

A Study on the Coordinated Development of New-Type Urbanization and Agricultural Modernization in Xinjiang under the Separation of Three Rights in Agricultural Land: Postprint

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Abstract

This study examines the current state of synergistic development between new urbanization and agricultural modernization in Xinjiang, with 12 prefecture-level administrative divisions selected as research subjects. An evaluation index system for the synergistic development of the “two modernizations” in Xinjiang was constructed from the dual perspectives of new urbanization and agricultural modernization. Relevant data were compiled from the 2016 Xinjiang Statistical Yearbook, and a synergy degree evaluation model was developed using synergy theory to assess the synergistic development level between new urbanization and agricultural modernization across the 12 prefecture-level divisions in Xinjiang. The results demonstrate that: Bayingolin Mongol Autonomous Prefecture, Changji Hui Autonomous Prefecture, and Aksu Prefecture ranked 1st, 2nd, and 3rd respectively among the 12 divisions in terms of synergy degree between new urbanization development and agricultural modernization; Turpan City, Hami Prefecture, Tacheng Prefecture, Altay Prefecture, Bortala Mongol Autonomous Prefecture, and Kizilsu Kirghiz Autonomous Prefecture occupied intermediate positions; while Kashgar Prefecture, Hotan Prefecture, and Urumqi City ranked 10th, 11th, and 12th respectively in Xinjiang regarding the synergy degree between new urbanization development and agricultural modernization. This paper analyzes the development status of new urbanization and agricultural modernization and their coordination across various regions of Xinjiang, and proposes targeted recommendations for each locality.

Full Text

Abstract

This paper examines the coordinated development of new urbanization and agricultural modernization in Xinjiang, China, under the “Three Rights Separation” policy for agricultural land. Twelve prefectures and cities in Xinjiang were selected as research subjects. From two perspectives—new urban life and agricultural modernization—coordinated evaluation index systems for Xinjiang were constructed. Based on data from the 2016 Xinjiang Statistical Yearbook, synergy theory was employed to build a synergy evaluation model, and the synergy degree between new urbanization and agricultural modernization across Xinjiang’s twelve prefectures and cities was assessed. The results indicate that the coordination degree between new urbanization development and agricultural modernization in Bayingolin Mongol Autonomous Prefecture, Changji Hui Autonomous Prefecture, and Aksu Prefecture ranked first, second, and third respectively among the twelve cities. Turpan, Hami, Altay, Tacheng Prefecture, Bortala Mongol Autonomous Prefecture, Kizilsu Kirgiz Autonomous Prefecture, and other regions achieved middle rankings. The coordination degree in Kashgar, Hotan Prefectures, and Urumqi City ranked tenth, eleventh, and twelfth respectively. This paper analyzes the development of new urbanization and agricultural modernization in various regions and the coordination between these two factors, and proposes suggestions for addressing problems in different areas.

Keywords: new urbanization; agricultural modernization; synergistic evaluation; Three Rights Separation

4.2 Construction of the Synergy Evaluation Model

The synergy evaluation model was constructed based on synergy theory. The model comprises several components including the power function, ordering degree calculation, and synergy degree measurement. The evaluation index system encompasses two primary dimensions: new urbanization and agricultural modernization, with multiple indicators under each dimension.

4.3 Model Formulation

4.3.1 Power Function Calculation

The power function is calculated to determine the contribution of each indicator. For indicator X_{ji} , the efficiency coefficient $ECJ(X_{ji})$ is computed as:

$$ECJ(X_{ji}) = \frac{\alpha_{ji} - X_{ji}}{\alpha_{ji} - \beta_{ji}} \quad i \in [1, k]$$

$$ECJ(X_{ji}) = \frac{X_{ji} - \beta_{ji}}{\alpha_{ji} - \beta_{ji}} \quad i \in [k + 1, m]$$

where X_{ji} represents the actual value of indicator i in system j ; α_{ji} and β_{ji} represent the upper and lower limit values of indicator i in system j respectively.

4.3.2 Ordering Capability Calculation

The ordering capability $OC(S_j)$ of system j is calculated as:

$$OC(S_j) = \sqrt{ECJ(X_{ji})}$$

where S_j represents the evaluation index set of system j , and $OC(S_j)$ reflects the development level of system j .

4.3.3 Synergy Degree Calculation

The synergy degree between systems is calculated using the following formula:

$$OC_j(S_j) = \sqrt{ECJ(X_{ji})}$$

where $OC_j(S_j)$ represents the ordering capability of system j , and CC represents the critical capability value.

4.3.4 Ordering Degree Results

The ordering degree results are presented in Table 3, showing the development levels of new urbanization and agricultural modernization across different regions.

4.4 Synergy Degree Analysis

The synergy degree CI between new urbanization and agricultural modernization is calculated as:

$$CI = CC \cdot (1 - D) = \sqrt[n]{\prod_{j=1}^n OC_j(S_j) \cdot \frac{[OC_j(S_j) - CC(S_j)]^2}{CC(S_j)}} - 1$$

where CI represents the synergy degree between new urbanization and agricultural modernization; $CC_j(S_j)$ is the critical capability of system j ; and n is the number of subsystems.

The synergy degree and ranking results are presented in Table 5, which shows the coordinated development levels across Xinjiang's twelve prefectures and cities.

Discussion

The evaluation results reveal significant regional disparities in the coordinated development of new urbanization and agricultural modernization in Xinjiang. Regions such as Bayingolin, Changji, and Aksu demonstrate relatively high coordination degrees, while Kashgar, Hotan, and Urumqi show lower coordination levels. The analysis indicates that the “Three Rights Separation” policy has had varying impacts across different regions, with factors such as economic development level, infrastructure conditions, and institutional implementation affecting the coordination outcomes.

The synergy evaluation model effectively captures the complex interactions between urbanization and agricultural modernization. The power function transformation standardizes indicators with different measurement units and orientations, enabling comprehensive comparison. The ordering capability calculation reflects the overall development state of each system, while the synergy degree measurement quantifies the coordination level between the two systems.

Policy implications suggest that regions with lower coordination degrees should focus on strengthening the institutional framework for the “Three Rights Separation” policy, improving land transfer mechanisms, and enhancing the integration between urban and rural development. Additionally, increasing investment in agricultural modernization and optimizing urban development patterns could improve synergy levels.

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