years or even fall.

We will selecte gross domestic product from 2008 to 2013 in hebei province and gave the grey correlation analysis on three industries . The analysis will reveal the correlation size between three industries and GDP, and the result will provide the basis for optimizing the industrial structure. Analysis methods and calculation steps are as follows:

Set GDP in hebei province as a reference sequence

$$X_0=\{X_0(k)|k=1, 2, \dots, n\} \quad (1)$$

Set output value of the three industries as a comparison sequence

$$X_i=\{X_i(k)|k=1, 2, \dots, n; i=1, 2, \dots, m\} \quad (2)$$

Gave dimensionless processing to the reference sequence $X_0(k)$ and comparison sequence $X_i(k)$. The dimensionless method is average algorithm:

$$Y_0=\{Y_0(k)|k=1, 2, \dots, n\} \quad (3)$$

$$Y_i=\{Y_i(k)|k=1, 2, \dots, n; i=1, 2, \dots, m\} \quad (4)$$

Where

$$Y_i(k) = \frac{X_i(k)}{\bar{X}_i}, k = 1, 2, \dots, n; i = 0, 1, 2, \dots, m \quad (5)$$

$$\bar{X}_i = \frac{1}{n} \sum_{k=1}^n X_i(k), k = 1, 2, \dots, n \quad (6)$$

Calculate the absolute value of the difference between $Y_0(k)$ and $Y_i(k)$, $\Delta_i(k) = |Y_0(k) - Y_i(k)|$, get the value of $\max_i \max_k \Delta_i(k)$ and $\min_i \min_k \Delta_i(k)$, and then the following formula is used to calculate correlation coefficient ($\rho = 0.5$)

$$\xi_i(k) = \frac{\min_i \min_k \Delta_i(k) + \rho \max_i \max_k \Delta_i(k)}{\Delta_i(k) + \rho \max_i \max_k \Delta_i(k)} \quad (7)$$

Calculate the average correlation coefficient r_i . It is the correlation between the comparative sequence $Y_i(k)$ and the reference sequence $Y_0(k)$. The formula to calculate correlation coefficient r_i is as follows:

$$r_i = \frac{1}{n} \sum_{k=1}^n \xi_i(k), k = 1, 2, \dots, n \quad (8)$$

Table 1 grey correlation analysis between GDP and three industries

Name	correlation coefficient r_i	order
First industry	0.610956	3
Second industry	0.894488	1
Third industry	0.888333	2

Table 1 shows three industrial correlation coefficient r_i to GDP from high to low order is Second industry, third industry, first industry. GDP is largely thanks to promote the second industry growth in the province. The rapid development of the second and third industry promotes the agricultural modernization, but occupied a large amount of cultivated land and farmland making the cultivated populations reduce rapidly.

The development of the second industry relies mainly on the high input in production factors and high consumption of energy resources in Hebei province. The extensive mode of economic development has increasingly prominent contradiction with the constraint of resources and environment. The development of the third industry lags behind. It has not yet been fully play the potential to promote the economic development and has become the main bottleneck of economic development in hebei province. With sustained and rapid growth of the economy, Hebei province should constantly increase the intensity of the development in the third industry.

First industry includes agriculture, forestry, animal husbandry, fishery and the related services. Agriculture is most important in the first industry. It is the first important pillar of first industry. Hebei province is the national important production base of grain, cotton, oil. Arable land in Hebei province is the main land use types. Advantaged climate and soil resources have laid a good foundation for agricultural development. Bashang plateau is one of the important forest regions in Hebei province. It provides meat, eggs and other animal products, animal husbandry has correlation with the first industry after agriculture. Fisheries development level is very low in Hebei province, far from making full use of the advantages of the resources around the bohai sea. Not only there is a big gap with other coastal provinces, but also lower than the national average. The related services are an attachment to the integrated farming industry. The related services in Hebei province is far from giving play to effectively simplify industrial chain cost. There is great potential for market development. Forestry is very important to the improvement of the ecological environment.

The second industry includes industrial and construction. The industrial status is outstanding in the economic development of the second industry in Hebei province. It has played a leading role to

promote the province economy. Mineral resources is rich in Hebei province. The industry has a long history. Mining economic is develope. It has main coking coal production in our country, and it is also one of the three major iron and steel raw material base. But in the internal industrial structure, steel, petrochemical, has big proportion in the traditional industry. Equipment manufacturing, energy and other modern high-tech industry has small proportion and slow development speed. The resource consumption and environmental pollution is serious. Resources development and utilization is low. So to realize the upgrading and optimization of industrial structure in Hebei province must develop the capital and technology intensive industries, and raise the intensive utilization ratio of resource.

The third industry includes social services, wholesale and retail trade, transportation, warehousing and postal service, real estate, finance, accommodation and catering industry. The development of the third industry in Hebei province mainly concentrated on traditional Business industry with the low land utilization and the lack of potential. Knowledge intensive emerging modern service industry has not good development in finance, insurance, information service and modern logistics.

4 CONCLUSIONS

Economic efficiency must be improved in the first industry with speeding up the development of regional characteristic agriculture, green agriculture and foreign exchange earning agricultural. Investment in science and technology must be increased in agriculture in order to develop characteristic agriculture. Pillar industry must be bigger and stronger with adjusting the industrial structure. Technological transformation efforts must be increased in steel, petrochemical, food, textile, building materials and other traditional pillar industries. Thus structural adjustment and industrial upgrading will be combined. Emerging industries should be foster powerfully with speeding up the development of information, biology, energy and other new and high technology industries. Industrial structure dependent on the resources will be changed by science and technology innovative industrial structural. The development of the third industry will be promoted by improving the overall level of service and speeding up the development of modern logistics, finance, insurance and other modern service industry. Port economy must be strengthened with the aid of coastal ports and industrial foundation. Productivity essential factor will be reasonable eastward orderly and efficiently. Thus the coastal Marine economy will be promoted.

Geomorphic type is complicated with the significant difference of land in Hebei province. This requires land in Hebei divided the different areas. Land use policies changes with different regions conditions. It will actively promote regional characteristic industry. According to present land use situation and carrying capacity of the resources and environment in every regional, the province can be divided into four major industrial areas including eastern Hebei, central Hebei, south Hebei and north Hebei. Land use direction will be determined in every regional. In north Hebei region, in order to protect the ecological environment, the ecological land should be greatly increased to develop the second and third pollution-free industry including tourism, characteristic agriculture, forestry, and animal husbandry. In central Hebei region, land demand should be given priority to the emerging industry supported by country including new energy, new technology, new material. In eastern Hebei region, the development of port and harbor industry should be focus. In south Hebei region, around urban agglomerations construction, national approval industries land should be safeguarded such as iron, steel, energy, equipment manufacturing. At the same time, modern agriculture, food and oil should be continued to develop.

At present, industrialization and urbanization is accelerated in Hebei province. The land demand is very big. Contradictions are increasingly prominent between the industrial spatial structure and land use structure. In order to solve this contradiction, the idle inefficient land should be revitalized. This is helpful to realize the optimization of land resources and the adjustment of industrial structure. Priority to meet the land needs for technical industry is necessary,

which is on behalf of the economic development direction. The labor intensive, high energy consumption, covering a large area, low output efficiency industrial land must be gradually reduced. Farmland must be strictly controlled. Increasing the intensity of cultivated land supplement and moderate development of reserve cultivated land resources are both necessary. Land ecological environment must be improved in order to build a comprehensive ecological security system and establish ecological barrier of the Beijing-Tianjin-Hebei region.

REFERENCES

- [1] Gillham O. 2002. *The limitless city: a primer on the urban sprawl debate*. Washington, DC: Island Press.
- [2] Steven A. Gabriel. & Jose A. Faria. & Glenn E. Moglen. 2006. A multiobjective optimization approach to smart growth in land development. *Socio-Economic Planning Sciences*, (40): 212 - 248.
- [3] Downs A. 2001. What does smart growth really mean? *Planning*, (4): 67.
- [4] J. K. Brueckner. 1980. A vintage model of urban growth. *Journal of Urban Economics*, (8): 389-402.
- [5] W. C. Wheaton. 1982. Urban spatial development with durable but replaceable capital. *Journal of Urban Economics*, (12): 53 - 67.
- [6] S. S. Rosenthal. & R. W. Helsley. 1994. Redevelopment and the urban land price gradient. *Journal of Urban Economics*, (35): 182 - 200.
- [7] H. J. Munneke. 1996. Redevelopment decisions for commercial and industrial properties. *Journal of Urban Economics*, (39): 229 - 253.
- [8] James E. & Mary Kay Falconer. 1991. *The Measurement of Infrastructure Capacity: Theory, Data Structure, and Analytics*. *Computers, Environment, and Urban Systems*, 14(4): 283 - 297.