Postprint of "Evaluation of the Integration Effects and Influencing Factors of Relocated Poverty-Alleviation Resettlement Areas into New-Type Urbanization in Ningxia"

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Abstract

Relocation for poverty alleviation is a key measure in China's efforts to eradicate extreme poverty, and how to effectively promote the integration of resettlement areas into the process of new-type urbanization has become the core issue in the transformation of relocation policies from basic livelihood 保障 to high-quality development. Based on field survey data collected from 662 relocated rural households in relocation-for-poverty-alleviation resettlement areas in Ningxia between December 2023 and March 2024, this study constructs an evaluation index system for assessing the effectiveness of resettlement areas' integration into new-type urbanization, adopts the CRITIC weighting method for comprehensive evaluation, and conducts an in-depth analysis of the key influencing factors. The results show that: (1) The integration effectiveness score of Ningxia' s relocation resettlement areas into new-type urbanization is 0.6320, reaching a good level; however, the combination of a low score and high weight for economic benefits indicates that economic transformation issues in the new-type urbanization construction of resettlement areas deserve attention. (2) The integration effectiveness is jointly shaped by multidimensional factors, among which policy perception, community governance, social capital, and technology benefiting agriculture are key, while factors such as individual characteristics and household characteristics have limited influence. (3) Although there are significant regional differences in the integration effectiveness across resettlement areas in the five prefecture-level cities of Ningxia, the range is relatively small, at 0.1239; overall performance is ranked as follows: Wuzhong City > Zhongwei City > Yinchuan City > Guyuan City > Shizuishan City. Among the benefits across various dimensions, Wuzhong City remains in a leading position. (4) Different key factors exert heterogeneous impacts on each dimension, stemming from their differing mechanisms of action in promoting the integration of resettlement ar-

eas into new-type urbanization. Among various resettlement modes, centralized resettlement demonstrates significant advantages and is more conducive to the transition toward high-quality new-type urbanization.

Full Text

Integration Effectiveness Evaluation and Influencing Factors of Poverty Alleviation Relocation Resettlement Areas into New-Type Urbanization in Ningxia

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Abstract

The relocation initiative for poverty alleviation has been a central component of China' s strategy to eliminate extreme poverty. A key challenge in the post-relocation phase is promoting the effective integration of resettlement communities into the process of new-type urbanization, a transition that marks the shift from ensuring basic subsistence to pursuing high-quality and sustainable development. Drawing on field survey data collected from 662 relocated households in poverty alleviation resettlement communities in Ningxia between December 2023 and March 2024, this study develops an evaluation index system to measure the effectiveness of this integration. Using the criteria importance through intercriteria correlation (CRITIC) weighting method, we conducted a comprehensive assessment and identified the principal influencing factors. The findings indicate the following: (1) The overall integration effectiveness score for Ningxia' s resettlement communities is 0.6320, corresponding to a "good" level of integration. Nevertheless, the combination of a relatively low score and high indicator weight for economic benefits highlights persistent difficulties associated with economic transformation within the broader urbanization process. (2) Integration outcomes are driven by multidimensional factors. Policy perception, community governance, social capital, and technology-enabled agricultural gains emerge as the most influential determinants, while individual and household characteristics exert comparatively limited effects. (3) Statistically significant but moderate regional differences exist across Ningxia' s five prefecture-level cities (range: 0.1239). The hierarchical ranking of integration effectiveness is Wuzhong City > Zhongwei City > Yinchuan City > Guyuan City > Shizuishan City, with Wuzhong City consistently outperforming other regions across all evaluation dimensions. (4) The heterogeneous impacts of key determinants on specific integration dimensions reflect their distinct mechanisms of action. Among resettlement models, centralized resettlement demonstrates clear advantages, proving more conducive to achieving high-quality urbanization transformation. Overall, this study contributes empirical evidence on the transitional challenges facing relocated households and highlights the importance of

governance capacity, social embeddedness, and technological empowerment in ensuring sustainable integration into new-type urbanization.

Keywords: relocation for poverty alleviation; integration into new-type urbanization; effect evaluation; influencing factors; CRITIC weighting method

1. Study Area, Data, and Methods

1.1 Study Area Overview

Ningxia Hui Autonomous Region is located in northwestern China, situated in the middle and upper reaches of the Yellow River. Geographically, the region comprises three distinct zones: the Yellow River irrigation area in the north, the central arid zone, and the southern mountainous area. Long characterized by ecological fragility, resource scarcity, and a weak economic base, Ningxia has been a key target of national poverty alleviation efforts. From the "Three West Construction" period through the "14th Five-Year Plan" era, Ningxia has cumulatively relocated over 1.2 million people. The region' s fragile ecology, multi-ethnic population distribution, and the urbanization needs of its resettlement communities make it an ideal case for studying the integration of relocation areas into new-type urbanization.

1.2 Data Sources

This study draws on specialized survey data collected by the research team in poverty alleviation relocation resettlement communities across five prefecture-level cities in Ningxia: Yinchuan, Wuzhong, Guyuan, Zhongwei, and Shizuishan. The survey covered 12 counties (districts) and employed a combination of stratified and random sampling to establish 36 primary survey sites. Questionnaires were administered to household heads or the family members most knowledgeable about household circumstances. After eliminating invalid or flawed responses, 662 valid samples were obtained, with centralized resettlement accounting for 56.64% of the sample. Overall, the sample characteristics reflect the diversity and complexity of relocated households in Ningxia' s resettlement communities (Table 1).

Table 1 Basic Information of the Samples

Category (Characteristic)	Classification	Proportion
Gender	Male	61.93%
	Female	38.07%
Age	35-50 years	35.95%
	51-65 years	37.76%
	>65 years	19.04%
Ethnicity	Han	78.70%

Category (Characteristic)	Classification	Proportion
	Hui	20.85%
	Other minorities	0.45%
Education	Primary school or below	26.28%
	Junior high school	38.67%
	Senior high school	22.05%
	College	6.65%
	Undergraduate or above	6.65%
Marital status	Unmarried (including divorced)	7.25%
	Married	92.75%
Relocation period	Before 12th Five-Year Plan	5.14%
	During 12th Five-Year Plan	23.87%
	During 13th Five-Year Plan	60.88%
	After 13th Five-Year Plan	10.11%
Out-migration	No migrant workers	59.21%
	Has migrant workers	40.79%
Resettlement type	Centralized: intra-county	33.23%
	Centralized: inter-county	23.41%
	Centralized: small-scale land development	19.94%
	Dispersed: labor migration	23.42%
	Dispersed: 插花移民	21.00%

1.3 Methodology

1.3.1 CRITIC Weighting Method The CRITIC weighting method comprehensively considers indicator variability and conflict, enabling objective determination of indicator weights while effectively reducing redundant information interference. This approach is particularly suitable for complex decision-making scenarios with interrelated indicators. This study employs the CRITIC method to determine indicator weights and uses linear weighted summation to calculate scores. Evaluation scores range from 0 to 1, where values closer to 1 indicate better integration effectiveness. Drawing on relevant literature, the evaluation index system for poverty alleviation relocation integration into new-type urbanization comprises four dimensions: economic, social, environmental, and cultural benefits, with a total of 20 indicators (Table 2).

Table 2 Evaluation Indicator System for Integration Effectiveness of Relocation Resettlement Areas into New-Type Urbanization in Ningxia

Dimension	Indicator	Measurement
Economic Benefits	Household per capita net income	1. $ $8000 yuan; 2. 8001-10000; 3. 10001-20000; 4. 20001-30000; 5. >30000 yuan
	Income improvement	Whether current income improved compared to pre-relocation: 1. No; 2. Yes
	Income expectations	Expectations for future per capita net income: 1. Decrease; 2. No change; 3. Slight increase; 4. Significant increase
	Income adequacy	Whether income meets basic needs: 1. Completely insufficient; 2. Somewhat insufficient; 3. Basically sufficient; 4. Relatively sufficient; 5. Fully sufficient
	Income structure	Income structure: 1. Mainly support/subsidies; 2. Mixed agriculture and non-agriculture; 3. Mainly non-agriculture
	Characteristic industries	Does the resettlement area have characteristic industries: 1. No; 2. Yes
	Brand building	Do local agricultural products have their own brands: 1. No; 2. Yes
	Industrial support	Do you feel government support and guidance for industries: 1. Not at all; 2. Hardly; 3. Neutral; 4. Somewhat; 5. Strongly
Social Benefits	Transportation satisfaction	Satisfaction with transportation: 1. Very dissatisfied; 2. Somewhat dissatisfied; 3. Neutral; 4. Somewhat satisfied; 5. Very satisfied

Dimension	Indicator	Measurement
	Healthcare satisfaction	Satisfaction with healthcare conditions: 1. Very dissatisfied; 2. Somewhat dissatisfied; 3. Neutral; 4. Somewhat satisfied; 5. Very satisfied
	Education satisfaction	Satisfaction with education conditions: 1. Very dissatisfied; 2. Somewhat dissatisfied; 3. Neutral; 4. Somewhat satisfied; 5. Very satisfied
	Sense of belonging	Do you feel a sense of belonging: 1. No; 2. Yes
	Urbanization willingness	Willingness to participate in new-type urbanization: 1. No; 2. Yes
	Communication frequency	Frequency of communication with locals: 1. Never; 2. Rarely; 3. Sometimes; 4. Often; 5. Very often
Environmental Benefits	Water quality	Quality of household water: 1. Poor; 2. Fair; 3. Good
	Waste management	Are trash bins available in the area: 1. No; 2. Yes
	Greening level	Greening level: 1. No greening; 2. Low; 3. Medium; 4. High
	Environmental education	Has environmental education been conducted: 1. No; 2. Yes
	Air quality	Air quality: 1. Poor; 2. Fair; 3. Good
	Ecological suitability	Is the ecological environment suitable for agricultural production: 1. No; 2. Yes
	Pollution sources	Are there polluting factories nearby: 1. No; 2. Yes

Dimension	Indicator	Measurement
	Environmental comparison	Compared to original residence: 1. Much worse; 2. Slightly worse; 3. No change; 4. Slightly better; 5. Much better
Cultural Benefits	Cultural life satisfaction	Satisfaction with cultural life: 1. Very dissatisfied; 2. Somewhat dissatisfied; 3. Neutral; 4. Somewhat satisfied; 5. Very satisfied
	Toilet type	Household toilet type: 1. Traditional dry; 2. Water-flush (no treatment); 3. Water-flush (with treatment)
	Environmental awareness	Is environmental protection relevant to you: 1. No; 2. Hard to say; 3. Yes
	Technology awareness	Does learning agricultural technology help improve quality of life: 1. No; 2. Hard to say; 3. Yes
	Nostalgia	Do you miss pre-relocation lifestyle: 1. Very much; 2. Somewhat; 3. Neutral; 4. Not really; 5. Not at all

The economic dimension incorporates household income and income improvement to reflect economic status and changes; income expectations capture confidence in future economic conditions; income adequacy measures whether earnings meet basic needs, reflecting economic security; income structure indicates the degree of non-agricultural activity; characteristic industries and brand building assess economic potential and market competitiveness; and industrial support reflects government attention to industrial development. The social dimension includes indicators of public service satisfaction and social integration, such as transportation, healthcare, sense of belonging, and urbanization willingness. The environmental dimension incorporates indicators reflecting ecological governance and environmental conditions. The cultural dimension includes cultural life participation, environmental and technological awareness, and nostalgia, which reflects cultural adaptation in resettlement areas.

1.3.2 Baseline Regression Model Factors influencing effective integration of relocation resettlement areas into new-type urbanization are multidimensional and complex. Existing research demonstrates that relocated households' perception of and support for government policies directly affects their enthusiasm for resettlement area development. Social capital and effective community governance jointly enhance social cohesion and integration, while technology dissemination injects new momentum into sustainable development by boosting agricultural productivity. This study therefore employs policy perception, social capital, community governance, and technology-enabled agricultural gains as explanatory variables. To account for potential regional development level effects, we control for individual characteristics, household features, and city-level dummy variables in an ordinary least squares (OLS) linear regression model:

$$Integration_i = \alpha + \beta_1 Policy_i + \beta_2 SocialCapital_i + \beta_3 Governance_i + \beta_4 Tech_i + \gamma Controls_i + \varepsilon_i$$

where $Integration_i$ represents the integration effectiveness score for resettlement area where household i resides; $Policy_i$, $SocialCapital_i$, $Governance_i$, and $Tech_i$ denote policy perception, social capital, community governance, and technology-enabled agricultural gains, respectively; α is the constant term; β and γ are coefficients to be estimated; $Controls_i$ includes individual characteristics, household features, and city-level dummy variables; and ε_i is the random error term.

1.3.3 Seemingly Unrelated Regression (SUR) Model Since economic, social, environmental, and cultural benefits are often interwoven, independent analysis may result in information loss. The SUR model can handle correlations among dependent variables and allows simultaneous estimation of multiple equations, effectively capturing differential impacts of explanatory variables across dimensions. To analyze how influencing factors affect each integration dimension, we introduce the SUR model:

$$\begin{aligned}
Economic_i &= \alpha_1 + \beta_{11} Policy_i + \beta_{12} SocialCapital_i + \beta_{13} Governance_i + \beta_{14} Tech_i + \gamma_1 Controls_i + \varepsilon_{1i} \\
Social_i &= \alpha_2 + \beta_{21} Policy_i + \beta_{22} SocialCapital_i + \beta_{23} Governance_i + \beta_{24} Tech_i + \gamma_2 Controls_i + \varepsilon_{2i} \\
Environmental_i &= \alpha_3 + \beta_{31} Policy_i + \beta_{32} SocialCapital_i + \beta_{33} Governance_i + \beta_{34} Tech_i + \gamma_3 Controls_i + \varepsilon_{3i} \\
Cultural_i &= \alpha_4 + \beta_{41} Policy_i + \beta_{42} SocialCapital_i + \beta_{43} Governance_i + \beta_{44} Tech_i + \gamma_4 Controls_i + \varepsilon_{4i}
\end{aligned}$$

where the dependent variables represent scores for the four dimensions (economic, social, environmental, cultural benefits) for household i' s resettlement area; α represents constant terms; β and γ are coefficients to be estimated; and ε represents random error terms.

Descriptive statistics for key variables are presented in Table 3.

Table 3 Descriptive Statistics of Variables

Variable Type	Variable	Measurement	Mean	Std. Dev.
Dependent	Integration effectiveness score	Calculated via CRITIC weighting	0.6320	0.1847
Policy Perception	Policy implementation	Government policy implementation: 1. Very negative; 2. Somewhat negative; 3. Neutral; 4. Somewhat positive; 5. Very positive	3.742	0.863
	Feedback channels	Availability of government feedback channels: 1. No; 2. Yes	0.682	0.466
Social Capital	Cadre relations	Relationship with community cadres: 1. Very poor; 2. Poor; 3. Neutral; 4. Good; 5. Very good	3.856	0.924
	Social networks	New interpersonal networks established: 1. No; 2. Yes	0.712	0.453
	Community acceptance	Local acceptance of migrants: 1. Not accepted; 2. Hard to say; 3. Accepted	2.634	0.742

Variable Type	Variable	Measurement	Mean	Std. Dev.
Community Governance	Community activities	Community activities organized: 1. Never; 2. Rarely; 3. Sometimes; 4. Often	2.853	1.124
	Public security	Perception of public security: 1. Very dissatisfied; 2. Dissatisfied; 3. Neutral; 4. Satisfied; 5. Very satisfied	3.925	0.856
Technology-enabled Agricultural Gains	New variety promotion	New crop varieties promoted: 1. No; 2. Yes	0.624	0.485
	Demonstration bases	Agricultural demonstration bases nearby: 1. No; 2. Yes	0.536	0.499
	Mechanization	Crop harvesting mechanization: 1. Manual; 2. Partial mechanization; 3. Full mechanization	1.842	0.763
	Cooperatives	Agricultural cooperatives: 1. No; 2. Yes	0.482	0.500
Controls	Gender	1. Male; 2. Female	1.381	0.486
	Age	Years	52.34	12.86
	Ethnicity	1. Han; 2. Hui; 3. Other minorities	1.219	0.456

Variable Type	Variable	Measurement	Mean	Std. Dev.
	Education	1. Primary or below; 2. Junior high; 3. Senior high; 4. College; 5. Undergraduate+	2.534	1.124
	Marriage	1. Unmarried/divorced; 2. Married	1.928	0.259
	Relocation timing	Years since relocation	7.842	3.256
	Household size	Number of family members	4.236	1.482
	Out-migration	Family members working outside: 1. No; 2. Yes	0.408	0.492
	Resettlement type	1. Centralized; 2. Dispersed	1.433	0.496

2. Results Analysis

2.1 Effectiveness Evaluation of Integration

2.1.1 Overall Effectiveness Assessment The integration effectiveness score for Ningxia' s poverty alleviation relocation resettlement areas is 0.6320, indicating a "good" level of integration (Table 4). Among the four dimensions, social benefits score highest (0.7125), while economic benefits score lowest (0.5236). Although dimension weights are relatively balanced, economic benefits carry the greatest weight (0.2837), demonstrating that economic performance is the primary concern for relocated households in the new-type urbanization process. Consequently, policy optimization and investment targeting the economic dimension are crucial for accelerating comprehensive integration. The negative correlation between weight and score suggests that current economic development has not met household expectations, and economic growth may not have effectively translated into tangible economic benefits for residents. While relocation creates new economic opportunities, without effective industrial support and employment training, relocated households continue to face economic adaptation challenges that hinder overall resettlement area development.

Table 4 Weights and Scores of Evaluation Indicators

Dimension	Weight	Score
Economic Benefits	0.2837	0.5236
Social Benefits	0.2426	0.7125
Environmental Benefits	0.2368	0.6842
Cultural Benefits	0.2369	0.6528
Overall	**1.0000**	**0.6320**

2.1.2 Regional Variation Analysis Integration effectiveness scores across Ningxia' s five prefecture-level cities reveal both challenges and advantages in the urbanization process (Table 5). The results show Wuzhong City (0.6987) significantly outperforms other cities, while Shizuishan City (0.5748) scores lowest, with a range of 0.1239. Wuzhong City' s superior performance stems from its relatively developed agricultural, industrial, and public service systems, enabling it to excel across all dimensions. Shizuishan City faces challenges likely related to industrial decline and population outflow, showing weaker performance in economic (0.4823) and social benefits (0.6234). Yinchuan and Zhongwei cities rank in the middle overall, though Yinchuan faces economic challenges (0.5123) requiring better balance between urbanization and economic restructuring. Environmental benefits show minimal inter-city variation, with Wuzhong (0.7245) and Zhongwei (0.7123) holding slight advantages, while Shizuishan (0.6542) faces ecological restoration challenges. For cultural benefits, Wuzhong (0.7241) and Zhongwei (0.6987) score higher, indicating successful cultural enrichment and identity building, while Shizuishan (0.6123) needs improvement in cultural activity diversity and accessibility.

Table 5 Effectiveness Evaluation Scores Across Five Ningxia Cities

City	Economic	Social	Environmental	Cultural	Overall
Wuzhong	0.6542	0.7345	0.7245	0.7241	0.6987
Zhongwei	0.5823	0.6987	0.7123	0.6987	0.6548
Yinchuan	0.5123	0.6845	0.6987	0.6823	0.6236
Guyuan	0.5236	0.6548	0.6842	0.6548	0.6125
Shizuishan	0.4823	0.6234	0.6542	0.6123	0.5748

Multiple comparison tests confirm statistically significant differences in integration effectiveness across cities, validating the regional variation analysis.

2.2 Analysis of Influencing Factors

2.2.1 Single-Indicator Regression Results We first conduct baseline regression using representative indicators from each influencing factor (Table 6). Age, marital status, relocation timing, household size, and resettlement type are significant at the 10% level or better, indicating these variables substantially affect integration effectiveness. As representative indicators are added,

the influence of control variables diminishes, suggesting their effects are limited and not primary determinants of integration outcomes. Models 3-6, which progressively add policy implementation, cadre-mass relations, community acceptance, and agricultural demonstration bases, show these four indicators are significant at the 1% level. This demonstrates that integration effectiveness is shaped by multiple factors rather than any single determinant, necessitating comprehensive analysis.

Table 6 Baseline Regression Results for Individual Indicators

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	0.002**	0.001*	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ethnicity	0.023	0.018	0.016	0.015	0.014	0.013
	(0.018)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Education	0.012	0.010	0.008	0.007	0.006	0.005
	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Marriage	0.062**	0.058**	0.052*	0.048*	0.045	0.042
	(0.028)	(0.027)	(0.026)	(0.026)	(0.026)	(0.026)
Relocation timing	0.008***	0.007***	0.006**	0.006**	0.005**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Household size	-0.015**	-0.012*	-0.010	-0.009	-0.008	-0.007
	(0.007)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Out-migration	0.032	0.028	0.024	0.022	0.020	0.018
	(0.021)	(0.020)	(0.019)	(0.019)	(0.019)	(0.019)
Resettlement type	0.058**	0.052**	0.048**	0.045*	0.042*	0.038*
	(0.023)	(0.022)	(0.021)	(0.021)	(0.021)	(0.021)
Policy implementation		0.124***	0.118***	0.112***	0.108***	0.102***
		(0.018)	(0.017)	(0.017)	(0.017)	(0.017)
Cadre relations			0.086***	0.082***	0.078***	0.074***
			(0.016)	(0.016)	(0.016)	(0.016)
Community acceptance				0.092***	0.088***	0.084***
				(0.019)	(0.019)	(0.019)
Demonstration bases					0.068***	0.064***
					(0.018)	(0.018)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.412***	0.356***	0.324***	0.298***	0.274***	0.252***
	(0.068)	(0.065)	(0.062)	(0.061)	(0.061)	(0.060)
N	662	662	662	662	662	662
R^2	0.124	0.186	0.234	0.268	0.296	0.324

Note: N = observations; R^2 = goodness-of-fit; **,** , and * denote significance at 1%, 5%, and 10% levels respectively; robust standard errors in parentheses.*

2.2.2 Composite-Indicator Regression Results Using composite indicators for each key factor, regression analysis shows that policy perception, social capital, community governance, and technology-enabled agricultural gains all exert positive and statistically significant effects on integration effectiveness (Table 7). Effective policy implementation and household perception of policies substantially influence overall outcomes by improving living standards and building confidence in resettlement area development. Social capital plays a critical role in fostering trust, cooperation, and social support networks among households, enhancing their sense of belonging and participation in new-type urbanization. Community governance improves public services and social security, thereby increasing social stability and quality of life. Technology-enabled agricultural gains boost household economic self-sufficiency and productivity, facilitating better integration into urbanized life. Together, these factors significantly enhance integration effectiveness.

In the composite regression, community governance shows the largest coefficient (0.156), while social capital shows the smallest (0.084), indicating differential impact magnitudes among key factors. The relatively large coefficient for community governance suggests it plays a more prominent role in driving integration. Effective community governance not only improves public services and infrastructure but also promotes social order and stability—critical for relocated households adapting to new-type urbanization. In contrast, social capital may influence integration more indirectly, as its effects depend on long-term social interaction and cultural adaptation, whereas community governance improvements can yield more immediate impacts on living conditions and social participation.

Table 7 Baseline Regression Results for Composite Indicators

Variable	Coefficient	Std. Error	t-value
Policy perception	0.124***	0.018	6.89
Social capital	0.084***	0.016	5.25
Community governance	0.156***	0.020	7.80
Technology-enabled agricultural gains	0.098***	0.017	5.76
Individual characteristics	Yes		

Variable	Coefficient	Std. Error	t-value
Household features	Yes		
City fixed effects	Yes		
Constant	0.212***	0.058	3.66
N	662		
R^2	0.386		

2.3 Robustness Tests

2.3.1 Variable Replacement To verify model robustness, we replace explanatory and dependent variables with alternative measures. In single-indicator regressions, we substitute original indicators with other representative measures. In composite-indicator regressions, we replace the dependent variable by re-measuring integration effectiveness using the entropy-based TOPSIS method. Results show that regardless of whether individual indicators are replaced or the effectiveness measurement approach is changed, the significance levels and directional effects of all variables remain largely consistent, confirming the robustness of our findings.

2.3.2 Quantile Regression Unlike traditional OLS regression that relies on mean estimation, quantile regression reveals how effects vary across the distribution. Results (Figure 1) show that the influence of key factors remains relatively stable across different quantiles, confirming the robustness of our earlier empirical findings.

Figure 1 [Figure 1: see original paper] Quantile Regression Coefficient Variations of Key Factors

2.4 Heterogeneity Analysis

2.4.1 SUR Model Results The SUR model results (Table 8) reveal how key factors affect different integration dimensions. Policy perception has the largest impact on economic benefits (coefficient: 0.142) and environmental benefits (0.128), as it directly affects government policy execution, infrastructure development, industrial support, and social identity. Social capital most strongly influences social benefits (0.156) by enhancing community trust and cooperation, thereby promoting social integration and belonging. Community governance primarily improves quality of life through public services and social security, showing particular strength in social benefits (0.168) but more indirect effects on economic benefits (0.082). Technology-enabled agricultural gains directly boost economic benefits (0.134) by enhancing productivity and economic autonomy, while having more indirect effects on social (0.062) and cultural benefits (0.058) through improved livelihoods that facilitate social integration and cultural adaptation. Overall, except for technology-enabled gains focusing on

economic benefits, community governance, policy perception, and social capital exert greater influence on social benefits.

Table 8 Seemingly Unrelated Regression Results

Variable	Economic	Social	Environmental	Cultural
Policy perception	0.142***	0.106***	0.128***	0.098***
	(0.024)	(0.022)	(0.023)	(0.021)
Social capital	0.068**	0.156***	0.084**	0.072**
	(0.028)	(0.026)	(0.027)	(0.025)
Community governance	0.082**	0.168***	0.112***	0.094***
	(0.032)	(0.030)	(0.031)	(0.029)
Technology-enabled agricultural gains	0.134***	0.062*	0.088**	0.058*
	(0.026)	(0.024)	(0.025)	(0.023)
Controls	Yes	Yes	Yes	Yes
N	662	662	662	662

2.4.2 Resettlement Method Heterogeneity Different resettlement methods exhibit varying resource allocation and social support capacities. Centralized resettlement typically enables better concentration of resources and social services with more complete infrastructure, while dispersed resettlement can avoid excessive social pressure but may suffer from resource fragmentation. Regression results by resettlement type (Table 9) show that policy perception effects vary significantly: intra-county centralized resettlement shows the largest coefficient (0.186), as these households maintain closer ties to original social networks and thus provide more direct policy feedback. Social capital has stronger effects on dispersed methods like labor migration (0.156) and 插花移民 (0.142), as these households rely more on social networks for support; in centralized resettlement, tight community structure and accessible public resources reduce social capital' s relative importance. Community governance positively and significantly affects all resettlement types, demonstrating its crucial role in managing public resources and coordinating resident relations. Technology-enabled agricultural gains significantly improve effectiveness across all types, though effects are weaker for labor migration (0.068), likely because these households engage more in non-agricultural activities. Overall, centralized resettlement shows slightly higher effectiveness scores (0.6542) than dispersed resettlement (0.6125), with more pronounced promotion by key factors.

Table 9 Heterogeneity Analysis Results by Resettlement Method

Variable	Intra-county Centralized	Inter-county Centralized	Small-scale Land Development	Labor Migration	插花移民
Policy perception	0.186***	0.124***	0.142***	0.086**	0.098**
	(0.032)	(0.028)	(0.030)	(0.034)	(0.031)
Social capital	0.072**	0.084**	0.092**	0.156***	0.142***
	(0.028)	(0.026)	(0.027)	(0.036)	(0.033)
Community governance	0.168***	0.152***	0.146***	0.134***	0.128***
	(0.036)	(0.032)	(0.034)	(0.038)	(0.035)
Technology-enabled agricultural gains	0.124***	0.116***	0.134***	0.068*	0.112**
	(0.030)	(0.026)	(0.028)	(0.032)	(0.029)
Controls	Yes	Yes	Yes	Yes	Yes
N	220	155	132	155	138

4. Discussion and Conclusions

4.1 Conclusions

This study evaluates the integration of poverty alleviation relocation resettlement areas into new-type urbanization in Ningxia and identifies key influencing factors, yielding four main conclusions:

1. **Overall integration effectiveness is good but economically constrained.** Ningxia' s resettlement areas achieved an integration score of 0.6320, indicating good performance. However, economic benefits dominate the weighting (28.37%) while scoring lowest (0.5236), revealing a negative weight-score correlation. This suggests economic growth has not sufficiently benefited residents, warranting greater attention to economic construction in resettlement areas.

2. **Regional and resettlement-type heterogeneity is significant.** Integration effectiveness varies markedly across cities and resettlement meth-

ods, though the range is moderate (0.1239). The ranking is Wuzhong > Zhongwei > Yinchuan > Guyuan > Shizuishan, with Wuzhong leading across all dimensions. Centralized resettlement slightly outperforms dispersed resettlement (0.6542 vs. 0.6125), as centralized methods benefit from concentrated resources, better infrastructure, and stronger community support systems. Future policies should account for these local and modal differences to avoid "one-size-fits-all" approaches and enable more targeted support.

3. **Multidimensional factors drive integration, with governance being paramount.** Policy perception, social capital, community governance, and technology-enabled agricultural gains all significantly promote integration, while individual and household characteristics have limited influence. Among these factors, community governance shows the largest effect size, as it directly enhances quality of life, social participation, and sense of belonging—critical elements for successful integration.

4. **Factor effects vary by dimension and resettlement type.** The SUR model reveals that different factors operate through distinct mechanisms across benefit dimensions. Policy perception most strongly affects economic and environmental benefits; social capital primarily influences social benefits; community governance excels in improving social benefits; and technology-enabled gains focus on economic benefits. Heterogeneity analysis shows policy perception and technology have stronger effects in centralized resettlement, while social capital matters more for dispersed resettlement. These findings suggest that differentiated policies should be implemented based on local conditions and resettlement types.

4.2 Policy Recommendations

Based on these findings, we propose four policy recommendations:

1. **Prioritize sustainable and inclusive economic growth.** Policies should strengthen the link between industrial development and household income, creating positive interactions between agricultural and non-agricultural sectors. Industrial restructuring must ensure that relocated households can access increased employment opportunities and income sources to tangibly experience economic growth benefits. Special attention should focus on making economic gains more accessible to residents, balancing overall development with household-level benefits.

2. **Implement differentiated policies addressing regional weaknesses.** For economically weaker areas with uneven resource distribution, increase investment in infrastructure and social services to ensure adequate support. In resource-rich areas, focus on optimizing resource allocation, strengthening social security systems, and enhancing social benefits. Each city should address its specific dimensional shortcomings: Shizuishan needs economic revitalization; Yinchuan must balance urban-

ization with structural adjustment; and all cities can learn from Wuzhong' s comprehensive approach.

3. **Integrate technology-enabled agricultural gains with economic adaptation.** Government should further promote agricultural technology adoption to boost productivity and value-added. For labor migration and other non-agriculture-dependent resettlement types, increase non-agricultural skills training to enhance employability and promote economic self-reliance. Technology dissemination should be tailored to the economic structure of each resettlement area.

4. **Strengthen community governance and social capital.** Local governments should enhance community governance capacity and build trust and cooperation among community members. Encourage participation in community organizations or cooperatives to improve social management, belonging, and participation. For dispersed resettlement areas, actively develop social capital by strengthening mutual support networks and promoting social resource integration. Governance improvements should be prioritized as they yield faster and more direct effects on integration outcomes.

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Note: Figure translations are in progress. See original paper for figures.