Study on the Impact of New Urbanization on Land Intensive Use--A Case Study of Shaanxi Province

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Abstract. As a national strategic implementation, new urbanization will inevitably change the disorderly urbanization in the past. Therefore, the problem of land intensive use in the new urbanization process is inevitably the top priority. Therefore, this paper analyzes the impact of the new urbanization of Shaanxi Province on land intensive use. The study found that: economic urbanization can promote land use efficiency; population urbanization will promote land input intensity; spatial urbanization can promote land use intensity and land use efficiency.

1.Introduction

Despite the obvious improvement in China's economic income over the years, this unreasonable urban expansion and rising prices of various resources have led to many problems in the process of using land resources. Specifically, it can be summarized as the following types of problems: 1. A large number of rural people flooding into cities, increasing the difficulty of urban management, but also bringing many problems to be solved, such as traffic congestion, housing shortages, etc. 2. Rural empty nesting And the problem of left-behind children; 3. The massive migration of population in rural areas has led to the waste of rural educational resources, while the abandonment of large-area arable land has led to a serious waste of land resources. In addition, due to the impact of the financial crisis, the external demand market is weak, and the export system dominated by European and American countries faces a historic turning point. Therefore, China's development in the future will have to rely on domestic demand, and urbanization is both the greatest potential for domestic demand and an important basis for adjusting the economic structure.

2.Survey area overview

Shaanxi is located between 31° 42′ -39° 35′ north latitude and 105° 29′ -111° 15′ east longitude, in the west of the Yellow River and Shanxi, in the eastern part of Gansu and Ningxia, in the northern part of Sichuan and Chongqing. In the south of Inner Mongolia, the southeast is bordered by
Henan and Hubei. The main cities in the province are Xi’an, Tongchuan, Baoji, Xianyang, Weinan, Yan’an, Hanzhong, Yulin, Ankang, Shangluo[1]. Shaanxi Province is located in the center of China and is the intersection of the South and the North, the East and the West. Therefore, Shaanxi Province has an important traffic status. Shaanxi Province is the gateway to the northwest and has an extremely important strategic position.

3. Data Sources

2010 Shaanxi Statistical Yearbook; 2011 Shaanxi Statistical Yearbook; 2012 Shaanxi Statistical Yearbook; 2013 Shaanxi Statistical Yearbook; 2014 Shaanxi Statistical Yearbook.

4. Entropy Method

Entropy method, which is used to indicate the uniformity of an energy distribution in space[2]. Entropy is a physical concept of thermodynamics and a measure of system chaos (or disorder). It calculates the weight of the indicator by calculating the information entropy of the indicator and the influence of the relative change degree of the indicator on the system as a whole[3]. The relationship between information entropy and information utility value and index weight is inversely proportional. The larger the entropy value is, the less the amount of information is expressed. The smaller the utility value is, the smaller the weight is. On the contrary, if the entropy value is smaller, the more orderly the system is, the more information is conveyed, and the utility value is larger. The greater the weight of the

The main steps are as follows:

Step 1: Construction of the original indicator data matrix: It is assumed that the development status of a city in m years needs to be evaluated, and the evaluation index system includes n indicators[5]. This is a problem consisting of m samples, using n indicators for comprehensive evaluation, which can form the initial data matrix of the evaluation system: \( \mathbf{X} = \{X_{ij}\}_{m \times n}, \) \( 0 \leq i \leq m, 0 \leq j \leq n \), where \( X_{ij} \) represents the value of the jth item of the i-th sample, and n is the number of years of evaluation, m For the number of indicators.

Step 2: Data standardization processing: Since the dimensions and order of magnitude of each index are different, in order to eliminate the influence of different dimensions on the evaluation results, it is necessary to standardize the indicators[6].

A. Positive indicator: \( Y_{ij} = \frac{X_{ij} - X_{jmin}}{X_{jmax} - X_{jmin}} \) (1)

B. Negative indicator: \( -\frac{X_{jmax} - X_{ij}}{X_{jmax} - X_{jmin}} \) (2)

If the value of the indicator used is as large as possible, the forward indicator formula is used; if the value of the indicator used is as small as possible, the negative indicator formula is selected.

In the formula, \( X_{ij} \) represents the raw data of the jth indicator of the i-th year, \( X_{jmax} \) and \( X_{jmin} \) respectively represent the maximum and minimum values of the jth index between 1994 and 2013; \( Y'_{ij} \) is the value after standardization, but the calculation results exist. A value of 0, so in order to facilitate the calculation and the value is meaningful, the normalized value is added to the whole, that is, \( Y_{ij} = Y'_{ij} + 1 \).

Step 3: Calculate the proportion of the jth indicator in the i-th year:
\[ P_y = \frac{Y_y}{\sum_{i=1994}^{2013} Y_i} \]  

Step 4: Calculation of calculation index information entropy:
\[ E_y = -k \sum_{i=1994}^{2013} (P_{yi} \times \ln P_{yi}) \]

Where \( k=\ln(m) \), \( m \) is the number of indicators, and the formulas (6) and (7) are the same.

Step 5: Calculate information entropy redundancy:
\[ D_j = 1 - E_j \]  

Step 6: Calculate the weight of the indicator:  
\[ W_j = \frac{D_j}{\sum_{j=1}^{m} D_j} \]  

Step 7: Subsystem score for the \( i \)th year:  
\[ S_i = \sum_{j=1}^{m} W_j \times P_y \]

5. Correlation analysis

From Figure 1 we see that the correlation between non-agricultural population and fixed asset investment is strong. From the Pearson correlation analysis, there was a significant correlation at the 0.05 level (both sides). It can be accurately found from the Kendall correlation that the correlation is significant when the confidence (double test) is 0.01. In the bar chart of non-agricultural population and fixed asset investment, the closer the ratio of the two is to one, the higher the bar chart, the more significant the correlation coefficient. It can be concluded that the non-agricultural population plays a role in promoting fixed asset investment.

![Figure 1](image1)

![Figure 2](image2)

Figure 2 represents the correlation analysis between information entropy, information utility value and weight in the area of built-up area and real estate development investment in Shaanxi Province from 2010 to 2014. From the Pearson correlation analysis, it is clear that there is a significant correlation at the 0.05 level (both sides). Among them, 0.02 represents the correlation between the information effect value between the real estate development investment and the built-up area, 0.17 represents the correlation between information entropy, and 0.98 represents the weight between them. relationship. The correlation between real estate development investment and the built-up area before 0.17 is not particularly significant. The correlation between 0.17 and 0.98 has changed significantly, and the closer to the real estate investment and the built-up area The more relevant the correlation. It can be known that the increase in the area of Jiancheng District is conducive to the investment in real estate development investment.

From the broken line chart of Figure 3, the correlation between per capita industrial output value
and industrial output value is clearly reflected. The abscissa represents industrial output value, the ordinate represents per capita industrial output value, and the point near 0.02 on the abscissa represents per capita industrial output value. The correlation between the information utility values between industrial output values, the points near 0.12 indicate the weight correlation between the two, and the value near 0.98 represents the correlation between the two. From the Pearson correlation significance (both sides), there was a significant correlation at the 0.05 level (both sides). It can be concluded that the industrial output value and the per capita industrial output value are positively correlated, and the increase in per capita industrial output value is conducive to the increase of industrial output value.

This pie chart reflects the correlation between information entropy, information utility value and weight between the second and third output value and the tertiary industry added value. The blue area represents the correlation between the information effect values of the secondary and tertiary industries and the added value of the tertiary industry, and the green area represents the correlation between the weights. The maximum regional area reflects the information entropy of the two. The relationship between the two. This pie chart clearly reflects the correlation between the proportion of the output value of the second and third industries and the added value of the tertiary industry, and information entropy accounts for the largest proportion. When applied in a social system, information entropy is equivalent to thermodynamic entropy, and the meaning mainly refers to the measure of the degree of uncertainty of the system state. Information entropy is inversely proportional to information utility value and index weight. The larger the entropy value is, the less the amount of information is expressed. The smaller the utility value is, the smaller the weight is. On the contrary, if the entropy value is smaller, the more orderly the system is, the more information is conveyed, and the utility value is larger. The greater the weight. Therefore, the amount of information represented by this figure is small, and the information effect value and weight are also relatively small. It is concluded that the greater the proportion of the output value of the second and third countries, the more significant the added value of the tertiary industry.

The area chart in Figure 5 reflects the correlation between information entropy, information utility value and weight between the population density of the built-up area and the per capita road area. From 0.02 to 0.17 to 0.98, the correlation between information utility value, weight and information entropy between the population density of the built-up area and the per capita road area is reflected. The larger the information entropy, the more disordered the data. The larger the utility value, the larger the utility contribution value. The larger the weight, the greater the contribution to the indicator. On
the whole, this conclusion can be drawn: the denser the population density in the built-up area, the smaller the per capita road area.

The pie chart in Figure 6 represents the correlation between information coverage, information utility value and weight between the green coverage rate and the green coverage rate of the built-up area. The blue area represents the information utility between the green coverage rate and the green coverage rate of the built-up area. The relationship between values, the green area indicates the correlation between the green coverage rate and the green coverage rate of the built-up area, and the gray color represents the correlation between the green coverage rate and the information entropy between the green coverage rate of the built-up area. Among them, the correlation of information entropy is the largest, followed by the correlation of weights, and the smallest is the correlation of information utility values. It can be clearly seen that there is a strong correlation between the green coverage rate and the green coverage rate in the built-up area: the greater the green coverage rate in the built-up area, the corresponding increase in green coverage.

Figure 7 is a pie chart showing the correlation between the per capita public green area and the information entropy, information utility value and weight of per capita construction land. Nearly four-fifths of the area on the pie chart is used to indicate the correlation of information entropy between them, followed by the proportion of weights, and the smallest proportion is the information utility value. It can be known that the change in the per capita public green area can reflect the change in per capita construction land.

6. Conclusions

1. The proportion of the output value of the second and third, the per capita industrial output value represents the economic urbanization, the added value of the tertiary industry and the average industrial output value represent the land use benefit, indicating that economic urbanization has a positive effect on land use efficiency and is conducive to land intensive use.

2. Non-agricultural population, built-up area, built-up population density represents population urbanization, average urban fixed asset investment, and average real estate development investment represent land input intensity, indicating that population urbanization will promote land input intensity. Conducive to the intensive use of land.

3. The green coverage rate of the built-up area and the per capita public green area represent the urbanization of space. The green coverage rate of urban built-up areas represents the land use benefit, and the urban per capita construction land represents the land use intensity, indicating that spatial urbanization has land use intensity and land use efficiency. Promoting the role is conducive to the intensive use of land.
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