Research on new urbanization in Shaanxi Province under the Rural Revitalization Strategy: Take Hanzhong city as a case

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Abstract : The implementation of the rural revitalization strategy can not only talk about the rural areas, but also combine with the new urbanization to drive the transfer of rural population to cities and towns. Taking Hanzhong city as the research area, taking industrial prosperity and ecological livability as the core, and based on the assessment of Rural Development Problems, the paper makes clear the theoretical logic and key tasks of rural revitalization in Hanzhong city. On the basis of evaluating the index system of Agricultural Ecology and urbanization in Hanzhong city, this paper studies the degree of coupling coordinated development by using the coupled coordinated development degree model. It can be used for reference in the construction of new urbanization in other similar areas of Shaanxi Province.

1 Layout

The new type of urbanization, on the one hand, emphasizes the overall planning of urban and rural areas, industrial interaction and ecological livability, the integration of urban and rural areas, conservation and intensive and harmonious development; on the other hand, while attaching importance to the cooperation and progress of large, medium and small cities and new-type rural communities, promote mutual promotion and common progress. According to the development of our country, the new-type urbanization construction not only promotes the regional modernization, but also gathers the strength for the national development. In 2014, China adopted the National new-type Urbanization Plan (2014-2020) to explain the urbanization, in addition to the main objectives, but also clear development path and strategic tasks. In 2016, China adopted the "Fifteen" plan to further deepen the construction requirements of a new type of urbanization. People around the development of urbanization, and constantly draw closer to the level of urban and rural development, urban and rural integration goals. The construction of new-type urbanization is an important development strategy of our country. Its core is to meet the growing needs of the farmers for a better life, so that urban and rural residents share the fruits of economic and social development. China is a vast country, the rural development of natural conditions and resource endowment of obvious differences, rural revitalization must proceed from the actual development of all places, study and formulate a strategy for rural revitalization.

Hanzhong lies in the southwest of Shaanxi Province, bordering Ankang, Xi'an and Baoji in the East and North,

and Gansu and Sichuan provinces in the southwest (figure 1). Hanzhong has a total area of 2,724 km² and has 10 counties under management. In 2015, the resident population was 3,438,100,000, with a GDP of 106,483 million yuan, and the ratio of primary, secondary and tertiary industries was 48:117:101. Among them, agriculture and forestry are dominated by grain, vegetable, Chinese medicine, oil and tea crops, the industry is dominated by equipment manufacturing, non ferrous metallurgy, energy, chemical and food industries, while the tertiary sector of the economy industry is dominated by tourism. The Hanzhong municipal government has continued to promote the construction of a new type of urbanization, continue to promote the citizenization of the agricultural transfer population, adhere to the concept of ecological civilization, and actively explore a green, intelligent new road to urbanization. We will diversify and operate on an appropriate scale, cultivate and develop new types of agricultural operators, constantly push forward the construction of modern agricultural parks, strive for more than 10 provincial-level agricultural parks, actively expand agricultural functions and vigorously promote the upgrading of agricultural industries.

With the continuous development of new-type agricultural subject and new-type urbanization, China's agriculture has entered a transitional period. The research on Agricultural Ecology and new-type urbanization includes the research on industrialization, mechanism, path, etc., it has laid a foundation for the sustainable development of agriculture and the smooth development of Xincheng, Tianjin, but there are few studies on the coordinated development of agricultural and new urbanization. According to the guiding ideology of ecological civilization construction, Chen(2019) puts

forward the countermeasures and suggestions for the construction of agricultural ecological civilization in the process of urbanization^[1]. Hassan(2019)&Wu(2019) points out that the transition from rural areas to urbanization has caused a certain degree of damage to the agricultural ecological environment, and through agricultural ecological compensation, farmers are given certain compensation while taking into account the economic benefits and value of agriculture, in order to accelerate the development of urbanization^[2-3]. At the same time, Ye(2017)&Farahani(2018) also points out that the development of urbanization and high-yield agriculture requires more and more ecological agriculture. At present, it is necessary to carry out ecological transformation of agriculture and develop ecological agriculture and circular agriculture. Therefore, it is particularly important to explore the coordinated development of agricultural ecology and urbanization^[4-5]. Based on this, this paper takes Hanzhong as an example, by constructing the evaluation system of coordinated development of agricultural ecology and urbanization, it Quantitative analysis the level of coordinated development of agricultural ecology and urbanization in Hanzhong, to contribute to the sustainable development of agriculture, economy and society in Hanzhong.

Fig.1 Location of Hanzhong City

2 Materials and Methods

The coupling coordination of Agricultural Ecology and new urbanization in Hanzhong is based on the knowledge of Agricultural Ecology and new urbanization in Hanzhong by consulting a lot of literature and materials^[6-7], by constructing the index system of agricultural ecology and new urbanization in Hanzhong, the coupled coordination degree model is used for quantitative analysis, including the following steps.

2.1 data standardization

In order to reduce the influence of the difference between the index dimension and the index, the range standardization method is used to standardize and normalize the selected data:

$$X'_{ij} = \frac{X_{ij} - X_{\min}}{X_{\max} - X_{\min}} \quad (1)$$

$$X'_{ij} = \frac{X_{\max} - X_{ij}}{X_{\max} - X_{\min}} \quad (2)$$

Formula (1)(2) , X_{ij} 、 X'_{ij} respectively for the original index value, standardized index value; $X_{\max}$ 、 $X_{\min}$ respectively for the corresponding index maximum and minimum value. X'_{ij} respectively the bigger the indicator, the more significant the impact, which formula (1) to calculate positive indicators, formula (2) to calculate negative indicators.

2.2 construction of indicator system

Based on the statistical data of Agricultural Ecology and new-type urbanization in Hanzhong city, combined with its characteristics, this paper comprehensively uses the existing evaluation system for reference, following the principles of validity, objectivity, systematicness and Operability, the paper selects the indexes which can represent the agricultural ecosystem and the new urbanization system in Anhui province and have low repetition rate (table 1) .

Table 1. coupling index system of agricultural and new urbanization

Target Layer	Criterion Layer	Index Layer	Positive and negative	Weight
Agroecosystem	Agricultural Land Resources	Fertilizer application	-	0.1032
		Area of cultivated land per capita	+	0.0513
		Area of soil erosion	-	0.0517
		Application rate of green manure	+	0.0356
	Mode of production	Integrated Coverage area of water and fertilizer	+	0.0422
		Surface price of Straw returned	+	0.0541

New Urbanization System	Agricultural Economy	Per capita mechanical power	+	0.0954
		Effective irrigated area	+	0.1034
		Value added of agriculture, forestry, animal husbandry and fishery	+	0.0192
		Total value of processed agricultural products	+	0.0174
		Growth rate of gross agricultural product	+	0.1301
		Growth rate of per capita income of farmers	+	0.0848
	Ecological resources	Forest Coverage	+	0.0111
		Per capita water resources	+	0.0317
		Per capita grain output	+	0.1535
	Social Urbanization	Per capita land area	+	0.0153
		Per capita living space of farmers	+	0.0237
		Non-farm employment rate of farmers	+	0.0757
		Per capita income of urban residents	+	0.0927
		Town Engel's coefficient	-	0.0426
		GDP per capita	+	0.0348
		Coefficient of income difference between urban and rural residents	+	0.0219
		Proportion of output value of secondary and tertiary	+	0.1513
		Economic density	+	0.0014
		Proportion of urban population	+	0.1832
	Population urbanization	Tertiary sector of the economy	+	0.0435
		Number of students per 1,000	+	0.1317
		Number of doctors per 10,000 population	+	0.0204
		Urban population density	+	0.0472
	Spatial urbanization	Built-up area of a city	-	0.0208
		Per capita urban road area	-	0.0653
		Per capita area of public green space	-	0.0438

2.3 coupled and coordinated development degree model

The index system of agro-ecosystem and new-type urbanization is composed of agro-ecosystem and new-type urbanization. The index of agro-ecosystem is expressed by $x_1, x_2, x_3, \dots, x_m$ and the index of

new-type urbanization is expressed by $y_1, y_2, y_3, \dots, y_n$.

agro-ecosystem assessment index:

$$f(x) = \sum_{i=1}^m a_i \bar{x}_i \quad (3)$$

New Urbanization Evaluation Index:

$$g(y) = \sum_{j=1}^n b_j \bar{y}_j \quad (4)$$

$$C = \sqrt{\{[f(x) \times g(y)]/[f(x) + g(y)]\}} \quad (5)$$

Through (3) and (4) constructors (5), C represents the coupling development coefficient between agricultural and new urbanization, $C \in [0, 1]$. The closer the C value is to 0, the lower the coupling degree is, which means the smaller the correlation among subsystems; $0.3 < C \leq 0.5$, the coupling degree is in the antagonistic stage; when $0.5 < C \leq 0.8$, the degree of coupling is in running-in stage; $0.8 < C \leq 1$, the higher the degree of coupling is, the closer the C value is to 1, the higher the degree of coupling is, which means the higher the correlation among subsystems, and the highest degree of coupling is when $C = 1$.

$$T = \alpha f(x) + \beta g(y) \quad (6)$$

$$D = \sqrt{C \times T} \quad (7)$$

In equation (6), T is the comprehensive evaluation index between agricultural and new-type urbanization. α and β are the undetermined parameters. In view of the importance of agricultural and new-type urbanization in Anhui Province, the value should be treated as both equally important. α and β are both 0.5. Based on the coupling development Coefficient C and the

comprehensive evaluation index T , the coupling development degree model (7) is constructed to reflect the comprehensive coordinated development degree between the agricultural ecology and the new urbanization.

2.4 classification criteria

In order to reflect more directly the level of coordinated development between agricultural and new-type urbanization, the paper classifies the degree of coordinated development according to the research results, as shown in Table 2.

2.5 data sources

According to the availability and completeness of the index data, this paper makes a quantitative study on the coupling and harmonious development relationship between agricultural and new urbanization in Hanzhong from 1997-2016, the data are from China Statistical Yearbook 1997-2016, China Urban Statistical Yearbook, China Demographic and Employment Statistical Yearbook, Shaanxi Statistical Yearbook and Shaanxi Statistical Bulletin on social and economic development.

Table 2. Criteria for classification of levels of coordinated development

Types	Coordination Degree (D) value range	level
Coordinated Development	0.9~1.0	Quality coordinated development
	0.8~0.9	Good coordination development
	0.7~0.8	Medium-level coordinated development
	0.6~0.7	Primary coordinated development
	0.5~0.6	Barely coordinated development
Transitional Development	0.4~0.5	On the verge of dysregulation
Dysregulation recession	0.3~0.4	Mild dissonance recession
	0.2~0.3	Moderate dissonance recession
	0.1~0.2	Severe dissonance recession,
	0.0~0.1	Extreme dissonance recession,

Fig 2. Assessment Index of agricultural and urbanization in Hanzhong, 1996-2017

Fig 3. Coupling Coefficient of agricultural ecology and urbanization in Hanzhong, 1996-2017

3 Results & Discussion

3.1 analysis of Agricultural Ecology and New Urbanization Evaluation Index

Formulas (3)(4) and (6) are used to calculate the agro-ecological evaluation index, the Urbanization Evaluation Index and the Comprehensive Evaluation Index of the two in Hanzhong. As can be seen from figure 2, the agro-ecological Assessment Index, Urbanization Assessment Index and their comprehensive assessment index of Hanzhong showed an overall upward trend from 1996 to 2017. In terms of urbanization, the Evaluation Index of new urbanization in Hanzhong before 2009 is higher than that of agricultural, which may be the reason for long-term attaching importance to industry and neglecting agricultural development. As far as agroecology is concerned, in 2006, its evaluation index was more than 1, and since 2009, the evaluation index of agroecology is higher than the evaluation index of new type urbanization, mainly because of the increase of effective irrigated area with the integration of agricultural water, fertilizer and mode of production, to a greater extent, the index of agricultural ecological assessment has been promoted.

3.2 analysis of coupling Coefficient between agricultural and new-type Urbanization

From the result of coupling Coefficient (figure 3) , we can see that the coupling Coefficient of agricultural ecology and new urbanization in Hanzhong has been on the rise from 1996 to 2017. The coupling Coefficient from 1996 to 2003 was lower than 0. 01, the coupling degree is very low, and the coupling Coefficient from 2004 to 2006 is 0. 1 ~ 0.3. From 2007 to 2010, the coupling Coefficient ranged from 0. 3 ~ 0. 5. the coupling coefficient of Hanzhong was at 0.5 ~ 0. 6 by 2016. the coupling degree is in the running-in stage.

3.3 analysis on coordination grade of agricultural and new-type urbanization

From 1997 to 2006, the coordination degree of agricultural and new-type urbanization in Hanzhong was in a severe maladjustment and decline. In 2007, the evaluation index of agricultural and new-type urbanization began to exceed 1, the coordination degree began to increase, and the coordination level continued to rise, but in 2007 ~ 2008, the coordination degree of the two is still in moderate maladjusted recession, in 2009 is in mild maladjusted recession, in 2010 is on the verge of maladjusted recession. Since 2011 the degree of coordination is greater than 0. 5. The coordinated development level will reach the intermediate level by 2014, and the coordinated degree will continue to increase, reflecting the process of coordinated development of agricultural ecology and new urbanization in Hanzhong from imbalance to coordination (table 3).

Table 3. harmony degree of agricultural and new urbanization in Hanzhong from 1997 to 2016

Year	Coupling coordination	level
1997~2006	0.0002~0.0881	Extreme dissonance recession
2007~2008	0.2460~0.2684	Moderate dissonance recession
2009	0.3420	Mild dissonance recession
2010	0.4221	On the verge of dysregulation
2011~2012	0.5083~0.5755	Barely coordinated development
2013	0.6599	Primary coordinated development
2014~2016	0.7061~0.7787	Medium-level coordinated development

4 Conclusions

The coupling degree of agricultural ecology and new urbanization in Hanzhong from 1997 to 2016 is analyzed by coupling coordinated development degree model. The coupling Coefficient of agricultural ecology and new urbanization in Hanzhong has experienced extremely low to low level in the past 20 years, then antagonistic, finally in the running-in phase of the process, while the degree of coordination from the disorder gradually develop coordination, the two coupled development of the overall upward trend. However, only 16 indexes of agricultural and new urbanization are selected in this paper,It may influence the result of this paper to some extent.Therefore, more evaluation indexes should be selected in the future research, which will lay a good

foundation for realizing the high-level and high-quality coordination between agricultural and new-type urbanization, and also point out the direction for the development of agricultural modernization in Shaanxi Province.

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