

Article

Farmers' Satisfaction with Land Expropriation System Reform: A Case Study in China

Chenxi Li ¹ , Jingyao Wu ², Zenglei Xi ^{3,4,*} and Weiqiang Zhang ⁵

¹ School of Public Administration, Xi'an University of Architecture and Technology, Xi'an 710055, China; lichexi@xauat.edu.cn

² Shaanxi Mineral Resources and Geological Survey, Xi'an 710068, China; 2012160040@cugb.edu.cn

³ School of Economics, Hebei University, Baoding 071000, China

⁴ Research Centre of Resources Utilization and Environmental Conservation, Hebei University, Baoding 071000, China

⁵ School of Economics and Management, China University of Geosciences, Beijing 100083, China; 3007210012@email.cugb.edu.cn

* Correspondence: hbuxzl@hbu.edu.cn

Abstract: Farmers' satisfaction with reform of the land expropriation system has not been fully examined, so it is difficult to comprehensively and successfully judge the effectiveness of the reforms. Traditional statistical methods cannot accurately explain the relationship between the variables. In order to fully understand the implementation, progress, and applicability of land expropriation system reform, this paper analyzes the factors influencing farmers' satisfaction, presents the shortcomings of land expropriation system reform, and puts forward improvement suggestions. Taking the land expropriation system reform pilot in Dingzhou city as an example, this paper investigates the satisfaction of the farmers who have had their land expropriated by establishing a structural equation model (SEM) to obtain feedback on the implementation effect of the pilot work. The results show that the factors affecting farmers' satisfaction with the reform of land expropriation systems can be summarized into four variables: land expropriation compensation standard, land income distribution, land expropriation security mode, and land expropriation procedure. The parameter estimation between these four potential variables and their corresponding observation variables shows that, in the process of land expropriation, the comparison of land expropriation compensation standards and observation variables with market entry projects is an important factor affecting the satisfaction of farmers with regard to land expropriation. The income of municipal and county governments and village collective incomes have a great impact on farmers, indicating that the satisfaction of farmers is not only related to the absolute level of compensation and income, but is also affected by the relative level. In addition, providing farmers with a variety of reasonable security methods is an important element to enable the smooth progress of land expropriation. Furthermore, attention should also be paid to the formulation of land expropriation schemes and emergency plans to solve land expropriation conflicts.

Keywords: land expropriation system reform; pilot; farmers' satisfaction; structural equation model



Citation: Li, C.; Wu, J.; Xi, Z.; Zhang, W. Farmers' Satisfaction with Land Expropriation System Reform: A Case Study in China. *Land* **2021**, *10*, 1353. <https://doi.org/10.3390/land10121353>

Academic Editors: Baojie He, Ayyoob Sharifi, Chi Feng and Jun Yang

Received: 20 October 2021

Accepted: 7 December 2021

Published: 8 December 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

In recent years, with the rapid development of the economy and urbanization, land expropriation in developing countries has been increasing [1–3]. In China, urban construction land area increased from 6720 km² in 1981 to 49,982.7 km² in 2014, with a net increase of 43,262.7 km², an increase of 6.44 times, and an average annual growth rate of 6.27% [4]. The expansion of the urban space scale has mainly been realized by the transformation of rural collective-owned land to state-owned land. Land expropriation is an inevitable phenomenon in the process of rapid urbanization [5–7]. Meanwhile, with the continuous expansion of China's urban scale, there have been a series of significant problems, such as

the widening gap between urban and rural areas, environmental damage, rapid population growth, resource crisis, and so on. Among them, the issue of land has become a key factor affecting China's rural stability [8,9]. In recent years, the disadvantages of the current land expropriation system have been gradually revealed, and conflict between farmers and the government has increased. Therefore, the reform of the land expropriation system continues to become a hot, and difficult, topic in Chinese society.

In order to further strengthen the reform of the land expropriation system and effectively safeguard farmers' land rights and interests, in 2015, the former Ministry of Land and Resources launched a pilot reform of rural land expropriation in 33 counties (cities and districts) in China [10]. With the development of the practice and the strengthening of the reform, the incompatibility between the current land expropriation system and the socialist market economic system has becoming increasingly obvious. The main problems include: the expropriation scope is too wide, the compensation and resettlement standards are low, the land expropriation procedure is opaque, the relief channels are not cleared, the farmers who have had their land expropriated lack the right to speak, and the distribution of land appreciation income is unreasonable, etc. [11]. At present, the reform of China's rural land expropriation system has entered a critical period. According to their own characteristics, each pilot area explores the reform effect by formulating local expropriation system reform policies. How to scientifically and reasonably evaluate the policy effect of the pilot area has become an urgent problem to be solved in current academic circles and land management departments.

Taking the land expropriation system reform pilot in Dingzhou city as an example, this paper analyzes the satisfaction of farmers who have had their land expropriated by establishing a structural equation model (SEM) to provide feedback on the implementation effect of the pilot work. The remainder of the paper is organized as follows: Section 2 provides a literature review on land right systems, land expropriation compensation systems, land expropriation system reform and farmers' satisfaction with it, and the influencing factors on reform. Section 3 describes the data collection, data processing, and sample analysis. Section 4 proposes the structural equation model used in this work. Section 5 provides the empirical results of the research. Section 6 concludes this research.

2. Literature Review

2.1. Land Expropriation System Reform

In recent years, under the leadership of the Chinese government, the level of social development and urbanization has increased rapidly [12]. In the process of urban construction and modernization, the land expropriation system has played an important role in allocating land resources [13,14]. Through land expropriation, rural land is transferred from agricultural land to urban construction land, from agricultural use to construction use, and from collective land ownership to state ownership.

The current land expropriation system in New China began in 1949, and the framework for the land expropriation system was initially established in 1955. From 1956 to 1998, the land acquisition system was basically unchanged. From 1982 to 1997, it was at a perfect stage. After the reform and opening up, the land acquisition process entered a formal development period, and the land acquisition system gradually showed the characteristics of comprehensiveness and diversification. The period from 1998 to 2011 was the reform and exploration stage. During this period, the basic framework of the reformed land expropriation system was established and the paid use system of state-owned land was implemented. From 2012 to now, the system has been in a stage of deepening reform. The Land Management Law, amended for the third time in 2019, formally upgraded the previous land expropriation system policy documents and the successful practices of local practice exploration into national law. The new Land Management Law was implemented on 1 January 2020, improving the legal guarantees for collective operating construction land to enter the market, and is an important milestone in the elimination of the dual system of urban and rural land.

Land is the most basic means of agricultural production [15–20]. Large-scale land expropriation has a profound impact on the way of life and the production of local farmers. After the country completed the unified land expropriation, problems regarding housing, social security resettlement, and fairness arose. The existing research on land expropriation reform mainly has three viewpoints.

The first view agrees with the existing land acquisition system, and advocates improving and establishing the negotiation mechanism between the state, the collective, and farmers, and coordinating the relationship among them [21]. For example, the people-oriented new urbanization strategy needs to benefit most people. The land acquisition model represented by southern Jiangsu converts the land appreciation income into government public revenue, which can be used for the construction of urban affordable housing projects [22]. The second view advocates operating the two systems in parallel to promote the entry of collective land into the market while improving the expropriation rights [23]. While standardizing the management of entering the market and refining the income distribution of entering the market, the reform of land acquisition should be strengthened and the level of land acquisition compensation and guarantee improved, achieving coordination and balance with one drop and one rise [24]. The third view is that the right of rural land should be confirmed to enable the land to enter the market through circulation [25]; that is, to abolish the “monopoly” of the government and give full play to the role of the market. For example, the government’s exclusive land acquisition and exclusive land sales monopolized the land sources, resulting in a significant increase in land prices and house prices [26]. Therefore, accelerating the formation of a construction land market, establishing a land trading market, and shifting from exclusive land acquisition and monopoly land supply by local governments to multi-channel market-oriented land supply was suggested.

The contradiction of land acquisition at this stage stems from the conflict between the government and farmers; that is, the government attaches importance to macro-control, whereas an improvement in farmers’ self-awareness depends more on their own income [27–30]. For example, land expropriation strengthens farmers’ awareness of land rights, changes the allocation of agricultural land resources among farmers’ families, and thus changes farmers’ behavior [31–35]. Based on the socialist system of New China, the goal of common prosperity, the imperfect land market, and the unique risk-sharing and social security functions of the land, we believe that the solution is not to cancel the land acquisition system but to improve it and enhance the satisfaction of farmers.

2.2. Farmers’ Satisfaction and the Influencing Factors

At present, the research on farmers’ satisfaction with regard to land expropriation mostly uses first-hand data obtained by means of field questionnaire surveys and structured interviews [35–43]. The main methods used in the studies are the multivariate ordered logistic regression model [44], factor analysis [45], principal component analysis [46], and the structural equation model [47].

Scholars have also studied the factors that influence farmers’ satisfaction regarding land expropriation. The influencing factors mainly include compensation procedures, compensation standards, compensation methods, compensation distribution, etc., and these factors affect each other [10]. When land expropriation is used for public welfare construction, farmers’ satisfaction with land expropriation is significantly higher than when the land is used for non-public welfare construction [48]. In addition, the satisfaction of the cadres and the participants in the process of the land expropriation in Liu village is also significant (in addition, whether Liu village had the right to know and participate in the process of land expropriation in 2016 is also significant). The inconsistency between the current land expropriation system and farmers’ understanding of land property rights is a key factor affecting farmers’ willingness to undertake land expropriation.

The formulation of land expropriation standards in developed countries mainly focuses on three aspects: the identification of land expropriation projects (that is, the determination of public interests), the optimization and rigor of land expropriation procedures,

and the compensation for the land expropriated [49]. The focus of land expropriation compensation research in developed countries is different from that in developing countries. Land expropriation compensation in developed countries strictly abides by laws and policies. The research on land expropriation compensation in developing countries focuses on various controversial issues of paying reasonable compensation, in which the interests of farmers have not been fully guaranteed. Many studies have been carried out on the land expropriation system in China, which has reached a certain depth and breadth [10]. At present, the research mainly focuses on reducing the scope of land expropriation, improving land expropriation procedures, reforming land expropriation compensation standards, and income distribution. However, there are still some deficiencies. Farmers' satisfaction with land expropriation reform has not been fully considered, so it is difficult to comprehensively and effectively judge the effectiveness of the reform. Traditional statistical methods cannot effectively explain the relationship between the variables.

The basic respondent information includes gender, age status, education level, health level, family size, number of labor force individuals in the respondents' families, etc. Employment and social security information includes: whether the respondents enjoy employment security, occupational satisfaction, housing living area, housing satisfaction, environmental satisfaction, public security satisfaction, neighborhood satisfaction, whether there are activity rooms and entertainment places, attitude towards land expropriation, satisfaction with land acquisition policies, participation in endowment insurance, social security satisfaction, what employment assistance the government has provided, whether it is necessary for the government to provide free employment training, whether the current minimum living security standard for landless farmers and herdsmen can ensure the basic needs of poor families, and the source of funds required for the establishment of a social security system for landless farmers and herdsmen. The index of procedural rights consists of the right to know, the right to participate, the right to express, and the right to supervise.

Based on the perspective of farmers' satisfaction regarding the land expropriation system, most of the existing studies use questionnaires or interviews. The contents of the surveys mainly include the following five aspects: the basic situation of the respondents, the political resources and economic income of the interviewed farmers, employment and social security, and the composition of procedural rights indicators.

The structural equation model is a statistical method used to analyze the relationship between variables based on the covariance matrix of variables. It is an important tool for multivariate data analysis. Traditional statistical methods cannot analyze these latent variables effectively, while structural equation models can examine latent variables and their indexes at the same time. Traditional linear regression analysis allows measurement errors in dependent variables, but it should be assumed that independent variables have no errors. Structural equation models are often used in confirmatory factor analysis, high-order factor analysis, path and causal analysis, multi-period design, simplex models, and multi-group comparisons. Therefore, a structural equation model can better analyze and explain the variables selected in this study (i.e., analyze the variables that cannot be observed directly), and the use of a structural equation model is more applicable than other models.

3. Theoretical Framework and Research Hypothesis

By consulting materials, reading literature, and investigating the actual situation with regard to the Dingzhou reform, this paper analyzes the land expropriation procedures, land expropriation compensation standards, land expropriation security mode, land income distribution, and other aspects that may affect farmers' satisfaction with regard to the reform of the land expropriation system. The specific indicators selected for evaluation mainly include land expropriation announcement, scheme formulation, public opinion feedback, contradiction mediation, actual compensation amount, changes in living standards, comparison with market projects, living security, old-age security, medical security,

employment security, income of municipal and county governments, village collective income, income of land-expropriated farmers, etc.

According to the determined influencing factors (variables), combined with the actual situation and theory, this paper explains how the relevant factors will affect farmers' satisfaction. In the process of using a structural equation model, according to the logic of "putting forward hypothesis–building theoretical model–model simulation–hypothesis test", this paper puts forward the following hypothesis (Figure 1):

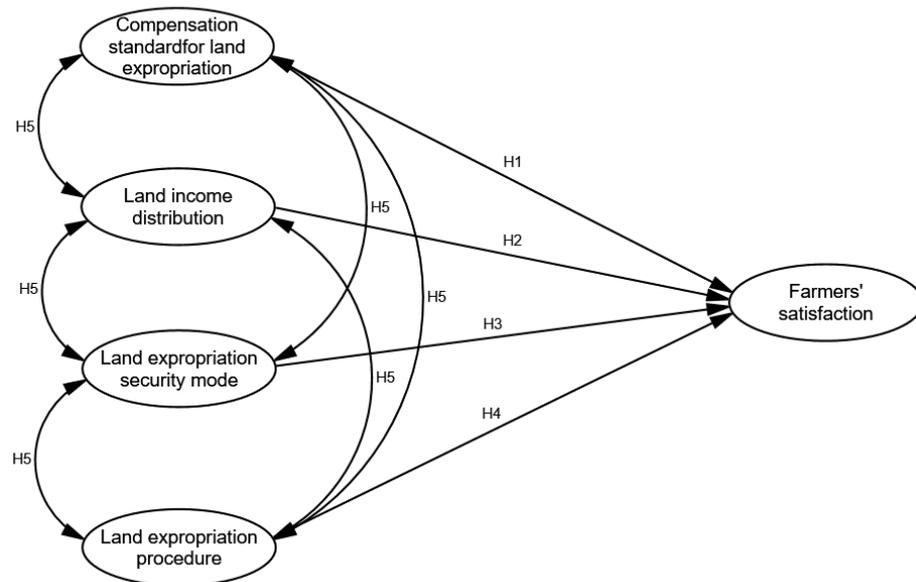


Figure 1. Research hypothesis.

Hypothesis 1 (H1). *The land expropriation compensation standard has a significant positive impact on farmers' satisfaction;*

Hypothesis 2 (H2). *Land income distribution has a significant positive impact on farmers' satisfaction;*

Hypothesis 3 (H3). *The land expropriation security model has a significant positive impact on farmers' satisfaction;*

Hypothesis 4 (H4). *Land expropriation procedures have a significant positive impact on farmers' satisfaction;*

Hypothesis 5 (H5). *Land expropriation compensation standard, land income distribution, land expropriation security model, and land expropriation procedures have a positive impact on each other.*

4. Materials and Methods

4.1. Study Context

As one of the regions undertaking pilot reform of the land expropriation system in China, Dingzhou city has notable contradictions regarding land use and frequent land expropriation activities, which are representative of those in other county and municipal cities in northern China [10,37]. This paper analyzes the factors influencing farmers' satisfaction with the process of land expropriation and the relationship between them. This study is conducive to obtaining feedback on the effectiveness of land expropriation system reform, thus identifying the areas in which the reform is more successful and the areas in which it is insufficient, in order to find the experiences that can be replicated and the problems that need to be corrected. The research results may provide policy suggestions for government management departments in the reform of land expropriation systems and in promoting reform.

The Dingzhou land acquisition project has a total area of 14.55 hectares of rural collective land, all of which is collectively owned by rural villages in Dingzhou, and includes 14.26 hectares of agricultural land and 0.29 hectares of construction land. This land acquisition involves 147 land-requisitioned farmers, all of whom have signed compensation agreements, accounting for 100% of the land-requisitioned farmers.

4.2. Methods

Structural equation modeling (SEM) examines the relationship between observation variables and latent variables, and the relationship between latent variables and latent variables by setting the observation variables of each latent variable [50]. According to the index system of farmers' satisfaction with the reform of the land expropriation system, the latent variables are four influencing factors: land expropriation compensation standard, land expropriation security mode, land income distribution, and land expropriation procedure, all of which are latent variables and cannot be measured directly. There are 14 observation variables, which were directly obtained from a questionnaire survey. The relationship between the variables in the model can be expressed by the following three matrix equations [50]:

Measurement equations:

$$X = \Lambda_x \alpha \quad (1)$$

$$Y = \Lambda_y \beta + \partial \quad (2)$$

Structural equation:

$$\alpha = B \alpha + I \beta + \zeta \quad (3)$$

where X is the endogenous index vector; α is an endogenous latent variable vector; Λ_x , where x is the α factor load matrix on; ε and ∂ are measurement error vectors; Y is the exogenous index vector; β is an exogenous latent variable vector; Λ_y , where y is the β factor load matrix on; B is an endogenous latent variable α coefficient matrix of interaction between; I is an exogenous latent variable β endogenous latent variable α coefficient matrix of influence; and ζ is the residual vector. The best fit test was carried out using the maximum likelihood estimation method and the likelihood chi square, and CFI, NFI, IFI, and RMSEA were used to consider the goodness of fit of the model [50].

4.3. Research Samples and Data Collection

The data used in this study is from the questionnaire survey conducted by the research group on the land-expropriated farmers in the pilot land expropriation reform in Dingzhou city, Hebei province from March to May 2017. A total of 160 questionnaires were distributed to the land-expropriated farmers, with 9 invalid questionnaires excluded due to incomplete information, leaving 151 valid questionnaires. The effective rate of the questionnaire was 94.38%.

By consulting materials, reading literature, and investigating the actual situation regarding the Dingzhou reform, this paper analyzes the land expropriation procedures, land expropriation compensation standards, land expropriation security mode, land income distribution, and other aspects that may affect farmers' satisfaction with regard to the reform of the land expropriation system. The specific indicators selected for evaluation mainly include land expropriation announcement, scheme formulation, public opinion feedback, contradiction mediation, actual compensation amount, changes in living standards, comparison with market projects, living security, old-age security, medical security, employment security, income of municipal and county governments, village collective income, income of land-expropriated farmers, etc.

This study quantifies the farmers' satisfaction using the selected indicators. As it is difficult to measure with specific values, in order to obtain more accurate results, the satisfaction evaluation index is quantified. Using the Likert scale method, it is divided into five satisfaction levels: very satisfied, more satisfied, general, less satisfied, and dissatisfied. The index is quantified in combination with the 10-point system data assignment method,

that is, 10 points for very satisfactory, 7 points for relatively satisfactory, 5 points for general, 3 points for relatively unsatisfactory, and 1 point for unsatisfactory [50]. After repeated modification and improvement, the design of the questionnaire on the pilot reform of the land expropriation system in Dingzhou city was completed. Through the analysis of the farmers' satisfaction, this paper studies the main factors affecting that satisfaction and the relationship between these factors.

5. Quantitative Analysis of the Factors Influencing Farmers' Satisfaction

5.1. Evaluation and Test of Validity and Reliability

After collecting the survey data, we first needed to verify and analyze the quality of the questionnaire data, and evaluate and test the validity and reliability of the questionnaire so as to ensure the scientific rationality and reliability of the questionnaire.

5.1.1. Validity Test

Validity analysis mainly includes content validity and structure validity. The higher the accuracy of the measurement, the higher the validity of the measurement [51].

Content validity refers to the representativeness of measurement tools on content measurement, which results in subjective indicators [52]. Based on a literature search, this study summarizes the evaluation research related to farmers' satisfaction with land expropriation, and constructs an initial scale. In addition, through in-depth interviews with government personnel, village cadres, and farmers in the study area, the views and opinions of the relevant personnel on farmers' satisfaction with land expropriation were collected. Combined with the theoretical elements of the literature and the realistic elements of the respondents, the content validity of this paper meets the requirements.

Structural validity refers to the corresponding relationship between the framework and the measured value, and exploratory factor analysis is often used [53]. In this paper, KMO and Bartlett's sphericity test are used to measure the correctness of the selected measurement variables. The KMO value calculated by IBM SPSS statistics 20.0 software is 0.728 (i.e., greater than 0.7), Bartlett's approximate chi square value is 2347.562, and the Sig. value is 0.000 (i.e., less than 0.05), which is suitable for an exploratory factor analysis (Table 1). Therefore, this paper uses principal component analysis (PCA) to explore the main factors affecting farmers' satisfaction.

Table 1. Test results of KMO and Bartlett.

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		0.728
Bartlett's sphericity test	Approximate chi square	2347.562
	df	190
	Sig.	0.000

5.1.2. Principal Component Analysis

Principal component analysis was performed using IBM SPSS statistics 20.0 software. In the process of principal component analysis, the eigenvalue greater than 1 is used as the evaluation standard for screening. The index selection basis of principal component is that the load of observation variables must be greater than 0.5. The maximum orthogonal rotation method is used to calculate the factor load matrix. According to the load matrix, 14 observation variables are summarized, the principal components are extracted, and the clear and reasonable practical significance is given.

Four principal components were extracted by principal component analysis, with contribution rates of 46.760%, 11.160%, 9.649%, and 7.055%, respectively, and the cumulative contribution rate reached 74.624% (Table 2). This indicates that the extracted four principal components are acceptable. The factor loads of 14 observation variables are greater than 0.5 and do not need to be eliminated.

Table 2. Principal component analysis results.

Component	Initial Eigenvalue			Extract Sum of Squares Load			Rotation Sum of Squares Loading		
	Total	Variance Percentage	Cumulative Percentage	Total	Variance Percentage	Cumulative Percentage	Total	Variance Percentage	Cumulative Percentage
1	9.352	46.760	46.760	9.352	46.760	46.760	3.853	19.265	19.265
2	2.232	11.160	57.921	2.232	11.160	57.921	3.751	18.757	38.022
3	1.930	9.649	67.569	1.930	9.649	67.569	3.684	18.420	56.442
4	1.411	7.055	74.624	1.411	7.055	74.624	3.636	18.182	74.624
5	0.942	4.712	79.335						
6	0.746	3.731	83.066						
7	0.669	3.344	86.410						
8	0.617	3.087	89.497						
9	0.561	2.803	92.300						
10	0.376	1.878	94.179						
11	0.255	1.273	95.451						
12	0.233	1.164	96.615						
13	0.166	0.829	97.444						
14	0.145	0.723	98.167						

According to the rotated factor load matrix, the four principal components can be defined, classified, and named as: land expropriation compensation standard, land income distribution, land expropriation security mode, and land expropriation procedure, which correspond to the contents of the land expropriation system reform mentioned above. The factor load matrix after rotation is shown in Table 3.

Table 3. Rotation component matrix.

	Component			
	1	2	3	4
X1	0.699	0.165	0.113	0.345
X2	0.815	0.258	0.058	0.045
X3	0.585	0.433	0.412	−0.070
X4	0.229	0.251	0.747	0.138
X5	0.053	0.302	0.847	0.117
X6	0.258	0.030	0.817	0.259
X7	0.232	0.653	0.205	0.282
X8	0.339	0.670	−0.142	0.362
X9	0.220	0.814	0.217	0.146
X10	0.118	0.756	0.413	0.086
X11	0.292	0.003	0.562	0.642
X12	0.387	−0.006	0.469	0.613
X13	0.004	0.346	0.057	0.823
X14	−0.024	0.309	0.138	0.839

Note: Extraction method: principal component; Rotation method: Kaiser standardized orthogonal rotation method; The rotation converges after 13 iterations.

The first principal component includes three indicators: actual compensation amount, changes in living standards, and comparison with market projects, named land expropriation compensation standard.

The second principal component includes four indicators: life security, old-age security, medical security, and employment security, which reflects the impact of different security methods in the compensation process on the satisfaction regarding land expropriation system reform and is named land expropriation security mode.

The third principal component includes three indicators: income of municipal and county governments, income of village collectives, and income of land-expropriated farmers, reflecting the distribution of land value-added income among various beneficiaries, and is named land income distribution.

The fourth principal component includes four indicators: land expropriation notice, scheme formulation, public opinion feedback, and contradiction mediation. This belongs to the scope of land expropriation procedure and is thus named land expropriation procedure.

5.1.3. Reliability Analysis

Reliability refers to the degree of consistency of the results obtained by repeated measurement on the same object in the same way [54]. The reliability test of data analyzes whether the questionnaire can stably measure the variables of the established index system, and tests whether the results obtained after multiple measurements are consistent and stable. Cronbach's reliability coefficient (α reliability coefficient) is one of the most commonly used methods [55–57].

The larger the coefficient of Cronbach's α , the higher the reliability of the data. When the coefficient of Cronbach's α is ≥ 0.7 , the data are highly reliable and acceptable [56].

Using SPSS statistics 20.0 software, the reliability analysis was selected and the data imported to test the reliability. The reliability coefficient of Cronbach's α of the total amount table was 0.938, which met the standard. This proved the reliability of the questionnaire.

The coefficient of Cronbach's α was used to detect the internal consistency of each factor level and the total table. The reliability coefficients of Cronbach's α of four sub-tables and the total table were greater than 0.8, which met the standard (Table 4).

Table 4. Reliability statistics results.

	Cronbach's Alpha	Number
X1–X14	0.938	14
X1–X3	0.892	3
X4–X6	0.880	3
X7–X10	0.878	4
X11–X14	0.885	4

5.2. Construction of Satisfaction Index System for Land Expropriation System Reform

According to the above four principal components, the first-level indicators of land expropriation system reform satisfaction are divided into 4 s-level indicators and 14 third-level indicators (Table 5). The second-level indicators show the factors that may affect the satisfaction of farmers regarding land expropriation, including land expropriation compensation standard, land income distribution, land expropriation security mode, and land expropriation procedure. The data collected by the questionnaire include 14 observation variables.

Table 5. Land expropriation system reform and farmers' satisfaction index system.

First-Level Indicators	Second-Level Indicators (Latent Variable)	Third-Level Indicators (Observation Variable)	Variable Symbol
Satisfaction with the reform of land expropriation system	Compensation standard for land expropriation	Actual compensation limit	X1
		Changes in living standards	X2
		Comparison with land market transactions	X3
	Land income distribution	Income from municipal and county governments	X4
		Village collective income	X5
		Income of land-expropriated farmers	X6
	Land expropriation security mode	Living security	X7
		Pension security	X8
		medical security	X9
		Employment security	X10
	Land expropriation procedure	Land expropriation announcement	X11
		Formulation of land expropriation plan	X12
		Public opinion feedback	X13
		Contradiction mediation	X14

6. Results and Discussion

6.1. Sample Analysis

First, the basic information regarding the individuals and the families of the investigated farmers was counted (Table 6). Among all the respondents, males accounted for 68.87% and females 31.13%. Among the investigated farmers, with regard to the different age levels, farmers aged 50–59 years accounted for the largest proportion, approximately 27.15%, and farmers aged 18–29 years accounted for the smallest proportion, 7.95%. The distribution of the education level results showed that the education level of most farmers was junior middle school and senior high school, accounting for 61.59%. The distribution of farmers' occupations was approximately 47.02%. The farmers' occupations were in agriculture and odd jobs work, accounting for 31.13% and 21.85%. The number of family members for most farmers was 3–4, accounting for 64.23%.

Table 6. Basic characteristics of individuals and families of the surveyed farmers.

Basic Characteristics	Description	Sample	Proportion
Gender	Male	104	68.87%
	Female	47	31.13%
Age	18–29	12	7.95%
	30–39	29	19.21%
	40–49	32	21.19%
	50–59	41	27.15%
	>60	37	24.50%
Education level	Illiteracy	0	0.00%
	Primary school	36	23.84%
	Junior middle school	44	29.14%
	High school/Technical secondary school	49	32.45%
	College or above	22	14.57%
Occupation	Farming	47	31.13%
	Farming and odd jobs	71	47.02%
	Odd jobs	33	21.85%
Total number of families	1	6	3.97%
	2	34	22.52%
	3	51	33.77%
	4	46	30.46%
	5	14	9.27%

6.2. Model Modification

6.2.1. Structural Equation Model Establishment

According to the model hypothesis, data test, and farmers' satisfaction evaluation index system of land expropriation system reform, a structural equation model, including 4 potential variables and 14 observation variables, was constructed (Figure 2). The satisfaction structure equation model of farmers regarding land expropriation system reform was constructed using IBM SPSS Amos 21.0. A cause-and-effect path map was set up and the program was run according to the requirements. The goodness-of-fit test is shown in Table 7. The ratio of chi squared to degrees of freedom was 3.499, and the values of NFI and TLI were less than 0.9, which did not meet the goodness-of-fit test, indicating that the model needed to be corrected [58,59].

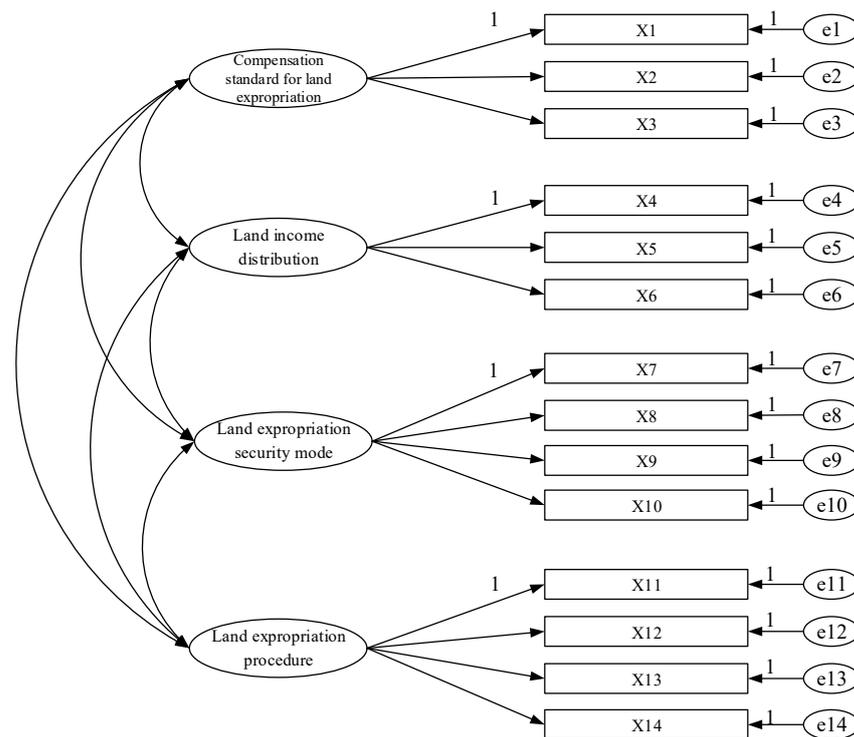


Figure 2. Structural equation model of farmers’ satisfaction regarding land expropriation system reform.

Table 7. Modified model fitting degree test index results.

Test Index	χ^2/df	CFI	NFI	IFI	TLI	PNFI	PCFI	PGFI
Initial fitting value	3.499	0.905	0.874	0.907	0.858	0.586	0.607	0.507
Corrected fitting value	2.292	0.940	0.901	0.941	0.916	0.643	0.672	0.561
Fitting standard	<5.00	>0.90	>0.90	>0.90	>0.90	>0.50	>0.50	>0.50

6.2.2. Structural Equation Model Modification

After the fixed parameters were re-estimated as free parameters, the modified model shown in Figure 3 was obtained. The results of the modified model test and goodness of fit are shown in Table 7. The ratio of chi squared to degrees of freedom was 2.292; CFI, NFI, IFI, and TLI were greater than 0.9; and PNFI, PCF, and PGFI were greater than 0.5, which met the requirements of the model test and goodness of fit, indicating that the modified theoretical model was more suitable for the data, which showed that the design of the structural equation model was relatively reasonable [60,61].

6.3. Hypothesis Test

6.3.1. Relationship between Latent Variables

The coefficient between the latent variables indicated the degree to which the change of one variable leads to the change of other variables [50]. There was a high correlation between the land expropriation compensation standard and land income distribution, with a coefficient of 0.93. The land expropriation compensation standard had a certain correlation with the land expropriation security mode and land expropriation procedure, and the coefficients were 0.41 and 0.64, respectively. There was a certain correlation between the land income distribution and land expropriation security mode and land expropriation procedure, and the coefficients were 0.67 and 0.71, respectively. The correlation coefficient between the land expropriation security mode and land expropriation procedure was 0.66.

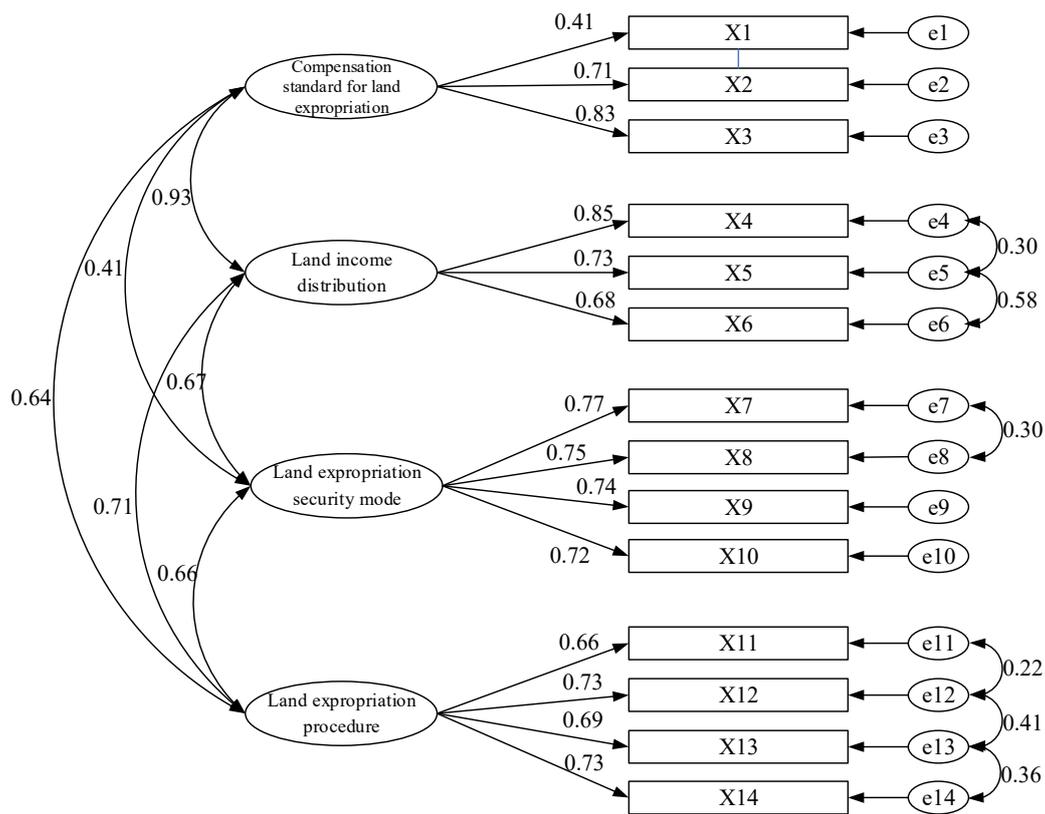


Figure 3. Modified structural equation model of farmers’ satisfaction. Note: The number in the figure represents the standardized path coefficient.

6.3.2. Relationship between Latent Variables and Farmers’ Satisfaction

This paper analyzes the relationship between latent variables and observation variables in the farmers’ satisfaction index regarding land expropriation system reform, and tests the observation variables that have the greatest impact on the potential variables. The estimated parameters of 14 observation variables in the structural equation model are shown in Table 8.

Table 8. The relationship between the land expropriation compensation standard and farmers’ satisfaction.

			S.E.	P
X1	<—	zdbc bz		
X2	<—	zdbc bz	1.826	0.005 **
X3	<—	zdbc bz	3.029	0.002 **
X4	<—	zdbc fp		
X5	<—	zdbc fp	0.064	***
X6	<—	zdbc fp	0.088	***
X7	<—	zdbc ms		
X8	<—	zdbc ms	0.082	***
X9	<—	zdbc ms	0.089	***
X10	<—	zdbc ms	0.097	***
X11	<—	zdbc cx		
X12	<—	zdbc cx	0.117	***
X13	<—	zdbc cx	0.156	***
X14	<—	zdbc cx	0.173	***

Note: *** $p < 0.001$; ** $p < 0.01$.

- (1) The relationship between the land expropriation compensation standard and farmers’ satisfaction

The latent variable compensation standard for land expropriation was positively correlated with the observed variable actual compensation limit, changes in living standards, and comparison with land market transactions. Among them, the coefficient of comparison with land market transactions (0.87) was the highest, indicating that the comparison between the compensation standard for land expropriation and comparison with land market transactions is an important factor affecting farmers' satisfaction regarding the reform of the land expropriation system [10].

(2) The relationship between the land income distribution and farmers' satisfaction

The latent variable land income distribution was positively correlated with the observed variables, such as income from municipal and county governments, village collective income, and income of land-expropriated farmers. Among them, the coefficient of income from municipal and county governments (0.85) was the highest, followed by village collective income (0.73), which reflects that income from municipal and county governments and village collective income have a great impact on farmers' satisfaction in the process of land expropriation.

(3) The relationship between the land expropriation security mode and farmers' satisfaction

The latent variable land expropriation security mode was related to the observed variables living security, pension security, medical security, and employment security. Among them, living security (0.77), pension security (0.75), medical security (0.74), and employment security (0.72) affected farmers' satisfaction with regard to the reform of the land expropriation system to varying degrees. Land can provide a security function for farmers (Verburg et al., 2013). In the process of land expropriation, providing reasonable security for farmers is an important condition for the smooth progress of land expropriation.

(4) The relationship between the land expropriation procedure and farmers' satisfaction

The latent variable land expropriation procedure was positively related to the observation variables, including land expropriation announcement, formulation of land expropriation plan, public opinion feedback, and contradiction mediation. Among them, the coefficients of formulation of the land expropriation plan (0.73) and contradiction mediation (0.73) were the highest, indicating that in the process of land expropriation, we should focus on the land expropriation scheme and the emergency plan to solve the conflicts around land expropriation [62–65].

7. Conclusions

Taking the reform of the land expropriation system in Dingzhou city, Hebei province as an example, this paper tested the reliability and validity of farmers' satisfaction with land expropriation, constructed a structural equation model, modified the parameter estimation results and standardized path coefficient of the hypothetical model, and finally summarized four factors affecting farmers' satisfaction with land expropriation, including the land expropriation compensation standard, land expropriation security mode, land income distribution, and land expropriation procedure.

According to the research results of this paper, Hypothesis 1 (the land expropriation compensation standard has a significant positive impact on farmers' satisfaction) was established. Hypothesis 2 (land income distribution has a significant positive impact on farmers' satisfaction) also passed the test. Hypothesis 3 (the land expropriation security model has a significant positive impact on farmers' satisfaction) and Hypothesis 4 (land expropriation procedures have a significant positive impact on farmers' satisfaction) were verified. Hypothesis 5 (land expropriation compensation standard, land income distribution, land expropriation security model, and land expropriation procedures have a positive impact on each other) was confirmed, and the direction of the impact between the variables was also established.

As the direct interest subject of land expropriation system reform, farmers' satisfaction is important feedback on the effect of land expropriation system reform, which directly

affects the effect of land expropriation system reform. In the process of land expropriation, the comparison of the land expropriation compensation standard and observation variables with market entry projects is an important factor affecting the satisfaction of farmers in land expropriation. Municipal and county government income and village collective income have a great impact on farmers, indicating that farmers' satisfaction is not only related to the absolute level of compensation and income, but also affected by the relative level. In addition, providing farmers with a variety of reasonable security methods is an important link for the smooth progress of land expropriation. At the same time, we should also pay attention to the formulation of a land expropriation scheme and emergency plan to solve land expropriation conflict.

In this paper, the analysis of farmers' satisfaction regarding the pilot land expropriation reform was only focused on the pilot plots in the eastern region. In future, pilot areas should be selected from the northeast, central, and western regions to compare the different reasons for farmers' satisfaction with the pilot reforms in the various regions. Since the experimental sample is a land expropriation project, there are three main occupations that can be summarized according to the actual situation of the sample. Therefore, in future research, the differences caused by occupation in the national land expropriation sample project should be discussed.

Author Contributions: Conceptualization, C.L. and J.W.; methodology, C.L.; software, J.W.; validation, C.L., J.W. and Z.X.; formal analysis, C.L. and J.W.; investigation, C.L. and J.W.; resources, C.L. and J.W.; data curation, C.L. and J.W.; writing—original draft preparation, C.L. and J.W.; writing—review and editing, Z.X. and W.Z.; visualization, Z.X.; supervision, C.L.; project administration, C.L.; funding acquisition, C.L. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Shaanxi Province Soft Science Research Project (grant number 2021KRM093), the Joint Project of Major Theoretical and Practical Problems in the Social Sciences of Shaanxi Province (grant number 20ST-98), the Joint Project of Major Theoretical and Practical Problems in the Social Sciences of Shaanxi Province (grant number 2021HZ0540), the Social Science Fund of Shaanxi Province (grant number 2020R051), and Xi'an University of Architecture and Technology Humanities and Social Sciences Special Project (grant number SK20014; ZR20074).

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Xi'an University of Architecture and Technology (Approval No. XAUAT 20170305; Date of approval: 5 March 2017).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Acknowledgments: The authors sincerely thank the editor and anonymous reviewers for their valuable comments and suggestions to improve the quality of this paper.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Liu, Y.; Li, Y. Revitalize the world's countryside. *Nature* **2017**, *548*, 275–277. [[CrossRef](#)] [[PubMed](#)]
2. Li, C.; Gao, X.; Wu, J.; Wu, K. Demand prediction and regulation zoning of urban-industrial land: Evidence from Beijing-Tianjin-Hebei Urban Agglomeration, China. *Environ. Monit. Assess.* **2019**, *191*, 412. [[CrossRef](#)] [[PubMed](#)]
3. Langton, D.M. Autocracy, Institutional Constraints and Land Expropriation: A Conceptual Analysis of Land Redistribution in Zimbabwe. *J. Public Adm. Gov.* **2020**, *10*, 327–349. [[CrossRef](#)]
4. Fan, Z.; Li, S. Spatio-temporal analysis of the economic benefit and driving mechanism of urban build-up land occupying the cultivated land in China since 1990. *Acta Ecol. Sin.* **2021**, *41*, 374–387.
5. Guo, X. Land Expropriation and Rural Conflicts in China. *China Q.* **2001**, *166*, 422–439. [[CrossRef](#)]
6. Hui, E.C.M.; Bao, H.J.; Zhang, X.L. The policy and praxis of compensation for land expropriations in China: An appraisal from the perspective of social exclusion. *Land Use Policy* **2013**, *32*, 309–316. [[CrossRef](#)]
7. Tsui, C.C. From public interest to public obligation: Compulsory land expropriation for capital reconstruction in Nationalist China. *Urban Hist.* **2020**, 1–18. [[CrossRef](#)]

8. Kan, K. The social politics of dispossession: Informal institutions and land expropriation in China. *Urban Stud.* **2020**, *57*, 3331–3346. [[CrossRef](#)]
9. Yan, Z.; Wei, F.; Deng, X.; Li, C.; Qi, Y. Does Land Expropriation Experience Increase Farmers' Farmland Value Expectations? Empirical Evidence from the People's Republic of China. *Land* **2021**, *10*, 646. [[CrossRef](#)]
10. Li, C.; Xi, Z. Social Stability Risk Assessment of Land Expropriation: Lessons from the Chinese Case. *Int. J. Environ. Res. Public Health* **2019**, *16*, 3952. [[CrossRef](#)]
11. Looney, K.; Rithmire, M.E. Urbanization with Chinese Characteristics? China's Gamble for Modernization. Available online: <https://hbswk.hbs.edu/item/urbanization-with-chinese-characteristics-china-s-gamble-for-modernization> (accessed on 18 February 2016).
12. Rong, W.; Student, P.D. Legal protection from physical form to form of value: On the transformation of China's land right system. *Soc. Sci. China* **2003**, *130*, 16527–16529.
13. Chekole, S.D.; de Vries, W.T.; Durán-Díaz, P.; Shibeshi, G.B. Analyzing the effects of institutional merger: Case of cadastral information registration and landholding right providing institutions in Ethiopia. *Land* **2021**, *10*, 404. [[CrossRef](#)]
14. Zhu, J. From Land Use Rights to Land Development Rights: Institutional Change in China's Urban Development. *Urban Stud.* **2004**, *41*, 191–220. [[CrossRef](#)]
15. Thu, T.T.; Perera, R. Consequences of the two-price system for land in the land and housing market in Ho Chi Minh City, Vietnam. *Habitat Int.* **2011**, *35*, 30–39. [[CrossRef](#)]
16. Grotius, H. On the law of war and peace. *Hist. Econ. Thought Books* **2010**, *39*, 404–406.
17. Wang, M. *French Administrative Law*; China University of Political Science and Law Press: Beijing, China, 1988.
18. Larbi, W.O. Spatial planning and urban fragmentation in Accra. *Third World Plan. Rev.* **1996**, *18*, 193. [[CrossRef](#)]
19. Courtney, J.M. Intervention through Land Use Regulation. In *Urban Land Policy: Issues and Opportunities*; Dunkerley, H.B., Ed.; Oxford University Press: Oxford, UK, 1983; Chapter 6.
20. Whitehead, C.M.E. The rationale for government intervention. In *Urban Land Policy: Issues and Opportunities*; Dunkerley, H.B., Ed.; Oxford University Press: Oxford, UK, 1983.
21. Rivkin, M.D. Intervention through direct participation. In *Urban Land Policy: Issues and Opportunities*; Dunkerley, H.B., Ed.; Oxford University Press: Oxford, UK, 1983; Chapter 7.
22. Dao, N. Dam development in Vietnam: The evolution of dam-induced resettlement policy. *Water Altern.* **2010**, *3*, 324–340.
23. Eaton, J.D. *Real Estate Valuation in Litigation*, 2nd ed.; Appraisal Institute: Chicago, IL, USA, 1995.
24. Denver-Green, B. Compulsory purchase and compensation. In *The Estate Gazette Limited*, 4th ed.; Estates Gazette: London, UK, 1994.
25. Chaudhry, S. *Land Acquisition Laws and Practices in Karnataka with a Focus on the Compensation in Acquisition of Land for the Companies and Urban Layouts. Fiscal Policy Institute, Summer Internship*; NLSIU: Karnataka, India, 2011.
26. Mezgebo, T.G.; Porter, C. From rural to urban, but not through migration: Household livelihood responses to urban reclassification in northern Ethiopia. *J. Afr. Econ.* **2020**, *29*, 173–191. [[CrossRef](#)]
27. Lichfield, N. Land policy: Seeking the right balance in government intervention—An overview. *Urban Law Policy* **1980**, *3*, 193–203.
28. Yang, J.; Guo, A.; Li, Y.; Zhang, Y.; Li, X. Simulation of landscape spatial layout evolution in rural-urban fringe areas: A case study of Ganjingzi District. *GISci. Remote Sens.* **2018**, *56*, 388–405. [[CrossRef](#)]
29. Feldman, S.; Geisler, C. Land expropriation and displacement in Bangladesh. *J. Peasant. Stud.* **2012**, *39*, 971–993. [[CrossRef](#)]
30. Hull, M.S. Ruled by records: The expropriation of land and the misappropriation of lists in Islamabad. *Am. Ethnol.* **2008**, *35*, 501–518. [[CrossRef](#)]
31. Jun, Y.; Weiling, L.; Yonghua, L.; Xueming, L.; Quansheng, G. Simulating intraurban land use dynamics under multiple scenarios based on fuzzy cellular automata: A case study of jinzhou district, Dalian. *Complexity* **2018**, *2018*, 7202985. [[CrossRef](#)]
32. Mahalingam, A.; Vyas, A. Comparative evaluation of land acquisition and compensation processes across the world. *Econ. Political Wkly.* **2011**, *32*, 94–102.
33. Zou, X.; Oskam, A.J. New Compensation Standard for Land Expropriation in China. *China World Econ.* **2007**, *15*, 107–120. [[CrossRef](#)]
34. Bao, H.; Peng, Y. Effect of land expropriation on land-lost farmers' entrepreneurial action: A case study of Zhejiang Province. *Habitat Int.* **2016**, *53*, 342–349. [[CrossRef](#)]
35. Ma, X.; Dai, M.; Fan, D. Land expropriation in tourism development: Residents' attitudinal change and its influencing mechanism. *Tour. Manag.* **2020**, *76*, 103957. [[CrossRef](#)]
36. Zhan, S. Accumulation by and without dispossession: Rural land use, land expropriation, and livelihood implications in China. *J. Agrar. Chang.* **2019**, *19*, 447–464. [[CrossRef](#)]
37. Yang, J.; Yang, R.; Chen, M.H.; Su, C.H.; Zhi, Y.; Xi, J. Effects of rural revitalization on rural tourism. *J. Hosp. Tour. Manag.* **2021**, *47*, 35–45. [[CrossRef](#)]
38. Lin, Q.; Tan, S.; Zhang, L.; Wang, S.; Wei, C.; Li, Y. Conflicts of land expropriation in China during 2006–2016: An overview and its spa-tio-temporal characteristics. *Land Use Policy* **2018**, *76*, 246–251. [[CrossRef](#)]
39. Jacoby, H.G.; Li, G.; Rozelle, S. Hazards of Expropriation: Tenure Insecurity and Investment in Rural China. *Am. Econ. Rev.* **2002**, *92*, 1420–1447. [[CrossRef](#)]

40. Hong, K.; Zhou, Y.; Zhu, M.; Zhang, Y. A Game Analysis of Farmland Expropriation Conflict in China under Multi-Dimensional Preference: Cooperation or Resistance? *Land* **2021**, *10*, 124. [[CrossRef](#)]
41. Zhao, D.; Arshad, M.; Wang, J.; Triantafyllis, J. Soil exchangeable cations estimation using Vis-NIR spectroscopy in different depths: Effects of multiple calibration models and spiking. *Comput. Electron. Agric.* **2021**, *182*, 105990. [[CrossRef](#)]
42. Cai, M.; Sun, X. Institutional bindingness, power structure, and land expropriation in China. *World Dev.* **2018**, *109*, 172–186. [[CrossRef](#)]
43. Xie, Y. Land expropriation, shock to employment, and employment differentiation: Findings from land-lost farmers in Nanjing, China. *Land Use Policy* **2019**, *87*, 104040. [[CrossRef](#)]
44. Lin, C.S.; Ho, P.S. The state, land system, and land development processes in contemporary China. *Ann. Assoc. Am. Geogr.* **2005**, *95*, 411–436. [[CrossRef](#)]
45. Cao, Y.; Dallimer, M.; Stringer, L.C.; Bai, Z.; Siu, Y.L. Land expropriation compensation among multiple stakeholders in a mining area: Explaining “skeleton house” compensation. *Land Use Policy* **2018**, *74*, 97–110. [[CrossRef](#)]
46. Tan, R.; Beckmann, V.; van den Berg, L.; Qu, F. Governing farmland conversion: Comparing China with the Netherlands and Germany. *Land Use Policy* **2009**, *26*, 961–974. [[CrossRef](#)]
47. Du, J.; Thill, J.C.; Feng, C.; Zhu, G. Land wealth generation and distribution in the process of land expropriation and development in Beijing, China. *Urban Geogr.* **2016**, *38*, 1231–1251. [[CrossRef](#)]
48. Zhou, C.; Banik, D. Access to Justice and Social Unrest in China’s Countryside: Disputes on Land Acquisition and Compensation. *Hague J. Rule Law* **2014**, *6*, 254–275. [[CrossRef](#)]
49. Kang, S.; Yu, J.-S. The Determinants of Contract by Agreement in Land Expropriation. *J. Korean Urban Manag. Assoc.* **2017**, *30*, 79–96. [[CrossRef](#)]
50. Hu, X.; Ran, R. Overview of multiple calculating methods for land expropriation compensation standard—a case of arable land in Nanyang, Henan province, China. *Asian Soc. Sci.* **2012**, *8*, 59–65. [[CrossRef](#)]
51. Araujo, C.; Bonjean, C.A.; Combes, J.-L.; Motel, P.C.; Reis, E.J. Property rights and deforestation in the Brazilian Amazon. *Ecol. Econ.* **2009**, *68*, 2461–2468. [[CrossRef](#)]
52. Guo, S.-L.; Li, C.-J.; Wei, Y.-L.; Zhou, K.; Liu, S.-Q.; Xu, D.-D.; Li, Q.-Y. Impact of land expropriation on farmers’ livelihoods in the mountainous and hilly regions of Sichuan, China. *J. Mt. Sci.* **2019**, *16*, 2484–2501. [[CrossRef](#)]
53. Ji, X.; Qian, Z. Assessing the satisfaction at land expropriation system from the perspective of land-lost farmers: Evidence from Jiangsu province. *China Land Sci.* **2011**, *25*, 8–13.
54. Chai, N.; Stevens, R.; Fang, X.; Mao, C.; Wang, D. The impact of compensation upon urban village residents satisfaction with the land expropriation process empirical evidence from Hangzhou, China. *Int. J. Law Built Environ.* **2019**, *11*, 186–216.
55. Long, C.A.; Yan, L.A.; Gba, B.; Gsa, C. Factors affecting farmers’ satisfaction with contemporary China’s land allocation policy—The link policy: Based on the empirical research of Ezhou. *Habitat Int.* **2018**, *75*, 38–49.
56. Feng, J.L.; Tian, P.C. Validity analysis of maximum entropy distribution based on different moment constraints for wind energy assessment. *Energy* **2011**, *36*, 1820–1826.
57. Brod, M.; Tesler, L.E.; Christensen, T.L. Qualitative research and content validity: Developing best practices based on science and experience. *Qual. Life Res.* **2009**, *18*, 1263–1278. [[CrossRef](#)] [[PubMed](#)]
58. Qudrat-Ullah, H.; Seong, B.S. How to do structural validity of a system dynamics type simulation model: The case of an energy policy model. *Energy Policy* **2010**, *38*, 2216–2224. [[CrossRef](#)]
59. Melchers, R.E. Structural Reliability Analysis and Prediction. In *Structural Reliability Analysis & Prediction*, 2nd ed.; John Wiley & Son Ltd.: New York, NY, USA, 1999.
60. Helms, J.E.; Henze, K.T.; Sass, T.L.; Mifsud, V.A. Treating Cronbach’s Alpha Reliability Coefficients as Data in Counseling Research. *Couns. Psychol.* **2006**, *34*, 630–660. [[CrossRef](#)]
61. Sharma, S.; Roberts, L.; Fleming, S. Nutrition self-efficacy assessment: Development of a questionnaire and evaluation of reliability in African-American and Latino children. *J. Hum. Nutr. Diet.* **2013**, *27*, 160–166. [[CrossRef](#)]
62. Gunduz, M.; Elsherbeny, H.A. Construction Contract Administration Performance Assessment Tool by Using a Fuzzy Structural Equation Model. *Sustainability* **2020**, *12*, 523. [[CrossRef](#)]
63. Li, C.-H. Statistical estimation of structural equation models with a mixture of continuous and categorical observed variables. *Behav. Res. Methods* **2021**, *53*, 2191–2213. [[CrossRef](#)] [[PubMed](#)]
64. Seng, L.; Li, J. Structural Equation Model Averaging: Methodology and Application. *J. Bus. Econ. Stat.* **2021**, 1–14. [[CrossRef](#)]
65. Huang, Q.; Xu, J.; Qin, H.; Gao, X. Understanding Land Use and Rural Development in the National Scheme of Village Relocation and Urbanization in China: A Case Study of Two Villages in Jiangsu Province. *Sustainability* **2018**, *10*, 3227. [[CrossRef](#)]