



Working together  
www.rcis.ro

**Revista de cercetare și intervenție socială**

ISSN: 1583-3410 (print), ISSN: 1584-5397 (electronic)

Selected by coverage in Social Sciences Citation Index, ISI databases

---

**ARE RURAL RESIDENTS' MENTAL HEALTH INFLUENCED  
BY THE NEW COUNTRYSIDE CONSTRUCTION?  
AN INVESTIGATION IN CHONGQING, CHINA**

*Yin PAN, Tiejun ZHOU, Haibin ZHANG, Xiaoyu DU*

Revista de cercetare și intervenție socială, 2015, vol. 51, pp. 135-149

The online version of this article can be found at:

*www.rcis.ro, www.doaj.org and www.scopus.com*

---

Published by:

Expert Projects Publishing House



On behalf of:

„Alexandru Ioan Cuza” University,

Department of Sociology and Social Work

and

Holt Romania Foundation

REVISTA DE CERCETARE SI INTERVENTIE SOCIALA

is indexed by ISI Thomson Reuters - Social Sciences Citation Index

(Sociology and Social Work Domains)



# Are Rural Residents' Mental Health Influenced by the New Countryside Construction? An Investigation in Chongqing, China

Yin PAN<sup>1</sup>, Tiejun ZHOU<sup>2</sup>, Haibin ZHANG<sup>3</sup>, Xiaoyu DU<sup>4</sup>

## Abstract

To improve the living environment in rural areas, the Chinese government has mapped out an important strategy, “New Countryside Construction” (NCC). The purpose of this study is to reveal the effect of NCC implementation on the rural residents' mental health, and the relationship between them. In this study, from Apr. 5 to Aug. 12, 2015, rural residents from 10 villages in Chongqing, a metropolis in southwest China, were chosen for questionnaires and interviews. The questionnaire was designed to cover two sets of questions: one concerned with the mental health scale (Kessler 6) and the other on the construction conditions in the rural areas. Afterward, the statistical software SPSS was employed to analyze the collected data. Based on the data analysis, two results were generalized. First, NCC significantly improved the mental health of the rural residents. Second, factors closely related to the NCC, such as infrastructure, housing satisfaction, and time spent from the newly built countryside to the city significantly influenced the mental status of the rural residents, whereas the influence of the road conditions was not significant. The NCC plays a positive role in improving the mental health of the rural residents. Thus, the Chinese government should exert greater efforts to encourage and promote NCC to safeguard social fairness and justice to improve rural residents' mental health.

*Keywords:* mental health, new countryside construction, rural residents, urbanization, Kessler 6.

---

<sup>1</sup> Chongqing University, Faculty of Architecture and Urban Planning, CHINA. Email: 20111501002c@cqu.edu.cn

<sup>2</sup> Chongqing University, Faculty of Architecture and Urban Planning, Key Laboratory of New Technology for Construction of Cities in Mountain Area, CHINA. Email: arch\_ztj@cqu.edu.cn (Corresponding Author)

<sup>3</sup> Chongqing University, Faculty of Architecture and Urban Planning, Key Laboratory of New Technology for Construction of Cities in Mountain Area, CHINA. Email: zhb243@cqu.edu.cn

<sup>4</sup> Delft University of Technology, Faculty of Architecture and the Built Environment, THE NETHERLAND. Email: X.Du@tudelft.nl

## Introduction

China has witnessed a rapid rate of urbanization with the improvement of its economy. However, this is followed by problems such as urban congestion and loss of rural population, wealth gaps between rural and urban populations, and the decreased happiness index of rural residents (Liu, Li, Xiao & Feldman, 2014). The dramatic reduction of population in rural China, especially in that of young workers, results in the transformation of most rural areas into “hollow villages” (Li, Liu, Long & Cui, 2014), and bringing disruptive changes to their social structures. As a result, the number of reported cases of mental health problems in rural China is higher than ever before, regardless of the improved living conditions. Studies have found that 74 percent of the rural children who were surveyed in the sample are at risk of being worse off in terms of their mental health problems (Huan, Yang, Fei, Shi, Qu, Rozelle & Chu, 2015), in addition, mental health problems are the largest issue for empty nesters in rural areas (Xe, Ding, Zhong, Yi, Zeng, Hu & Zhou, 2014). Thus, the mental health situation of rural residents deserves more attention than ever before.

Aware of these problems caused by the progress of urbanization, the Chinese government has attempted to narrow the gap between the urban and the rural to better protect peasant's benefits and safeguard social justice. As one study showed, social justice and the role of policy-making significantly influence the mental health of rural residents (Liang, Gong, Wen, Guan, Li, Yin & Wang, 2012). Thus, the rural policies regarding “New Countryside Construction (NCC)” and “In-situ Urbanization” have gained considerable support and received governmental encouragement. Government officials have stated that the policies can improve peasants' living conditions and promote the sustainable development of rural areas, as well as reduce the appeal of the urban environment to the rural population, thereby easing urban congestion. As thoroughly discussed in previous studies, NCC could improve the physical environment of rural areas. However, its impact on the mental health of rural residents remains unstudied.

## Literature Review

Numerous studies on mental health problems in rural China have been conducted. First, referring to the influencing factors of mental health problems, studies have found that depression among senior citizens indicated significant relationships with living alone, low family income, lack of social support, and poor health status, respectively (Chen, Wei, Hu, Qin, Copeland & Hemingway, 2005). Consequently, those negative life issues could increase the possibility of their committing suicide (Zhang, Jia, Zhang, Wang & Liu, 2015). By using Kessler 10, one study showed that mental health of rural residents in China could be

influenced by such factors as social support, lifestyle, and functional disability (Feng, Ji & Xu, 2013). Studies have also been conducted on gender and mental health. After conducting surveys, one study found that women had a higher mortality rate stemming from suicide than did men in rural China (Pearson, 1995). However, recent research has found no significant difference in mental health between men and women in rural China (Anson & Sun, 2002). One study found that the mental health of rural women was negatively correlated with unemployment, a low amount of money, unhealthy conditions, and low social support; their mental health was positively correlated with young age and additional available social support (Hou, Cerulli, Wittink, Caine & Qiu, 2015). Nevertheless, under the current social conditions in China, especially in rural areas in which mental health facilities and services are almost devoid, mental health problems, although a widespread phenomenon, has not yet received adequate attention (Wong, Zhuang, Pan & He, 2014). Some scholars, after conducting an experiment in Chengdu, a city in southwest China, found that appropriate family psychological intervention was effective for patients with mental disorders, and that mental health services in the community and social welfare were important (Ran, Xiang, Simpson & Chan, 2005).

Meanwhile, studies also found that two groups of people, namely empty-nesters (Liu & Guo, 2007; Lv, Jiang, Sun, Ren, Sun, Sun, Wu & Zhao, 2013; Liu & Guo, 2008; Xie, Zhang, Peng & Jiao, 2010; Wang, Shu, Dong, Luo & Hao, 2013) and left-behind children (Zhao, Su, He, Wu, Chen & Ye, 2009; Wang, Gao & Liu, 2008; Tao, Guan, Zhao & Fan, 2014; Wu, Lu & Kang, 2015; He, Fan, Liu, Li, Wang, Williams & Wong, 2012) in rural China, are most likely to develop mental health problems. Numerous reasons have been analyzed in these studies. However, admittedly, the immediate cause of their mental health problems lies in China's urbanization discourse. As China accelerates its urbanization progress, more and more rural citizens have surged into cities to make a better living. Those who have been left behind are usually senior citizens, the empty-nesters, and the so-called left-behind children. Moreover, urbanization exerts a direct effect on the mental health of landless peasants, who were deprived of the land because of the rapid rate of urbanization, although they do not benefit from urbanization (Liang, Lu & Wu, 2014). For abovementioned studies on rural residents' mental health, they have been cited for their scientific methods, but not for their research subjects. New countryside construction, as one of the most significant policies as regards rural development, should be examined more from the perspective of the influence on rural residents' mental health.

Therefore this research aims to reveal the effect of NCC's implementation from the perspective of infrastructure construction on the mental health of rural residents, as well as the relationship between them. The paper is organized as follows: we begin by introducing a background of the study in Section 1 and its related literature review in Section 2. Section 3 describes the case study sites, as

well as the design of questionnaires, data collection process, and the data analysis. In Section 4, we present the analysis results and discussion. This section discusses and analyses the differences among groups, the relations between the influence intensity of NCC and K6 scale scores, influencing factors of the mental health of rural residents and the differences in the incidence of mental illnesses, respectively. Finally, we present a conclusion and suggestions in Section 5.

## **Methodology**

### ***Case study sites and data collection***

The study sites are located in the countryside of Chongqing, which is representative of China's strategy of NCC because it is listed as one of China's Urban-Rural Overall Development and Demonstration Areas. However, in reality, the number of new countrysides is small because of limited government funds. Therefore, only few rural citizens could move into the new village. Sometimes, decisions were even made via lottery. Furthermore, in most cases, only after the new villages were built that the peasants were presented the choice regarding whether they wanted to move. Therefore, researchers encounter difficulties in determining whether people wished to move beforehand. That said, this situation ensured that comparison on the rural residents' mental states, before and after they moved in was rarely possible. Meanwhile, the direct purpose of NCC was to improve the rural living environment and the infrastructure; the NCC actually changed the infrastructure most. Thus, the research objects in this study were divided into four controlled trials based on the influence of the newly built countryside from the perspective of infrastructure construction. In Group 1, the rural residents who were hardly influenced by the newly built countryside were selected since no new countrysides were built within their administrative villages. In Group 2, rural residents who lived in the old village witnessed the new countryside being built in their administrative village. However, those residents did not benefit from the convenient infrastructure brought about by the new countryside, such as traffic, medical services, fitness facilities, and gas pipelines. In Group 3, the rural residents did not move into the new countryside but lived next it, benefiting from the convenient infrastructure. In Group 4, the rural residents already moved into the new settlements. Figure 1 and Figure 2 can directly show the differences among groups, although they only represent part of the villages in this research.



Figure 1. *Schematic Figure of Countryside in Group 1*



Figure 2. *Schematic Figure of Countryside in Group 2, 3, 4*

Here, they are recruited to determine the meaning of having four different groups. In this study, five villages were selected from each of the two districts, Jiangjin District and Wanzhou District, in Chongqing in terms of their distances from the center of the city and whether the new countryside was built. A total of 30 questionnaires were designed for each of the four complete control groups in each district, and rural residents were randomly chosen from the suitable villages to conduct face-to-face interviews and complete questionnaires. Thus, 240 questionnaires were sent out in total, of which 224 were valid. More specifically, 56 valid questionnaires were sent out in Group 1 with an effective rate of 93%, 60 valid questionnaires were sent out in Group 2 with an effective rate of 100%, 54

valid questionnaires were sent out in Group 3 with an effective rate of 90%, and 54 valid questionnaires were sent out in Group 4 with an effective rate of 90%.

### ***Questionnaire Design***

This questionnaire was designed to cover two sets of questions: one concerns the mental health issue and the other concerns the basic living conditions in rural areas. The Kessler 10 (K10) and Kessler 6 (K6) (Chinese versions) can be used to measure mental health. Previous studies have proved their reliability and validity (Zhou, Chu, Wang, Peng, He, Zheng, Liu, Wang, Ma, & Xu, 2008; Xu, Xiong, Chen, Wang, Liu, Kang, Fu, Kang, Xie, L., Li, Wang, Tan, Liu, Yin, Xu, Luo, Feng, Li & Zheng, 2013). Thus, using K10 and K6 scales to probe mental problems is feasible. However, the notion of mental health continues to be less recognized, and discussing mental disorders in rural China is a humiliating prospect (Liu & Griffiths, 2011). Therefore, to avoid embarrassment during the interview and questionnaire processes, making the questionnaire more accountable, a simplified version of K6 scale with fewer questions was adopted in this study (Kessler, Andrews, Colpe, Hiripi, Mroczek, Normand, Walters & Zaslavsky, 2002; Furukawa, Kessler, Slade & Andrews, 2003; Green, Gruber, Sampson, Zaslavsky & Kessler, 2010). The K6 comprises six questions on how frequently, in one month, respondents experience each of the six symptoms of major depression and general anxiety disorder. In addition, the questionnaire adopted response options such as “never”, “a little of the time”, “some of the time”, “most of the time”, and “all of the time”. These items consist of questions about frequency of feeling so depressed that nothing could cheer you up, nervous, restless or fidgety, hopeless, that everything was an effort, and worthless. Responses were scored in the range 0-4, generating a scale with a range of 0–24. A higher mark indicates poorer mental health. Specifically, the marks 0-12 show the absence of mental illnesses, whereas marks 13-24 indicate their presence.

In order to study the specific influence of NCC on the mental health of rural residents from the perspective of infrastructure construction, the following designs were made in this paper. These influence factors were chosen because the most obvious improved hardware facilities by infrastructure construction of the NCC are house and traffic. Therefore, four questions were designed as follows. First, satisfaction of housing conditions scored in the range 1–5, in which Range 1 marked “very dissatisfied” and Range 5 “very satisfied”. Second, satisfaction of road conditions adjacent to the residential houses scored in the range 1–5, in which Range 1 marked “very dissatisfied” and Range 5 “very satisfied”. Third, the roads adjacent to the residential houses were divided into five levels, in which Level 1, the worst, was marked as “the earthen road”, Level 2 “the hardened road”, Level 3 “the county road”, Level 4 “the provincial road”, and Level 5, the best, “the national road”. Finally, the time spent from the new countryside to the

city was divided into four levels, in which Level 1 was marked “less than 30 minutes”, Level 2 “30 minutes to 1 hour”, Level 3 “1 to 2 hours”, and Level 4 “more than two hours”.

### ***Research Models and Analytical Approach***

The statistical software SPSS 22.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the collected data from the questionnaire. The influence intensity of NCC on the mental health of rural residents was divided into four levels, ranging from 1 to 4 with Level 1 (Group 1) being the weakest and Level 4 (Group 4) the strongest. First, we ran descriptive analyses. Second, the one-way ANOVA analysis of the influence intensity of NCC was made based on K6 scale scores. Third, we ran multiple comparisons between groups. Fourth, the Model 1 was used for the simple linear correlation analysis of the influence intensity of NCC and K6 scale scores. Concrete model 1 is shown as follow:

$$Y_i = \beta_0 + \beta_1 X_i + \mu_i \tag{1}$$

The dependent variable  $Y_i$  indicates the mental health status of rural residents, and the independent variable  $X_i$  is the influence intensity of NCC on the mental health of rural residents. Thus, simple linear regression analysis was made to check whether the influence intensity of NCC exerted a direct influence on K6 scale scores.

Fifth, in Model 2, the multiple linear regression analysis of K6 scale scores was taken. Concrete model 2 is shown as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \mu \tag{2}$$

The dependent variable  $Y$  also indicates the mental health status of rural residents, and the independent variable  $X_1, X_2, \dots, X_k$  are consider road conditions, convenient transportation, and time spent from the new settlements as regards city and housing satisfaction.

Finally, the chi-square test of four-fold table was used to check the differences in the incidence of mental illnesses between the rural residents who live in the new countryside and those who do not.

## **Analysis and Discussion**

### ***Analysis of the Differences in K6 Scale Scores between Groups***

Tables 1, 2, and 3 indicate significant differences in K6 scores between groups, showing that the grouping in this study was meaningful. In mean and standard deviations in K6 scale scores, Group 4 is the best in terms of the rural residents’



mental health, whereas Group 2 is the worst. The mental state of people in Group 4 is most likely to be estimated because this group is far superior to other groups in housing conditions, environment, and infrastructure. However, unexpectedly, Group 2 scored the worst in terms of the rural residents' mental health. Group 1 was expected to be the worst and to significantly differ from Group 2 in this aspect, because rural residents in Group 1 live in far more remote and less advanced houses.

Table 1. *Descriptive Analyses of K6 Scale Scores*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Maximum	
					Lower Bound	Upper Bound	Minimum	Maximum
Group 1	56	9.13	3.040	0.406	8.31	9.94	5	15
Group 2	60	9.17	4.920	0.635	7.90	10.44	1	20
Group 3	54	6.74	4.243	0.577	5.58	7.90	2	20
Group 4	54	4.06	2.343	0.319	3.42	4.69	1	11
Total	224	7.34	4.320	0.289	6.77	7.91	1	20

Table 2. *The Result of One-way ANOVA*

	Sum of Squares	df	Mean square	F	Sig.
Between Groups	980.552	3	326.851	22.601	0.000
Within Groups	3181.662	220	14.462		
Total	4162.214	223			

Note: *df*, degrees of freedom; *F*, the ratio of the mean square between groups to the mean square within groups.

Table 3. *Multiple Comparisons between Groups*

The influence intensity of NCC	The influence intensity of NCC	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Group 1	Group 2	-.042	0.707	0.953	-1.43	1.35
	Group 3	2.384*	0.725	0.001	.95	3.81
	Group 4	5.069*	0.725	0.000	3.64	6.50
Group 2	Group 3	2.426*	0.713	0.001	1.02	3.83
	Group 4	5.111*	0.713	0.000	3.71	6.52
Group 3	Group 4	2.685*	0.732	0.000	1.24	4.13

Note: \* The mean difference is significant at the 0.05 level.

Thus, these Tables 1-3 show that first, infrastructure significantly influences rural residents' mental health, because no significant differences are found in mental health scoring of rural residents in Group 1 and Group 2, who fail to benefit from convenient infrastructure brought about by NCC. Meanwhile, significant differences are found in the same respect between Groups 1, 2 and Groups 3, 4. Second, Group 2 is the highest in mean and standard deviation in K6 scale scores, demonstrating that rural residents' mental health in this group is negatively

influenced by NCC. This effect could be caused by the widened wealth gap among the rural residents and the increased psychological gap among the poverty-stricken peasants. Third, rural residents in Group 3 and Group 4 benefit from almost the same infrastructure but differ remarkably in K6 scores, indicating the presence of other influencing factors. Finally, K6 scores in Group 1 are generally poor with smaller fluctuations compared with those in Group 2, showing that the rural residents in the first group, who live in relatively less advanced and remote houses devoid of other extraneous interferences, are relatively content.

**Relation between Influence Intensity of NCC and K6 Scale Scores**

The influence intensity of NCC was divided into four levels in four groups. Here, Group 1 corresponding with Level 1 was the least influenced by NCC and Group 4 corresponding with Level 4 was the most influenced by it. Tables 4 and 5 were drawn using simple linear regression analysis. The influence intensity of NCC significantly affected K6 scale scores, and is in the negative and linear correlation with the latter. This result indicates a higher influence of NCC results in lower K6 scores. Thus, NCC in rural areas of Chongqing plays a positive and effective role in improving the rural residents’ mental health. Moreover, NCC not only improves the living conditions of those who have moved in, but also promotes infrastructure construction in rural areas and correspondingly improves the mental outlook of those who live nearby.

Table 4. Performance of Model 1

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	Durbin-Watson (U)
1	0.451	0.203	0.199	3.874	1.805

Note: R, correlation coefficient; R<sup>2</sup>, determination coefficient.

Table 5. Coefficients of Model 1

Model		Nonstandard coefficient		Standard coefficient	t	Sig.
		B	standard error	Beta		
1	constants	11.687	0.632		18.483	0.000
	The influence intensity of NCC	-1.754	0.233	-0.451	-7.521	0.000

Note: B, regression coefficient; Beta, standard regression coefficient; t, the value of the t test

**Analysis of Influencing Factors of the Mental Health in NCC**

Tables 6 and 7 were drawn using multiple linear regression analysis. The tables indicate that traffic satisfaction and road grades are not in significant linear relation with K6 scores. Shorter time spent from the new countryside to the city results in lower k6 scores; higher housing satisfaction corresponds to lower k6 scores. As a complex social activity, the NCC project influence rural residents in various ways. Determining the aspects by which NCC influences the mental health of rural residents is difficult only by its influence intensity. Therefore, several factors that would be greatly improved in NCC and closely linked with rural residents were chosen in this section, such as traffic satisfaction, road grade, and housing satisfaction. The main intention of the government’s encouragement and the policies of the development for NCC are to balance urban and rural development, reduce the gap between those two areas, and decrease the influence of urbanization on rural areas. Thus, “time spent from the new countryside to the city”, a factor closely related to urbanization, was added in this study. As one part of the infrastructure, satisfaction of road conditions and road grades failed to influence the rural residents’ mental health. The analysis is shown as follows.

Table 6. Performance of Model 2

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	Durbin-Watson(U)
2	0.517	0.267	0.254	3.740	1.737

Note: R, correlation coefficient; R<sup>2</sup>, determination coefficient.

Table 7. Coefficients of Model 2

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity statistics	
		B	Std. Error	Beta			Tolerance	VIF
2	constants	11.369	1.541		7.379	0.000		
	Traffic satisfaction	-0.145	0.343	-0.033	-0.422	0.674	0.560	1.786
	Road grade	-0.233	0.397	-0.040	-0.586	0.558	0.702	1.425
	Time spent from the new countryside to the city	0.764	0.280	0.168	2.730	0.007	0.880	1.136
	Housing satisfaction	-1.456	0.253	-0.403	-5.751	0.000	0.682	1.466

Note: B, regression coefficient; Beta, standard regression coefficient; t, the value of the t test; Sig., significance; VIF, variance inflation factor.

We found that road conditions failed to influence the mental health of rural residents. We assume that this result does not mean that the factor of road conditions is unimportant, but that the main reason is a certain government policy. After this policy, “The Project to Expand Roads in All Rural Areas,” was

conducted, the good road conditions could be seen almost everywhere in all villages and small towns; the convenience of transportation was homogenized.

The results show that the expenditure of time spent from the new countryside to the city can significantly influence the mental health of rural residents. This effect is because the rapid development of urbanization in China inevitably influences the development of the rural areas. The city continues to be a significant attraction for rural residents. Therefore, the connection between the newly built countryside and the city must be considered, and the new countryside should be located as near to the city as possible.

The study shows that housing satisfaction can significantly influence the mental health of the rural residents. This result accounts for the presence of a significant difference between Groups 3 and 4. The only difference between these two groups lies in the houses themselves. All newly built houses in Group 4 have at least three bedrooms in the layout and are made of reinforced concrete. Meanwhile, many houses in Group 3 are old buildings made of brick or soil. Located at the relatively poor mountainous area in the southwest of Chongqing, the villages are, for the most part, characterized by poor housing conditions. Thus, the rural residents are very satisfied with their newly built houses, but only a minority of them could live in that area. Therefore, if the government wishes to improve their mental health but cannot afford the funds to build all new countryside, then repairing their dilapidated houses would be an effective method to do so. Three reasons are identified below to support this argument.

First, infrastructure and housing conditions in rural areas greatly benefit from NCC, which has been proven to have a positive and significant influence on rural residents' mental health. Second, although the road construction factor failed to significantly affect the mental health of rural residents, it indirectly proved the effectiveness of the efforts that the government made to propel the national development. Finally, the present research provides a meaningful reference for NCC or rural development in later periods. That is, improving the housing conditions and infrastructure in rural areas should be prioritized. If the rural residents' satisfaction of their housing conditions is improved, their mental health will be maintained in an ideal state, even if the NCC project is not implemented.

### ***Comparison of Differences in the Incidence of Mental Illnesses***

The chi-square test was conducted to directly test whether living in the new countryside would significantly reduce the probability of the rural residents' mental illnesses. Table 8 indicates a significant difference in the incidence of mental illnesses between residents who have lived in the new countryside and those who have not, at 1.9% and 19.4%, respectively. The result shows that NCC can greatly improve the rural residents' mental state. Furthermore, the government

should encourage building more new countryside so that more rural residents can live in the new area.

Table 8. *Cross Tabulation of the Groups and Description of Mental Illnesses*

		Description of mental illnesses		Total	
		Absence of mental illnesses	Presence of mental illnesses		
Groups	People who have not lived in the new countryside	Number	137	33	170
		Percentage	80.6%	19.4%	100.0%
	People who have lived in the new countryside	Number	53	1	54
		Percentage	98.1%	1.9%	100.0%

Note: *Pearson Chi-Square Sig. 0.002*

### Conclusion

This research suggests that the positive role of NCC in improving the mental health of rural residents as a whole. Greater NCC influence on rural residents corresponded to their better mental health status, and vice versa. However, NCC has been a controversial issue in China in recent years because certain people believe that it will destroy the original social ecosystem of the rural areas and has political implications. However, previous studies showed that NCC could improve the living environment, infrastructure, and other material conditions of rural residents. Furthermore, as shown in this study, NCC also plays a significant role in improving the rural residents' mental health. The factors that influence their mental health are not confined to NCC; NCC may not be the only means. However, the Chinese government's efforts to promote NCC to exert a positive influence on rural residents' mental status are undeniable.

China's rural society is experiencing dramatic changes because of the rapid development of urbanization such as a huge loss of labor force and the phenomena of empty nesters and left-behind children. NCC has been proven to contribute to the rural residents' mental health. Thus, the Chinese government should make greater efforts to encourage and promote NCC to safeguard social fairness and justice.

### Acknowledgements

This research is supported by the National Science & Technology Pillar Program during the Twelfth Five-year Plan Period in China. Project Name: The Research into and Demonstration of Key Technologies in the Intensive Planning and Development of Mountainous Villages; Project Number: 2013BAJ11B01.

## References

- Anson, O., & Sun, S. F. (2002). Gender and health in rural China: evidence from HeBei province. *Social Science & Medicine*, *55*(6), 1039-1054.
- Chen, R. L., Wei, L., Hu, Z., Qin, X., Copeland, J., & Hemingway, H. (2005). Depression in older people in rural China. *Archives of Internal Medicine*, *165*(17), 2019-2025.
- Feng, D., Ji, L., & Xu, L. (2013). The influence of social support, lifestyle and functional disability on psychological distress in rural China: Structural equation modeling. *Australian Journal of Rural Health*, *21*(1), 13-19.
- Furukawa, T. A., Kessler, R. C., Slade, T., & Andrews, G. (2003). The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychological Medicine*, *33*(2), 357-362.
- Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Improving the K6 short scale to predict serious emotional disturbance in adolescents in the USA. *International Journal of Methods in Psychiatric Research*, *19*(S1), 23-35.
- He, B., Fan, J., Liu, N., Li, H., Wang, Y., Williams, J., & Wong, K. (2012). Depression risk of 'left-behind children' in rural China. *Psychiatry Research*, *200*(2-3), 306-312.
- Hou, F., Cerulli, C., Wittink, M. N., Caine, E. D., & Qiu, P. (2015). Depression, social support and associated factors among women living in rural China: a cross-sectional study. *BMC Womens Health*, *15*, 1-9.
- Huan, W., Yang, C., Fei, H., Shi, Y., Qu, Q., Rozelle, S., & Chu, J. (2015). Mental health and dropout behavior: A cross-sectional study of junior high students in northwest rural China. *International Journal of Educational Development*, *41*(SI), 1-12.
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S., Walters, E. E., & Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, *32*(6), 959-976.
- Li, Y., Liu, Y., Long, H., & Cui, W. (2014). Community-based rural residential land consolidation and allocation can help to revitalize hollowed villages in traditional agricultural areas of China: Evidence from Dancheng County, Henan Province. *Land Use Policy*, *39*(0), 188-198.
- Liang, Y., Gong, Y., Wen, X., Guan, C., Li, M., Yin, P., & Wang, Z. (2012). Social determinants of health and depression: a preliminary investigation from rural China. *Plos One*, *7*(1), 1-7.
- Liang, Y., Lu, W., & Wu, W. (2014). Are social security policies for Chinese landless farmers really effective on health in the process of Chinese rapid urbanization? a study on the effect of social security policies for Chinese landless farmers on their health-related quality of life. *International Journal for Equity in Health*, *13*, 1-16.
- Liu, H., Li, S., Xiao, Q., & Feldman, M. W. (2014). Social support and psychological well-being under social change in urban and rural China. *Social Indicators Research*, *119*(2), 979-996.

- Liu, L., & Guo, Q. (2007). Loneliness and health-related quality of life for the empty nest elderly in the rural area of a mountainous county in China. *Quality of Life Research, 16*(8), 1275-1280.
- Liu, L., & Guo, Q. (2008). Life satisfaction in a sample of empty-nest elderly: a survey in the rural area of a mountainous county in China. *Quality of Life Research, 17*(6), 823-830.
- Liu, S., & Griffiths, S. M. (2011). From economic development to public health improvement: China faces equity challenges. *Public Health, 125*(10), 669-674.
- Lv, X., Jiang, Y., Sun, Y., Ren, C., Sun, C., Sun, L., Wu, Z., & Zhao, X. (2013). Short Form 36-Item Health Survey test result on the empty nest elderly in China: A meta-analysis. *Archives of Gerontology and Geriatrics, 56*(2), 291-297.
- Pearson, V. (1995). Goods on which one loses - women and mental-health in China. *Social Science & Medicine, 41*(8), 1159-1173.
- Ran, M.S., Xiang, M.Z., Simpson, P., & Chan, C.L. (2005). *Family-based mental health care in rural china*, Hong Kong: Hong Kong University Press, pp. 25-34.
- Tao, X., Guan, H., Zhao, Y., & Fan, Z. (2014). Mental health among left-behind preschool-aged children: Preliminary survey of its status and associated risk factors in rural China. *Journal of International Medical Research, 42*(1), 120-129.
- Wang, T., Gao, W., & Liu, Z. (2008). The impact of parents' migration from rural to urban areas on the mental health of their children left behind in China. *International Journal of Psychology, 43*(3-4), 767-767.
- Wang, Z., Shu, D., Dong, B., Luo, L., & Hao, Q. (2013). Anxiety disorders and its risk factors among the Sichuan empty-nest older adults: A cross-sectional study. *Archives of Gerontology and Geriatrics, 56*(2), 298-302.
- Wong, D. F. K., Zhuang, X. Y., Pan, J., & He, X. S. (2014). A critical review of mental health and mental health-related policies in China: More actions required. *International Journal of Social Welfare, 23*(2), 195-204.
- Wu, Q., Lu, D., & Kang, M. (2015). Social capital and the mental health of children in rural China with different experiences of parental migration. *Social Science & Medicine, 132*, 270-277.
- Xe, J., Ding, S., Zhong, Z., Yi, Q., Zeng, S., Hu, J., & Zhou, J. (2014). Mental health is the most important factor influencing quality of life in elderly left behind when families migrate out of rural China. *Revista Latino-Americana De Enfermagem, 22*(3), 364-370.
- Xie, L., Zhang, J., Peng, F., & Jiao, N. (2010). Prevalence and related influencing factors of depressive symptoms for empty-nest elderly living in the rural area of Yongzhou, China. *Archives of Gerontology and Geriatrics, 50*(1), 24-29.
- Xu, H., Xiong, H., Chen, Y., Wang, L., Liu, T., Kang, Y., Fu, L., Kang, L., Xie, L., Li, N., Wang, Y., Tan, Z., Liu, C., Yin, X., Xu, Q., Luo, Y., Feng, J., Li, T., & Zheng, W. (2013). The application of the Chinese version of K6 and K10 screening scales for psychological distress on the psychological investigation of college students. *Modern Preventive Medicine, 40*(24), 4493-4496.
- Zhang, W., Jia, C., Zhang, J., Wang, L., & Liu, X. (2015). Negative life events and attempted suicide in rural China. *Plos One, 10*(1), 1-12.

- Zhao, K., Su, H., He, L., Wu, J., Chen, M., & Ye, D. (2009). Self-concept and mental health status of 'stay-at-home' children in rural China. *Acta Paediatrica*, 98(9), 1483-1486.
- Zhou, C., Chu, J., Wang, T., Peng, Q., He, J., Zheng, W., Liu, D., Wang, X., Ma, H., & Xu, L. (2008). Reliability and validity of 10-item Kessler scale (K10) Chinese version in evaluation of mental health status of Chinese population. *Chinese Journal of Clinical Psychology*, 16(6), 627-629.