Research on the Integrated Urban-Rural Development in Xuzhou Area under the Background of Rural Revitalization

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Abstract: Taking the counties and districts under the jurisdiction of Xuzhou City as the research object, 16 indicators were selected to construct the measurement index system of urban-rural integration from the four dimensions of spatial integration, economic integration, social integration and ecological integration, and the entropy weight method was used to study the level of urban-rural integration in Xuzhou. The study shows that during the 13th Five-Year Plan period, the level of urban-rural integration in Xuzhou has significantly improved, and most areas have reached a highly integrated and developed stage; But after 2020, indicators of urban-rural integration in some counties and districts showed a downward trend. Based on the research results, propose countermeasures for the integrated development of urban and rural areas in Xuzhou City in the context of rural revitalization.

Keywords: Rural revitalization; Urban-rural integration; Development path

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1. Introduction

The 20th National Congress of the Communist Party of China pointed out that we should comprehensively promote rural revitalization, uphold the priority position of rural development, promote integrated urban-rural development, and facilitate the free flow of factors between urban and rural areas. To fully achieve integrated urban-rural development, we must give greater priority to the development of agriculture and rural areas, break the imbalance in integrated urban-rural development, and achieve common prosperity in both urban and rural areas. The successive governments of Xuzhou have attached great importance to the integrated development of urban and rural areas and have issued a series of policy documents for implementation, achieving remarkable results in the integrated development of urban and rural areas. However, as a resource-based city, economic transformation is urgently needed. In the process of promoting rural revitalization, the economic functions of counties need to be strengthened to achieve a high degree of integrated development of urban and rural areas. For this purpose, this paper takes the county as the research unit, constructs the measurement index system of urban-rural integration, explores the laws of urban-rural integration in counties and districts of Xuzhou City during the 13th Five-Year Plan period and puts forward development suggestions.

2. Introduction to the Current Situation and Research Methods of Urban-Rural Integration in Xuzhou

(1) Current situation of integrated urban-rural development in Xuzhou city

Xuzhou, located in the northwest of Jiangsu Province, has a long history and rich culture, and is an important economic, scientific, educational, cultural and financial center in East China. Xuzhou is divided into five districts, namely

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Gulou District, Quanshan District, Yunlong District, Tongshan District and Jiawang District, two county-level cities, Pizhou and Xinyi, and three counties, Suining, Fengxian and Peixian. It has a total area of 11,7652 square kilometers and a permanent resident population of 9.02 million. In 2023, the regional GDP reached 890.044 billion yuan, an increase of 7.1% year-on-year. The per capita disposable income of urban and rural residents was 45,000 yuan and 27,000 yuan respectively, an increase of 5.1% and 7.4% compared with last year. From Figure 1, it can be seen that Xuzhou's urbanization rate is slightly higher than the national urbanization rate and about 6 percent lower than that of Jiangsu Province, and there is still considerable room for improvement.

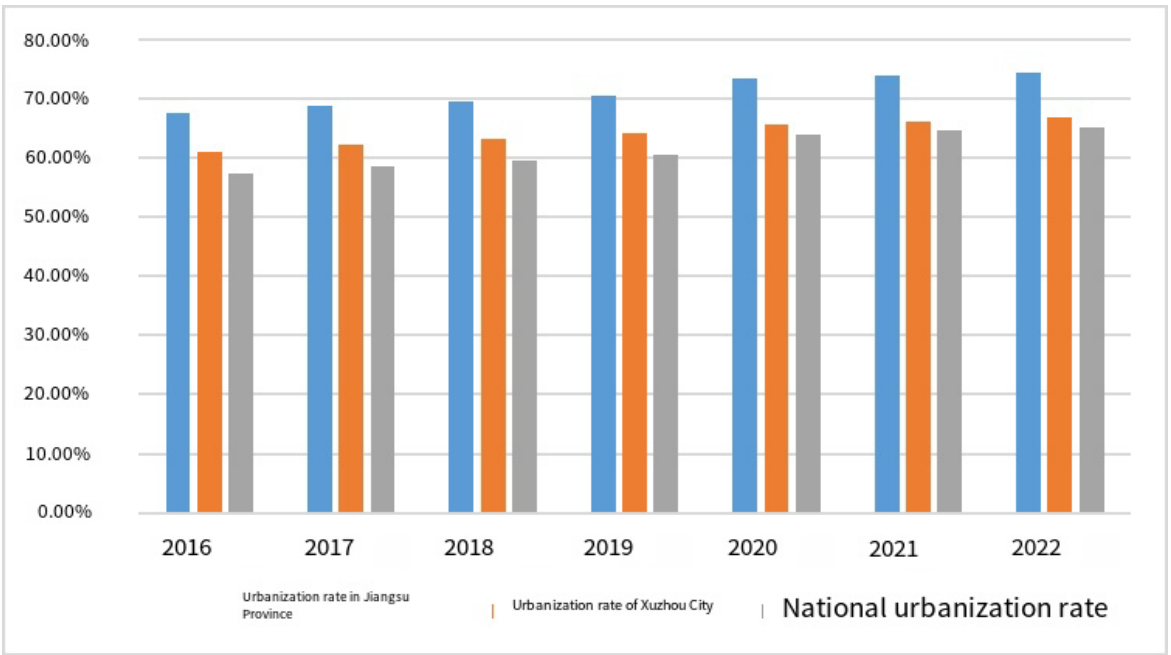

Figure 1 shows the urbanization rate of Xuzhou compared with that of Jiangsu Province and the whole country

(2) Selection of measurement indicators

Based on the academic achievements of relevant scholars, this paper selects urban-rural spatial integration, urban-rural economic integration, urban-rural social integration, urban-rural ecological integration as the research perspective, and selects 16 factors such as urbanization rate, per capita GDP, Engel's coefficient, etc. to construct the comprehensive development evaluation system of urban-rural integration in Xuzhou (see Table 1), and the weights are calculated by the entropy method.

Table 1 Evaluation Index System of urban-rural Integration Level

First-level indicators	Secondary indicators	Nature of Indicators
Urban-rural spatial integration	Urbanization rate	positive
	Population density	positive
	Road network density	positive
	The proportion of built-up area to total land area	positive
Urban-rural economic integration	Per capita GDP	positive
	The ratio of disposable income between urban and rural areas	negative
	The proportion of the tertiary industry in GDP	positive
	Ratio of per capita consumption expenditure between urban and rural residents	negative
Urban-rural social integration	Ratio of Engel's coefficient between urban and rural residents	negative

Urban-rural social integration	Ratio of per capita healthcare expenditure between urban and rural residents	negative
	Ratio of per capita housing expenditure between urban and rural residents	negative
	Ratio of per capita expenditure on education, culture and entertainment for urban and rural residents	negative
Urban-rural ecological integration	Green coverage rate in built-up areas	positive
	Sewage treatment rate	positive
	Industrial wastewater discharge	negative
	Share of environmental spending	positive

(3) Data sources

The basic data for this research on the level of integrated urban-rural development in Xuzhou City are mainly from Jiangsu Statistical Yearbook (2016-2023), Xuzhou Statistical Yearbook (2016-2023), and Xuzhou National Economic Development Statistical Bulletin (2016-2023).

(4) Selection of evaluation methods

The entropy method can determine the extent of influence of different elements by calculating the weights of different indicators. To better reflect the significance of the positive and negative indicators in the evaluation indicators, the scientific entropy method is used to calculate the level of urban-rural integration in Xuzhou City. The calculation steps are as follows:

1) Build the original numerical matrix

Table 1 shows the constructed measurement index system of urban-rural integration in Xuzhou City, where R_{ij} represents the original data of the JTH indicator in the i-th year. R_{ij}A total of 16 indicators from 2016 to 2022 were selected to construct the original matrix R (for the original values of the data).

$$R = \begin{bmatrix} R1 & R21 & \cdots & R \\ R12 & R22 & \cdots & R2 \\ \vdots & \vdots & & \vdots \\ R_{1m} & R2m & \cdots & R_{nm} \end{bmatrix}$$

Where i=1,2, 7, j=1,2, 16……

2) Standardization processing of data

Because the order of magnitude of the indicator data is inconsistent, it is necessary to standardize the data in the matrix, converting absolute values to relative values, so that different indicators in different years are more comparable. To eliminate the effects of negative numbers and zeros, the data is also shifted.

The formula for normalizing the positive metric is:

$$r_{ij} = \frac{R_{ij} - min\{R_{1j}\ldots R_{nj}\}}{max\{R_{1j,\ \ldots},\ R_{nj}\} - min\{R_{1j,\ \ldots},\ R_{nj}\}} + 1$$

The formula for standardizing negative indicators is:

$$r_{ij} = \frac{max\{R_{1j}\ldots R_{nj}\} - R_{ij}}{max\{R_{1j,\ \ldots},\ R_{nj}\} - min\{R_{1j,\ \ldots},\ R_{nj}\}} + 1$$

R_{ij}It is the standardized value of the JTH indicator in the i-th year.

Calculate the proportion of j indicator in i:k_{ij}

$$k_{ij} = \frac{r_{ij}}{\sum_{i=1}^{m} r_{ij}}$$

Calculate the entropy value. The calculation formula is as follows:

$$e_j = -\frac{1}{Inm}\sum_{i=1}^{m} k_{ij} Ink_{ij} j = 1,\ 2\cdots,\ n$$

Here, is the entropy of the JTH metric, where 0≤≤1, and Inm must be greater than 0.$e_j e_j$

Calculate the weights of the indicators using the following formula:

$$g_i = 1 - e_j$$

$$w_j = g_i / \sum_{i=1}^{n} g_i$$

w_jIs the weight of the JTH indicator and is the coefficient of difference of the i-th indicator. The greater the entropy of the indicator and the smaller the coefficient of difference, the greater its weight.g_i

Calculate the overall score using the formula as follows:

$$s_{ij} = \sum_{j=1}^{n} w_j r_{ij}$$

Here, the weights of each indicator are the normalized values of the JTH indicator in the i-th year, m is the test year, n is the indicator, the larger it is, the better the degree of urban-rural integration in that year.$w_j r_{ij} s_{ij}$

3. Analysis of the Measurement Results of the Urban-Rural Integration Level in Xuzhou City

(1) Analysis of the comprehensive level of integrated urban-rural development

The scores of urban-rural integration in each county and city of Xuzhou from 2016 to 2022 were obtained through econometric analysis (Table 2). In terms of the overall score, the level of urban-rural integration in urban districts and counties and cities has risen significantly. In 2016, Pei County had the highest score (0.5299), twice that of Suining (0.2583), and in 2020, Pizhou topped the list with 0.6525, but other districts and counties were on par with Pizhou in terms of urban-rural integration. Peixian and Pizhou scored lower in 2022, with Suining taking the top spot at 0.5785. Drawing on the research of other scholars, urban-rural integration goes through three stages: the initial stage of urban-rural integration, the coordinated stage of urban-rural integration, and the advanced stage of urban-rural integration. It can be seen from Table 2 that in 2016, Peixian and Suining scored relatively low and were in the initial stage of integration, while the rest of the counties and districts were in the stage of integrated and coordinated development. In 2020, Fengxian, Pizhou, Xinyi, Pizhou, the urban area and Peixian had all reached the stage of advanced urban-rural integration.

Table 2 Measurement of the overall level of urban-rural integration in counties and cities of Xuzhou from 2016 to 2022

	2016	2018	2020	2022
Fengxian	0.3710	0.3200	0.6651	0.4402
Pei County	0.5299	0.4285	0.5549	0.3458
Suining	0.2583	0.2558	0.5363	0.5785
Xinyi	0.4537	0.4005	0.6074	0.5468
Pizhou	0.4268	0.4012	0.6525	0.3394
Urban area	0.4244	0.5339	0.5657	0.4993

(2) Systematic analysis of urban-rural spatial integration

The integrated development of urban and rural Spaces can break the urban-rural dual structure, facilitate the free flow of economic resources and factors of production, and achieve optimal allocation. During the 13th Five-Year Plan period, the counties and districts under the jurisdiction of Xuzhou City made significant progress in spatial integration, thanks to the continuous investment in road construction and the densification of network facilities. From the perspective of the urban districts and the counties under their jurisdiction, the urban districts have been in the leading position, with rapid expansion of urban space; Fengxian District, though ranked low, has seen its built-up area rise in recent years, its urbanization rate increase significantly by nearly 10%, and its road network density rise from 1.26 to 1.40. Suining ranks first because of its relatively high urbanization rate and very rapid population growth; Pei County and Pizhou are relatively backward because of their larger areas, the gap in infrastructure construction between urban and rural areas, and a certain degree of population loss.

(3) Analysis of the system of urban-rural economic integration

Economic development is the core task for achieving rural revitalization and integrated urban-rural development. The main tasks are to develop modern rural industries, promote the upgrading of the urban-rural industrial structure, and increase the income and consumption levels in both urban and rural areas. In terms of total economic volume, the level of economic integration between urban and rural areas in Xuzhou region has continued to improve, and the total regional GDP and per capita GDP have grown at a high speed in both directions. From the perspective of the counties and districts under Xuzhou's jurisdiction, the economic development competition is intense and the ranking has changed significantly. The economic development level of the urban districts has a relatively high starting point and the ranking has remained at the forefront. Under the policy guidance of establishing the county through industry and strengthening the county through industries, Peixian County has achieved rapid economic development and its ranking has continued to rise. Xinyi City has made rapid progress in the integration of urban and rural economies by establishing economic development zones and Wuxi-Xinyi High-tech Zone and vigorously developing park economy. Fengxian's low ranking is due to its weak economic foundation and inability to attract advantageous resources, resulting in insufficient growth momentum.

(4) Analysis of the urban-rural social integration system

The purpose of urban-rural social integration is to achieve equalization of basic public services and to build a shared public service system. Since 2016, the Xuzhou municipal Government has coordinated the implementation of a series of measures to ensure people's livelihood, further advanced the universal social insurance plan, promoted the construction of beautiful villages throughout the region, compiled practical village plans, arranged concentrated residential areas in accordance with local conditions and promoted the improvement and upgrading of rural infrastructure, and steadily advanced the construction of rural schools. By region, Fengxian has made significant progress in social integration between urban and rural areas, mainly due to the decline in housing expenses; But in other areas, the increase in per capita housing expenditure is obvious, mainly due to the rapid rise in urban housing prices during the 13th Five-Year Plan period (2016-2020); In terms of educational resources, the gap between urban and rural areas is still widening, which is attributed to the population loss in some counties and districts and the slow decline in the number of rural teachers.

(5) Analysis of the urban-rural ecological integration system

Ecological livability is the key to implementing rural revitalization. The key tasks are to improve the rural living environment, strengthen the protection of agricultural ecological environment, and achieve the improvement of the rural ecosystem . During the 13th Five-Year Plan period, the Xuzhou municipal government focused on promoting the construction of a beautiful Xuzhou, coordinating the construction of a beautiful and livable city and the comprehensive revitalization of rural areas, and continuously improving the comfort of the living environment. By region, Fengxian

and Xinyi ranked high in ecological integration, thanks to increased green coverage in built-up areas, with both the green coverage rate and the sewage treatment rate in built-up areas improving; Peixian lagged behind in ecological integration for a time due to persistently high industrial wastewater discharge and sluggish growth in built-up area green coverage. In Xuzhou City, the discharge of industrial wastewater far exceeds that of other counties and districts, and the integration of urban and rural ecology has been at a low level. Therefore, there is a need to increase investment in environmental protection and follow the path of ecological priority, conservation and efficiency, and green and low-carbon development.

Table 3 Measurement of urban-rural Integration Levels in Xuzhou's counties and cities from 2016 to 2022

Region	System	2016	2018	2020	2022
Fengxian	Spatial Fusion	0.0426	0.0940	0.1740	0.1824
	Economic integration	0.0729	0.0948	0.1111	0.0686
	Social integration	0.0875	0.1104	0.1230	0.0410
	Ecological integration	0.1679	0.0208	0.2571	0.1482
Pei County	Spatial Fusion	0.0815	0.1436	0.1003	0.1315
	Economic integration	0.0957	0.1159	0.1273	0.0915
	Social integration	0.1509	0.1168	0.1184	0.0164
	Ecological integration	0.2018	0.0523	0.2089	0.1065
Suining	Spatial Fusion	0.0292	0.0675	0.1205	0.3448
	Economic integration	0.0655	0.0888	0.0985	0.0669
	Social integration	0.1007	0.0620	0.0844	0.0706
	Ecological integration	0.0629	0.0375	0.2329	0.0962
Xinyi	Spatial Fusion	0.0792	0.1249	0.2284	0.1868
	Economic integration	0.0818	0.1219	0.1049	0.1040
	Social integration	0.1519	0.1015	0.0726	0.0787
	Ecological integration	0.1407	0.0522	0.2016	0.1774
Pizhou	Spatial fusion	0.0101	0.0773	0.1616	0.1193
	Economic integration	0.0808	0.1523	0.0990	0.1018
	Social integration	0.2193	0.1224	0.1140	0.0138
	Ecological integration	0.1166	0.0492	0.2778	0.1045
Urban area	Spatial fusion	0.0803	0.1509	0.1671	0.2019
	Economic integration	0.0991	0.1337	0.1261	0.0845
	Social integration	0.1653	0.1172	0.1346	0.1062
	Ecological integration	0.0797	0.1321	0.1379	0.1067

4. Exploring the Path of Urban-Rural Integration in Xuzhou City

(1) Give full play to the government's leading role and coordinate the flow of resources and factors of production between urban and rural areas

The government plays a significant role in coordinating the direction of urban and rural planning and the flow of urban and rural elements and resources. First, it is necessary to strengthen the leading and guiding role of governments

at all levels in social governance, urban and rural planning, and industrial policies. Municipal and county governments need to create an efficient and convenient government environment and a fair and orderly market environment. Secondly, promote the smooth two-way flow of resources and elements between urban and rural areas by providing policies such as infrastructure construction subsidies and land transfer incentives to promote the balanced distribution and utilization of urban and rural capital; Promote cooperation between urban industry and commerce and rural collective economic organizations to facilitate resource sharing and complementary advantages. Finally, enhance technological empowerment for rural revitalization, introduce advanced agricultural production technologies, and boost the momentum of rural and agricultural development; Increase efforts to attract talent by means of tax and fee reductions, low-interest loans, etc., to bring outstanding talent back to rural areas.

(2) Improve the living infrastructure in rural areas and create new eco-friendly and livable rural areas

To build an ecologically livable rural environment, efforts should be made in the following aspects: First, agricultural-related funds should be coordinated to give priority to key areas such as rural roads, power grid renovation, water conservancy facilities, drinking water safety, logistics distribution and broadband networks, and improve the quality of life for farmers. Second, expand the scale of targeted training of rural teachers and doctors and increase their salaries to attract more outstanding talents to rural development, encourage urban teachers to teach in rural areas, improve medical insurance payment, hierarchical medical treatment, and coordination of medical insurance benefits to narrow the gap in education and medical care between urban and rural areas. Third, enhance cultural exchanges and interactions between urban and rural areas, develop rural cultural functions, inherit intangible cultural heritage, increase the coverage of public cultural venues such as cultural service centers and libraries in rural areas, and enrich the cultural life of rural residents.

(3) Accelerate the construction of a modern industrial system in urban and rural areas and achieve the transformation and upgrading of the agricultural industry

The core to achieving sustained growth in rural residents' income and promoting the vigorous development of the rural economy lies in the modernization and upgrading of rural industries. The first is to improve the quality of agricultural products and build brands with market influence, and promote the upgrading of characteristic agricultural products such as high-quality rice and characteristic fruits around the Yellow River Ecological enrichment Corridor and the Fifth Ring Road Urban agriculture Demonstration belt. Focus on cultivating agricultural product brands and leading enterprises to increase the added value of agricultural products; Second, vigorously develop leisure agriculture and tourism to promote the deep integration of agriculture and tourism. Local township governments should make full use of local characteristic resources, promote the joint construction of beautiful villages and agricultural complex projects, and attract urban residents to enjoy rural life. Third, innovate the sales channels and operation models of agricultural products, enable farmers to obtain market demand information in a timely manner, establish and improve online trading platforms, and use information technology to facilitate the flow of agricultural products and expand the sales channels of high-quality agricultural products.

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