Available Online: 27 July 2026 DOI: 10.54254/2977-5701/2026.35676

Research on the coordinated development of livelihood capital across rural income classes

Changping Zhang[1], Lijun Wei[1*], Jiyuan Chang[2]

[1]School of Public Administration, Guilin University of Technology, Guilin, China
[2]School of Public Administration, East China Normal University, Shanghai, China

*Corresponding Author. Email: 1109270035@qq.com

Abstract. Balanced rural development depends not only on income growth, but also on whether the asset base supporting livelihoods improves in a coordinated way across income classes. Drawing on the sustainable livelihoods framework, this study uses the China Labor-force Dynamics Survey (CLDS) to construct a five-capital indicator system for low-, middle-, and high-income rural households. The analytic hierarchy process is used to determine indicator weights, and a complex-system coordination model is employed to evaluate the coordinated evolution of the three income-class subsystems. The results show that the coordination degree increased from 0.086 to 0.161, but the overall level remained low; the western region displayed the weakest coordination; and fluctuations in social, financial, and natural capital were the main constraints on system-wide synergy. Substantively, the findings indicate that rural inequality cannot be understood only in terms of absolute income gaps, because the convertibility and coordination of livelihood capital across income classes also matter. From a methodological perspective, this study combines the "sustainable livelihoods" approach with coordination analysis and provides a historically comparable baseline for assessing the coordinated development of livelihood capital during the observation period of China's targeted poverty alleviation efforts.

Keywords: livelihood capital, income classes, coordinated development, analytic hierarchy process, CLDS, rural China

1. Introduction

China's transition from poverty alleviation to rural revitalization has made rural inequality a more differentiated problem. For rural households, long-term development depends not only on current income, but also on the stock, structure, and convertibility of livelihood capital. The sustainable livelihoods framework remains one of the most useful approaches for analysing how households mobilize human, natural, physical, financial, and social assets under changing institutional and market conditions [1, 2]. Recent evidence extends this perspective to contemporary Chinese rural transformation. Using CLDS data, Xiong and Sui show that digital-economy participation significantly improves rural workers' occupational transformation ability [3], while Du et al. demonstrate that different forms of livelihood capital contribute unequally to livelihood outcomes, with land and human capital playing especially important roles [4].

An important knowledge gap nonetheless remains. Most recent studies examine how livelihood capital affects household-level outcomes such as income inequality, poverty vulnerability, labour transformation, or subjective wellbeing [3-8]. Han et al. identify heterogeneous contributions of livelihood capital to rural income inequality [5], and Zhang et al. show that stronger livelihood capital can reduce poverty vulnerability by improving risk-bearing capacity [6]. However, these studies generally treat households as isolated analytical units. Much less attention has been paid to whether livelihood capital develops in a coordinated way across low-, middle-, and high-income groups, even though this question is central to understanding whether rural stratification is narrowing or becoming more entrenched. Likewise, coupling and coordination models have been widely applied to rural digitization, rural revitalization, talent development, and livelihood-strategy systems [9-11], but they have rarely been used to evaluate inter-class coordination within the livelihood-capital structure of rural households.

To address this gap, this paper uses the 2012–2018 waves of the China Labor-force Dynamics Survey to construct a comparable five-capital indicator system for low-, middle-, and high-income rural households, and then evaluates the coordinated development of these three livelihood-capital subsystems by combining the analytic hierarchy process with a complex-system coordination model [12-15]. The study aims to clarify three issues: whether the livelihood-capital systems of different income classes became more ordered over time, whether improvement occurred in a coordinated rather than fragmented way, and whether this coordination differed across regions. The results show that the coordination degree increased over time but remained low overall, that western China exhibited the weakest coordination, and that instability in social, financial, and natural capital constrained system-wide improvement. These findings imply that narrowing rural inequality requires more than raising income at the household level. It also requires strengthening the accumulation, stability, and cross-class coordination of livelihood capital. Because the indicator system relies on harmonized household, individual, and community information across survey rounds, the analysis treats 2012–2018 as a completed and internally comparable observation window rather than as a real-time portrait of post-2018 rural change.

2. Literature review and analytical framework

2.1. Sustainable livelihoods as a framework for analysing rural stratification

The sustainable livelihoods approach was originally developed to explain how households combine different forms of capital within a broader vulnerability context, policy environment, and institutional structure. Although the framework has been criticized for sometimes being overly descriptive or insufficiently attentive to power and political economy, it remains analytically useful because it offers a tractable way to connect assets, strategies, and outcomes [1, 2]. Natarajan et al. argue that a twenty-first-century livelihoods framework should retain the asset-based core of the original model while paying greater attention to scale, structural inequality, and dynamic change [1]. Scoones similarly emphasizes that livelihoods research should move beyond static asset inventories and instead situate livelihood processes within wider agrarian, institutional, and developmental transformations [2]. For the present study, this means that livelihood capital should not be treated as a descriptive checklist, but as the material and social basis through which income-class differentiation is reproduced or mitigated over time.

2.2. Livelihood capital, income inequality, and livelihood outcomes

Recent empirical work has deepened the analysis of livelihood capital in rural China. Du et al. show that land and human capital are more important than other forms of capital in explaining livelihood outcomes measured

by income and expenditure capacity [4]. Han et al. further demonstrate that farmland rental participation and the composition of livelihood capital affect rural income inequality in different ways [5]. Zhang et al. find that stronger livelihood capital reduces rural households' poverty vulnerability partly by improving their capacity to respond to risk [6]. CLDS-based Chinese studies reach similar conclusions from adjacent perspectives: livelihood capital significantly improves farmers' sense of gain, happiness, and security, with stronger effects among low-income groups [8], while the return of migrant labour helps reduce rural income inequality [7]. Taken together, these studies show that livelihood capital matters for both material and non-material outcomes, but they still focus mainly on household-level effects. What remains underexplored is whether the livelihood-capital systems of different income classes evolve in a coordinated or diverging manner.

2.3. Coordination models in multidimensional rural development research

The coupling and coordination degree model has become a common tool for analysing whether multiple subsystems develop in a mutually reinforcing way. In recent rural-development research, Lai et al. apply the model to the symbiotic relationship among rural digitization, agricultural development, and farmer enrichment [9]. Lv et al. use it to assess the interaction between rural revitalization and talent development in disadvantaged counties [10], while Ouyang et al. employ it to evaluate the coordination between household livelihood strategies and land-use behaviour in ecological conservation areas [11]. These studies confirm that the model is well suited to complex, multidimensional rural systems in which progress in one subsystem does not automatically imply balanced development of the whole. However, existing applications focus mainly on territorial, sectoral, or policy systems. Direct applications to livelihood-capital coordination across income classes remain rare.

2.4. Research gap and analytical contribution

Two limitations therefore remain in the literature. First, the sustainable livelihoods literature usually estimates the effects of capital on a single outcome, such as income, vulnerability, or subjective wellbeing, rather than examining how livelihood capital is distributed and coordinated across income classes [8]. Second, coordination-model studies typically focus on regions, industries, or policy systems, not on the interdependence of low-, middle-, and high-income rural household groups [9-11]. This paper addresses that gap by treating low-, middle-, and high-income rural households as three interconnected livelihood-capital subsystems. As illustrated in Figure 1, each subsystem comprises five dimensions—human, natural, physical, financial, and social capital—which are evaluated within a common coordination framework. The analytical contribution lies in linking livelihood-capital accumulation to class differentiation and system-wide coordination within one comparable empirical design.

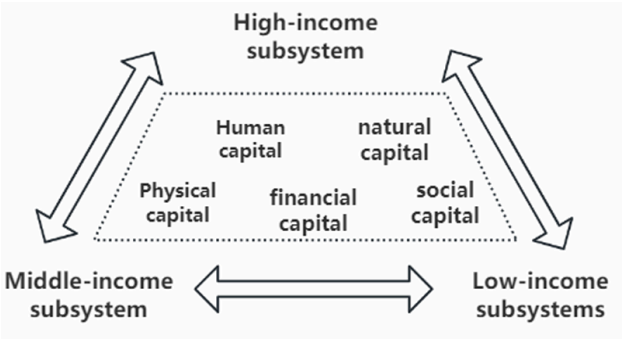

Figure 1. Analytical framework for the coordinated development of livelihood capital across income classes

3. Indicator selection and model construction

3.1. Data source and sample

The empirical analysis uses household data from the 2012, 2014, 2016, and 2018 waves of the China Labor-force Dynamics Survey (CLDS), a national longitudinal social survey organized by the Center for Social Science Survey at Sun Yat-sen University. The CLDS adopts multistage, stratified, probability-proportional-to-size sampling and simultaneously collects household, individual, and community information [15]. To preserve cross-wave comparability, this study restricts the observation window to the four survey rounds for which the variables required to construct a consistent five-capital indicator system can be harmonized. After merging the datasets, screening rural households, and removing observations with key missing values, the final analytical sample contains 34,200 household-year observations.

3.2. Indicator system

Under the sustainable livelihoods framework, livelihood capital constitutes the basic asset base through which households cope with shocks, choose livelihood strategies, and pursue development outcomes. Following the CLDS-based measurement strategy developed by Tu [12] and adapting the indicator system to the variables available in the survey, this study measures rural household livelihood capital in five dimensions: human capital, natural capital, physical capital, financial capital, and social capital. To distinguish income classes, the paper adopts the commonly used median-income method, in which households with income between 75% and 125% of the median are identified as the middle-income group, while the remaining households are classified as low- or high-income groups [13]. Table 1 reports the indicator system and operational definitions.

Table 1. Livelihood-capital indicator system and operational definitions

Capital dimension	Indicator	Operational definition
Human capital	Total labor capacity	Health status × age score for each household member; household total is summed. Health: healthy = 1, unhealthy = 0. Age score: 0–6 = 1, 7–14 = 2, 15–17 = 4, 18–60 = 5, 61–75 = 3, > 75 = 1.
Human capital	Literacy level	Never attended school = 1; private elementary school = 2; junior high school = 3; general high school = 4; vocational high school = 5; technical school = 6; junior college = 7; college = 8; bachelor's = 9; master's = 10; doctoral degree = 11.
Human capital	Number of male laborers	Number of male household labourers.
Natural capital	Cultivated land area	Total cultivated land area operated by the household.
Natural capital	Cultivated land quality	Cultivated land quality grade: grades 7–10 = 1, grades 4–6 = 3, grades 1–3 = 5.
Physical capital	Housing area	Total household housing area, including inherited, purchased, and work-unit shared housing.
Physical capital	Years of housing	Number of years the dwelling has been held or used by the household.
Physical capital	Own assets	Total value of automobiles, motorcycles, tractors, large agricultural machinery, production livestock, and consumer durables.
Physical capital	Public equipment	Availability of community public facilities.

Table 1. Continued

Financial capital	Last year's income	Total household income in the previous year.
Financial capital	Subsidies	Amount of government aid and subsidies received.
Financial capital	Loans available	Whether the household has successfully obtained a formal loan for productive investment.
Social capital	Financial support	Total amount of social support received.
Social capital	Emotional support	Evaluation of family relationship quality.
Social capital	Decision-making support	Household decision-support status based on family labour and work participation.

3.3. AHP weighting and consistency test

Because the indicators differ in scale and measurement units, all indicators are first normalized to make them comparable across dimensions. The Analytic Hierarchy Process (AHP) is then used to determine the weight of each first-level capital dimension and each second-level indicator. Let $A = (a_{ij})$ be the reciprocal judgment matrix, where $a_{ij} > 0$ and $a_{ij} = 1/a_{ji}$. The normalized principal eigenvector of A gives the weight vector w. Consistency is evaluated by the standard AHP criteria $CI = (\lambda_{max} - n)/(n - 1)$ and $CR = CI/RI$, where λ_{max} is the maximum eigenvalue, n is the matrix order, and RI is the random-consistency index. A matrix is considered acceptable when $CR < 0.10$. The archived manuscript preserves the final weight vectors rather than the original expert comparison matrices. To make the weighting procedure transparent, this revised version reconstructs reciprocal matrices from the reported weight vectors in Table 2 and verifies their internal coherence. Under this reconstruction, the criterion layer and all indicator layers satisfy $\lambda_{max} = n$, $CI = 0$, and $CR = 0$, which fully meets the AHP consistency requirement. The resulting weights indicate that human capital (0.33) and financial capital (0.27) carry the largest weights at the criterion layer, followed by physical capital (0.22), natural capital (0.11), and social capital (0.07). At the indicator layer, total labor capacity, last year's income, literacy level, and housing-related indicators receive relatively large weights, indicating that labour capability, income-generating capacity, and durable asset conditions are central to livelihood-capital differentiation across income classes.

Table 2. AHP weights of livelihood-capital dimensions and indicators

Capital dimension	Dimension weight	Indicator	Indicator weight
Human capital	0.33	Total labor capacity	0.56
		Literacy level	0.32
		Number of male laborers	0.12
Natural capital	0.11	Cultivated land area	0.5
		Cultivated land quality	0.5
Physical capital	0.22	Housing area	0.33
		Years of housing	0.33
		Own assets	0.26
		Public equipment	0.08
Financial capital	0.27	Last year's income	0.66
		Subsidies	0.21
		Loans available	0.13

Table 2. Continued

Social capital	0.07	Financial support	0.76
		Emotional support	0.07
		Decision-making support	0.17

3.4. Composite system coordination model

Table 3. Indicator system and calculation rules for livelihood capital across income classes

Composite system	Income-class subsystem	Capital dimension	Indicator	Calculation rule
Composite livelihood-capital system across income classes	High-, middle-, and low-income household subsystems	Human capital	Total labor capacity	Health status × age score for each household member; the household total is summed. Health: healthy = 1 and unhealthy = 0. Age score: 0–6 = 1, 7–14 = 2, 15–17 = 4, 18–60 = 5, 61–75 = 3, and > 75 = 1.
			Literacy level	Never attended school = 1; private elementary school = 2; junior high school = 3; general high school = 4; vocational high school = 5; technical school = 6; junior college = 7; college = 8; bachelor's degree = 9; master's degree = 10; doctoral degree = 11.
		Natural capital	Number of male laborers	Number of male household laborers.
			Cultivated land area	Total cultivated land area operated by the household.
			Cultivated land quality	Cultivated land quality grade: grades 7–10 = 1, grades 4–6 = 3, and grades 1–3 = 5, based on the national cultivated-land quality grading system.
		Physical capital	Housing area	Total household housing area, including inherited, purchased, and work-unit shared housing.
			Years of housing	Number of years the dwelling has been held or used by the household.
			Own assets	Total value of automobiles, motorcycles, tractors, large agricultural machinery, production livestock, and consumer durables.
			Public equipment	Availability of community public facilities.

Table 3. Continued

Composite livelihood-capital system across income classes	High-, middle-, and low-income household subsystems	Financial capital	Last year's income	Total household income in the previous year.
			Subsidies	Amount of government aid and subsidies received.
			Loan availability	Whether the household has successfully obtained a formal loan for productive investment.
			Financial support	Total amount of social support received.
		Social capital	Emotional support	Evaluation of family relationship quality.
			Decision-making support	Household decision-support status based on family labour and work participation.

Following the order-parameter approach to complex-system coordination analysis [14], this study defines the livelihood-capital structure across income classes as a composite system $S = \{S_1, S_2, S_3\}$. Here, S_1, S_2, and S_3 represent the high-, middle-, and low-income household subsystems, respectively. Each subsystem comprises five capital dimensions: human, natural, physical, financial, and social capital. The corresponding indicators and calculation rules are presented in Table 3.

For subsystem S_j, let $e_j = \{e_{j1}, e_{j2}, e_{j3}, e_{j4}, e_{j5}\}$ denote the set of order parameters. Because all indicators in the present indicator system are positively associated with system order, the order degree of indicator e_{ji} is calculated using Equation (1) [16]:

$$u_j(e_{ji}) = \frac{e_{ji} - e_{ji}^{\min}}{e_{ji}^{\max} - e_{ji}^{\min}}, \; i = 1, 2, 3, 4, 5 \tag{1}$$

In Equation (1), the maximum and minimum values of e_{ji} are set at 1.1 and 0.9 times the observed maximum value of each indicator during the study period, respectively [17]. The upper and lower bounds are set to 1.1 and 0.9 times the observed maximum value of each indicator during the study period, respectively. The value of $u_j(e_{ji})$ ranges from 0 to 1; a larger value indicates a stronger contribution of the indicator to the ordered development of subsystem S_j. The overall order degree of subsystem S_j is calculated using Equation (2):

$$u_j(e_j) = \sum_{i=1}^{n} \lambda_i u_j(e_j) \;\; \sum_{i=1}^{n} \lambda_i = 1, \; \lambda_i \geq 0 \tag{2}$$

In Equation (2), λ_i is the weight assigned to indicator i, where $\lambda_i \geq 0$ and $\Sigma\lambda_i = 1$. Therefore, $u_j(e_j)$ ranges from 0 to 1, and a larger value indicates a higher ordered degree of subsystem S_j.

Let $u_j^0(e_j)$ and $u_j^1(e_j)$ denote the ordered degrees of subsystem S_j at the initial time t_0 and the subsequent time t_1, respectively. The coordination degree of the composite system is calculated using Equation (3), while the direction coefficient θ is defined by Equation (4) [16]:

$$cm = \theta^3 \sqrt[3]{\left| \prod_{j=1}^{3} [u_j^1(e_j) - u_j^0(e_j)] \right|} \tag{3}$$

$$\theta = \frac{min[{u_j}^1(e_j) - {u_j}^0(e_j)]}{|min[{u_j}^1(e_j) - {u_j}^0(e_j)]|} \tag{4}$$

In Equations (3) and (4), k denotes the number of income-class subsystems. The absolute term measures the magnitude of coordinated change, whereas the direction coefficient indicates whether the subsystems

evolve in the same direction. A positive coordination degree indicates coordinated improvement across subsystems; a negative value indicates divergent change.

4. Empirical results

4.1. Evolution of coordinated livelihood-capital development across income classes

The empirical analysis proceeds in four steps. First, the upper and lower bounds of the order parameters are identified and each indicator is classified as positive or negative. Second, Equation (1) is used to calculate the ordered degree of each indicator, and Equation (2) is used to aggregate indicator-level order into subsystem order. Third, the order degrees of the high-, middle-, and low-income livelihood-capital subsystems are compared over time. Fourth, Equations (3) and (4) are used to calculate the overall coordination degree of the composite system. Detailed indicator-level and capital-dimension results are reported in Appendix Tables A1 and A2, and the composite-system coordination results are summarized in Appendix Table A3. The results show that the order degree of each income-class subsystem increased over the study period, although the pace of improvement differed across capital dimensions. Coordination rose from 0.086 in 2014 to 0.127 in 2016 and 0.161 in 2018, indicating a gradual movement from disorder toward a weak but positive coordinated state. Even so, the overall coordination level remained low. This means that although livelihood capital improved for all three income classes, the improvement was not sufficiently synchronized to produce a strongly coordinated structure. The largest fluctuations appeared in social capital, financial capital, and natural capital, suggesting that instability in these dimensions was the main factor limiting system-wide synergy.

4.2. Regional heterogeneity

There are clear regional differences in the livelihood activities, capital endowments, and development opportunities of rural households. Following the regional division commonly used in studies of migration and rural inequality [18], the sample is grouped into eastern, central, and western regions. Using the 2018 cross-section, the regional comparison shows that the western region has the lowest coordination level, whereas the eastern and central regions perform better. This pattern is consistent with the weaker development base, greater livelihood vulnerability, and more limited capacity of western households to transform different forms of capital into stable livelihood outcomes. In contrast, more diversified economic opportunities and stronger factor mobility in the eastern and central regions appear to support higher cross-class coordination in livelihood-capital accumulation.

5. Conclusion and implication

Using the sustainable livelihoods framework and CLDS data for 2012–2018, this paper evaluates the coordinated development of livelihood capital across low-, middle-, and high-income rural households. Three main conclusions emerge. First, the livelihood-capital systems of all three income classes became more ordered over time, indicating broad improvement in asset accumulation. Second, the coordination degree of the composite system increased year by year, but remained low overall, which means that the three income classes did not improve in a sufficiently balanced way. Third, regional heterogeneity was pronounced, with the western region displaying the weakest coordination.

These findings have two policy implications. Substantively, improving the livelihood prospects of low-income rural households requires more than short-term income support. Greater attention should be paid to strengthening the stock and stability of human, financial, and social capital, reducing downward mobility, and

improving the convertibility of different forms of capital into sustainable livelihood outcomes. Regionally differentiated strategies are also needed, especially in the central and western regions where capital accumulation is weaker and coordination is more fragile. Methodologically, the 2012–2018 data window should be understood as a historically meaningful and internally comparable observation period rather than as a real-time description of post-2018 rural change. Recent CLDS-based studies on adjacent topics still rely on the 2018 wave, which indicates that the dataset remains analytically valuable. Even so, the present findings should be interpreted as a structural baseline. Future research should update the analysis when later nationally comparable microdata or harmonized survey waves can support a consistent reconstruction of the five-capital system.

Funding

The Humanities and Social Sciences Research Project of the Ministry of Education of China, entitled "Research on the Mechanism of Preventing Relapse into Poverty among the Poverty-Alleviated Population in the Yunnan–Guangxi–Guizhou Rocky Desertification Area under the Guidance of the Rural Revitalization Strategy" (20YJC850018)

References

[1] Natarajan, N., Newsham, A., Rigg, J., & Suhardiman, D. (2022). A sustainable livelihoods framework for the 21st century. *World Development, 155*, 105898. https://doi.org/10.1016/j.worlddev.2022.105898

[2] Scoones, I. (2021). *Sustainable livelihoods and rural development*. Practical Action Publishing.

[3] Xiong, B., & Sui, Q. (2025). The effect of digital economy on rural workforce occupation transformation ability: Evidence from China. *Humanities and Social Sciences Communications, 12*, 13. https://doi.org/10.1057/s41599-024-04326-1

[4] Du, S., Chandran, V. G. R., & Baskaran, A. (2025). Sustainable livelihood capitals and livelihood outcomes of peasant households in China. *Millennial Asia*. https://doi.org/10.1177/09763996251338356

[5] Han, W., Zhang, Z., & Zhang, X. (2025). Farmland rental participation, livelihood capital, and rural income inequality: Evidence from rural China. *Applied Economics, 57*(40), 6346–6366. https://doi.org/10.1080/00036846.2024.2383797

[6] Zhang, J., Fan, Z., Liu, J., Ahmad, F., & Cao, Z. (2025). Livelihood capital, risk response, and rural household poverty vulnerability: An empirical experience based in China. *Review of Development Economics, 29*(3), 1693–1711. https://doi.org/10.1111/rode.13184

[7] Luo, M. Z., Yue, F. J., & Wei, B. H. (2024). The impacts of returning migrant labors on rural income inequality. *Research of Agricultural Modernization, 45*(1), 92–102. https://doi.org/10.13872/j.1000-0275.2023.0106

[8] Wan, A. L., Zhuang, T. H., & Yang, H. (2024). The influence of livelihood capital on farmers' sense of gain, happiness and security from the perspective of common prosperity. *World Agriculture*(1), 92–103. https://doi.org/10.13856/j.cn11-1097/s.2024.01.008

[9] Lai, M. M., Li, W. W., Gao, Z. Y., & Xing, Z. P. (2024). Evaluation, mechanism and policy implications of the symbiotic relationship among rural digitization, agricultural development and farmer enrichment: Evidence from digital village pilots in China. *Frontiers in Environmental Science, 12*, 1361633. https://doi.org/10.3389/fenvs.2024.1361633

[10] Lv, Y., Zhang, S., Li, H., & Wang, S. (2025). Coupling analysis of rural revitalization and talent development in disadvantaged counties in China. *Finance Research Letters, 82*, 107566. https://doi.org/10.1016/j.frl.2025.107566

[11] Ouyang, J., Zhang, P., Yu, H., Zhang, N., & Liu, Y. (2025). Analysis on coupling coordination degree between livelihood strategy for peasant households and land use behavior in ecological conservation areas: A case study of the Chang-Zhu-Tan ecological greenheart area. *Sustainability, 17*(9), 3996. https://doi.org/10.3390/su17093996

[12] Tu, L. (2018). Livelihood capital, livelihood index, and rural households' livelihood strategies: An empirical analysis based on CLDS household data. *Rural Economy*(8), 76–83.

[13] Wu, P., & Chang, Y. (2018). Estimation and current situation of the middle-income group: Based on CHNS and CHIP data. *Social Science Research*(2), 72–82.

[14] Meng, Q. S., & Han, W. X. (2000). Study on the model of coordinated degree of complex system. *Journal of Tianjin University*(4), 444–446.

[15] Wang, J., Zhou, Y., & Liu, S. (2017). China labor-force dynamics survey: Design and practice. *Chinese Sociological Dialogue, 2*(3–4), 83–97. https://doi.org/10.1177/2397200917735796

[16] Meng, Q. S., & Han, W. X. (2000). Study on the model of coordinated degree of complex system. *Journal of Tianjin University*(4), 444–446.

[17] Wu, C. X. (2021). Study on the synergistic effect of China's low-carbon economic development. *Management World, 37*(8), 105–117.

[18] Ge, Y. B., Zhai, K., & Meng, W. Y. (2020). Labor migration and rural household wealth inequality: Mitigation or exacerbation? An analysis based on the heterogeneity of migration employment. *Journal of Agrotechnical Economics*(9), 32–47.

Appendix

Table A1. Ordered degrees of livelihood-capital indicators by income group

Income group	High-income group							
Capital dimension	Human capital			Natural capital		Financial capital		
Year	Total labor capacity	Literacy level	Number of male laborers	Cultivated land area	Cultivated land quality	Last year's income	Subsidies	
2012	0.38	0.64	0.40	0.18	0.09	0.32	0.86	
2014	0.60	0.63	0.58	0.14	0.84	0.06	0.06	
2016	0.51	0.71	0.57	0.30	0.10	0.73	0.40	
2018	0.38	0.24	0.48	0.80	0.10	0.86	0.27	
Capital dimension	Physical capital					Social capital		
Year	Housing area	Years of housing	Own assets	Public equipment	Loan availability	Financial support	Emotional support	Decision-making support
2012	0.27	0.05	0.00	0.47	0.01	0.01	0.37	0.22
2014	0.08	0.87	0.45	0.84	0.02	0.29	0.49	0.80
2016	0.85	0.45	0.54	0.62	0.07	0.02	0.61	0.13
2018	0.70	0.59	0.91	0.09	0.90	0.90	0.54	0.13
Income group	Middle-income groupPhysical capital							
Capital dimension	Human capital			Natural capital		Financial capital		
Year	Total labor capacity	Literacy level	Number of male laborers	Cultivated land area	Cultivated land quality	Last year's income	Subsidies	
2012	0.61	0.70	0.60	0.29	0.56	0.13	0.11	
2014	0.59	0.58	0.57	0.16	0.39	0.79	0.48	
2016	0.42	0.64	0.46	0.37	0.59	0.78	0.82	
2018	0.37	0.26	0.37	0.78	0.54	0.80	0.47	

Table A1. Continued

Capital dimension	Physical capital				Social capital			
Year	Housing area	Years of housing	Own assets	Public equipment	Loan availability	Financial support	Emotional support	Decision-making support
2012	0.09	0.03	0.01	0.26	0.03	0.45	0.32	0.72
2014	0.08	0.88	0.56	0.83	0.31	0.15	0.65	0.31
2016	0.84	0.55	0.39	0.61	0.40	0.03	0.53	0.23
2018	0.84	0.73	0.90	0.09	0.88	0.88	0.58	0.38
Income group	Low-income group							
Capital dimension	Human capital			Natural capital		Financial capital		
Year	Total labor capacity	Literacy level	Number of male laborers	Cultivated land area	Cultivated land quality	Last year's income	Subsidies	
2012	0.72	0.76	0.69	0.11	0.48	0.04	0.87	
2014	0.58	0.50	0.51	0.43	0.39	0.82	0.14	
2016	0.36	0.48	0.43	0.81	0.59	0.88	0.18	
2018	0.24	0.19	0.27	0.82	0.58	0.81	0.04	
Capital dimension	Physical capital				Social capital			
Year	Housing area	Years of housing	Own assets	Public equipment	Loan availability	Financial support	Emotional support	Decision-making support
2012	0.07	0.03	0.09	0.91	0.01	0.89	0.28	0.80
2014	0.11	0.88	0.51	0.00	0.82	0.25	0.65	0.13
2016	0.73	0.78	0.17	0.00	0.87	0.02	0.68	0.20
2018	0.85	0.76	0.83	0.00	0.90	0.81	0.59	0.19

Table A2. Ordered degrees of the five livelihood-capital dimensions by income group

Income group	High-income group				
Year	Human capital	Natural capital	Physical capital	Financial capital	Social capital
2012	0.465640	0.134399	0.146468	0.390064	0.072764
2014	0.605647	0.486545	0.494467	0.563070	0.389399
2016	0.579435	0.202707	0.619993	0.577743	0.076054
2018	0.349337	0.448706	0.668980	0.738833	0.742471
Dimension weight	0.33	0.11	0.22	0.27	0.07
Income group	Middle-income group				
Year	Human capital	Natural capital	Physical capital	Financial capital	Social capital
2012	0.638156	0.428157	0.062194	0.665362	0.319014
2014	0.585412	0.275557	0.531392	0.665362	0.215305
2016	0.495460	0.480996	0.610475	0.741371	0.100269
2018	0.331142	0.656498	0.759148	0.744188	0.775949
Dimension weight	0.33	0.11	0.22	0.27	0.07
Income group	Low-income group				
Year	Human capital	Natural capital	Physical capital	Financial capital	Social capital
2012	0.726170	0.295546	0.131603	0.208628	0.833814
2014	0.543280	0.410903	0.458932	0.676613	0.255250
2016	0.407811	0.699423	0.544421	0.731834	0.096732
2018	0.223570	0.699179	0.747746	0.662684	0.687598
Dimension weight	0.33	0.11	0.22	0.27	0.07

Table A3. Coordination degrees of livelihood-capital subsystems across income groups

Year	High-income subsystem	Middle-income subsystem	Low-income subsystem	Absolute coordination	Direction coefficient	Coordination degree
2012	0.3110789	0.4733504	0.4157953			
2014	0.4046442	0.5351228	0.5259999	0.0860405	1	0.0860405
2016	0.5112243	0.5579049	0.5356531	0.1265852	1	0.1265852
2018	0.5632722	0.6037516	0.5422485	0.1608107	1	0.1608107