Residential Satisfaction and Its Influencing Factors among Ecological Migration Residents in Villages and Towns: A Postprint

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Abstract

Studying the residential satisfaction of ecological migration village and town residents and improving their living environment quality holds both theoretical and practical significance. Taking typical ecological migration villages and towns in Ningxia as the study area, this research employs interview-based questionnaires and structural equation modeling to construct a residential satisfaction indicator system, exploring the characteristics and influencing factors of residents' residential satisfaction. The results indicate: (1) The overall residential satisfaction of ecological migration village and town residents is relatively high; however, satisfaction levels in the three dimensions of public space, supporting facilities, and environmental conditions are slightly lower, with residential satisfaction ranking from high to low as Zhenbeibao Town, Xinghai Town, Hongsibu Town, and Xingjing Town. (2) The mean satisfaction scores of different resident groups all exceed 3.5, indicating a relatively high satisfaction level, but significant differences exist among resident groups with different attributes; residential satisfaction perception is lower among middle-aged and young residents, those with a large family burden coefficient, those with higher education levels, those with migration duration exceeding 30 years, those unwilling to reside permanently, and those experiencing housing crowding. (3) The residential satisfaction of ecological migration village and town residents is influenced by five aspects: neighborhood environment, organizational management, public space, environmental conditions, and supporting facilities.

Full Text

Preamble

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A Study on Residential Satisfaction and Its Influencing Factors Among Residents of Ecological Immigrant Villages and Towns

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Abstract

Studying residential satisfaction among residents of ecological immigrant villages and towns holds both theoretical and practical significance for improving their living environments. This research examines typical ecological immigrant villages and towns in Ningxia, constructing a residential satisfaction index system based on interview questionnaires and employing a structural equation model to explore the characteristics of residential satisfaction and its influencing factors. The results indicate that: (1) Overall residential satisfaction among residents of ecological immigrant villages and towns is relatively high, though satisfaction regarding public spaces, supporting facilities, and environmental conditions is slightly lower. The ranking of residential satisfaction levels across the studied towns, from high to low, is Zhenbeipu, Xinghai, Hongsipu, and Xingjing. (2) The average satisfaction score across different resident groups exceeds 3.5, indicating a relatively high satisfaction level, yet substantial differences exist among groups with different attributes. Young and middle-aged residents, those with large family burden coefficients, those with higher education levels, those who relocated more than 30 years ago, those unwilling to reside permanently, and those who perceive their housing as crowded exhibit lower residential satisfaction. (3) Residential satisfaction in ecological immigrant villages and towns is influenced by five dimensions: neighborhood environment, organizational management, public space, environmental conditions, and supporting facilities.

Keywords: residential satisfaction; ecological immigrant villages and towns; influencing factors; structural equation model

Introduction

Research on ecological migration originated in the early 20th century with Cowles' initial concept of "ecological migration." International scholarship has evolved from "environmental refugees"and "ecological refugees"to "environmental migrants" and finally to "ecological migration," defined as population migration phenomena resulting from the combined effects of ecological environments and other factors. In China, ecological migration carries dual significance for poverty

alleviation and ecological protection, similar to the concept of "poverty alleviation through relocation." China' s ecological migration began in the early 1980s when Ningxia responded to the national "Three Wests" (Hexi and Dingxi in Gansu, and Xihaigu in Ningxia) poverty alleviation policy, initially employing the unique "diaozhuang" (hanging village) migration model and later adopting poverty relocation models. This involved targeted relocation of impoverished populations from the southern mountainous and central arid regions of Ningxia to new settlements, completing large-scale resettlement of over one million people and forming multiple ecological immigrant villages and towns in central and northern Ningxia.

As living standards improve among residents of ecological immigrant villages and towns, demands for living environments and spatial quality have increased, necessitating research on residential satisfaction. Current studies on residential satisfaction primarily focus on urban communities, old residential districts, rental housing, urban villages, and traditional villages, with limited attention to special study areas like ecological immigrant villages and towns. Moreover, most research concentrates on specific groups such as the elderly, migrant workers, urbanizing farmers, and floating populations, while paying insufficient attention to ecological immigrants themselves. Methodologically, while various approaches including adjustment models, structural equation models, and remote sensing technologies have been widely applied, most studies focus on the immediate post-relocation period, with less attention to residents who have lived in these areas for extended periods. In terms of measurement indicators, most research emphasizes the physical built environment while giving less attention to neighborhood environments and public spaces.

Therefore, this study takes typical ecological immigrant villages and towns in Ningxia as the research area, constructing an index system covering both living environment and neighborhood social environment aspects. Through field survey data collection and structural equation modeling, it reveals residential satisfaction and its influencing factors, aiming to contribute to both ecological immigrant village and town development and residential satisfaction research, while providing recommendations for future decision-making.

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1. Study Area Overview

This study selected four typical ecological immigrant villages and towns: Hongsipu, Zhenbeipu, Xinghai, and Xingjing [Figure 1: see original paper]. Hongsipu Town represents the Ningxia Poverty Alleviation through Yellow River Irrigation Project ("1236" Project) and is the largest ecological immigrant settlement area in China, having implemented resettlement since 1998 and accommodating populations from Tongxin, Haiyuan, Xiji, Yuanzhou, Pengyang, Jingyuan, and Longde counties, totaling 2.3$×10^{5}$ people. Zhenbeipu Town is a typical "diaozhuang" immigrant area that began resettlement in

1983 and has since developed into a nationally recognized tourism-featured town. Xinghai Town, formerly Ningxia Longhu Economic Development Zone, represents a typical labor migration area. Xingjing Town began immigration work and development construction in 1983 and, after more than 30 years of development, has become a typical logistics and trade town.

2.1 Data Sources

This study employed random sampling questionnaires and face-to-face interviews. Based on the proportional distribution of relocated populations, 400, 200, 200, and 200 questionnaires were distributed in Hongsipu, Zhenbeipu, Xinghai, and Xingjing towns respectively in August 2021, yielding 960 valid questionnaires (96% recovery rate). Resident residential satisfaction perception dimensions primarily included environmental conditions, neighborhood environment, supporting facilities, and organizational management, encompassing 17 measurement indicators. A five-point Likert scale was used for satisfaction evaluation, with survey data analyzed using Excel and SPSS software.

2.2 Research Methods

The study first employed SPSS software descriptive statistics to explore overall characteristics and dimensional features of residential satisfaction in ecological immigrant villages and towns. Cross-tabulation analysis examined satisfaction perception differences among different resident groups. Exploratory factor analysis extracted potential variables affecting residential satisfaction, and confirmatory factor analysis was conducted using Amos 23.0 software to construct a structural equation model of residential satisfaction influencing factors. The complete structural equation model is expressed through linear equations:

The measurement model is represented as:

$$y = \Lambda_y \eta + \varepsilon$$
$$x = \Lambda_x \xi + \delta$$

The structural model is:

$$\eta = B\eta + \Gamma\xi + \zeta$$

Where: y is the vector of endogenous observed variables; Λ_y is the matrix of relationships between endogenous observed variables and endogenous latent variables; η is the vector of endogenous latent variables; ε is the vector of residual terms for endogenous observed variables; x is the vector of exogenous observed variables; Λ_x is the matrix of relationships between exogenous observed variables and exogenous latent variables; ξ is the vector of exogenous latent variables; δ is

the vector of residual terms for exogenous observed variables; B is the matrix of relationships among endogenous latent variables; Γ is the matrix of relationships between exogenous and endogenous latent variables; and ζ is the error term of the structural equation model. Equations (1) and (2) are measurement models, while equation (3) is the structural model, collectively known as the structural equation model [31,37].

3.1.1 Overall Characteristics of Residential Satisfaction

Evaluation results show that the overall mean residential satisfaction score is 3.78, indicating good overall satisfaction . Specifically, 26.0% of residents reported being "very satisfied," over half felt "satisfied," 13.1% felt "neutral," 9.9% felt "dissatisfied," and only 2.1% felt "very dissatisfied." Across different dimensions, satisfaction levels ranked from high to low as: neighborhood environment (4.08), organizational management (3.92), public space (3.68), supporting facilities (3.52), and environmental conditions (3.45). With urban development and improved facilities, relocated residents are generally satisfied with their current living conditions, though certain dimensional environments require improvement.

3.1.2 Residential Satisfaction Characteristics Across Different Towns

Evaluation results across different towns show varying satisfaction levels . The overall ranking from high to low is Zhenbeipu (4.01), Xinghai (3.85), Hongsipu (3.72), and Xingjing (3.53). Across dimensions, Xingjing shows extremely low satisfaction with public space (2.98), while other towns exceed 3.5. Xinghai shows lower satisfaction with supporting facilities (3.31), while Xingjing shows lower satisfaction with organizational management (3.42). Both neighborhood environment and environmental condition satisfaction exceed 3.5 across all towns, indicating relatively high overall satisfaction levels.

Since the 1980s, ecological migration projects have significantly improved immigrants' living conditions. However, due to construction standards and technological limitations at the time, housing construction and living environments have issues, creating substantial gaps with current resident needs. Supporting facilities are insufficient, public activity space is inadequate, and the external environment urgently requires improvement, leading to generally low satisfaction with these physical environmental issues.

3.2 Group Differentiation in Residential Satisfaction Perception

Analysis of different resident groups reveals generally positive overall perception but internal differences based on socioeconomic attributes .

Regarding individual characteristics, minimal gender differences exist. Age analysis shows 36-45 year-olds constitute the highest proportion. Satisfaction scores are higher among children and elderly residents (both >3.8), as elderly residents are satisfied with improved living conditions while children are generally less concerned. However, residents aged 18-35 and 36-45, with higher life expectations and demands, show lower satisfaction (<3.7).

Family size analysis reveals 71.28% of households have 3-5 members, typically comprising two adults with one child or elderly parent, while households exceeding five members account for 12.11%. Larger family burden coefficients correlate with lower satisfaction, as smaller family burdens indicate better living conditions and higher satisfaction.

Educational attainment shows 44.98% with primary school education and 33.56% with junior high school education, concentrated below high school level. However, residents with lower education levels show greater contentment with current conditions, while those with university education or above report a mean satisfaction of only 3.51, indicating that higher education correlates with higher living demands and lower satisfaction.

Relocation duration analysis shows residents with <10 years and 10-20 years since relocation report mean satisfaction >3.8, while those with >30 years report only 3.52. Initial satisfaction was high among early relocators, but after 30 years, rising living standards and environmental expectations have decreased satisfaction.

Relocation type analysis shows 70.93% participated in government-organized collective relocation, while 29.07% relocated spontaneously. Spontaneous relocators report slightly higher satisfaction (>3.8), indicating voluntary migration correlates with greater contentment.

Housing conditions show 84.78% of residents live in brick-tile or brick-concrete structures, with few remaining adobe houses. Better structural quality correlates with higher satisfaction. However, 9.34% perceive their housing as very crowded, reporting low satisfaction (2.91), while 44.29% feel neutral about crowding.

Permanent residence intention analysis shows 92.73% are willing to remain permanently with high satisfaction (3.85), while the remaining 7.27% (mostly with better economic conditions or alternative destinations) show lower satisfaction (3.24).

3.3.1 Exploratory Factor Analysis

Exploratory factor analysis reveals that water conditions, cleanliness, noise environment, air environment, and housing quality primarily reflect environmental conditions, constituting the first main factor with 21.423% contribution . Transportation facilities, commercial services, education facilities, and medical facilities reflect surrounding supporting facilities as the second main factor (21.719% contribution). Public space quantity and quality reflect public space conditions as the third factor (11.287% contribution). Village affairs transparency and community management reflect organizational management as the fourth factor (10.750% contribution). Resident homogeneity and neighborhood relations reflect neighborhood environment as the fifth factor (10.889% contribution).

3.3.2 Structural Equation Model Construction

Based on exploratory factor analysis results, a structural equation model was constructed to examine causal relationships between satisfaction measurement indicators and overall residential satisfaction [Figure 2: see original paper]. The model includes five exogenous latent variables (environmental conditions, supporting facilities, public space, organizational management, and neighborhood environment), 17 exogenous observed variables, and one endogenous latent variable (residential satisfaction) with five endogenous observed variables. Based on this model, the following hypotheses were proposed:

H1: Environmental conditions are positively correlated with residential satisfaction
H2: Supporting facilities are positively correlated with residential satisfaction
H3: Public space is positively correlated with residential satisfaction
H4: Organizational management is positively correlated with residential satisfaction
H5: Neighborhood environment is positively correlated with residential satisfaction

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3.3.3 Structural Equation Model Testing

Model Reliability and Validity Testing
Confirmatory factor analysis using Amos 23.0 software examined each latent variable's measurement indicators. All variables'Cronbach's α coefficients ranged 0.826-0.887 (>0.7), indicating strong reliability [38]. Standardized factor loadings ranged 0.710-0.892 (>0.5), showing each latent variable is well-explained by its observed variables. Item reliability ranged 0.504-0.796, composite reliability ranged 0.829-0.888 (>0.7), and average variance extracted ranged 0.605-0.785 (>0.5), demonstrating good convergent validity [39]. The model exhibits strong overall reliability and validity .

Model Fit Testing
The residential satisfaction measurement model was evaluated using eight fit indices . Results show: relative chi-square (CMIN/DF) = 2.368 (<3.0), root mean square error of approximation (RMSEA) = 0.038 (<0.08), standardized root mean square residual (SRMR) = 0.032 (<0.05), comparative fit index (CFI) = 0.978 (>0.9), goodness-of-fit index (GFI) = 0.961 (>0.9), adjusted goodness-of-fit index (AGFI) = 0.945 (>0.9), Tucker-Lewis index (TLI) = 0.972 (>0.9), and normed fit index (NFI) = 0.953 (>0.9). All parameters fall within ideal ranges, indicating excellent overall model fit.

3.3.4 Influencing Factors Analysis

Model results show all five hypotheses are supported [FIGURE:3, TABLE:7]. Influencing factors ranked by impact magnitude are: neighborhood environment, organizational management, environmental conditions, public space, and supporting facilities. These dimensions interact to jointly affect residential satisfaction.

Neighborhood Environment shows the strongest significant positive effect on residential satisfaction ($P < 0.001$), supporting H5. Most residents originate from the same or neighboring villages/towns, fostering harmonious neighborhood relations. Factor loadings for neighborhood relations and resident homogeneity are 0.85 and 0.81 respectively, indicating strong influence.

Organizational Management significantly impacts residential satisfaction ($P < 0.001$), supporting H4. Community management and village affairs transparency show factor loadings of 0.79 and 0.82 respectively. The COVID-19 pandemic has highlighted community management' s importance, increasing resident attention to community policies and management.

Environmental Conditions affect residential satisfaction significantly ($P < 0.001$), supporting H1. Better environmental conditions correlate with higher satisfaction. However, some older residential areas suffer from material deterioration, requiring improvements in housing, water, cleanliness, and air quality.

Public Space significantly influences residential satisfaction ($P < 0.001$), supporting H3. As essential venues for daily life and social interaction, public spaces have gained increasing attention. Enhancing public space quantity and quality can effectively improve satisfaction.

Supporting Facilities also significantly affect residential satisfaction ($P < 0.05$), supporting H2. As external hardware for daily life, well-developed facilities provide substantial convenience. Transportation, education, and commercial service facilities receive particular attention from residents, and improving these can effectively enhance satisfaction.

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4. Discussion

Residents' subjective evaluations of residential satisfaction are based on comparisons with pre-relocation living conditions. Despite significant environmental improvements and high satisfaction levels, long-term considerations reveal that as living standards rise, so do living demands, potentially decreasing satisfaction with current conditions over time.

This study integrates individual attribute characteristics with objective features to quantitatively examine residential satisfaction characteristics and influencing factors among ecological immigrant village and town residents, addressing literature gaps that emphasize qualitative description and single-factor analysis. The measurement indicators incorporate both physical built environment and social neighborhood interaction dimensions. The structural equation model effectively explains differential impacts across dimensions, informing targeted future improvements.

However, the questionnaire-based data collection has limitations in sample size, and further investigation is needed to explore residents' potential implicit cognitions.

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5. Conclusions

1) The mean residential satisfaction score among ecological immigrant village and town residents is 3.78, indicating good overall satisfaction. Across dimensions, satisfaction ranks from high to low as: neighborhood environment, organizational management, public space, supporting facilities, and environmental conditions. Across towns, satisfaction ranks from high to low as: Zhenbeipu, Xinghai, Hongsipu, and Xingjing, with dimensional variations across towns.

2) Average satisfaction across different resident groups exceeds 3.5, indicating relatively high satisfaction, but substantial differences exist among groups. Young and middle-aged residents, those with large family burden coefficients, higher education levels, relocation duration exceeding 30 years, unwillingness to reside permanently, and perceived housing crowding correlate with lower satisfaction perception.

3) Residential satisfaction is influenced by five dimensions: neighborhood environment, organizational management, public space, environmental conditions, and supporting facilities, ranked by impact magnitude as: neighborhood environment > organizational management > environmental conditions > public space > supporting facilities.

4) Comprehensive improvement is needed to enhance residential satisfaction. Neighborhood environment is the most influential factor. Environmental conditions, public space, and supporting facilities require prioritized up-

grading. Beyond establishing sound community governance systems and strengthening resident interaction to promote neighborhood relations, improvements should focus on upgrading physical environments, creating harmonious public spaces, and developing supporting facilities.

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