land

MDPI

Article

A Geographic Analysis on Rural Reconstruction-Transformation-Revitalization: A Case Study of Jianghan Plain in China

Mingjie Wang [1,2], Bin Yu [1,*], Rongrong Zhuo [3] and Zhuofan Li [1]

[1] Hubei Key Laboratory for Geographical Process Analysis and Simulation, Central China Normal University, Wuhan 430079, China; wangmingjie@sdau.edu.cn (M.W.); lizhuofan@mails.ccnu.edu.cn (Z.L.)
[2] School of Public Administration, Shandong Agricultural University, Tai'an 271000, China
[3] School of Public Administration, Zhejiang University of Finance and Economics, Hangzhou 310018, China; zhuorongrong@zufe.edu.cn
* Correspondence: yubin@mail.ccnu.edu.cn; Tel.: +86-132-6471-6677

Abstract: At the beginning of the 21st century, with the rapid advancement of industrialization and urbanization, production factors such as population, capital, and land between urban and rural areas in China have gradually shifted to non-agricultural fields, the structure and function of rural territorial systems have been reconstructed and transformed therewith. In response to the relatively declining villages, the Chinese government proposed rural revitalization strategy. Taking the human–land relationship as the theoretical basis and functional changes of rural region as the main line, the study analyzes the characteristics of rural reconstruction, interprets the rural transformation mechanism and deconstructs paths of rural revitalization by using the rural reconstruction index, the model of rural transformation measurement and rural spatial transformation effect. The case study shows that: (1) Rural reconstruction in Jianghan Plain is characterized by temporal continuity and spatial imbalance. The periodical changes presents from social-reconstruction-dominated, economic-reconstruction-dominated to spatial reconstruction -dominated. The distribution of high values varied from the U-type to O-type along the main transportation routes, while that of low values alternated between points (hinterlands of the Plain) and lines from spatial viewpoint. (2) The driving mechanism of rural transformation was the coupling effect of the exogenous drivers and endogenous responses. The standardized regression coefficient between the drivers and the changes to rural regional functions is 0.766. The endogenous response is mainly manifested as the negative effect of the rural spatial reconstruction on the territorial agriculture-oriented function. (3) The key path of rural revitalization facilitated the optimization of regional functions through reorganization of the rural elements in Jianghan Plain. It is the strategic choice of rural areas to implement regional function zoning and realize the balance of spatial function. The research results can provide inspiration for theoretical research on rural geography, and provide policy and method support for rural revitalization in case areas.

Keywords: rural territorial system; rural regional functions; rural reconstruction; rural transformation; rural re-vitalization; Jianghan Plain

Citation: Wang, M.; Yu, B.; Zhuo, R.; Li, Z. A Geographic Analysis on Rural Reconstruction-Transformation-Revitalization: A Case Study of Jianghan Plain in China. *Land* **2022**, *11*, 616. https://doi.org/10.3390/land11050616

Academic Editors: Tao Liu, Qiujie Shi, Raymond Yu Wang and Guangzhong Cao

Received: 19 March 2022
Accepted: 19 April 2022
Published: 21 April 2022

1. Introduction

Arising from and being associated with industrialization and urbanization, rural decline is a lingering and challenging perplexity faced by human societies, and an enduring proposition in academic research [1,2]. In response to this global challenge, the Chinese government has promoted the implementation of the rural revitalization strategy which is not only an important policy measure to solve rural decline, but also an important way to resolve the major development contradictions in China. Rural reconstruction and transformation are the main features of contemporary rural development, and rural

reconstruction-transformation-revitalization has an inherent relationship [3–6]. Geography regards rural area as a rural territorial system, and takes functional changes in rural territorial system as the main line, scientifically understand the characteristics of rural reconstruction and transformation mechanism, and clarify the path of rural revitalization. The purpose of our study is to construct a theoretical framework of rural reconstruction-transformation-revitalization from the perspective of geography, and to provide insights into the rural revitalization and provide policy and technical support for the development of the case areas.

It is generally believed that rural reconstruction and transformation emerged at the same time [1,2]. Rural reconstruction is relative to the traditional rural territorial system of farming society [7–10]. Rural reconstruction in the Western world has undergone an evolutionary process that was in turn led by economic, social, and comprehensive factors. Correspondingly, rural transformation has undergone various developmental stages of being production-driven, consumption-driven, multifunctional and globalized villages [11–18]. Before the 1990s, under the tide of modernization and urbanization, rural areas were placed in the development framework dominated by productivism. It is generally believed that the value of rural areas lies in providing food and natural resources for the society, and production is the basic and central function [19]. The main factors driving rural reconstruction during this period were economic factors such as capital, land and property rights [20–22]. During this period, rural areas changed from a production space to a post-Ford economy-based consumption space [14]. In the 1990s, postmodernism and the urban disease had given rise to "rural unvarnished beauty" of urban society, and resettled groups with economic and cultural capital reproduced the space of rural cultural construction, causing otherness to the identity of rural disadvantaged group and marginalization to their social space, so as to restore the rural cultural landscape and reconstruct rural social relations [23–25]. At this stage, rural reconstruction in economical field turned to that in cultural/social field [26–29]. The main geographical function in rural area had gradually shifted from consumption to multi-functionality [30]. In the 21st century, with the in-depth development of globalization, rural reconstruction in developed countries has taken on new characteristics of the times. Globalization has promoted the global flow of capital, labor and other factors, and new rural subjects such as multinational corporations, international labor migrants, refugees and asylum-seekers have participated in it, which promoted the village to become a pluralistic society including non-human subjects [18,28,30]. Multifunctional local villages gradually integrate into globalization, Woods conceptualized it as a globalized village. In the past 10 years, global climate change has triggered food crisis and rural risk impact, and environmental pressures such as carbon emissions, biosafety, resource depletion and climate change have gradually become important factors affecting rural restructuring and transformation [18,31]. Global rural ecological transformation has become a global issue of rural reconstruction and transformation.

The rapid industrialization and urbanization of China from the 1980s onward have triggered drastic changes to its rural areas. Consequently, the structure and functions of the rural territorial system have undergone reconstruction and transformation as well. Individual regions have become dissimilar after active integration into urban civilization, and most regions started declining after suffering from deprivation [32–35]. The initial inducement of rural restructuring in China is the large-scale outflow of population caused by rapid industrialization and urbanization, and the transfer of production factors such as land and capital to non-agricultural industries in cities, which leads to the economic restructuring, social restructuring and spatial restructuring of rural areas [4]. Economic restructuring is mainly manifested in the change of rural industrial structure and the adjustment of agricultural industrial development mode, among which the regional mode such as specialized village and the operation mode such as family farm are conspicuous [36]. Social restructuring is mainly manifested in the change of employment mode, the relationship between workers and peasants and the relationship between urban and rural areas, and other social phenomena are of concern such as the continuous loss of rural elites, empty nesters and left-behind children, but the relatively isolated urban and rural

social structure in the past is gradually shifting to the integrated development of urban and rural areas [37]. The spatial reconstruction mainly shows the parallel development of transportation network, rural hollowing and environmental pollution, but the rural cultural style and landscape base still exist [38]. Rural reconstruction drives the changes of production, living and eco-logical functions of the rural territorial system, and shows regional differences due to the stages of rural transformation and development. The eastern coastal areas and the inner suburbs of large inland cities are significantly affected by industrialization and urbanization, and the function of rural areas is gradually shifting from production-oriented to consumption-oriented. Some rural areas show multifunctional development, and the rural transformation in some areas brings rural revitalization and development [34,37,39,40]. However, areas with relatively poor natural, positional, social and economic conditions undergone decline in rural restructuring and transformation to a certain extent. In some areas, due to the imbalance of man-land relationship in the process of rural transformation, the rural territorial system is hollowed out [39,40]. From the perspective of process, China's rural areas are generally in an evolutionary process dominated by economic restructuring. In the 21st century, along with the in-depth development of urbanization and globalization, the phenomenon of "rural gentry" began to appear in the suburbs of some big cities, and the globalization factors began to penetrate into some rural areas with advantages, thus the globalized countryside began to appear. It can be seen that the connotation and characteristics of China's rural reconstruction and transformation are different from those of Western developed countries.

Rural transformation and reconstruction is an important area of interdisciplinary research, and methods are diverse. From the perspective of research methods, qualitative methods such as semi-structured interviews, in-depth interviews, sampling surveys, etc. are used in literatures [5,9,21], among which Citespace5.3, Ucinet6, etc. are commonly tools; Model mechanism analysis mostly adopts statistical analysis such as index system construction, development level evaluation and other variable assignment and models. Entropy method, AHP method, principal component analysis method, TOPSIS model, linear regression, etc. are commonly methods [4,10,41–43]. The spatial expression of rural reconstruction, transformation and revitalization is mostly realized through ArcGIS.

In a word, fruitful researches have been carried out focused on the historical process, the characteristics of transformation, and the driving factors of rural reconstruction. The rural areas have experienced multiple reconstructions led by economic factors, cultural factors and comprehensive factors in developed countries respectively from historical viewpoint. From the perspective of functional transformation, rural areas have gradually been shifting from productive villages to global villages. China's rural development is relatively backward, still in the stage led by economic factors. With the rapid development of China's economy, the functions of rural areas are rapidly transforming. However, most of the existing researches ignore above connection. Geography has a long tradition of research on human-land relations, so urban-rural integration, land use and regional patterns are important perspectives for geography to intervene in the theoretical study of rural revitalization. Related literatures put forward the idea of building rural geography based on the rural territorial system as the theoretical foundation, which shows the unique discipline value [3,40,44]. So, the rapidly changing rural areas of Jianghan Plain in China is taken as the research object. Through the construction of rural reconstruction index, rural transformation measurement model, rural spatial transformation effect model, we demonstrate the characteristics of rural reconstruction, interpret the mechanism of rural transformation and clarify the direction of rural revitalization. The rural reconstruction index is the innovative application in this research.

The research structure of the text is as follows. Section 2 elaborate on the relationship between rural reconstruction, transformation and revitalization from the perspective of geography, and put forward the main research methods in this paper. Section 3 systematically analyzes the characteristics of rural reconstruction in the Jianghan Plain. The mechanism of rural transformation in the Jianghan Plain is explained in Section 4. And then, we give

the proposals of rural revitalization in the Jianghan Plain in Section 5. Paper' conclusion is presentation in Section 6. Finally, research limitations and future research prospects are discussed in Section 7.

2. Framework & Methods

2.1. Framework of Rural Reconstruction-Transformation-Revitalization from a Geography Perspective

In geography, a particular rural region is regarded as a rural territorial system. Interactions between human production–life activities and the natural–human environments in that rural areas constitute the structure of its rural territorial system, leading to the exhibition of certain functions (combinations) [33,43,44]. Rural reconstruction from the perspective of geography refers to the reorganization of elements in rural territorial system and the reshaping of their relationships, which manifests as changes to the system structure. Rural transformation refers to changes from the intrinsic and extrinsic characteristics in the rural territorial system, which manifests as changes to the system functions. Rural revitalization can be understood as the optimizing or strengthening of functions through the reorganization of the elements in rural territorial system and the reshaping of relationships between them. The rural human–land relationship, with a concentrated reflection through the rural area functions, is an important perspective from which geography can be involved in the study of rural revitalization.

China has been undergoing rapid industrialization and urbanization. Under the conditions of a market economy, changes of the elemental composition and structure in the rural territorial system are mainly controlled by exogenous drivers, such as industrialization, urbanization, and globalization. These exogenous forces trigger relative changes in the system's internal factors to answer above exogenous drivers, such as population, industry, and land. In turn, the responses are manifested in terms of rural reconstruction, including economic, social, and spatial reconstructions [4]. Interactions between the exogenous drivers and endogenous responses give impetus to functional changes of the rural territorial system, manifested as rural transformation, including the dissimilation or degradation of rural territorial functions. A logical necessity for rural revitalization is to reorganize the system elements and reshape the system structure with the guidance of government policies, to facilitate the optimizing or strengthening of the rural areas functions. For the implementation of rural revitalization, the theoretical prerequisite is to accurately grasp the characteristics of current rural reconstruction and its transformation mechanism. The rural reconstruction-transformation-revitalization interrelationship is illustrated in Figure 1.

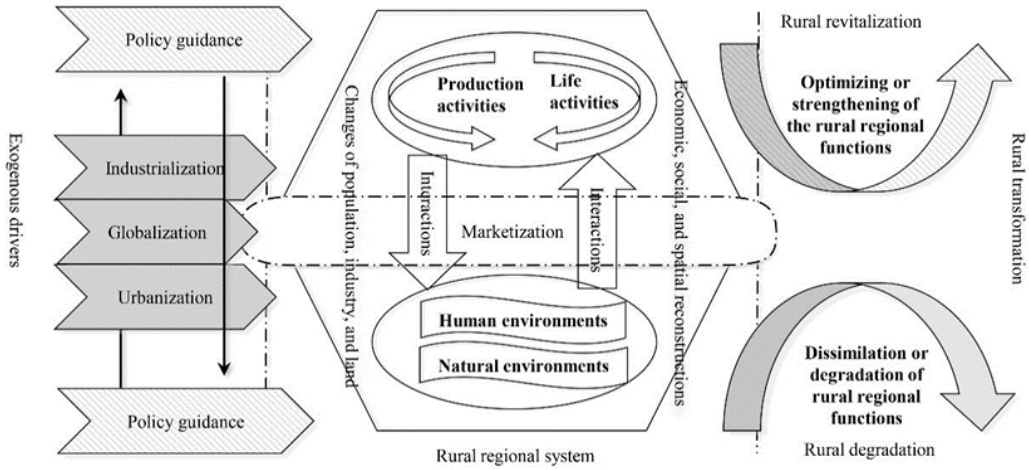

Figure 1. Framework of rural reconstruction-transformation-revitalization from a geography perspective. Note: On the left side, the upward arrow represents policy guidance to activate and amplify the positive effects, while the downward arrow represents policy guidance to shield and filter the negative effects.

2.2. Systematic Analysis of Rural Reconstruction-Transformation-Revitalization

2.2.1. Analyzing the Characteristics of Rural Reconstruction

The rural territorial system contains complex connections between its elements. Reconstruction of the rural territorial system was summarized as three dimensions: economic, social, and spatial restructuring. This summarization follows the conflicting nature of human–land relationship in modern rural systems with the reference to the relevant research results [4,44,45]. Among the dimensions, economic and social restructuring represent changes to human activities under the constraints of the internal and external environments; spatial restructuring refers to changes in the geographic environment (the overlap of the human geographic environment with natural geographic environment), which resulted from the impacts of human activities [44,46]. Accordingly, the characteristic indices of rural reconstruction were selected from the perspective of rural structure and function correlation.

The indices for the comprehensive, economic, social, and spatial restructuring of a particular rural area were represented by comprehensive indices for the rural reconstruction (RRC), economic restructuring (RX), social restructuring (RY), and spatial restructuring (RZ), respectively. The numerical values of the indices reflect the amount of changes to the structure of the rural territorial system. Details of the system of measurement indices are shown in Table 1 ("Endogenous responses"). Among these, the attributes of the indices represent the structural relationships, while their connotations map the functional relationships. The original value of the various indices was standardized (classified into positive and negative indices). With that as the basis, the weights were calculated using the entropy method. Next, the values of the dimensional and comprehensive indices of rural reconstruction were obtained by summation [47]. Specific steps are as follows:

1. Data standardization

$$v_i = \begin{cases} (w_i - w_{min})/(w_{max} - w_{min}) & \text{(Forward)} \\ (w_{max} - w_i)/(w_{max} - w_{min}) & \text{(Posive)} \end{cases}$$

where: v_i is the value of the indicator after data standardization; w_i is the value of the index before standardization; w_{min} is the minimum value of the index before data standardization; w_{max} is the maximum value of the index before data standardization.

2. Using the data after standardization to calculate the information entropy e_i of the sub-indices, in which, $k = \frac{1}{ln\ n}$, n is the number of units to be evaluated.

$$e_i = -k \sum_{i=1}^{n} X'_{ij} ln X'_{ij}$$

where: e_i is information entropy.

3. to calculate information utility value of i, information utility value $g_i = 1 - e_i$.
4. to calculate the weight c_i;

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

5. to calculate comprehensive reconstruction index:

$$RRC = aRX + bRY + cRZ = \sum_{i=1}^{4} ai \times xi + \sum_{i=1}^{3} bj \times yj + \sum_{i=1}^{3} ck \times zk$$

where: ai, bj, ck is the weight confidence of economic, social and spatial reconstruction respectively, their values are 0.065 ($a1$), 0.108 ($a2$), 0.102 ($a3$), 0.102 ($a4$), 0.127 ($b1$), 0.114 ($b2$), 0.105 ($b3$), 0.108 ($c1$), 0.099 ($c2$), 0.071 ($c3$), respectively. The values of RRC, RX, RY, and RZ reflect the rural territorial system structure and the drastic change of the dimension elements. The larger the value means the more violent the rural reconstruction, and vice versa.

Table 1. Influencing factors of rural transformation: Indexes and interpretation.

Factors		Indices	Interpretations
Exogenous drivers	Urbanization	Size of the urban population (U1)	
		Growth rate of the urban population (U2)	U2 = (U1 in current year−U1 in last year)/U1 in last year
		Size of urban construction land (U3)	U4 = (U3 in current year−U3 in last year)/U3 in last year
		Growth rate of urban construction land (U4)	
	Industrialization	Added value of secondary Industries (I1)	I2 = (I1 in current year−I1 in last year)/I1 in last year
		Growth rate of secondary Industries (I2)	
		Secondary industry practitioners (I3)	I4 = (I3 in current year−I3 in last year)/I3 in last year
		Growth rate of secondary industry practitioners (I4)	
	Globalization	Total export-import volume (G1)	G2 = (G1 in current year−G1 in last year)/G1 in last year
		Growth rate of export-import volume(G2)	
		Disbursement of foreign capital (G3)	G4 = (G3 in current year−G3 in last year)/G3 in last year
		Growth rate of disbursement of foreign capital (G4)	
	Marketization	Added value of the tertiary industries (M1)	M2 = (M1 in current year−M1 in last year)/M1 in last year
		Growth rate of tertiary Industries (M2)	M4 = (M3 in current year−M3 in last year)/M3 in last year
		Tertiary industry practitioners (M3)	
		Growth rate of tertiary industry practitioners (M4)	
Endogenous responses	Economic restructuring (RX)	Ratio of gross value of agricultural production (X1)	X1 = Gross value of agricultural production/Gross Domestic Product of county
		Ratio of agricultural land (X2)	X2 = Area agricultural land/the total territory of county
		The proportion of agricultural labor (X3)	X3 = Number of agricultural labor/Number of labor in county
		Ratio of agricultural input (X4)	X4 = Agricultural fixed assets investment/Total fixed assets investments
	Social restructuring (RY)	The proportion of rural population (Y1)	Y1 = Rural population/County population
		The proportion of rural elites (Y2)	Y2 = Number of rural elites/Agricultural labor
		The proportion of agricultural income (Y3)	Y3 = Agricultural income/Household income
	Spatial restructuring (RZ)	Degree of spatial concentration (Z1)	Z1 = (Population concentration + Economic concentration)/2
		Network accessibility (Z2)	Z2 = (Exterior accessibility + Interior connectivity)/2
		Geographical heterogeneity (Z3)	Z3 = Urban and rural construction land/the total territory of county

Notes: ① The rural elites index comes from the "backbone farmers". ② Population concentration and economic concentration were estimated by the ratio of the population and Gross Domestic Product of urban area in a county to their counterparts of the whole county. ③ Exterior accessibility suggests the temporal distance between county center to regional city's center. Interior connectivity suggests the road density by county.

2.2.2. Interpreting the Mechanism of Rural Transformation

Quantitative measurement of rural transformation. The rural territorial system has a composite functional structure. With the reference to related research results [48], the functions of a rural territorial system were summarized as the following three types: produc tion (economic output), life (population carrying capacity), and ecology (ecological ser-vices) (In the national Strategy for Rural Revitalization (2018–2022), rural areas functions were categorized into four types: production, life, ecology, and culture. With the idea of measuring functional strength as the basis and for the purpose of measurement in this study, the cultural function was incorporated separately into the non-agricultural production function and ecological function of cultural services). Accordingly, rural transformation entails significant changes to the structure of production, life, and ecological functions in a particular rural area.

A standardized benchmark for measurement based on marketization of functional values. In order to quantitatively measure the rural transformation value, the rural territorial comprehensive function index (RCF), rural territorial production function index (RPF), rural territorial living function index (RLF) and rural territorial ecological function index (REF) are established. The comprehensive function index is the sum of the production, life and ecological function index in rural areas. There are:

$$\mathrm{RCF} = \mathrm{RPF} + \mathrm{RLF} + \mathrm{REF} \tag{5}$$

RPF (index for the rural production function) = Total value of rural economic outputs = Value of agricultural rural economic outputs (RPF1) + Value of non-agricultural rural economic outputs (RPF2).

RLF (index for the rural life function) = Total incomes of rural residents = Agricultural incomes of rural residents (RLF1) + Non-agricultural incomes of rural residents (RLF2).

REF (index for the rural ecological function) = Total rural ecological values = Rural environmental protection values (REF1) + other rural ecological values (REF2).

The REF was calculated by using the method recommended by Xie Gaodi [49], which was amended as follows:

Assumption: the population and economic densities of a particular rural areas is set to $P0$ and $E0$ respectively in the base period. The population density is P, and the corresponding economic density is E in different years or units. The index for the ecological function, calculated using Xie Gaodi's method is REF0; the amended index for the ecological function is REF. The adjustment coefficient for the ecological function is defined as r, such that

$$r = \sqrt{(P * E)} / \sqrt{(P0 * E0)}. \tag{6}$$

When $r \leq 1$, REF = REF0; when $r > 1$, REF = REF0/r. In the equation, r refers to the relative strength of the impacts that the coupling of human production and life activities have on the rural geographic environment. When $r > 1$, the impacts of human activities on the geographic environment are greater than that during the base period, so that the value of the actual index for the ecological function is smaller than the theoretical calculated value.

1. *How to identify rural transformation from the heterogeneity in functional structure*. A rural area is an agricultural type of regional space, and its main function is that of agriculture. The agricultural function of a rural areas is recorded as RBF, which is expressed as RBF= RPF1 + RLF1 + REF1. So, the degree of rural transformation (denoted as RTM) is defined as the proportion of non-agricultural rural function to the comprehensive function, such that

$$\mathrm{RTM} = [1 - \mathrm{RBF}/\mathrm{RCF}] * 100\% = [1 - (\mathrm{RPF1} + \mathrm{RLF1} + \mathrm{REF1})/\mathrm{RCF}] * 100\%. \tag{7}$$

When RTM > 50%, the agriculture-based function is relegated to a secondary position, and the rural territorial function transforms. When RTM $\leq$ 50%, the agriculture-based function is still predominant.

Driving mechanism of rural transformation. Behind the rural territorial system is a complex driving mechanism. As shown in Figure 1, rural transformation is the result of the coupling of exogenous drivers (i.e., industrialization, urbanization, globalization, and marketization) and endogenous responses (i.e., economic, social, and spatial restructuring). Hence, the driving mechanism of rural transformation can be examined by describing the external environment and the system's internal structural changes.

2. *How to identify influencing factors from analysis of internal–external correlations*. External environmental changes trigger structural alterations to the system through modifications to the rural population, industry, and land uses. Internal structural changes drive alterations to the production, life, and ecological functions through modifications

to the rural economy, society, and space. Accordingly, 14 indices representing the four aspects of industrialization, urbanization, globalization, and marketization were selected to characterize external environmental changes. Among them, the attributes of the indices encompass the characteristics of environmental changes, while their connotations point toward possible paths of action. Another 10 indicators representing the three aspects of economic, social, and spatial restructuring were chosen to describe internal structural changes. The attributes of the indices represent the structural relationships, and connotations of the indices reflect their functional connections. The main influencing factors and specific indices of rural transformation are shown in Table 1.

3. *How to interpret the mechanism of action based on multiple structural analysis*. Multiple structure analysis is the hierarchical analysis of the indices for rural areas functions. Through the multi-level analysis of rural areas functions, the main influencing factors of rural transformation-and to a large extent, the internal mechanism of rural transformation-could be identified. After standardized processing of the relevant data, the factors and indices of the exogenous drivers and endogenous responses are treated as the explanatory variables, while the indices for rural areas functions are treated as the explained variables. There are three levels of functional indices: the comprehensive, the dimensional (production, life, and ecology), and the itemized (agricultural production, agricultural income, and environmental protection). These are used to construct a multiple linear regression model.

Spatial effects of rural transformation. It is the technical basis to evaluate the effects of rural transformation for analyzing the characteristics of rural decline and exploring the path of rural revitalization. With reference to the relevant policy results [50,51], rural decline in modern China was primarily a relative decline compared with the changes in the main social contradictions. In contrast, the main territorial functions constituted a constraint condition for rural revitalization.

4. *How to examine the overall effects of rural transformation with comparison between rural–urban regional functions*. At this stage, it was difficult to systematically obtain related series of street-level data of the case study area. Hence, the value of non-agricultural industrial outputs, urban residents' incomes, and changes in urban construction land are selected to express the urban production, life, and ecological functions respectively. The indices for the urban production, life, and ecological functions are labeled as UPF, ULF, and UEF; so ⊿UPF, ⊿ULF, and ⊿UEF mean the changes of the urban production, life, and ecological functions, and ⊿RPF, ⊿RLF, and ⊿REF mean the changes of the rural production, life, and ecological functions respectively, in which ⊿ means the result of current value of indices for the classified functions subtracting previous value of indices for the same functions divides previous value of indices for the same types of functions. Such that,

When ⊿UPF—⊿RPF > 0, the rural production functions are under degeneration; conversely, reinforcement

When ⊿ULF—⊿RLF > 0, the rural life functions are under degeneration; conversely, reinforcement

When ⊿UEF—⊿REF > 0, the rural ecological functions are under degeneration; conversely, reinforcement

5. *How to evaluate the main effects of rural transformation through the changes in rural agricultural functions*. At this stage, the main effects of rural transformation in China are reflected in changes to the agricultural functions of rural areas. Under a country's plans for its main functional areas, the agricultural production areas constitute a type of geographical space. Changes to the rural agricultural functions of this type of space have implications on national food security and sustainable rural development. Equation (7) is used to evaluate changes to the agricultural functions of rural areas,

and the results facilitate the selection of targets and provided information support for the implementation of rural revitalization strategies.

2.2.3. Deconstructing the Path of Rural Revitalization

The evolution of the rural territorial system occurs from two directions, as shown in Figure 1. Rural revitalization refers to the successful optimization or strengthening of regional functions through the conscious transformation and reconstruction of the rural territorial system under the guidance of government policies and other external forces. That is to say, for the direction for rural development, the plans for different rural development models (what types of rural areas to build on) should be clarified, and the priorities of rural development and the path to rural revitalization (how to build) should be explored through conscious reconstruction.

1. *How to refine the rural revitalization model*. There is a clear normative orientation to rural revitalization, the basic projects of which are zoning and positioning the functions for different zones. With the reference to the relevant research findings, the SOFM analytical tool is used to zone the rural territorial functions [52]. The functional zones are then interconnected to form development zones for rural revitalization. With this as the basis, similarity in zonal functions is used to categorize the types of development for rural revitalization, while the correlation of dominant functions is used to generalize the development models for rural revitalization.
2. *How to explore the path of rural revitalization*. Rural revitalization occurs in a definite and regular direction, and the only way to achieve it is to identify the key elements and optimize the relationships among them. The key elements for rural revitalization should be extracted learning from different regional models for rural revitalization and results from the mechanism of rural transformation. Thus, correlational analysis of the internal elements and impact analysis of the external factors are performed to optimize the rural functional structure and the developmental environment for rural revitalization, respectively.

2.3. Selection of Study Case and Data Description

The Jianghan Plain, the case study for this research, is located in the middle reaches of the Yangtze River and at the central–southern part of Hubei Province (Figure 2). In the National Principal Functional Zoning Plan, the Jianghan Plain is designated as one of the country's main agricultural production regions. It is also a traditional agricultural region in Central China with a large rural population. Its population in 2018 was 15.60 million, of which the rural population accounted for 43.07% (672 million). Agricultural production holds a special status, with the total regional output being valued at RMB 845 billion during the same period. The added value of the primary industry was RMB 121 billion, accounting for 14.33% of the total. Rural revitalization of the plain is of great significance to the country's food security and the rise of Central China. The Jianghan Plain constitutes an appropriate case study subject, being one of the main agricultural production regions in the country; moreover, it represents the rural development of agricultural regions in Central China well.

Figure 2. Location of the study area.

The research period spans form 2000 to 2016 with the county as the basic spatial unit, including 20 counties and districts in the Jianghan Plain. The socioeconomic data needed for the research were derived from the China Urban Statistical Yearbooks, China Counties Socioeconomic Statistical Yearbooks, Hubei Statistical Yearbooks, and statistical yearbooks of the various counties in the study area [53–55]. Data of the relevant outputs used for the calculation of rural functions were converted into comparable prices with Year 2000 as the base period. Any missing data for individual years were supplemented by using linear interpolation. Spatial data of the boundaries of the counties and the rivers within each administrative division were derived from the Lake–Watershed Science Sub-center of the National Earth System Science Data Center (www.geodata.cn, accessed on 27 February 2017), which is a project developed on the National Science and Technology Infrastructure Platform.

3. Results

3.1. Temporal Changes of Rural Reconstruction in the Plain

Following Section 2.2.1, the entropy method was used to obtain the weights of the various indices in Table 1 (Endogenous responses). Next, the dimensional and comprehen-

sive indices for the rural reconstruction of the Plain were calculated through summation of the weights. The results, as shown in Table 2, indicate the following: (1) the rural areas of the Plain were undergoing a process of continuous reconstruction. In 2000–2016, the RRC increased from 0.10 to 0.79, while the RX, RY, and RZ increased from 0.05, 0.04, and 0.01 to 0.28, 0.23, and 0.28, respectively. During the study period, the proportion of rural population decreased from 66.68% to 47.12%, whereas the pro-portion of non-agricultural industries rose from 74.13% to 90.58%, and the proportion of urban construction land increased from 0.91% to 1.52%. Overall, the rural areas elements and system structure had undergone dramatic changes. (2) Rural reconstruction of the Plain was characterized by a phased development, with 2009 roughly being the node. RX's contribution rate rose in the early stage but declined steadily in the later stage; RY's contribution rate decreased significantly in the early stage but remained relatively stable in the later stage; and RZ's contribution rate fluctuated in the early stage before rising steadily in the later stage. The evolutionary process of rural reconstruction was in the sequence of social, economic, and spatial restructuring. The Plain experienced rapid industrialization and urbanization in the 21st century, causing the rural areas to experience an evolutionary process with changes to the population structure, industrial structure and land use structure in sequence [47]. There was a general coincidence between the phased characteristics of rural reconstruction and the trend of evolution in the rural space.

Table 2. Changes of rural restructuring index of Jianghan Plain from 2000 to 2016.

	RRC	RX		RY		RZ	
Year	**Index**	**Index**	**Proportion**	**Index**	**Proportion**	**Index**	**Proportion**
2000	0.1	0.04	40%	0.05	50%	0.01	10%
2001	0.12	0.05	42%	0.05	42%	0.02	18%
2002	0.21	0.09	43%	0.08	38%	0.04	19%
2003	0.31	0.14	45%	0.11	35%	0.06	20%
2004	0.34	0.14	41%	0.14	41%	0.06	18%
2005	0.37	0.16	43%	0.15	40%	0.06	17%
2006	0.4	0.17	43%	0.13	32%	0.1	25%
2007	0.44	0.19	43%	0.15	34%	0.1	23%
2008	0.45	0.2	44%	0.15	33%	0.1	23%
2009	0.49	0.23	47%	0.15	31%	0.11	22%
2010	0.56	0.26	46%	0.16	29%	0.14	25%
2011	0.59	0.26	44%	0.17	29%	0.16	27%
2012	0.6	0.26	43%	0.16	27%	0.18	30%
2013	0.66	0.26	39%	0.3	29%	0.2	31%
2014	0.71	0.26	37%	0.22	31%	0.23	32%
2015	0.75	0.26	35%	0.22	30%	0.27	35%
2016	0.79	0.28	35%	0.23	30%	0.28	35%

3.2. Spatial Differentiation of Rural Reconstruction in the Plain

Following Section 2.2.1, the dimensional and comprehensive indices for rural reconstruction were calculated using the counties as the unit. The results are shown in Figure 3 and explained further in text.

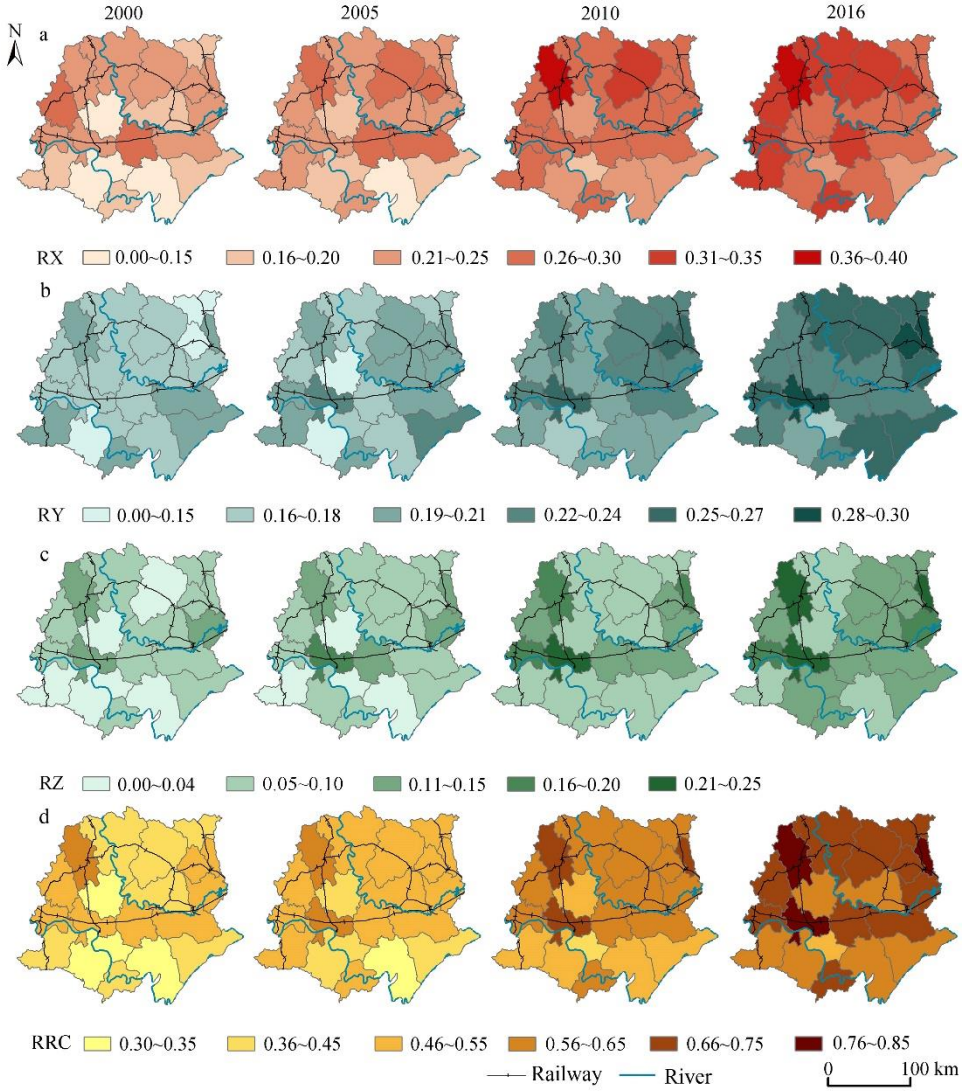

Figure 3. Spatial patterns and changes during rural reconstruction of the Plain, 2000–2016. (**a**) economic restructuring, (**b**) social restructuring, (**c**) spatial restructuring, (**d**) rural restructuring.

The development trend for rural reconstruction was spatially unbalanced. In terms of the locational characteristics, the high RRC values were always found in areas undergoing rapid urbanization such as the downtowns of Jingmen City and Jingzhou City, whereas the low values consistently appeared in typical agricultural areas along the Yangtze River such as the Jiangling and Jianli Counties. From the perspective of regional structure, areas in the Plain with high RRC values in 2000 were distributed roughly in a U-type along the Jiaozuo-Liuzhou Railway (west), Wuhan-Yichang Railway (south) and Hankou-Danjiangkou Railway (east). In 2016, areas with high RRC values evolved into an O-type distribution comprising the three aforementioned railways in the west, south, and east, with the addition of the Changjing Railway in the north. Transportation is the main medium through which external sources such as industrialization, urbanization, globalization, and marketization drove rural reconstruction, and certainly played a fundamental role in the rural reconstruction of the Plain. However, the advantages of waterway transportation, such as the Yangtze and Han Rivers, need to be further explored at this stage.

3.3. Formatting of Mathematical Components

Rural reconstruction has the distributional characteristic of structural imbalance. Overall, RX and RZ presented roughly the same locational structures and regional patterns as RCC. The downtown of Jingmen City, located at the intersection of the Changjing and

Jiaozuo-Liuzhou Railways, had high RCC values throughout. In contrast, the typical agricultural areas along the Yangtze River, such as Jiangling and Jianli Counties, always had low RCC and RZ values. In contrast, RY exhibited different spatial characteristics. First, the locations of the high and low RY values were not stable and had the characteristics of random distribution. Second, the RY locational differences were relatively small. Specifically, the standard deviation of RY (0.02) was significantly lower than that of RCC (0.08), RX (0.04) and RZ (0.04) indicating a relatively homogeneous characteristic. Being a traditional agricultural region in Central China, the migration of rural population out of the region was a guiding factor for RY. Compared with the aggregation of RX and RZ, the discrete nature of RY was basically in line with the actual situation of rural development in underdeveloped agricultural areas in the Plain.

4. Mechanism of Rural Transformation in Jianghan Plain

4.1. Spatiotemporal Map of Rural Transformation in the Plain

Following Section 2.2.2, the RCF, RBF, and RTM of the plain in 2000 and 2016 were calculated at the county level. The results, shown in Figure 4, indicate that the spatiotemporal map of rural transformation was largely consistent with that of rural reconstruction. Temporally, there were still 10 counties (including Jingshan County) with an RTM < 50% in 2000, and where agricultural functions were still dominant. By 2016, all the counties had an RTM > 50%, indicating that agricultural functions had been degraded to a non-primary role and that the rural areas had undergone stable transformation. From a spatial perspective, the 10 counties that underwent rural transformation (RTM > 50%) in 2000 showed a U-type distribution pattern along the railways located in the west, south, and east. The rural functions in the northern area and along the Yangtze River in the south were still predominant. By 2016, all the counties had undergone rural transformation. With completion of the Changjing Railway's high-speed transformation and operational launch in 2012, areas with high RTM values (>75%) gradually formed an O-type distribution in the northern–central part. The low RTM values (≤75%) were located in the south along the Yangtze River and at the central hinterlands.

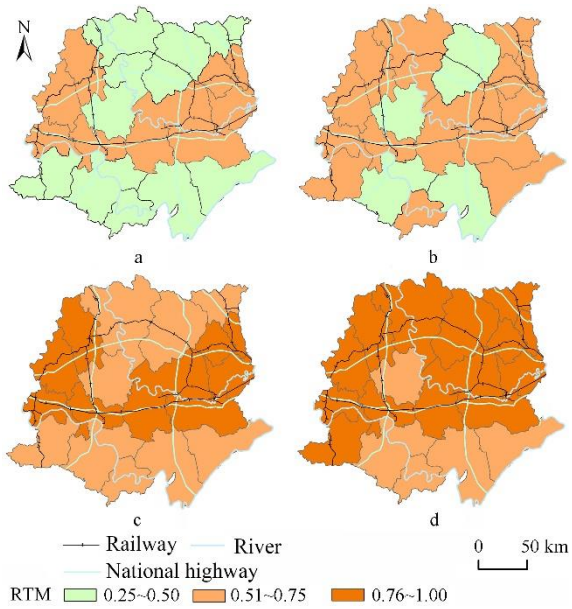

Figure 4. Spatial differentiation of rural transformation in the Jianghan Plain in 2000 and 2016. Note: Red = Undergone transformation; Green = Not undergone transformation. (**a**) 2000, (**b**) 2005, (**c**) 2010, (**d**) 2016.

4.2. Driving Mechanism of Rural Transformation in the Plain

4.2.1. Factors Affecting Rural Transformation in the Plain

RCC correlations were used to clarify the factors affecting rural transformation. A multiple regression analysis was conducted with the RCF and the related factors in Table 1 being treated as the explained and explanatory variables, respectively. The purpose was to identify the correlation between the two, as well as the relative importance of the various explanatory variables. This was divided into three levels: categories, factors and indices (see Table 1). Among these, the factor of globalization was eliminated due to the unavailability of continuous data from the counties in the case study area. In reality, doing so would not have a significant impact on the results of the analysis [47].

The results show that the exogenous drivers (W) and endogenous responses (N) passed the significance test at the 0.01 confidence level. For the regression analysis, the adjusted R2 was 0.757, the D-W value was 1.419 and all the variance inflation factors (VIFs) were smaller than 5. The standardized residual plots of the tested variables conformed to a normal distribution, and the model settings were reasonable. The standardized regression coefficient of the exogenous drivers (0.766) was significantly larger than that of the endogenous responses (−0.148), indicating that the former was the main influencing factor behind the comprehensive changes in the Plain's rural functions.

The relative importance of industrialization (I), urbanization (U), marketization (M), economic restructuring (X), social restructuring (Y) and spatial restructuring (Z) was ranked as I (0.426) > M (0.324) > Y (0.206) > Z (−0.130) > X (0.12) > U (0.111). Based on the standardized regression coefficients, the relative importance of the 11 indicators was ranked as follows: I1 (added value of secondary industries, 0.650), M1 (added value of tertiary industries, 0.313), U1 (urban population, 0.165), Z3 (regional heterogeneity, −0.156), Y2 (proportion of rural elites, 0.084), Y1 (proportion of rural population, −0.055), Y3 (proportion of agricultural income, −0.030), U2 (urban population growth, −0.029), X3 (proportion of agricultural labor, 0.029), I3 (number of employees in secondary industries, 0.025) and I2 (growth rate of secondary industries, −0.021) (see Table 3).

Table 3. Regression analysis results of influencing factors for the changes of comprehensive functions in rural areas of Jianghan Plain.

Explained Variables	Explanatory Variables	Unstandardized Coefficients		Standardized Coefficients	*t*
		B	Standard Error		
RCF	(Constant)	−1.651	0.158	-	−10.425
	W	9.878	0.459	0.766	21.509 ***
	N	1.574	0.379	−0.148	4.147 ***
RCF	(Constant)	−2.514	0.202	-	−12.453
	I	11.283	0.968	0.426	11.651 ***
	U	3.937	1.187	0.111	3.318 ***
	M	11.580	1.445	0.324	8.016 ***
	X	2.637	0.813	0.120	3.244 ***
	Y	7.550	1.335	0.206	5.656 ***
	Z	−3.775	1.153	−0.130	−3.273 ***

Note: *** $p < 0.01$.

4.2.2. Action Mechanism of Rural Transformation in the Plain

Clarify the path of rural transformation by connecting the agricultural functions and influencing factors. Multivariate regression was performed with RPF1, RLF1, and REF1 as the explained variables and the aforementioned 11 indicators as the explanatory variables. The specific details and standardized regression coefficients are shown in Table 4.

Table 4. Pathways of the territorial changes of rural areas of Jianghan Plain.

Explained Variables	Explanatory Variables	Unstandardized Coefficients		Standardized Coefficients	*t*
		B	Standard Error		
RPF1	(Constant)	0.178	0.012		15.474
	I3	0.002	0.000	0.239	8.010 ***
	M1	6.389×10^{-8}	0.000	0.249	5.934 ***
	Z3	−4.469	0.257	−0.525	−17.372 ***
	U1	0.002	0.000	0.443	13.960 ***
	I2	2.944×10^{-8}	0.000	0.278	6.393 ***
	Y3	−0.097	0.019	−0.128	−5.136 ***
	Y2	0.113	0.028	0.105	3.981 ***
	U2	−0.053	0.017	−0.066	−3.085 ***
RLF1	(Constant)	0.079	0.028		2.848
	M1	1.162×10^{-7}	0.000	0.320	5.370 ***
	I3	0.002	0.001	0.168	3.923 ***
	Y3	0.244	0.038	0.229	6.432 ***
	Y2	0.535	0.056	0.352	9.495 ***
	U1	0.003	0.000	0.435	9.721 ***
	Z3	−2.882	0.545	−0.240	−5.285 ***
	X3	−0.156	0.036	−0.190	−4.329 ***
	I1	3.059×10^{-8}	0.000	0.205	3.374 ***
REF1	(Constant)	0.003	0.000		7.535
	X3	0.005	0.000	0.544	10.522 ***
	U1	3.009×10^{-5}	0.000	0.482	9.493 ***
	Z3	−0.091	0.007	−0.714	−13.805 ***
	Y1	−0.004	0.001	−0.471	−7.687 ***
	I1	-2.366×10^{-10}	0.000	−0.150	−2.800 ***
	U2	−0.001	0.000	−0.098	−2.824 ***
	I3	-1.636×10^{-5}	0.000	−0.106	−2.131 **

Note: ** $p < 0.05$, *** $p < 0.01$.

3. Internal mechanism of the exogenous drivers' role in rural transformation

As can be seen in Figure 5, the six exogenous drivers—industrialization (I1, I2, and I3), urbanization (U1 and U2) and marketization (M1) had different effects on rural transformation in the plain.

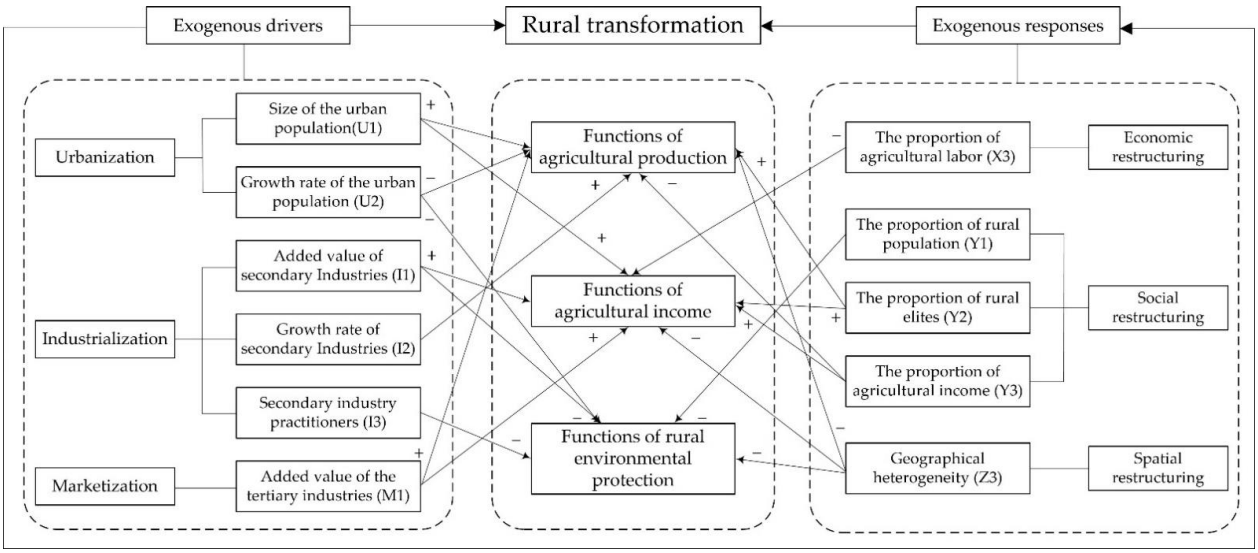

Figure 5. Mechanism of rural transformation in Jianghan Plain.

Industrialization mainly affected rural transformation through the added value of secondary industries (I1), growth rate of secondary industries (I2), number of employees in secondary industries (I3) as well as their changes. A larger I1 indicates a higher industrialization level-substitution of agricultural technologies increases labor productivity, thereby positively affecting the function of agricultural income security (RLF1); and the spillover effects of industrial pollution harm the rural ecological environment, thereby negatively affecting the function of rural environmental protection (REF1). A larger I2 indicates a faster industrialization rate, which increases the demand for agricultural products. This in turn stimulates agricultural production, thereby positively affecting the function of agricultural production (RPF1). Although a larger I3 (number of industrial workers) may in-crease the demand for agricultural products and positively affect the function of agricultural production (RPF1), it can also negatively affect the function of rural environmental protection (REF1) through the spillover effects of domestic pollution.

Urbanization affects rural transformation through the size (U1) and growth (U2) of the urban population as well as their changes. When the other conditions remain unchanged, a larger U1 indicates a smaller agricultural labor force. Accelerating the substitution of agricultural technologies to increase labor and land productivities has a positive impact on the functions of agricultural production (RPF1) and agricultural income (RLF1). With the reduction of population pressure and domestic pollution, there is a positive impact on the function of rural environmental protection (REF1). However, a rapid growth in urban population (U2) may affect agricultural production and rural management through the excessive loss of rural elites. This negatively affects the functions of agricultural production (RPF1) and rural environmental protection (REF1) to a certain extent (the standardized regression coefficient was small).

Marketization leads to rural transformation through the added value of the tertiary industries (M1) and their changes. It is also the institutional platform and technological path for industrialization and urbanization to bring about rural transformation. Its main function is to magnify or reduce the role of the exogenous drivers. A larger M1 reflects a higher marketization level. This can positively affect the functions of rural agricultural production (RPF1) and agricultural income security (RLF1) by accelerating the circulation of agricultural production and transforming the agricultural consumption markets.

4. Internal mechanism of the endogenous responses' role in rural transformation

The endogenous responses, as shown in Table 4, include economic restructuring (X3), social re-structuring (Y1, Y2, and Y3) and spatial restructuring (Z3). These five variables had dissimilar impacts on rural transformation in the Plain.

Economic restructuring affects rural transformation through the proportion of agricultural labor (X3) and its changes. Under the conditions that the amount of agricultural land and the technological level remain unchanged, a larger X3 reflects a blockage to the transfer of rural labor, and a lower agricultural labor productivity can negatively affect the function of agricultural income security (RLF1).

Social restructuring affects rural transformation through the proportion of rural population (Y1), of rural elites (Y2), of agricultural income (Y3) as well as their changes. A larger Y1 implies an in-crease in population pressure and worsening pollutant emissions, which can negatively affect the function of rural environmental protection (REF1). A larger Y2 signifies that the agricultural labor and rural governance structures are relatively optimized, which can positively affect the functions of agricultural production (RPF1) and agricultural income (RLF1). Although a larger Y3 can contribute to RLF1 directly, it also means a relatively low total income level. This negatively affects RPF1 because the inputs for agricultural production are affected.

Rural transformation is affected by spatial restructuring through geographical heterogeneity (Z3) and its changes. A larger Z3 indicates losses of agricultural production factors, especially agricultural land. This can negatively affect the functions of agricultural production (RPF1) and agricultural income (RLF1). In addition, a larger Z3 changes the

rural land use structure, weakening the environment's ability at self-purification in turn. As a result, the function of rural environmental protection (REF1) is negatively affected.

4.3. Spatial Effects of Rural Transformation in the Plain

4.3.1. Overall Effects of Rural Transformation in the Plain

Following Section 2.2.3, the functions of the urban and rural areas were compared to examine the overall effects of rural transformation. The calculated results comparing changes to the rural–urban functions in the Plain are shown in Table 5. In terms of the absolute changes to rural–urban functions, there was sustained strengthening in the production and life functions of both rural and urban areas. However, the gap in functional intensity (index for overall function) had also widened continuously. In 2000–2016, the UPF, RPF, (UPF—RPF), ULF, RLF, and (ULF—RLF) had increased by 7.26, 5.52, 9.64, 6.27, 3.94 and 7.51 times, respectively. These reflect a widening gap in rural–urban development with the region's rapid socioeconomic development. At the same time, the ecological functions of rural–urban areas continued to weaken. Nevertheless, the intensity of the rural areas functions was still much higher than that of the urban areas.

Table 5. Comparison of the absolute and relative changes between urban and rural territorial function in Jianghan Plain from 2000 to 2016 (10,000 yuan/km^2).

	Production Function			**Life Function**			**Ecological Function**		
	UPF	**RPF**	**Gap**	**ULF**	**RLF**	**Gap**	**UEF**	**REF**	**Gap**
2000	422.17	243.86	178.31	267.57	93.45	174.12	38.50	134.29	−95.79
2005	645.09	380.30	264.79	418.86	128.99	289.87	34.66	121.91	−87.25
2010	1703.38	727.86	975.52	741.90	197.26	544.65	24.83	89.06	−64.23
2016	3064.43	1345.69	1718.74	1676.49	368.16	1308.33	15.63	58.23	−42.59
	Production Function			**Life Function**			**Ecological Function**		
	⊿UPF	**⊿RPF**	**Gap**	**⊿ ULF**	**⊿RLF**	**Gap**	**⊿UEF**	**⊿REF**	**Gap**
2000	11.09	8.50	2.59	0.31	0.29	0.03	−2.64	−1.95	−0.42
2005	13.15	10.34	2.81	7.21	5.85	1.37	−1.15	−1.84	0.69
2010	21.59	15.07	6.52	13.09	7.73	5.36	−5.61	−5.91	0.30
2016	9.17	8.00	1.17	9.41	3.59	5.81	−7.71	−6.80	−0.92

In 2000–2016, the UEF and REF declined to 40.60% and 43.36% respectively, while (UEF/REF) decreased from 28.67% to 26.84%. This pointed to the decisive role that rural ecological functions play for the region's sustainable development. The relative changes to rural–urban regional functions indicate that the production and life functions of the rural–urban areas in the Plain had maintained a fluctuating but increasing trend. However, the production and life functions of the urban areas had consistently strengthened faster than that of the rural areas. In particular, there were continuously widening disparities in the rates of life functions being strengthened. (⊿UPF—⊿RPF) was al-ways >0 in 2000–2016, although the trend was first increasing and then decreasing. Similarly, (⊿ULF—⊿RLF) was always >0, but it was a continuously increasing trend. The average value of ⊿UPF and ⊿RPF was −4.28% and −4.12%, respectively, while (⊿UEF—⊿REF) presented the trend of an inverted U-type. Based on Section 2.2.3, the fluctuation and degradation of rural production functions, accelerated degradation of life functions, and the trend of degradation of ecological functions in the Plain were all relative to urban fluctuations.

4.3.2. Main Effects of Rural Transformation in the Plain

Following Section 2.2.3, the main effects of rural transformation were evaluated based on changes to the rural agricultural functions. Figure 6 shows the calculated results of rural agricultural functions and sub-functions in the Plain. Overall, the agricultural functions had increased gradually, although their dominant position was being eroded rapidly. The RBF increased from 0.95 to 1.37 in 2000–2016, representing an average annual increase of

2.76%. However, RBF/RRF fell from 47.26% to 16.02%, with the average annual decrease being 1.95%.

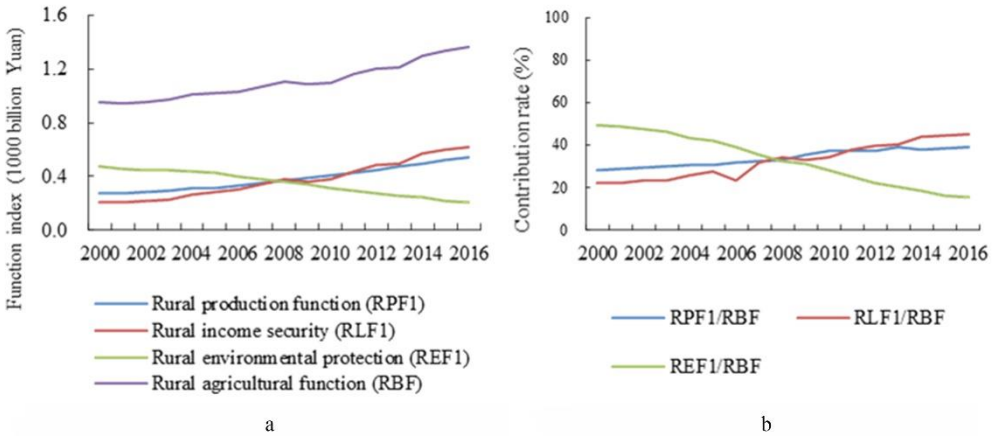

Figure 6. Index and contribution rate changes of rural comprehensive and production, living and ecological function in Jianghan Plain from 2000 to 2016. (**a**) indexes of rural agricultural function and sub-function, (**b**) contribution rates of the sub-function of rural agricultural function.

Going by the items, the functions of agricultural production and income sustained their increases, whereas the function of environmental protection deteriorated continuously. The RPF1, RPF1/RBF, RLF1, RLF1/RBF, REF1, and REF1/ RBF rose from 0.27 to 0.54, 28.42% to 39.42%, 0.21 to 0.62, 22.11% to 45.26%, 0.47 to 0.21, and 49.47% to 15.33%, respectively. In comparison with Table 5, the functions of agricultural production (RPF1) and agricultural income (RLF1) were found not being the main causes of changes to the functions of rural production (RPF) and life (RLF). Rather, it was the environmental protection function (REF1) that had a decisive impact on changes to the rural ecological function (REF).

5. Path of Rural Revitalization in Jianghan Plain

5.1. Development Direction of Rural Revitalization in the Plain

Jianghan Plain is not only a typical agricultural region in central China, but also one of the main agricultural production regions in the country's functional zoning plan. The goal and requirement of rural revitalization is the promotion of balanced rural–urban development. This ensures that the main functions of the region serve as the constraining conditions for rural revitalization. As explained in Section 4.3, widening gaps in rural–urban development, especially the rural–urban income gap and rapid decline of the function of rural environmental protection, were the main contradictions faced by rural revitalization in the Plain. Based on its regional heterogeneity and characteristic of unbalanced transformation, implementation of regional functional zoning and realization of balanced spatial functions were the strategic choices for its rural revitalization.

The results of the Plain's rural revitalization and development zoning are shown in Figure 7. The revitalization and development pattern were "being driven by the central axis and supported by the two flanks". The "central axis" refers to the axial-shaped Zone I, which is the Plain's exit channel and radiation node of the exogenous drivers. Rural transformation began early, reaching the level of 60.67% by 2000. The function of non-agricultural production had a prominent status. The overall level of development was relatively high, with the proportion of RPF2 being 73.58% in 2016. The development of rural revitalization was positioned as being led by non-agricultural functions, and the development direction was toward the high-end. Non-agricultural transformation of agricultural, forestry and aquatic products drove the extension of the industrial chain and enhancement of agricultural quality and efficiency at the "two flanks".

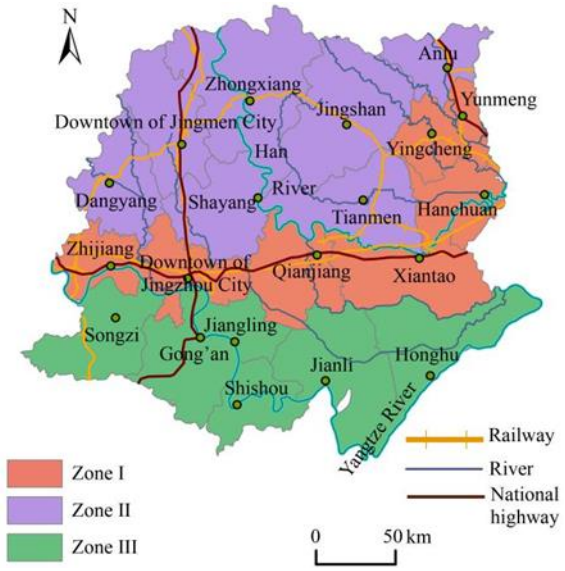

Figure 7. Zoning of rural revitalization development of Jianghan Plain.

The northern "flank" refers to the ribbon-shaped Zone II, the main body of which belongs to the Han River ecological–economic belt. There are diverse types of agricultural resources there, as well as a high level of heterogeneity in the geographic environment. Rural transformation developed rapidly, with the degree of rural transformation increasing by 32.49% over the study period. The function of non-agricultural production expanded speedily, with the RPF2 having increased by nearly 30%. However, the overall level still needed to be further improved. The development of rural revitalization was positioned as the balancing of multiple functions, with diversification as the development direction, to promote the growth of agricultural production and increased farmers' incomes through the integration of agriculture and forestry, and that of agriculture and tourism.

The southern "flank" refers to the strip-shaped Zone III, a traditional agricultural area with rich soil and water resources and superior conditions for agricultural production. The rural transformation here started later, reaching a rate of only 45.60% in 2000, with the agricultural functions remaining predominant. The RPF was still as high as 26.23% in 2016, and the overall development level was low. The agricultural functions were positioned to lead rural revitalization, with the development direction being scaling up. Through population and land transfers, the development of the rice/aquatic products industry was promoted, and the residential areas were optimized to become green production areas/green residences.

5.2. Implementation Path of Rural Revitalization in the Plain

The effects of rural transformation arising from rural reconstruction in the Plain were mainly manifested in the widening of the rural–urban gap and decline of ecological functions. The main driving mechanism was the coupling effect led by the exogenous drivers and the resultant endogenous responses. Following Section 4.2, government policies aimed at industrialization and market transformation were used to promote integrated rural–urban development. The requisite paths to rural revitalization included reorganizing the elements of the rural territorial system with spatial restructuring as the basis and reshaping the structure of the rural territorial system. The corresponding strategic choices for rural revitalization included coordinating the division of spatial functions and clearly defining the focus of zoning. The implementation paths for zonal-based rural revitalization in the Plain are shown in Table 6.

Table 6. Zonal characteristics and implementation paths of rural revitalization.

Zone I	Zone II	Zone III
Geographical scope		
Extends westward from the edge of Wuhan to the Zhijiang Municipal District along the Wuhan–Yichang Railway; has seven counties, including Hanchuan.	Located to the north of Zone I, the rows are distributed within the ribbon-shaped area in an east–west alignment; has seven counties, including Jingshan.	Distributed in strips along both banks of the Yangtze River; has six counties including Jiangling.
Transformation characteristics		
High-level transformation zone; significant advantages in non-agricultural functions	Rapid transformation zone; good foundation for multi-functional development	Low-level transformation zone; agricultural functions are prominent
Development direction		
Led by non-agricultural functions: High-end	Balance of multiple functions: Diversification	Led by agricultural function: Scaling up
Implementation foci		
i. High-end: Optimize industrial layout; strengthen technological innovation; promote rural revitalization with extension of industrial chain and non-agricultural transformation of agricultural products ii. Urbanization: Optimize rural–urban layout; strengthen system innovation; create conditions for rural areas revitalization through economic agglomeration and absorption of population iii. Agriculturalization: Hold fast to land marked for cultivation; demonstrate operation by scale; realize the main regional functions through the support of stable agricultural production	i. Diversification: Highlight the foundation of agriculture; hold fast to pan-agricultural developments; expand agricultural functions and increase agricultural benefits through integration of tertiary industries ii. Characterization: Uncover characteristic resources; create characteristic industries; promote rural revitalization through the development of the "two valleys" (for agriculture and shrimps) iii. Ecologicalization: Tie in with the development of the Han River ecological–economic belt; strengthen pollution control and environmental remediation to build beautiful and livable rural areas	i. Scaling up: Accelerate population and land transfers to expand the scale of industrial operations for rice/aquatic products, and enhance the function of agricultural production ii. Branding: Introduce leading enterprises and focus on brand building to improve agricultural quality and efficiency, and enhance the function of agricultural income iii. Greening: Strengthen pollution control and prevention and control of water hazards to build optimized rural living environment with green production areas/green residences

6. Discussion

Taking the human–land relationship as the theoretical basis and rural area function changes as the main theme, this study analyzes the characteristics of rural reconstruction based on changes of internal elements of the rural territorial system, interprets the rural transformation mechanism based on connections between exogenous drivers and endogenous responses, and deconstructs a path of rural revitalization on the optimization of rural areas functions. On account of the case study of Jianghan Plain with an analytical thinking to demonstrate the rural reconstruction-transformation-revitalization process, the research findings could provide inspiration for the study of rural revitalization in geography and serve as reference for the implementation of rural revitalization in the case study area.

Rural reconstruction in the Plain was characterized by temporal continuity and spatial imbalance. The RCC rose from 0.10 to 0.79 between 2000 and 2016, with phased changes following the sequence of social, economic, and spatial restructuring. Areas with high RCC values were consistently located in regions that underwent rapid urbanization, such as the downtowns of Jingmen City and Jingzhou City. In contrast, areas with low RCC values were always found in typical agricultural regions along the Yangtze River, such as Jiangling and Jianli Counties. The overall distribution pattern consisted of the high values being distributed along the main transportation routes transitioning form a U-type to an O-type, and the low values alternating between points (hinterlands of the Plain) and lines (banks of the Yangtze River). Rural reconstruction had shaped the spatiotemporal map of rural transformation, which roughly corresponded to the former.

1. The driving mechanism for rural transformation was manifested as the coupling between exogenous drivers and endogenous responses. Overall, the standardized regression coefficient between the drivers and the changes to rural areas functions is 0.766, and industrialization and marketization were the top two factors. Specifically, industrialization positively affected the function of agricultural income security (RLF1) through the added value of the secondary industries, whereas negatively affected the function of rural environmental protection (REF1), and positively affected the function of agricultural production (RPF1) through the growth rate (I2) and number of employees (I3) of the secondary industries. Marketization positively affected the functions of rural agricultural production (RPF1) and agricultural income security (RLF1) through the added value of the tertiary industries (M1). Endogenous responses also played an active role in rural transformation. In particular, spatial restructuring negatively affected the functions of agricultural production (RPF1), agricultural income (RLF1), and rural environmental protection (REF1) through geographic heterogeneity (Z3).
2. The path for rural revitalization was to promote the optimization of regional functions through the reorganization of rural elements. Implementing the spatial development strategy of "being driven by the central axis and supported by the two flanks" to achieve balanced spatial functions by focused operation, rural revitalization development of the "central axis" (Zone I) was positioned as being led by the non-agricultural function with high-end development direction to drive the extension of the industrial chain on both flanks and improved agricultural quality and efficiency by non-agricultural transformation of agricultural, forestry, and aquatic products.. Rural revitalization development of the "north flank" (Zone II) was positioned as a balance of multiple functions with the direction of diversification to promote the growth of agricultural production and farmers' income through the combination of agriculture and forestry, and that of agriculture and tourism. Rural revitalization development of the "south flank" (Zone III) was positioned as being led by the agricultural functions with the development direction of scale-up to promote optimization of the rice/aquaculture industries and green production areas/green residences through population and land transfers.
3. The main function of rural area is the constraint condition of China's rural revitalization. Jianghan Plain is an agricultural area in central China and a National agricultural products main producing areas. In the context of China, the sustainable growth of agricultural functions is the basic requirement of rural revitalization in the case area. Long believes that in the process of rural reconstruction, the phenomenon of non-agricultural, non-grain, and abandonment of cultivated land is a reflection of the economic rationality of the main body in market, which is accompanied by the damage to the social security value and ecological service value of cultivated land, affecting the sustainable development in rural areas [34]. Therefore, clarifying the main functions of rural areas is the basic premise of rural revitalization. In addition, previous studies believe that the rural territorial system is composed of humanities, economy, resources and environment connected and interacted with each other. It is a rural spatial system with certain structure, function and inter-regional connection [3]. This paper reinterprets this from the perspective of geography. Namely, the rural territorial system is actually the interaction (human-land relationship) between the rural human activities (including production and living activities) and the geographical environment (including natural, human environment).
4. The major function of rural areas is the constraint of rural revitalization in China. From 2000 to 2016, it was found that the agricultural function of Jianghan Plain has increased slowly, while the agricultural status of the region in China has declined rapidly. As one of the major agricultural production areas of China, the sustainability of agricultural function must be taken into account with the implementation of rural revitalization policies in Jianghan Plain. Long et al. believe that the decline of agricultural functions not only affects the realization of the major function of ru-

ral territory, but also affects its ecological functions and sustainable development, thus fundamentally restricting the realization of the rural revitalization strategy [56]. Therefore, clarifying the major function of rural territory is the basic premise of rural revitalization. Rural reconstruction in the Jianghan Plain is shifting from economic-social reconstruction to balanced economic-social reconstruction, and existing studies in other regions of China have also reached similar conclusions. For example, Tu et al. found that the average intensity of rural economic, social and spatial reconstruction in Guangxi Province gradually increased from 2000 to 2015 [41]. Industrialization and marketization are the leading exogenous factors driving rural transformation in the Jianghan Plain, and it has been found that industrialization and urbanization are more important forces driving the continuous change and reorganization of rural development elements, which can be seen in the marginal areas of the metropolis [57].

5. The findings of this study need to be considered in view of the limitations associated with it. Rural reconstruction-transformation-revitalization is a complex and dynamic process. From the perspective of geography, we tried to analyze the characteristics of rural reconstruction, interpret the mechanism of rural transformation, and clarify rural revitalization. However, the limitation of available data makes us consider little the influence of human factors such as institutions, policies, culture, customs, etc. Further improvement on the availability of human factors data, and elaboration on the process of rural reconstruction, transformation and revitalization from microscale are the focus of follow-up research. All in all, China has a vast territory with various rural territorial types. Further, different types of rural areas should be strengthened in order to enrich the knowledge of rural geography.

7. Conclusions

Rural reconstruction/transformation is the main characteristic of rural development in the modern times, also being the practical background for rural revitalization in China. The rural reconstruction-transformation-revitalization process contains inherent logical connections, although different disciplines may have dissimilar interpretations due to differences in research objects and focal points [58,59]. Since geography has a specific subject perspective and comprehensive research expertise, a reversion to it provides focus on the subject themes and condenses the scientific issues. Thus, it can contribute unique insights into the rural geography research and rural revitalization practices of China [60].

1. The functional change of rural areas is an important perspective for geography to intervene in rural revitalization. In the new era, China's rural revitalization has rich connotations. Geography can provide unique insights for that, and it is an inevitable requirement to condense the scientific problems from geography. The functional change in rural area is the result of the reorganization of elements in rural regional system and their structural changes. Accordingly, the functional changes of rural territorial system is the reasons of rural reorganization, and rural transformation is the presence of the functional changes of rural territorial system [4,6–10,60], and rural revitalization can be regarded as an important sign reflecting functional optimization in rural areas. However, the structure of the rural territorial system is represented by the interactions (human–land relationship) between rural human activities (including production and life activities) and the geographical environment (including natural and human environments). Integrating the three parts of rural reconstruction-transformation-revitalization into the functional changes of rural territorial system shows great significance in geography, which is an effective way to return to the geographical tradition and explore the combination of rural geographical theory and rural revitalization practice.
2. There are heavy responsibilities to bear and a long struggle ahead for geographical research of rural reconstruction-transformation-revitalization in China. The spatiotemporal background for rural reconstruction/transformation in contemporary China is completely different from that of the Western world, and the connotations

of the two backgrounds are not exactly similar. The common features of the two are manifested in the reconstruction of rural elements and transformation of regional functions resulting from transfers in population, land and capital. However, rural reconstruction/transformation in contemporary China originated from the process of rapid industrialization and urbanization. The main mechanism was the exogenous drivers stimulating responsive changes to the rural internal factors. This was manifested in the activation of the "stock" of rural factors, leading to rural reconstruction/transformation and, subsequently, rural decline [42,43,60,61]. Rural reconstruction/transformation in the Western world started with post-industrialization and counter-urbanization as the background. Its main mechanism was the driving actions of external entities, capital and culture, which was manifested in the "incremental" embeddedness of urban elements. This led to rural reconstruction/transformation, which gave impetus to rural revival [12–15]. The practical experiences and theoretical cognition of rural reconstruction/transformation in the Western world are neither standard templates nor of universal significance. China is a large developing country with a large total and rural population. Its agricultural production functions are unique, so rural development is of great significance. Its diversified practices in rural development provide rich inputs for rural geographic research. The specific national conditions of contemporary China should serve as the foundation for Chinese rural geographers, even as they absorb research inputs from the Western world. Their task is then to propose innovative theories on rural reconstruction-transformation-revitalization with Chinese characteristics that should be taken as the path that rural geographic research in China should follow.

3. The findings have significant value for policy advice and practical guidance. The main mechanism of rural reconstruction in the case area at the current stage is from external factors such as industrialization, and the main feature is the change of internal factors such as rural population. The transformation of rural areas is mainly manifested as the rapid decline of agricultural functions, promoting the optimization of regional functions through the reorganization of rural elements, which is an important path for rural revitalization. Accordingly, there are important references to direct rural revitalization such as strictly abiding by the red line of basic farmland, ensuring agricultural production through moderate operations, increasing farmers' income by extending the industrial chain, and protecting the rural environment through green production and lifestyle. Besides the research framework can be extended to other regions. For example, about China's eastern urbanized areas and the urban and suburban areas of the China's central and western regions, rural revitalization needs to focus on the changes in rural non-agricultural functions; about ecological function areas in the west of China, rural revitalization need to focus on changes in rural ecological functions.

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

Funding: This research was funded by the National Natural Science Foundation of China, grant number 41671179.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: Not applicable.

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. Woods, M. *Rural*; Routledge: London, UK, 2010; ISBN 9780203844304.
3. Liu, Y.; Zhou, Y.; Li, Y. Rural Regional System and Rural Revitalization Strategy in China. *Acta Geogr. Sin.* **2019**, *74*, 2511–2528. [CrossRef]
4. Long, H.; Tu, S. Rural Restructuring: Theory, Approach and Research Prospect. *Acta Geogr. Sin.* **2017**, *72*, 563–576. [CrossRef]
5. Tu, S.; Long, H. Rural Restructuring in China: Theory, Approaches and Research Prospect. *J. Geogr. Sci.* **2017**, *27*, 1169–1184. [CrossRef]
6. Shen, J.; Chou, R.J. Rural Revitalization of Xiamei: The Development Experiences of Integrating Tea Tourism with Ancient Village Preservation. *J. Rural Stud.* **2022**, *90*, 42–52. [CrossRef]
7. Long, H. Land Consolidation: An Indispensable Way of Spatial Restructuring in Rural China. *J. Geogr. Sci.* **2014**, *24*, 211–225. [CrossRef]
8. Mikle, G. Long-Term Transformation of Hungarian Manors: The Relevance of the Rural Restructuring Approach and the Concept of the Precariat. *J. Rural Stud.* **2020**, *77*, 105–112. [CrossRef]
9. Woods, M. Rural Geography. In *International Encyclopedia of Human Geography*; Elsevier: Amsterdam, The Netherlands, 2009; Volume 12, pp. 429–441. ISBN 9780080449104.
10. Yu, B.; Li, Y.; Zhu, Y.; Zhuo, R.; Zeng, J. Characteristics and Regional Model of Rural Restructuring in Main Agricultural Production Regions in Central China: A Case Study of Jianghan Plain. *J. Nat. Resour.* **2020**, *35*, 2063. [CrossRef]
11. Cloke, P.; Goodwin, M. Conceptualizing Countryside Change: From Post-Fordism to Rural Structured Coherence. *Trans. Inst. Br. Geogr.* **1992**, *17*, 321–336. [CrossRef]
12. Hollander, G.M. Agricultural Trade Liberalization, Multifunctionality, and Sugar in the South Florida Landscape. *Geoforum* **2004**, *35*, 299–312. [CrossRef]
13. Lobley, M.; Potter, C. Agricultural Change and Restructuring: Recent Evidence from a Survey of Agricultural Households in England. *J. Rural Stud.* **2004**, *20*, 499–510. [CrossRef]
14. Marsden, T. Rural Futures: The Consumption Countryside and Its Regulation. *Sociol. Ruralis* **1999**, *39*, 501–526. [CrossRef]
15. McCarthy, J. Rural Geography: Multifunctional Rural Geographies - Reactionary or Radical? *Prog. Hum. Geogr.* **2005**, *29*, 773–782. [CrossRef]
16. McCarthy, J. Rural Geography: Globalizing the Countryside. *Prog. Hum. Geogr.* **2008**, *32*, 129–137. [CrossRef]
17. Ward, N.; Lowe, P.; Bridges, T. Rural and Regional Development: The Role of the Regional Development Agencies in England. *Reg. Stud.* **2003**, *37*, 201–214. [CrossRef]
18. Woods, M. Engaging the Global Countryside: Globalization, Hybridity and the Reconstitution of Rural Place. *Prog. Hum. Geogr.* **2007**, *31*, 485–507. [CrossRef]
19. Cloke, P. Rural Development Issues in Industrialized Countries. *Assoc. Am. Geogr.* **1988**, *78*, 178–180. [CrossRef]
20. Krivokapic-Skoko, B.; Reid, C.; Collins, J. Rural Cosmopolitism in Australia. *J. Rural Stud.* **2018**, *64*, 153–163. [CrossRef]
21. Marsden, T.K.; Whatmore, S.J.; Munton, R.J.C. Uneven Development and the Restructuring Process in British Agriculture: A Preliminary Exploration. *J. Rural Stud.* **1987**, *3*, 297–308. [CrossRef]
22. Whatmore, S.; Munton, R.; Marsden, T. The Rural Restructuring Process: Emerging Divisions of Agricultural Property Rights. *Reg. Stud.* **1990**, *24*, 235–245. [CrossRef]
23. Cloke, P. Country Backwater to Virtual Village? Rural Studies and "the Cultural Turn". *Rural Crit. Essays Hum. Geogr.* **2017**, *13*, 311–319. [CrossRef]
24. Cloke, P.; Milbourne, P.; Widdowfield, R. Homelessness and Rurality: "Out-of-Place" in Purified Space? *Environ. Plan. D Soc. Sp.* **2000**, *18*, 715–735. [CrossRef]
25. Lawrence, M. Heartlands or Neglected Geographies? Liminality, Power, and the Hyperreal Rural. *J. Rural Stud.* **1997**, *13*, 1–17. [CrossRef]
26. Halfacree, K.H. Locality and Social Representation: Space, Discourse and Alternative Definitions of the Rural. *J. Rural Stud.* **1993**, *9*, 23–37. [CrossRef]
27. Halfacree, K. From Dropping out to Leading on? British Counter-Cultural Back-to-the-Land in a Changing Rurality. *Prog. Hum. Geogr.* **2006**, *30*, 309–336. [CrossRef]
28. Cloke, P.; Jones, O. Dwelling, Place, and Landscape: An Orchard in Somerset. *Environ. Plan. A* **2001**, *33*, 649–666. [CrossRef]
29. Halfacree, K.H. Rurality and Post-Rurality. In *International Encyclopedia of Human Geography*; Elsevier: Amsterdam, The Netherlands, 2009; pp. 449–456. ISBN 9780080449104.
30. Holmes, J. Impulses towards a Multifunctional Transition in Rural Australia: Gaps in the Research Agenda. *J. Rural Stud.* **2006**, *22*, 142–160. [CrossRef]
31. Horlings, L.G.; Marsden, T.K. Towards the Real Green Revolution? Exploring the Conceptual Dimensions of a New Ecological Modernisation of Agriculture That Could "Feed the World". *Glob. Environ. Chang.* **2011**, *21*, 441–452. [CrossRef]
32. He, S.; Qian, J.; Xu, Y.; Liu, B. Spatial-Temporal Evolution of Rural Gentrification amidst Rapid Urbanization: A Case Study of Xiaozhou Village, Guangzhou. *Acta Geogr. Sin.* **2012**, *67*, 1044–1056. [CrossRef]
33. Li, Y.; Liu, Y.; Long, H. Characteristics and Mechanism of Village Transformation Development in Typical Regions of Huang-Huai-Hai Plain. *Acta Geogr. Sin.* **2012**, *67*, 771–782. [CrossRef]

34. Liu, Y.; Yang, R. The Spatial Pattern Measure of Urban-Rural Development Transformation in the Bohai Rim Region in China. *Acta Geogr. Sin.* **2015**, *70*, 248–256. [CrossRef]
35. Long, H.; Li, Y.; Liu, Y.; Woods, M.; Zou, J. Accelerated Restructuring in Rural China Fueled by "increasing vs. Decreasing Balance" Land-Use Policy for Dealing with Hollowed Villages. *Land Use Policy* **2012**, *29*, 11–22. [CrossRef]
36. Liu, J.; Liu, Y.; Yurui, L.; Hu, Y. Coupling Analysis of Rural Residential Land and Rural Population in China during 2007–2015. *J. Nat. Resour.* **2018**, *33*, 1861–1871. [CrossRef]
37. Liu, Y. Rural Transformation Development and New Countryside Construction in Eastern Coastal Area of China. *Acta Geogr. Sin.* **2007**, *62*, 563–570. [CrossRef]
38. Tian, X.; Wu, W.; Zhou, Q.; Verburg, P.H.; Yu, Q.; Yang, P.; Ye, L. Model-Based Analysis of Spatio-Temporal Changes in Land Use in Northeast China. *J. Geogr. Sci.* **2016**, *26*, 171–187. [CrossRef]
39. He, Y.; Wang, C. The Evolution and Sustainable Development Capacity of Rural Production Space System Based on Information Entropy. *J. Nat. Resour.* **2019**, *34*, 815. [CrossRef]
40. Liu, Y. Research on the Urban-Rural Integration and Rural Revitalization in the New Era in China. *Acta Geogr. Sin.* **2018**, *73*, 637–650. [CrossRef]
41. Tu, S.; Zheng, Y.; Long, H.; Wan, S.; Liang, X.; Wang, W. Spatio-Temporal Pattern of Rural Development and Restructuring and Regional Path of Rural Vitalization in Guangxi, China. *Acta Geogr. Sin.* **2020**, *75*, 365–381. [CrossRef]
42. Zhu, F.; Zhang, F.; Li, C.; Zhu, T. Functional Transition of the Rural Settlement: Analysis of Land-Use Differentiation in a Transect of Beijing, China. *Habitat Int.* **2014**, *41*, 262–271. [CrossRef]
43. Liu, Y.; Hu, Z.; Li, Y. Process and Cause of Urban-Rural Development Transformation in the Bohai Rim Region, China. *J. Geogr. Sci.* **2014**, *24*, 1147–1160. [CrossRef]
44. Li, H.; Hu, X.; Zhang, X.; Li, Z.; Yuan, Y. On the Analysis of Rural Space. *Prog. Geogr.* **2018**, *37*, 591–600. [CrossRef]
45. Feng, J.; Du, Y. The Aspiration of Renovation of Hollow Villages: An Investigation of Xiji County, Ningxia Hui Autonomous Region. *Hum. Geogr.* **2016**, *31*, 39–48. [CrossRef]
46. Yu, B.; Luo, J.; Zeng, J. *Contemporary Chinese Villages Spatial Changes and Governance*; Science Press: Beijing, China, 2016; ISBN 9787030477330.
47. Zhuo, R.; Yu, B.; Zeng, J.; Guo, X.; Li, R. Spatio-Temporal Evolution of Rural Development Capacity of Jianghan Plain from the Perspective of Regional Major Function. *Econ. Geogr.* **2019**, *39*, 171–180. [CrossRef]
48. Li, P.; Chen, W.; Sun, W. Spatial Differentiation and Influencing Factors of Rural Territorial Multifunctions in Developed Regions: A Case Study of Jiangsu Province. *Acta Geogr. Sin.* **2014**, *69*, 797–807. [CrossRef]
49. Xie, G.; Lu, C.; Leng, Y.; Zheng, D.; Li, S. Ecological Assets Valuation of the Tibetan Plateau. *J. Nat. Resour.* **2003**, *18*, 189–196. [CrossRef]
50. Zhang, J. Village Value Orientation and Rural Revitalization. *Chin. Rural Econ.* **2018**, 2–10. Available online: http://jtp.cnki.net/Bilingual/detail/html/znjj201801001?view=2 (accessed on 18 March 2022).
51. Guo, X. Researches on the China's Rural Vitalization Strategy from Several Dimensions. *Reform* **2018**, 54–61. Available online: http://en.cnki.com.cn/Article_en/CJFDTOTAL-REFO201803005.htm (accessed on 18 March 2022).
52. Liu, Y.; Liu, Y.; Guo, L. SOFM-Based Functional Subareas of Rural Area along the Bohai Rim in China. *Hum. Geogr.* **2013**, *28*, 114–120. [CrossRef]
53. National Bureau of Statistics of China. China City Statistical Yearbook. 2001–2017. Available online: http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm (accessed on 18 March 2022).
54. National Bureau of Statistics of China. China Statistical Yearbook (County-Level). 2001–2017. Available online: http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm (accessed on 18 March 2022).
55. National Bureau of Statistics of China. Hubei Statistical Yearbook. 2001–2017. Available online: http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm (accessed on 18 March 2022).
56. Long, H.; Zhang, Y.; Tu, S. Rural Vitalization in China: A Perspective of Land Consolidation. *J. Geogr. Sci.* **2019**, *29*, 517–530. [CrossRef]
57. Zang, Y.; Yang, Y.; Cao, Z. Typical Model of Rural Transformation and Restructure in Suburban Areas: A Case Study of Huaming Township in Dongli District, Tianjin City. *Geogr. Res.* **2019**, *38*, 713–724. [CrossRef]
58. Liu, Y.; Lu, D.; Bao, J.; Ye, C.; Tang, M.; Liu, Y.; Zhao, Y.; Feng, Z.; Huang, X.; Hao, Q.; et al. How to Revive Geography: Our Reflection and Practice. *Geogr. Res.* **2018**, *37*, 1049–1069. [CrossRef]
59. Newby, H. Locality and Rurality: The Restructuring of Rural Social Relations. *Reg. Stud.* **1986**, *20*, 209–215. [CrossRef]
60. Li, Y.; Chen, C.; Wang, Y.; Liu, Y. Urban-Rural Transformation and Farmland Conversion in China: The Application of the Environmental Kuznets Curve. *J. Rural Stud.* **2014**, *36*, 311–317. [CrossRef]
61. Li, H.; Zhang, X.; Wu, Q.; Wang, Y. Characteristics and Mechanism of Rural Settlements Spatial Reconstruction in Developed Areas—A Case Study of Southern Jiangsu. *J. Nat. Resour.* **2015**, *30*, 591–603. [CrossRef]