Author/s:
Timalsina, B;Mavoa, S;Hahs, AK

Title:
Dynamic changes in melbourne’s urban vegetation cover-2001 to 2016

Date:
2021-08-01

Citation:
Timalsina, B., Mavoa, S. & Hahs, A. K. (2021). Dynamic changes in melbourne’s urban vegetation cover-2001 to 2016. Land, 10 (8), pp.813-813. https://doi.org/10.3390/land10080813.

Persistent Link:
https://hdl.handle.net/11343/289602

land

MDPI

Article

Satisfaction Evaluation of Rural Human Settlements in Northwest China: Method and Application

Pengyan Wang [1,2], Xiaofei Qin [1,3,4] and Yurui Li [1,3,4,*]

1 Key Laboratory of Regional Sustainable Development Modeling, Institute of Geographic Sciences and Natural Resources Research, CAS, Beijing 100101, China; wpy2019y@163.com (P.W.); qinxf.19s@ignsrr.ac.cn (X.Q.)
2 College of Tourism and Urban-Rural Planning, Chengdu University of Technology, Chengdu 610059, China
3 Key Laboratory of Degraded and Unused Land Consolidation Engineering, Beijing 100101, China
4 University of Chinese Academy of Sciences, Beijing 100049, China
* Correspondence: liyr@igsnrr.ac.cn

Abstract: Rural human settlements are an integral part of a rural system. The evaluation of public feedback based on farmers' satisfaction is a crucial way to understand the current situation of rural human settlements. This paper establishes a framework to evaluate local dwellers' satisfaction towards the environment of rural human settlements in northwest China from six dimensions involving living conditions, the environment, physical infrastructure, public service, governance, and culture. The empirical study was conducted in Yanchi County, which demonstrates the applicability of this evaluating method. This study shows that the overall degree of satisfaction towards the environment of rural human settlements is relatively high, with a figure of 77.38. However, the satisfaction scores for the six dimensions are uneven, and there are significant differences between the villages. Further, these villages can be divided into three types according to the residents' satisfaction, and viable strategies are suggested correspondingly. To sustain rural settlement development, the authors argue that more efforts should be put into technology advancement, public participation incentives, and the subsequent maintenance of projects in the long run.

Keywords: rural human settlements; satisfaction evaluation method; division of village types; northwest China

Citation: Wang, P.; Qin, X.; Li, Y. Satisfaction Evaluation of Rural Human Settlements in Northwest China: Method and Application. *Land* **2021**, *10*, 813. https://doi.org/10.3390/land10080813

Academic Editor: Luca Salvati

Received: 8 June 2021
Accepted: 22 July 2021
Published: 2 August 2021

1. Introduction

While substantial attention has been paid to urban human settlements [1–8], it is increasingly accepted that rural areas should also be considered since rural human settlements are also crucial components of the human settlement system [9–17]. In the rural system, rural human settlements are a complex combination of physical and nonphysical substances essential for supporting farmers' daily lives [18–21]. The environment of these settlements partly determines the well-being and productivity of rural residents.

Many countries, therefore, conduct proper rural governance strategies to improve human settlements. For instance, Japan innovatively improves human settlements through constructive cultural activities, such as training courses and local handicraft workshops. Germany implements strict policies to promote infrastructure delivery, passes laws and regulations for planning and environmental protection, and innovates rules to ensure public participation. With effective policies and social efforts, the rural living environment in many countries has been improved. In China, the Central Agricultural Office, in coordination with other eighteen departments, unveiled an action plan for improving the rural living environment in 2018, key tasks of which include garbage sorting, toilet upgrades, residential sewage treatment, and village governance. Although progress has been made, there is a huge disparity in human settlements between developed and underdeveloped regions. Many areas are in the grip of dirt and disorder, such as northwest China, and the action plan falls short of people's expectations to some extent. The main issue stems from the less

systematic or in-depth understanding of the locale and the neglect of the diversified needs of rural dwellers. There appear to be many villages superficially copying the equivalent modes of developed counterparts. Many public infrastructures in these villages fall into disuse, and their local culture is undermined.

To ameliorate the mismatch between the improvement action for human settlements and farmers' demands, a local-based and human-centered perspective should be introduced into human settlement research. It has been proven that studies focusing on resident satisfaction have greatly deepened and expanded the concept and content of rural human settlements [22]. The evaluation of public feedback based on farmers' satisfaction is an important way to understand the current situation of rural human settlements [2,3]. It reflects the perception of local farmers and, thus, can be a guidance for the construction of human settlements that are most likely to respond to their needs. Previous studies, in terms of evaluation, have established a variety of theoretical frameworks [21,23], most of which evaluate the quality of rural human settlements systematically and objectively. Yet, an evaluation from the perspective of local dwellers remains largely unexplored. Regarded that the satisfaction and well-being of the dwellers are the ultimate goals of improving rural human settlements, this research gap highlights the need for developing a viable methodology to evaluate the satisfaction of rural human settlements.

On the other hand, most of the previous research focuses on rural human settlements in developed areas, while underdeveloped rural areas with fragile ecological environments have been neglected. Our research provides a particular regional case for satisfaction evaluation towards the underdeveloped rural area in northwest China. The arid environment and the shortage of water resources lead to poor irrigation and agriculture in this region. The physical infrastructure, including sanitation, traffic, and pipe networks, is also not yet fully developed. Even worse, there even appears to be a low literacy rate and a lack of will and ability for development among the residents. Due to its relatively harsh conditions, the rural human settlements in this area deserve discussion in the global arena.

This paper presents a particular regional case and a framework to assess dwellers' satisfaction towards the environment of rural human settlements. The survey was conducted in Yanchi County, a county in northwest China. After evaluating the rural human settlement satisfaction in ten villages of Yanchi County, these villages were divided into several types. Corresponding strategies for each type of village are suggested to support effective policymaking.

2. Rural Human Settlement Satisfaction and the Evaluation Method

2.1. Evaluation Framework

The concept of satisfaction is probably universal. The human ability to reflect on oneself and one's situation invites appraisals of likes and dislikes. The conceptual differentiation between satisfaction and other notions, for instance, between "subjective" satisfaction and "objective" quality-of-life, took place in social indicator research over the last six decades. It has been concluded that satisfaction can be measured quite validly and reliably [24]. To better guide the follow-up work of improving human settlements with the evaluation results, it is necessary to comprehensively consider the regional background, people's immediate needs, and long-term development.

The satisfaction evaluation of rural human settlements includes the following five stages. We first conducted a preliminary investigation and research to explore the current development and underlying problems of the local human settlements. Following the obtained information, we established an index system of rural settlement satisfaction and determined the weight of every index. Next, we conducted a pre-survey and a formal questionnaire survey, which included field interviews, telephone, and online surveys. The results of the composite evaluation in the research area are shown. Finally, in-depth analysis and corresponding suggestions are presented.

The main steps to establishing an index system, determining the index weights, and calculating the scores were as follows: (1) Establishing an index system. Existing

studies show that both physical and nonphysical environments are paramount for rural development [25]. These two aspects, therefore, were both included in the index system. An analytic hierarchy process (AHP) was used to determine the target weight A, criterion weight B, and index weight C. Finally, according to the "Three-Year Action Plan for Rural Human Settlement Improvement ", 28 indicators were selected in the categories of living conditions, environment, physical infrastructure, public service, governance, and culture (Table 1).

Table 1. Evaluation index system and weight of rural human settlement satisfaction.

Criterion and Weight (B)	Index (C)	Introduction of Index	Weight (%)
Living conditions (B1) (26.33)	Housing quality (C1)	Satisfaction towards the house quality	8.82
	Kitchen hygiene (C2)	Satisfaction towards kitchen facilities and hygiene	3.91
	Toilet hygiene (C3)	Satisfaction towards toilet facility and user experience	4.05
	Wall quality (C4)	Satisfaction towards the structure and appearance of the courtyard wall	2.28
	Water quality (C5)	Satisfaction towards water supply and domestic water quality	7.27
Environment (B2) (15.31)	Greening (C6)	Satisfaction towards the greening	4.63
	Air quality (C7)	Satisfaction towards local air quality	2.32
	Domestic waste treatment facilities (C8)	Satisfaction towards waste disposal methods and the convenience	5.22
	Wastewater treatment facilities (C9)	Satisfaction towards sewage treatment methods and the convenience	3.14
Physical infrastructure (B3) (22.07)	Road quality (C10)	Satisfaction towards materials and the service life of roads	6.15
	Street lights (C11)	Satisfaction towards the number and the service life of street lights	1.90
	Power facilities (C12)	Satisfaction towards the coverage and the service life of power facilities	6.51
	Irrigation facilities (C13)	Satisfaction towards the number of irrigation facilities	4.13
	Communication facilities (C14)	Satisfaction towards the communication facilities in the village	2.32
	Recreational amenities (C15)	Satisfaction towards the recreational amenities in the village	1.06
Public service (B4) (14.31)	School accessibility (C16)	Satisfaction towards the cost of education and the distances to schools	3.75
	Medical treatment accessibility (C17)	Satisfaction towards the cost of medical treatment and the distances to hospitals	3.65
	Social Security (C18)	Satisfaction towards social insurance, relief, subsidies, and other systems	2.37
	Number of shops (C19)	Satisfaction towards the number of shops serving life and production	2.91
	Employment training (C20)	Satisfaction towards the employment training for laborers	1.63
Governance (B5) (9.48)	Village committee (C21)	Satisfaction toward the local implement of policies, delivery of public goods and services, and village committee's work efficiency	2.52
	Organization (C22)	Satisfaction toward regulations and rules posed on local officials and village cadres and transparency of operation, management, and election	1.74
	Village rules (C23)	Satisfaction towards the rules and regulations restricting villagers' behavior	2.02
	Planning scheme (C24)	Satisfaction towards the planning schemes of village layout and constructions	3.74
Culture (B6) (12.47)	Cultural events (C25)	Satisfaction towards the cultural activities in the village	3.28
	Social atmosphere (C26)	Satisfaction towards the culture, moral codes, and behavioral pattern in the village	4.64
	Neighborhood (C27)	Satisfaction towards the local neighborhood	2.54
	Public security (C28)	Satisfaction towards social stability and public security	2.01

(2) Determining the index weight. The relative importance of the criteria and alternatives were evaluated based on Saaty's nine-point scale [26]. Experts and scholars in RHSE were invited to compare and score each index at the same level in the evaluation index system, and the weight value of a single expert was, in turn, calculated. The weights that fifteen experts and scholars calculated passed the consistency test. After taking the arithmetic mean, the weight of each index was derived (Table 1).

(3) Performing synthesis calculations. After determining the final weights of each indicator, the values of all indicator factors of the research villages were integrated with their corresponding weight values, and for the convenience of expression, each questionnaire score was standardized; namely, 20–100 points represent 1–5 respectively. After the integration, the linear weighted sum can be used to get the comprehensive evaluation value of the satisfaction of rural human settlements in the study area. The formula is as follows:

$$S_i = \sum G_i \cdot W_i \quad (1)$$

S_i is the total score of satisfaction towards rural human settlements; G_i is the weighted average score of the index i; W_i is the final weight of the index i.

2.2. Case Study in Yanchi

Yanchi County, located in the eastern part of Ningxia Hui Autonomous Region, is the junction of Ningxia, Shaanxi, Gansu, and Inner Mongolia (Figure 1). The geographical location is 106°30′~107°47′ E, 37°14′~38°10′ N. The terrain is high in the south and low in the north, at 1295–1951 m. It is adjacent to Mu Us Sandy Land in the north and Loess Plateau in the south. Yanchi County has a typical mid-temperate continental climate with an annual average temperature of 7.8 °C. The average annual rainfall is about 248.6 mm, and the evaporation is 2179.8 mm, which is 8–9 times the amount of rainfall; Yanchi county is very short of water resources. The annual surface runoff is only 26.9 million m^3. The proven groundwater storage is about 16 million m^3. The total area of the county is about 8661 km^2, with a total population of about 173,000. It has jurisdiction over 102 administrative villages in eight towns/townships. In 2018, the county's GDP was 9.03 billion yuan, with Tan sheep and related industries as its characteristic industries. The per capita disposable income of urban residents and rural residents was 26,601 and 10,685 yuan, respectively, which is lower than the national average.

Yanchi used to be a poverty-stricken county, but this ushers in a new opportunity for leapfrog development these days. In 2018, taking the lead in northwest China, Yanchi County issued the "Three-Year Action Plan for Rural Human Settlement Improvement in Yanchi County" that selected five villages from Huamachi Town, Gaoshawo Town, Hui'anpu Town, and Fengjigou Township as pilot villages. However, there appeared to be a variety of problems, such as resource and environmental constraints, inefficient planning and infrastructure construction, diverse needs of the public, and inexperience in remediation.

To deeply investigate the current situation of rural human settlements in Yanchi County and obtain first-hand research data, our research group conducted a 21-day field investigation in 2019. Before the formal questionnaire from July to August, we conducted a pre-survey of 20 farmers. We first selected three pilot villages in our research. Apart from these pilot villages, we also selected three villages that experienced human settlement remediation. At the same time, to avoid sample bias, we included four villages without remediation of human settlements. Our research area covered all towns of Yanchi County. In these ten villages, we randomly surveyed 216 farmers. Eventually, 207 valid questionnaires were obtained, and the effective rate was 95.40%. The number of valid questionnaires in each village was more than 20. The questionnaire was designed in the form of a five-level scale, with 1 as "dissatisfied", 2 as "moderately dissatisfied", 3 as "general", 4 as "moderately satisfied", and 5 as "very satisfied". This questionnaire also surveyed the villages' basic information and farmers' family situations.

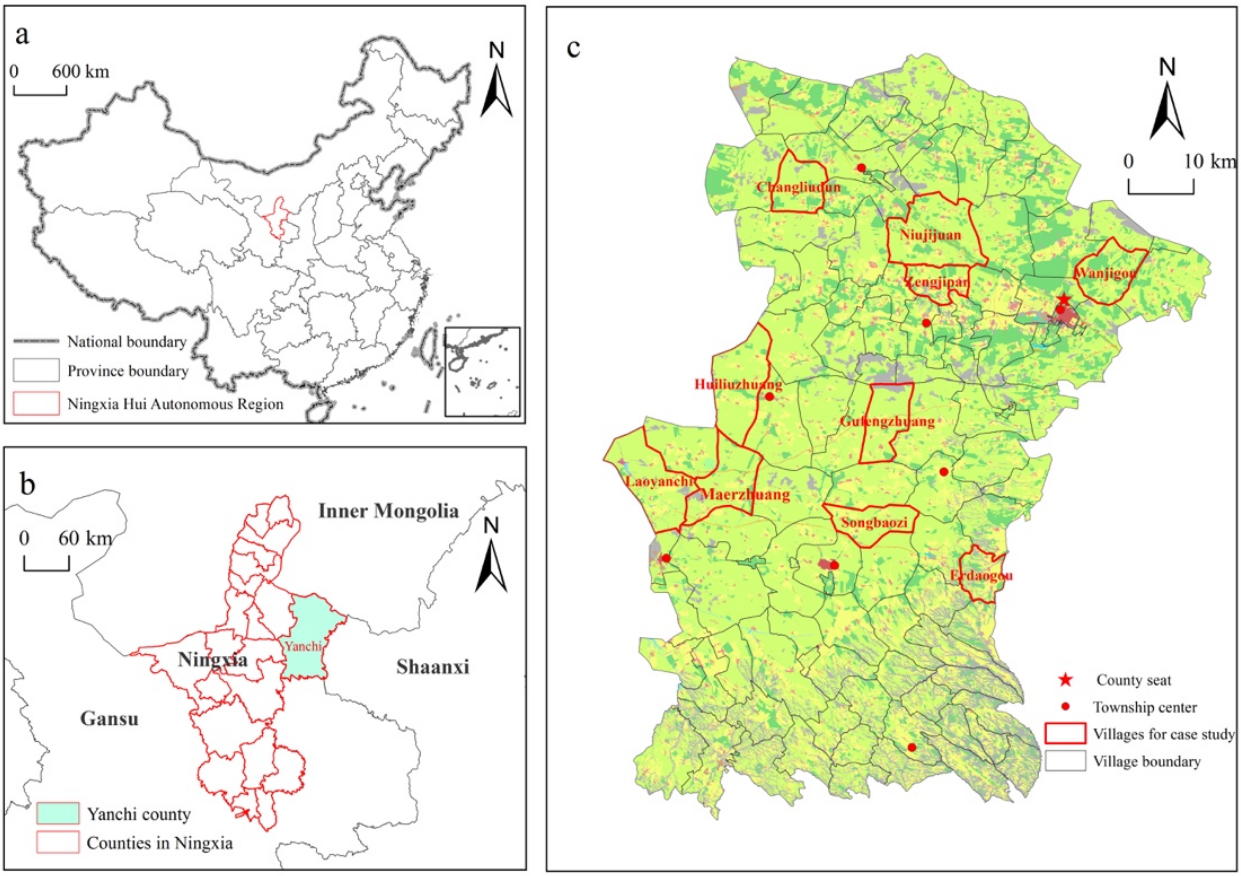

Figure 1. Location of the study area. (**a**–**c**) showed the location of Ningxia Hui Autonomous Region, Yanchi County and the ten case study villages, respectively.

2.3. Data Processing and Descriptive Statistics

Before the statistical analysis of the questionnaire data, the SPSS13.0 was used for calculation, and Cronbach's alpha was used as the test standard. When the alpha coefficient is greater than 0.7, the questionnaire has high reliability [27]. The SPSS test results show that the Cronbach coefficient α value of our data is 0.885, and the Cronbach coefficient based on the standardized items is 0.885. Therefore, the questionnaire has high internal consistency, acceptable reliability, and can be used for further data analysis.

There were 120 males and 87 females in the sample, accounting for 57.97% and 42.03% of the total, respectively. A total of 74.40% of them were over 41-year-old. Most of them had graduated from primary school, accounting for 57.91%, followed by junior high school, accounting for 34.30%. Most of the interviewees work in agriculture (88.41%), and only 6.76% of them work in nearby villages or towns with nonagricultural jobs. It is notable that 93.24% of them work in the local village. Thus, they are so familiar with the living environment of their villages that the questionnaire can well reflect the rural human settlements of Yanchi County from the perspective of permanent residents.

3. Results and Analysis

3.1. Satisfaction Evaluation Results

(1) The overall score of satisfaction towards rural human settlements in Yanchi county is 77.38, which is between "general" and "moderately satisfied" (Table 2). The scores of different dimensions for each case study village are shown in Figure 2. The survey shows that improving rural human settlements has a positive effect on environmental health and village governance. A total of 93.23% of the interviewers reported that the environment of rural human settlements had improved significantly, and 93.23% believed that the living environment could promote rural development. However, 57.97% of the interviewed

villagers reported that it fell short of their expectations and the human settlements should be further improved in the near future.

Table 2. Scores of rural human settlement satisfaction evaluation.

Target-Level Weighted Score (A)	Criterion Weight Score (B)	Index Weight Score (C)	Weighted Indicator Layer Score	Ranking
The satisfaction evaluation of rural human settlement environment (77.38)	Living condition (B1) (81.71)	Housing quality (C1)	81.72	11
		Kitchen hygiene (C2)	85.18	7
		Toilet hygiene (C3)	71.16	21
		Wall quality (C4)	80.46	12
		Water quality (C5)	87.60	5
	Environment (B2) (79.68)	Greening (C6)	77.22	17
		Air quality (C7)	89.36	4
		Domestic waste treatment facilities (C8)	83.60	9
		Wastewater treatment facilities (C9)	52.88	28
	Physical infrastructure (B3) (74.51)	Road qualities (C10)	77.80	15
		Street lights (C11)	69.80	20
		Power facility (C12)	87.60	5
		Irrigation facilities (C13)	55.80	27
		Communication facilities (C14)	75.80	18
	Public service (B4) (72.58)	Recreational facilities (C15)	77.60	16
		School accessibility (C16)	64.40	26
		Medical treatment accessibility (C17)	78.40	13
		Social Security (C18)	78.20	14
		Number of shops (C19)	68.00	24
		Employment training (C20)	68.20	23
	Governance (B5) (76.67)	Village committee (C21)	84.00	8
		Organization (C22)	81.60	10
		Village rules (C23)	68.60	22
		Planning scheme (C24)	66.80	25
	Cultural (B6) (88.26)	Cultural events (C25)	75.20	19
		Social atmosphere (C26)	92.00	3
		Neighborhood (C27)	93.80	2
		Public security (C28)	94.20	1

(2) The satisfaction score for culture is the highest, with a score of 88.26. Three of the top five factors in the index system are in the cultural sector: social atmosphere, neighborhood, and public security. All their scores have more than 90 points. This cannot be achieved without the strengthening of the rural government. However, the score for cultural events is far lower than other indexes.

(3) The living conditions in the research area have improved significantly these days, as shown in Figure 3, and the degree of satisfaction towards living conditions (81.71) ranks second. However, the rank for toilet hygiene fell behind, with a score of 71.16. The proportion of dissatisfaction with the toilet conditions is 50.9%. In 2018, the government carried out a large-scale renovation of toilet facilities, and toilet hygiene was significantly improved. However, some villagers appeared to be not accustomed to flushing toilets, resulting in low utilization after the renovation.

(4) The satisfaction evaluation for the environment is at the "general" level, 79.68 points. It is notable that the wastewater treatment facilities are considerably underdeveloped (Figure 4). Apart from the drainage pipes built in recent years, the central government advocated the local village committee to construct centralized wastewater treatment systems. However, being vast and underpopulated, many villages chose not to fund such a costly central processing system. Eventually, the improvement of wastewater treatment was inadequately resourced.

Figure 2. A radar chart for rural human settlement satisfaction in each case study village.

Figure 3. Living conditions of rural Yanchi county. (Note: Photos taken by the first author.)

Figure 4. Sewage treatment facilities in Yanchi County. (Note: Photos taken by the first author.)

(5) The overall score for governance is 76.67, within which the scores for the village committee and the organization are the highest. This high satisfaction indicates that residents in recent years appreciate precise poverty alleviation, rural construction, and the government work style. However, the score for the planning scheme and village rules are merely 66.8 and 68.6. To be precise, 38.92% of the interviewers stated that the current village rules and regulations have yet to be reinforced, and 25.2% believed that the plan needed improvement.

(6) The satisfaction degree for physical infrastructure is 74.51, and the scores for the sub-indicators are unevenly distributed. Irrigation facilities (Figure 5) have the lowest score at 55.8 points. Changliudun, Songbaozi, Niujinjuan, and other villages are all in arid and water-deficient areas, and even worse, the agricultural drip irrigation has not been adopted yet. In addition, the dwellers reported a low degree of satisfaction towards streetlights (69.8) due to the absence of regular maintenance.

(7) The public service in the research area least satisfies the dwellers. The overall score for public service is 72.58, within which the scores for school accessibility and number of shops and employment are the lowest. First, approximately 28% of interviewed parents believed that commuting fees from their villages to schools were undesirable, with 27.80% of the interviewed households reporting that it cost more than 40% of their family expenditure. Second, while there were retail stores in every village to meet the basic

demands of the residents, the categories were unsatisfying. Finally, more than half of the interviewers illustrated that the content of employment training was impractical and could not support them to pursue a desirable career.

Figure 5. Drip irrigation facilities and streetlights in Yanchi County. (Note: Photos taken by the first author.)

3.2. Division of Village Types in Terms of Rural Human Settlements

According to the evaluation results, the average score of residents' satisfaction towards rural human settlements is 77.38, and the highest and lowest were 82.80 and 72.00, respectively. Following the average partition method [28], the degree of satisfaction in the investigated villages can be preliminarily divided into two regions: $72.00 < S_i < 77.38$ and $77.38 < S_i < 82.80$. Among the villages with a degree of satisfaction between 77.38 and 82.80, the average score is 80.90. As for those with a degree of satisfaction between 72.00 and 77.38, the average score for them is 74.69. Therefore, we further divided the villages into three types using these two average values as separatrix. As shown in Table 3, the villages with a higher degree of satisfaction ($80.90 < S_i < 82.80$) are Changliudun, Huiliuzhuang, and Laoyanchi; villages with a medium degree of satisfaction ($74.69 < S_i < 80.90$) are Wanjigou, Zengjiban, Songbaozi, and Ma'erzhuang; villages with a lower degree of satisfaction ($72.00 < S_i < 74.69$) are Erdaogou, Niujijuan, and Gufengzhuang (Figure 6).

Table 3. Classification of villages in terms of the satisfaction toward rural human settlements.

Types	Value Interval	Name of Village Involved
Villages with a higher degree of satisfaction	(80.90,82.80)	Changliudun, Huiliuzhuang, Laoyanchi
Villages with a medium degree of satisfaction	(74.69,80.90)	Wanjigou, Zengjiban, Songbaozi, Ma'erzhuang
Villages with a lower degree of satisfaction	(72.00,74.69)	Erdaogou, Niujijuan, Gufengzhuang

(1) Villages with a higher degree of satisfaction. The average overall satisfaction score in this type of village is up to 82.67, and all six dimensions of the rural human settlements received balanced and high scores. These villages were the earliest to implement the action plan for improving the rural living environment, indicating that government support and policy guidance play a key role in improving rural human settlements. Nonetheless, the participation rate of improving rural human settlements is only 56%.

(2) Villages with a medium degree of satisfaction. The overall degree of satisfaction in this type of village is 77.25. The scores for public service, physical infrastructure, and governance are 71.09, 72.60, and 74.76, respectively, all of which are slightly lower than the county's average. Through the closure of the mountains to grazing, the return of farmland to forest, and other treatment measures, the environment of this type of village gradually recovered in recent years. However, due to the limited investment in technology and

inadequate funding for environmental improvement, the village planning system was still underdeveloped.

(3) Villages with a lower degree of satisfaction. The average overall satisfaction of this type of village is 72.67, lower than the average of all investigated villages by 4.71 points. The scores of each indicator are 78.83 (living conditions), 76.95 (environment), 73.08 (physical infrastructure), 70.05 (public service), 75.37 (governance), and 82.70 (cultural), respectively. The degree of satisfaction towards physical infrastructure, environment, public service, and governance in this type of village is far lower than in other villages. It reflects the poor quality of the roads, a lack of greening, insufficient garbage cans, and improper village planning. This type of village has only improved the rural human settlements slightly, for instance, by repairing houses, building cultural squares, and repairing additional lanes. Although these renovations had preliminary achievements, the research found that 73.00% of interviewed villagers thought that the local area does not have enough funds for settlement improvement. Furthermore, according to the response of village cadres, the depopulation issue is serious in these villages. In addition, the low literacy level and weak driving force of the local actors have also exacerbated the existing situation.

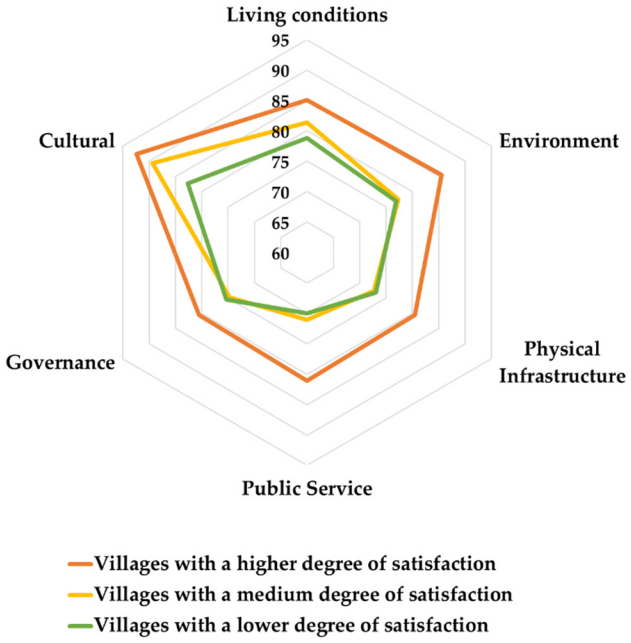

Figure 6. A radar chart for the average satisfaction within a category of villages.

4. Discussion

4.1. Limitations and Further Research

This study is a preliminary exploration of the satisfaction evaluation method toward rural human settlements in northwest China. However, there are some limitations, such as the lack of objective indicators. One of the possible solutions for future research is, for example, using the Normalized Difference Vegetation Index (NDVI) to assess the ecosystem. Future research can focus on establishing a more comprehensive and targeted index system. In addition, based on only one year's worth of data, the case study lacks dynamic observation. Furthermore, different types of subjects may have different perceptions of human settlements, leading to differential results of satisfaction evaluation [29,30]. Thus, we will further conduct a dynamic analysis, investigate perceptions from different groups, and explore the mechanism of human settlement remediation in particular regions.

4.2. Policy Implications

Based on the results of the satisfaction evaluation, this research identifies the superiorities and the weaknesses of some aspects of rural human settlements. Thus, we put

forward our strategic recommendations on improving the environment of rural human settlements as follows.

(1) One of the priorities is to advance the technology towards renovating the environment of rural human settlements. To be precise, the immediate step is to establish a centralized wastewater treatment plant and improve the quality of sewage treatment pipelines that can promote wastewater treatment efficiency. Moreover, it is necessary to equip villages with drip irrigation and a real-time environmental system through which the dynamics of water consumption can be monitored.

(2) Another crucial remedy is public participation [31]. At present, villagers in Yanchi County inadequately participate in cultural building, the construction, management, and maintenance of physical infrastructure. The government can make people more aware of the importance of the environment and rural development and encourage people to participate in decision-making by initiatives and viable mechanisms [1,5], for example, the creation of an attractive and effective participation mechanism that rewards contributors and punishes free-riders. To raise awareness through a sense of achievement, the government should also guarantee villagers can participate in relatively simple, encouraging tasks in such a mechanism.

(3) In addition, the government should promote employment training to improve villagers' professional literacy and entrepreneurship. For example, it is viable to provide lectures, courses conducted by experienced agricultural technicians, encourage villagers to attend the professional training courses frequently, diversify the employment training courses, and develop a partnership with private corporates that provide particular positions as well as training. Better literacy and skills promise people's initiative in human settlement remediation.

(4) More emphasis should be put on the maintenance of projects in the long run. Continuous maintenance is crucial to sustainable development but is underestimated in construction for better rural human settlements. It is necessary to define who will be involved and the administration scope for them. The quantified appraisal, accountability system, supervision, and incentives should also be in place. In addition, funding sources should be diversified to guarantee public goods' post-management, maintenance, and restoration.

(5) The government should adopt distinct strategies depending on the local conditions. For villages with a higher degree of satisfaction, an essential step is establishing a "bottom-up" and well-coordinated mechanism, aiming to stimulate farmers' passion for participation and consciousness to improve rural human settlements. As for villages with a medium degree of satisfaction, the priority is to reallocate the funding to the environmental improvement of rural human settlements. It is viable to set up a particular plan regarding the existing conditions. An immediate step can be the installation of necessary waste processing centers and the improvement of household latrines. Finally, for villages with a lower degree of satisfaction, the key is coordinating external resources and enhancing endogenous growth. Precisely, the government should coordinate the relative projects, exploit new sources of funding, and deploy some targeted improvement projects for the most underdeveloped villages to enhance the popularity and benefit of these policies.

5. Conclusions

This study provides a particular regional case in northwest China for rural human settlement research and an important reference for the following analysis. Precisely, a methodology to evaluate the satisfaction towards rural human settlements in underdeveloped northwest China is proposed, and its applicability has been examined. This study also divides the villages into three types in terms of residents' satisfaction towards human settlement. The local-based and differential strategies suggested in this paper serve as a pathway to the ultimate objective, rural revitalization. Moreover, our study may also serve the global practice, especially in the global south. In rural human settlement improvement, it is necessary to motivate public participation, consider the opinions of different groups

and actors, and attach importance to local knowledge. All these practices promise a more livable and satisfactory rural community.

Author Contributions: Conceptualization, Y.L. and P.W.; methodology, Y.L. and P.W.; formal analysis, P.W. and X.Q.; resources, Y.L.; data curation, P.W. and Y.L.; writing—original draft, P.W.; writing—review and editing, P.W., X.Q. and Y.L.; supervision, Y.L.; funding acquisition, Y.L. 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: 41971220) and the Strategic Priority Research Program of the Chinese Academy of Sciences (grant number: XDA23070303).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

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

References

1. Cornwell, T.L. *Vital Signs: Quality-of-Life Indicators for Virginia's Technology Corridor*; Springer: Dordrecht, The Netherlands, 2004; pp. 1–27. [CrossRef]
2. Kayzar, B.A. Analyzing Revitalization Outcomes in Downtown San Diego. Ph.D. Thesis, University of California, Los Angeles, CA, USA, 2007.
3. Li, B.H.; Liu, C.M.; Zeng, J.X. An evaluation on the satisfaction degree and optimization strategy of rural human settlements—A case study of Jiuheyuan town in Shishou City. *Hum. Geogr.* **2009**, *24*, 28–32. (In Chinese)
4. Asare-Donkor, N.K.; Boadu, T.A.; Adimado, A.A. Evaluation of groundwater and surface water quality and human risk assessment for trace metals in human settlements around the Bosomtwe Crater Lake in Ghana. *SpringerPlus* **2016**, *5*, 1812. [CrossRef]
5. Ruth, M.; Franklin, R.S. Livability for all? Conceptual limits and practical implications. *Appl. Geogr.* **2014**, *49*, 18–23. [CrossRef]
6. Fidler, D.; Olson, R.; Bezold, C. Evaluating a Long-Term Livable Communities Strategy in the U.S. *Futures* **2011**, *43*, 690–696. [CrossRef]
7. Yuliastuti, N.; Saraswati, N. Environmental Quality in Urban Settlement: The Role of Local Community Association in East Semarang Sub-district. *Procedia Soc. Behav. Sci.* **2014**, *135*, 31–35. [CrossRef]
8. Komeily, A.; Srinivasan, R. A need for balanced approach to neighborhood sustainability assessments: A critical review and analysis. *Sustain. Cities Soc.* **2015**, *18*, 32–43. [CrossRef]
9. Zhou, K.; Lin, X.Q.; Shen, Y.M.; Wu, L.J. Comprehensive evaluation of the quality of human settlements in the new rural construction in Beijing suburbs. *Prog. Geogr. Sci.* **2011**, *30*, 107–114. (In Chinese)
10. Zhu, B.; Zhang, X.L.; Yin, X. Quality evaluation and spatial pattern analysis of rural human settlements in Jiangsu Province. *Econom. Geogr.* **2015**, *105*, 140–146. (In Chinese)
11. Zhang, M.; Zheng, H.W.; Gao, C.Y.; Luo, Q.Y. Research on satisfaction with villages enhancement of environment: A perspective of farmers—Based on the survey of four areas in Jiangsu Province. *China Agric. Resour. Regionalization* **2018**, *39*, 145–151. (In Chinese)
12. Sheng, J.Z.; Zhao, X.C.; Zhou, Y.Y.; Tang, L.S. Study on human settlements assessment of Yuntian Town, Zhuzhou based on AHP and questionnaire. *Rural Econ. Technol.* **2018**, *387*, 46–50. (In Chinese)
13. Tang, N.; Wang, C. Comprehensive evaluation and spatial differentiation of rural human settlements in Chongqing. *Soil Water Conserv. Res.* **2018**, *25*, 315–321. (In Chinese)
14. Wen, Q.; Zheng, D.Y. Research on rural type identification and revitalization in Northwest poverty-stricken areas. *Geogr. Res.* **2019**, *38*, 53–65. (In Chinese)
15. Wu, W.L.; Shi, Y.; Zhou, B. Evaluation of human settlement environment of traditional villages based on the system theory of human settlement environment—A case study of 18 villages in Lichuan City of Hubei Province. *J. Hubei Univ. Natl. (Nat. Sci. Ed.)* **2019**, *37*, 353–360. (In Chinese)
16. Yu, F.W. The improvement of rural human settlements needs to give full play to the main role of farmers. *Rural Work Commun.* **2019**, *12*, 53. (In Chinese)
17. Afshar, F. Balancing global city with global village. *Habitat Int.* **1998**, *22*, 375–387. [CrossRef]
18. Li, B.H.; Zeng, J.X.; Hu, J. Progress and prospects on the research of rural human settlement environment. *Geogr. Geogr. Inf. Sci.* **2008**, *24*, 70–74. (In Chinese)
19. Long, H.L.; Tu, S.S. Theoretical thinking of rural restructuring. *Prog. Geogr. Sci.* **2018**, *37*, 581–590. (In Chinese)
20. Liu, Y.S.; Zhou, Y.; Li, Y.H. Rural regional system and rural revitalization strategy in China. *Acta Geogr. Sin.* **2019**, *74*, 2511–2528. (In Chinese)

21. Zhao, X.; Sun, H.; Chen, B.; Xia, X.; Li, P. China's rural human settlements: Qualitative evaluation, quantitative analysis and policy implications. *Ecol. Indic.* **2019**, *105*, 398–405. [CrossRef]
22. van Dam, F.; Heins, S.; Elbersen, B.S. Lay discourses of the rural and stated and revealed preferences for rural living. Some evidence of the existence of a rural idyll in the Netherlands. *J. Rural. Stud.* **2002**, *18*, 461–476. [CrossRef]
23. Hu, Q.; Wang, C. Quality evaluation and division of regional types of rural human settlements in China. *Habitat Int.* **2020**, *105*, 102278. [CrossRef]
24. Fournier, S.; Mick, D.G. Rediscovering satisfaction. *J. Mark.* **1999**, *63*, 5–23. [CrossRef]
25. Li, Y.R.; Qiao, L.Y.; Wang, Q.Y. Towards the evaluation of rural livability in China: Theoretical framework and empirical case study. *Habitat Int.* **2020**, *105*, 102241.
26. Saaty, R. The analytic hierarchy process—What it is and how it is used. *Math. Model.* **1987**, *9*, 161–176. [CrossRef]
27. Xue, W. *SPSS Statistical Analysis Method and Application*; Electronic Industry Press: Beijing, China, 2009. (In Chinese)
28. Rey, S.J.; Murray, A.T.; Anselin, L. Visualizing regional income distribution dynamics. *Lett. Spat. Resour. Sci.* **2011**, *4*, 81–90. [CrossRef]
29. Wang, Q.; Cheong, K.C.; Li, Y. Who Benefits From Development? Analyzing the Stakeholder Contestations in a Traditional Settlement of Malaysia. *Hous. Policy Debate* **2020**, *30*, 861–877. [CrossRef]
30. Wang, C.; Ren, M.; Li, H.; Zhu, Y. Understanding the Rural Production Space System: A Case Study in Jiangjin, China. *Sustainability* **2019**, *11*, 2811. [CrossRef]
31. Li, Y.-R.; Liu, Y.; Long, H.; Wang, J.-Y. Local responses to macro development policies and their effects on rural system in China's mountainous regions: The case of Shuanghe Village in Sichuan Province. *J. Mt. Sci.* **2013**, *10*, 588–608. [CrossRef]