Community Resilience in Transitional Rural Society: A Case study from Central China

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Introduction

China was an agricultural nation for thousands of years before 1978, when the "opening up and economic reform" policy was implemented to embrace the market economy. In the last 40 years of development, rural China has experienced urbanization and industrialization as a result of which the resources, organizational structure, and governance of rural communities have changed from the traditional agricultural pattern to a modern market pattern. Rural Chinese communities and residents are confronted with challenges emanating from this social transition. Community resilience is a reliable reflection of rural communities' capacity to adapt to uncertainties. It measures the current status of resources available for the community to respond to adversity, the structure of community organization that can mobilize the public to deal with adversity, and the effectiveness of governance when the community administration and residents cooperate to overcome adversity. Community resilience can reveal how rural communities maintain sustainable development by utilizing their collective resources, organization structure, and governance.

Compared to community resilience in response to natural disasters, community resilience under social adversity is more likely to be influenced by the current social-ecological system. In rural areas individual perceptions of community resilience are significantly influenced by natural conditions, the status of local businesses, social networks, culture, and public administration. In a case study of rural communities in West China, it was reported that the resilience of rural villages comes from their geographical features, their economic conditions, their social networks, and the local village culture. Considering community autonomy and the one-party governance in rural China, resilience of a community relies heavily on the status of its community administration. The present study addresses community resilience using individual perceptions of community resilience and the theoretical framework of social-ecological systems. Here we introduce the theory of community resilience and use a survey of residents from rural central China to explore this resilience.First, the different categories of community resilience in rural communities are explored. Then social-ecological covariates are introduced to explore how China's social transition leads to different degrees of community resilience.

Data and methods

The data come from a 2018 Hubei survey on family development, resilience, and governance under urbanization. Hubei, in central China, is a province with average social-economic status relative to the whole country. In total, twenty communities and 1,032 individuals were selected.

We use Emery and Flora's (2006) definition of the social-ecological system of community resilience, in which nature, economy, society, culture, and politics are included as indexes from X_1 to X_5. The detailed measurements for each index are designed according to the current situation in rural China. First, X_1, the distance from the rural community to the closest city (kilometer), is defined as the natural factor. Second, the annual expenditure-income ratio of the community (%) is X_2, which measures the economic activities of the community. Third, we use the number of outside organizations that cooperate with the community, X_3, as a measure of society. We use three items to measure the importance of traditional culture in a rural community: are there any ancestral halls in the community (0=no, 1=yes); are there any temples for local religions in the community

(0=no, 1=yes); are there any churches or mosques in the community (0=no, 1=yes). The index of traditional culture, X_4, is defined as the summed score of these three items. The fifth aspect of the social-ecological system is political. We take the participation ratio (%) at villagers' congresses by rural residents, X_5, to measure the political factor in social-ecological systems. We use $X'_i = (X_i - X_{imin}) / (X_{imax} - X_{imin})$ (i=1, 2, …5) to standardize the five indexes. Table 1 presents the standardized indexes of the social-ecological system.

Table 1. Standardized measurements of the social-ecological system (N=20)

Social-ecological system	Mean	SD	Min/Max
Distance to the closest city (X'_1)	0.346	0.355	0/1
Annual expenditure-income ratio (X'_2)	0.817	0.207	0/1
Social capital (X'_3)	0.147	0.217	0/1
Traditional culture (X'_4)	0.375	0.358	0/1
Political participation (X'_5)	0.707	0.277	0/1

This study uses individuals' perceptions of community resilience (PCR) to measure community resilience in rural China. Leykin et al. (2013) used twenty-eight scales that measure PCR in their original "conjoint community resiliency assessment measure (CCRAM)" based on interviews in communities faced with social risks. The present study slightly revises the original CCRAM according to the specific conditions in rural China: four items related to preparedness are deleted due to duplication; five items related to preparedness from the communities advancing resilience toolkit (CART) are added to form an index of emergency preparedness (Pfefferbaum et al., 2013; Patel and Gleason, 2018). Detailed information about the Chinese CCRAM in this study is presented in Appendix 1, and the final scores and reliabilities of the six indexes in the Chinese CCRAM are presented in Table 2.

Table 2. Indexes and reliabilities of PCR (N=1032)

Indexes of community resilience	items	α	Mean	SD
Community belief (CB)	3	0.742	3.644	0.664
Normal preparedness (NP)	3	0.758	3.880	0.666
Emergency preparedness (EP)	5	0.877	3.965	0.655
Collective efficiency (CE)	6	0.863	3.803	0.626
Leadership (LP)	6	0.835	3.815	0.619
Social trust (ST)	6	0.839	3.832	0.582
Total	29	0.944		

PCR for each individual is represented by six indexes: "community belief", "normal preparedness", "emergency preparedness", "collective efficiency", "leadership", and "community trust". The value of each index is the average of its items. The latent categories of PCR are identified according to the features of these indexes among the individual samples. Here we use latent profile analysis (LPA), which classifies all respondents into latent groups according to their answers to scales of community resilience. After the classification of PCR by LPA, we use causal analysis to assess the influence of the social-ecological system on community resilience. Since community factors have cross-level effects on individual perceptions, we use multi-level regression mixture modeling (MRMM), in which the identified category of PCR is the dependent variable, and factors at the individual level and social-ecological factors at the community level are independent variables. Mplus 8.3 is used for LPA and MRMM.

Results and discussion

LPA gives the average score of the six indexes (AS) within each category. In the first category, the AS is 4.473, and the categorical probability of this category is 0.187; that is, 18.7% of respondents perceive community resilience as category 1. For the second category, the AS is 3.840, and 65% of respondents perceive community resilience as category 2. For the third category, the AS is 3.008, and 16.3% of respondents perceive community resilience as category 3. We then make a standardization calculation as follow: within each category, the estimated score of each index minus the AS gives the standardized score of each index. The categorical classification based on the standardized scores of the six indexes is presented in Figure 1.

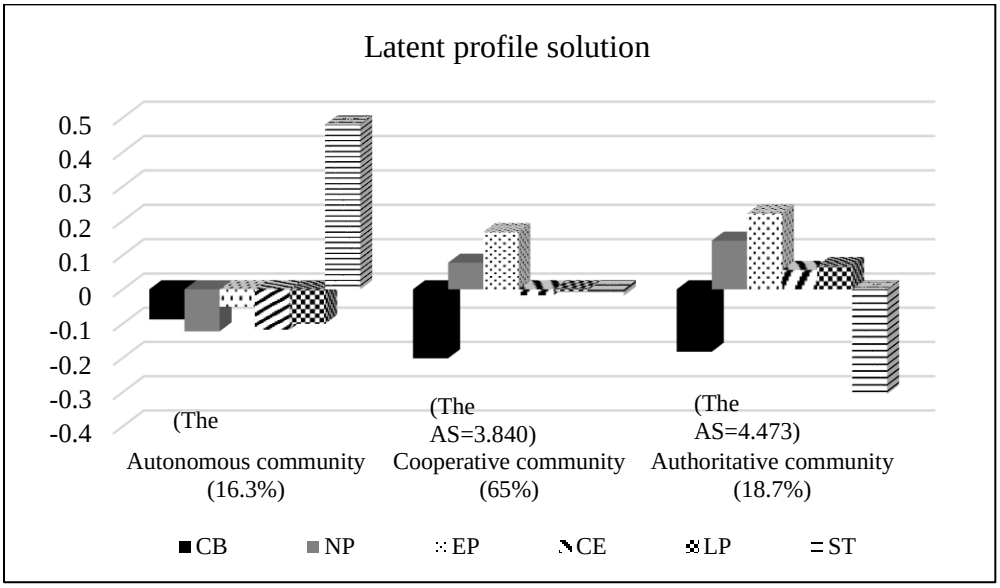

Figure 1. Classification of PCR

Note: AS is the average score of the six items. CB: "community belief"; NP: "normal preparedness"; EP: "emergent preparedness"; CE: "collective efficiency"; LP: "leadership"; ST: "community trust".

In Figure 1, the category with the lowest AS (3.008) has the highest score for community trust, but significantly lower scores for the other five indexes. Since people in this category have strong trust in the community and the leadership in this community is less authoritative, this category is named "autonomous community". The highest scores in the category with intermediate AS (3.840) are for normal preparedness and emergency preparedness, but this category has lower scores for the other four indexes. Since preparedness depends on cooperation between the residents and the governors, we call this category "cooperative community". In the category with the highest AS (4.473) the scores for normal preparedness, emergency preparedness, collective efficiency, and leadership are highest. However, the score for community trust is significantly lower than those for the other indexes. Since the rural community with powerful leaders and good preparedness is likely to be more authoritative, this category is called "authoritative community".

After identifying the categories of PCR, we use the regression mixture model (RMM) to estimate the impacts of social-ecological system factors on PCR. We apply the multilevel regression mixture model (MRMM), in which both factors of the social-ecological system at the community level and individual factors are included as covariates, and the category of PCR is the dependent variable. Table 3 presents the MRMM results, in which the category of autonomous community is the reference for the dependent variables.

Table 3. Multilevel effects on the classification of PCR

Reference: Class 2 (Autonomous community)	Model 1 Class 1 (Cooperative community)			Model 2 Class 3 (Authoritative community)		
	β	S.E.	P	β	S.E.	P
Within level						
Age	0.009	0.008	0.285	-0.034	0.004	0.000***
Gender (ref: female)	-0.622	0.129	0.000***	0.222	0.002	0.000***
Education	0.026	0.007	0.000***	-0.013	0.006	0.049*
Income (ref: lower than per capita disposable income in rural China)	-0.348	0.054	0.000***	-0.833	0.011	0.000***
History of urban residence (ref: no)	0.428	0.041	0.000***	1.518	0.087	0.000***
Between level						
Distance to the closest city	-0.505	0.004	0.000***	0.196	0.027	0.000***
Annual expenditure-income ratio	1.074	0.144	0.000***	0.408	0.092	0.000***
Social capital	0.536	0.013	0.000***	1.221	0.094	0.000***
Traditional culture	0.097	0.006	0.000***	1.261	0.110	0.000***
Political participation	0.005	0.006	0.423	-0.017	0.009	0.054
Intercept	1.054	0.125	0.000***	0.524	0.229	0.022*
AIC	4496.885					
BIC	4692.206					
ABIC	4546.193					
df	46					
Entropy	0.906					
N	1032					

Note: * p<0.05, ** p<0.01, *** p<0.001.

Individual features affect how rural residents perceive community resilience. Oder residents are more likely than younger residents to perceive an autonomous community. Gender and education are the other two individual features that are correlated with perception of community resilience. These suggest that both males and more educated people have no confidence in cooperation within the rural community. Some still rely on community leaders to protect public interests, whereas some are more likely to trust each other than the leaders. Individual income and urban community experience are significantly correlated with the perception of community resilience. Compared to people without urban community experiences, people who had migrated into cities for long periods do not perceive community autonomy.

With rapid urbanization and industrialization, rural communities that are closer to cities have experienced more social-economic changes. These changes lead to an increase in community cooperation and a decrease in community authoritativeness. Rural communities with a high annual expenditure-income ratio are more likely to be cooperative and authoritative. Rural communities have to effectively unite to take advantage of public resources and should have leaders with authority who are accepted by residents and lead the cooperation. Rural communities with more social networks are more likely to be cooperative and to have strong leaders. An increase in social networks also leads to more social conflicts among stakeholders. Therefore, a cooperative mechanism in which both residents and reliable leaders are included is the future of rural community governance. Rural communities with more traditional culture are more likely to be cooperative and have strong leadership. The status of traditional culture reflects how rural governance works; rural communities with more traditional cultures usually maintain traditional governance, in which cooperation between authoritative leaders and other residents plays a key role when the communities have to overcome adversity.