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# Impact of COVID-19 on the Comprehensive Resilience of Rural Areas—A Case Study of Jilin Province of China

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**Abstract:** It is of practical significance for rural revitalization to clarify the gap in resilience development among different rural areas and improve the ability to cope with external interference. Combined with the strategic policy of rural revitalization in China, the evaluation index system of rural comprehensive resilience was constructed from the five dimensions of productive resilience, ecological resilience, social resilience, institutional resilience, and economic resilience. The advantages and disadvantages of rural development are determined based on a quantitative evaluation of the comprehensive resilience of rural development. This could provide a reference for decision making in rural development. This study uses the rural statistical data of nine cities (prefectures) in Jilin Province in 2019 and 2020 as an example as well as the entropy weight method to evaluate the impact of COVID-19 on rural resilience development. The results showed that the pandemic situation has an obvious impact on rural economic resilience; rural areas with high ecological resilience have a strong ability to cope with the panidemic situation; and rural areas with excellent ecological environment resources have strong comprehensive resilience.

**Keywords:** COVID-19; rural area; resilience; entropy weight method; Jilin Province



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## 1. Introduction

At the beginning of 2020, COVID-19 broke out in Wuhan, China, and quickly spread throughout the country. Thus far, this impact has continued. The COVID-19 pandemic has had a serious impact on individual health, society, and the economy. Rural areas are inherently vulnerable; therefore, they are more seriously affected. Making an objective assessment of the impact of the COVID-19 pandemic on rural areas and seeking an effective path for rural development are urgent tasks. At present, owing to the impact of various natural disasters, social interference, cultural shock, and COVID-19, there has been an increase in uncertainty and risks in the process of rural development. Resilience, an important component of sustainability, largely reflects the ability of a system to cope with external tension and shock [1]. Taking rural resilience as a new research idea in the field of rural risk governance and rural sustainable development is consistent with current social background needs.

Resilience refers to the capacity of a dynamic system to adapt to challenges that threaten the function and future development of the system. It can be viewed as a trait, a process, or an outcome [2]. Research on resilience has already begun in the field of engineering [3,4]. In the 1970s, it expanded to the field of ecosystems [5–7]. In the 1990s, it was extended to the social field [8–11]. Walker, Folke et al. proposed that resilience should be regarded as a type of recovery of the initial state of the system, and as a type of continuous ability of the complex social ecosystem to be constantly stimulated to change, adapt, and change in response to pressure and constraints [12,13]. In the 21st century, the study of

resilience has gradually extended to rural areas. Owing to the complexity, vulnerability, and adaptability of rural regional systems, the resilience theory has been widely used in rural research. At first, rural resilience was mainly used to assess the resilience of villages after major disasters, such as financial crisis or pandemics [14–20]; however, resilience theory has gradually been introduced into research on rural development as a theoretical attempt to study rural sustainable development [21–27]. Chinese scholars have successfully integrated the two scientific issues, rural sustainable development and resilience. The research includes the interaction between rural resilience and rural revitalization [28], multiple functions of rural areas from the perspective of resilience [29], and the interaction between rural resilience and rural space [30]. In terms of measuring the dimensions of rural resilience, a unified method has not yet been developed. Of the five aspects—including economy, production, ecology, society (folk customs and traditional culture), and political system (governance policies and management systems)—the existing literature mainly studied the evolution of rural resilience, spatiotemporal evolution, and improvement of comprehensive governance; assessed the ability of the village to resist risks and interference; and discussed the stability of rural areas [31–36].

At present, most studies on the impact of COVID-19 on rural areas in China discuss one aspect or some aspects [37–39], such as the rural economy, rural medical conditions, rural emergency security, and food production. However, few studies have examined the impact of resilience in rural comprehensive development. China's rural revitalization strategy has made plans for the direction and objectives of agricultural and rural development and has proposed new requirements for the governance of rural areas. In view of this, based on a systematic summary of the framework of rural resilience and the evolution of rural regional systems, and under the guidance of a rural revitalization strategy, this study constructs an evaluation index system of rural comprehensive resilience. The national economic and social development statistical data of rural areas in Jilin Province in 2019 (before COVID-19) and 2020 (continuously affected by COVID-19) were used for the evaluation. The changing characteristics of rural comprehensive resilience indicators over two years could indirectly reflect the impact of COVID-19 on the rural comprehensive resilience of nine cities (prefectures) in Jilin Province. According to the analysis results, the advantages and disadvantages of rural development can be identified in different regions, which can provide a theoretical reference for local rural construction and development planning in the context of epidemic normalization. This study could enrich the content of rural resilience research.

## 2. Study Area and Data

Jilin Province is located in central Northeast China. Its terrain is inclined from southeast to northwest, showing the characteristics of southeast high and northwest low terrain. Its eastern part is the Baekdu Mountain, and its central and western parts are the Northeast China Plain. Jilin Province is divided into nine prefecture-level administrative regions: Tonghua City, Baishan City, and Yanbian Korean Autonomous Prefecture in the east; Changchun City, Jilin City, and Liaoyuan City in the center; and Siping City, Songyuan City, and Baicheng City in the west. The eastern region is dominated by forestry, the central region is dominated by planting because of its plain location, and the western region is dominated by grassland animal husbandry (Figure 1).

As this study mainly examined the impact of COVID-19 on the rural comprehensive resilience of Jilin Province, we comparatively analyzed the statistical data of 2019 and 2020, which represent the year before the COVID-19 pandemic and during the pandemic, respectively. The corresponding statistical data were obtained from the Jilin Statistical Yearbook and the Statistical Bulletin of National Economic and Social Development of each city (prefecture). The regionalization vector data of Jilin Province in China were obtained from the China National Basic Geographic Information Center. The climatic data were obtained from National Meteorological Science Data Center of China (Table 1).

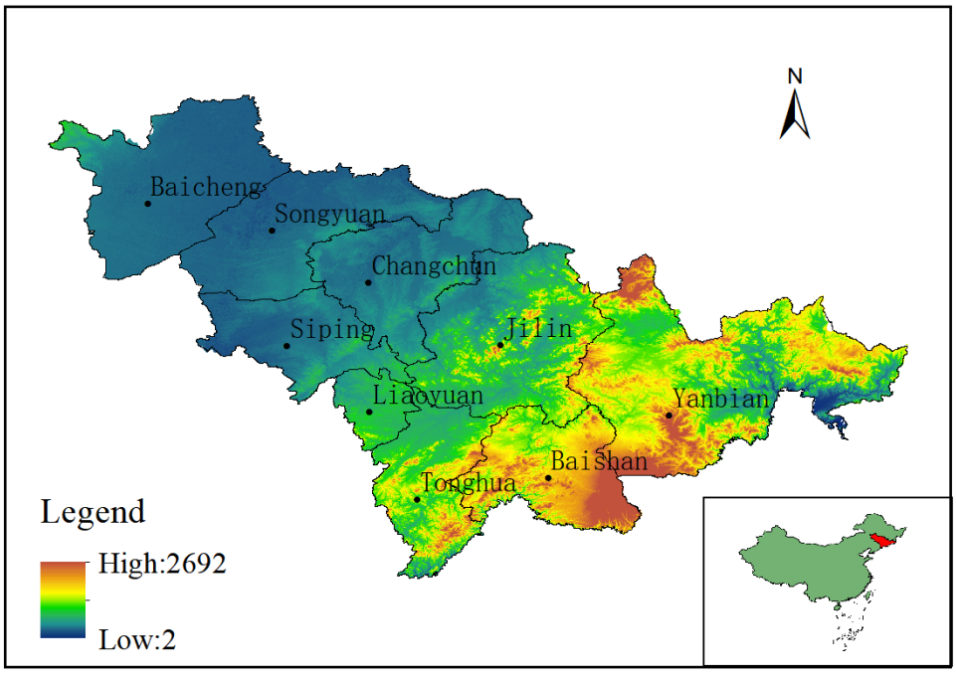



**Figure 1.** Map of Jilin Province.

**Table 1.** Overview of the data used in this study.

| Data | Time | Data Sources |
|---|---|---|
| Total number of rural population | 2019–2020 | Jilin Statistical Yearbook and the Statistical Bulletin of National Economic and Social Development of each city (prefecture) |
| Total land area | 2019–2020 | |
| Agricultural technicians (person) | 2019–2020 | |
| Gross output value of agriculture, forestry, animal husbandry and fishery (yuan) | 2019–2020 | |
| Machine seeding tillage | 2019–2020 | |
| Capita gross power of agricultural machinery (KW/person) | 2019–2020 | |
| Good air quality days | 2019–2020 | |
| Forest coverage (%) | 2019–2020 | |
| Number of beds in township hospitals (bed) | 2019–2020 | |
| Road (km/100 sq.km) | 2019–2020 | |
| Rural teachers (person) | 2019–2020 | |
| People above junior college (person) | 2019–2020 | |
| Number of towns and villages (%) | 2019–2020 | |
| Number of rural committees | 2019–2020 | |
| Financial expenditure for agriculture, forestry, and water (yuan) | 2019–2020 | |
| Urban and rural community expenditure (yuan) | 2019–2020 | |
| GDP (yuan) | 2019–2020 | |
| Disposable income in rural areas (yuan) | 2019–2020 | |
| Total social consumer goods in rural areas (yuan) | 2019–2020 | |
| Number of opening broadband village | 2019–2020 | |
| A nnual average temperature (°C) | 2019–2020 | National Meteorological Science Data Center of China |
| Altitude (m) | | National Basic Geographic Information Center of China |

## 3. Method

### *3.1. Entropy Weight Method*

The entropy weighting method is an objective weighting method. It mainly calculates the entropy weight of each index using information entropy according to the dispersion degree of all evaluation index data to obtain a more objective index weight. Therefore, information entropy can be used to calculate the weight of each indicator, providing a basis

for the comprehensive evaluation of multiple indicators. The entropy weighting method has been widely used in various research fields [40,41]. Therefore, in this study, the weight of each index was determined using the entropy weighting method.

### *3.2. Evolutionary Framework of Rural Comprehensive Resilience and Evaluation System*

Rural resilience is the ability of the rural regional system to resist and mitigate the impact when dealing with internal and external disturbances, and to change the rural social ecosystem to a better state (rather than "rebound" to the pre-disturbance) by comprehensively making use of the economic, social, and environmental capital. This emphasizes that the system has the characteristics of active adaptation and sustainable development [29]. Disturbances can be divided into natural and artificial disturbances according to their source [42]. The rural regional system comprises a natural ecological subsystem (reflecting ecological resilience), an economic production subsystem (reflecting economic resilience), and social and cultural subsystem (reflecting social, cultural, and institutional resilience). Internal system elements are closely linked [43]. After the rural area system is affected by disturbance factors, the system with sufficient resilience can actively resist and mitigate the disturbance and use the strong adaptability to promote the system to adjust, adapt, and reorganize, so as to transform the disturbance into development opportunities and move towards the direction of strong resilience. However, a fragile rural system with weak anti-interference ability and resilience can only passively withstand the impact of disturbance until the structure and function of the system are destroyed, and it will eventually decline and die out [44]. Currently, there is no unified standard for the construction of a comprehensive rural resilience indicator system. To ensure the rationality and standardization of the indicator system as much as possible, this study compared, summarized, and sorted out the dimensions of rural resilience assessment and the relevant measurement indicators of each dimension in previous literature [45,46]. On this basis—combined with the policy of China's rural revitalization strategy, and considering the availability of data, the comprehensiveness of the measurement system and the characteristics of the studied region—the evolutionary framework of rural comprehensive resilience, and its evolution mechanism were determined (see Figure 2). China's rural revitalization strategy prioritizes the development of rural areas and comprehensively promotes rural revitalization in the new stage of development, which highlights the development direction for China's agriculture, rural areas, and farmers [47]. China's rural revitalization strategy includes five aspects: thriving businesses, a pleasant living environment, social etiquette and civility, effective governance, and prosperity [48]. Thriving businesses promote high-quality and upgrading agriculture, forestry, animal husbandry, sidelines, fishery, and agricultural product processing industries, and they achieve the purpose of local industrial revitalization. This strategy proposes requirements for rural development from a production perspective. A pleasant living environment improves the quality of rural life and ensures that villagers have a beautiful natural environment and a modern quality of life. This strategy proposes requirements for rural development, mainly from the living and ecological environments. Social etiquette and civility refer to the development of rural culture and education, and medical and health services, the purpose of which is to improve farmers' cultural level and to strengthen farmers' technical training, so as to enable farmers to have their own skills and achieve the sustainable development of rural areas. It proposes requirements for rural development, mainly from the social aspects of culture, education, and medical and health care. Effective governance requires the construction of a comprehensive rural governance system with a responsible government, harmonious society, public participation, and a rule of law that guarantee achieving self-regulation and autonomy in the countryside. This strategy also suggests requirements for rural development, mainly from the perspective of the governance system. Prosperity is the ultimate goal of implementing a rural revitalization strategy. By enabling farmers to have a stable income, improving the lives of farmers, solving the problem of farmers' employment, and effectively shortening the income gap between urban and rural residents, rural areas achieve a good life [49].

The strategy also proposes requirements for rural development from the perspective of rural economic activities. China's rural revitalization strategy proposes requirements for rural development in five aspects: production, ecology, society, institutions, and economy. According to the five aspects of the rural revitalization strategy, the evaluation index system of rural comprehensive resilience comprises five dimensions.

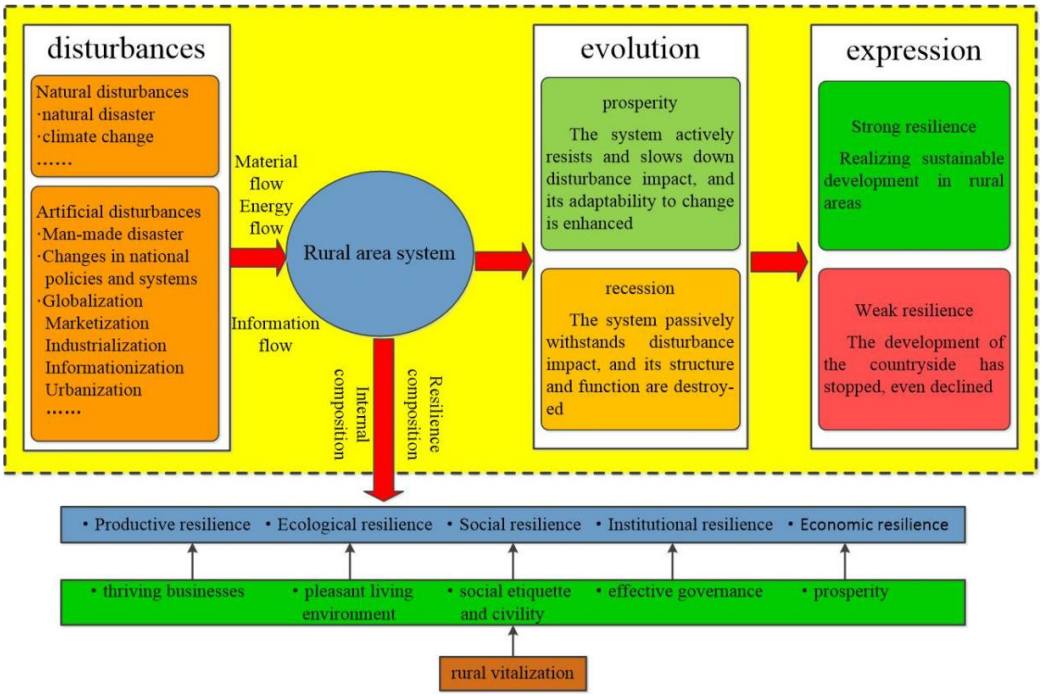



**Figure 2.** Evolutionary framework of rural comprehensive resilience.

These five dimensions are as follows: productive resilience (thriving businesses), ecological resilience (pleasant living environment), social resilience (social etiquette and civility), institutional resilience (effective governance), and economic resilience (prosperity) (see Table 2). Productive resilience (Prod-R) includes four indicators: the proportion of agricultural technicians; the per capita total output value of agriculture, forestry, animal husbandry, and fishery; the machine-sowing/tillage rate; and the per capita total power of agricultural machinery. The proportion of agricultural technicians per 100,000 people reflects the quality of the personnel engaged in agricultural production; the per capita gross output value of agriculture, forestry, animal husbandry and fishery reflects the level of rural productivity; the rate of machine seeding/tillage reflects the development level of rural agricultural modernization; the total power of agricultural machinery per capita reflects the strength of rural mechanization. All four indicators are positive impact indicators. Ecological resilience (Ecol-R) includes four indicators: elevation difference, annual rate of good air quality days, forest coverage, and annual average temperature. The elevation difference reflects the undulation of the rural terrain; he greater the elevation difference, the more uneven the terrain. The annual rate of good air quality days reflects the quality of rural air; forest coverage reflects the level of rural greening; and the annual average temperature reflects rural climate conditions. Among the ecological Resilience indicators, except for the elevation difference, which is a negative impact indicator, the other three indicators are all positive impact indicators, which reflects the ecological environment quality in each region. Social resilience (Soci-R) includes four indicators: per capita number of beds in township hospitals; road density; proportion of rural teachers; and proportion of people receiving education above junior college. These indicators reflect the social development levels of health, transportation, education, and culture in each region, which are all positive impact indicators. Institutional resilience (Inst-R) includes four indicators: the proportion of towns; the per capita number of village committees; the per capita

financial expenditure for agriculture, forestry, and water; and the per capita urban and rural community expenditure. Although the administrative ranks of towns in China are the same as those of villages, their comprehensive development level is higher than that of villages. Therefore, the proportion of towns in each region was determined as an indicator of institutional resilience in this study. The higher the proportion of towns, the stronger the comprehensive strength, and the higher the administrative level of the region. The per capita number of village committees reflects the rural administrative governance level. Per capita financial expenditures for agriculture, forestry, and water reflect the level of government investment in rural governance. Per capita urban and rural community expenditures reflect the level of investment in rural community governance. The four indicators reflect the level of rural governance in all regions and are all positive indicators. Economic resilience (Econ-R) includes four indicators: per capita GDP, per capita disposable income in rural areas, per capita total social consumer goods in rural areas, and rate of opening broadband villages. The per capita GDP reflects the overall situation of rural economic development, and the per capita disposable income in rural areas reflects the level of villagers' income; the per capita total social consumer goods in rural areas reflects the level of rural consumption; the rate of opening broadband villages reflects the level of rural informatization and can indirectly reflect the level of rural online consumption. These four indicators reflect the level of living standards in rural areas from different perspectives and are all positive impact indicators.

**Table 2.** Evaluation index system of rural comprehensive resilience.

| Dimension | Index | Computing Method |
|---|---|---|
| Prod-R | Proportion of agricultural technicians (person/100,000 person): reflects the quality of rural agricultural employees. | 100,000 × Total number of agricultural technicians/total number of rural population |
| | Per capita gross output value of agriculture, forestry, animal husbandry, and fishery (yuan): reflects the level of rural production capacity. | Gross output value of agriculture, forestry, animal husbandry, and fishery/total number of rural population |
| | Rate of machine seeding tillage (%): reflects the modernization level of rural agriculture. | Total area of machine seeding tillage/total area of planting |
| | Per capita gross power of agricultural machinery (KW/person): reflects the strength of rural mechanization. | Gross power of agricultural machinery/rotal number of rural population |
| Ecol-R | Altitude difference (m): reflects the fluctuation of rural terrain. | Highest regional altitude-lowest regional altitude |
| | Rate of good air quality days (%): reflects rural air quality. | (good air quality days/365) × 100% |
| | Forest coverage (%): reflects the level of rural greening. | (Forest area/total land area) × 100% |
| | Annual average temperature (°C): reflects the advantages and disadvantages of rural climate conditions. | Total average temperature of each month/12 |
| Soci-R | Per capita number of beds in township hospitals (bed/10,000 person): reflects the rural medical level. | 10,000 × Total number of beds in township hospitals/Total number of rural populations |
| | Road density (km/100 sq.km): reflects rural traffic conditions. | Total length of road/total area |
| | Proportion of rural teachers (person/100,000 person): reflects the level of rural education. | 100,000 × total number of rural teachers/total number of rural populations |
| | Proportion of people above junior college (person/100,000 person): reflects the cultural level of villagers. | 100,000 × total number of people above junior college/total number of rural populations |
| Inst-R | Proportion of towns (%): reflects the level of rural administrative governance. | Total number of towns/total number of villages and towns |
| | Per capita number of village committees (unit/100,000 person): reflects the level of rural administrative governance. | 100,000 × total number of village committees/total number of rural populations |
| | Per capita financial expenditure for agriculture, forestry, and water (yuan): reflects the government's investment in rural governance. | Total financial expenditure for agriculture, forestry, and water/total number of rural populations |
| | Per capita urban and rural community expenditure (yuan): reflects the investment in rural community governance. | Total urban and rural community expenditure/total number of populations |

**Table 2.** *Cont.*

| Dimension | Index | Computing Method |
|---|---|---|
| Econ-R | Per capita GDP (yuan): reflects the development of rural economy. | GDP/total number of populations |
| | Per capita disposable income in rural areas (yuan): reflects villagers' incomes. | Per capita disposable income in rural areas |
| | Per capita total social consumer goods in rural areas (yuan): reflects the level of rural consumption. | Total social consumer goods in rural areas/total number of rural populations |
| | Rate of opening broadband village (%): indirectly reflects the rural online consumption. | The number of opening broadband village/total number of administrative villages |

## 4. Result

### *4.1. Weight of Rural Comprehensive Resilience in Jilin Province*

The entropy weight method was used to calculate the weight of each index of rural comprehensive resilience in nine cities (states) of Jilin Province in 2019 and 2020. Then, the weight values of productive resilience, ecological resilience, social resilience, institutional resilience, and economic resilience of each region were calculated. Further details are provided in Tables 3 and 4.

**Table 3.** Weights of evaluation indicators of rural comprehensive resilience in Jilin Province.

| Dimension | Index | Weight in 2019 | Weight in 2020 |
|---|---|---|---|
| Prod-R | Proportion of agricultural technicians (person/100,000 person) | 0.061 | 0.07 |
| | Per capita gross output value of agriculture, forestry, animal husbandry, and fishery (yuan) | 0.073 | 0.04 |
| | Rate of machine seeding tillage (%) | 0.02 | 0.03 |
| | Per capita gross power of agricultural machinery (KW/person) | 0.037 | 0.05 |
| Ecol-R | Average altitude (m) | 0.02 | 0.022 |
| | Rate of good air quality days (%) | 0.066 | 0.069 |
| | Forest coverage (%) | 0.068 | 0.076 |
| | Annual average temperature (°C) | 0.060 | 0.067 |
| Soci-R | Per capita number of beds in township hospitals (bed/10,000 person) | 0.045 | 0.043 |
| | Road density (km/100 sq.km) | 0.035 | 0.039 |
| | Proportion of rural teachers (person/100,000 person) | 0.047 | 0.045 |
| | Proportion of people above junior college (person/100,000 person) | 0.059 | 0.066 |
| Inst-R | Proportion of towns (%) | 0.034 | 0.036 |
| | Per capita number of village committees (unit/100,000 person) | 0.045 | 0.061 |
| | Per capita financial expenditure for agriculture, forestry, and water (yuan) | 0.071 | 0.064 |
| | Per capita urban and rural community expenditure (yuan) | 0.045 | 0.049 |
| Econ-R | Per capita GDP (yuan) | 0.091 | 0.083 |
| | Per capita disposable income in rural areas (yuan) | 0.034 | 0.039 |
| | Per capita total social consumer goods in rural areas (yuan) | 0.062 | 0.049 |
| | Rate of opening broadband village (%) | 0.028 | 0.001 |

**Table 4.** Weights of evaluation dimension of rural comprehensive resilience in Jilin Province.

| Dimension | Weight in 2019 | Weight in 2020 |
|---|---|---|
| Prod-R | 0.189838755 | 0.190466172 |
| Ecol-R | 0.214220398 | 0.233822827 |
| Soci-R | 0.186817783 | 0.194025606 |
| Inst-R | 0.194578248 | 0.210623582 |
| Econ-R | 0.214544816 | 0.171061813 |

*4.2. Comparative Analysis of Dimension Weights in Jilin Province*

Before the pandemic, the resilience of the five dimensions of Jilin Province in 2019—including productive, ecological, social, institutional, and economic resilience—showed a balanced development trend, and the weight value of each dimension was approximately 0.2. After the outbreak of the pandemic in 2020, the weight value of economic resilience decreased significantly, and the weight value of ecological resilience increased significantly (see Figure 3 for details). This showed that before the pandemic, rural comprehensive resilience in Jilin Province was developed in a balanced way, in five aspects, including production, ecology, society, institution, and economy working hand in hand; and no relative weakness was reported. However, owing to the impact of the pandemic, the economy of Jilin Province has been significantly affected, resulting in a weakening of the weight of economic resilience. As shown in Figure 3, productive resilience was also negatively affected, and its weight value decreased compared with that before the pandemic; however, the degree of impact was not as obvious as that of economic resilience, and the weight of ecological resilience, social resilience, and institutional resilience increased (especially ecological resilience). This was mainly because travel and productive activities were affected by the pandemic and the impact on the environment was weakened. Therefore, the quality of the ecological environment improved.

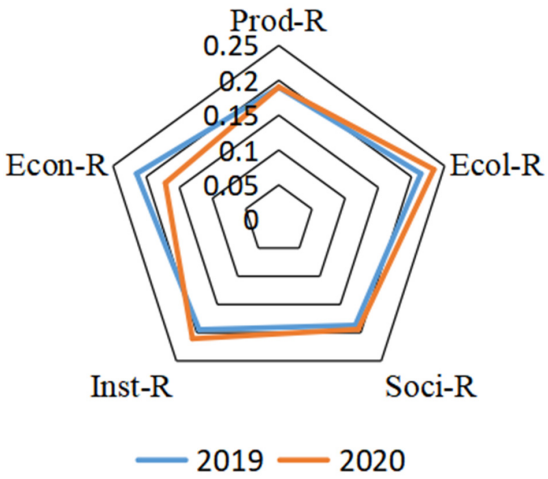
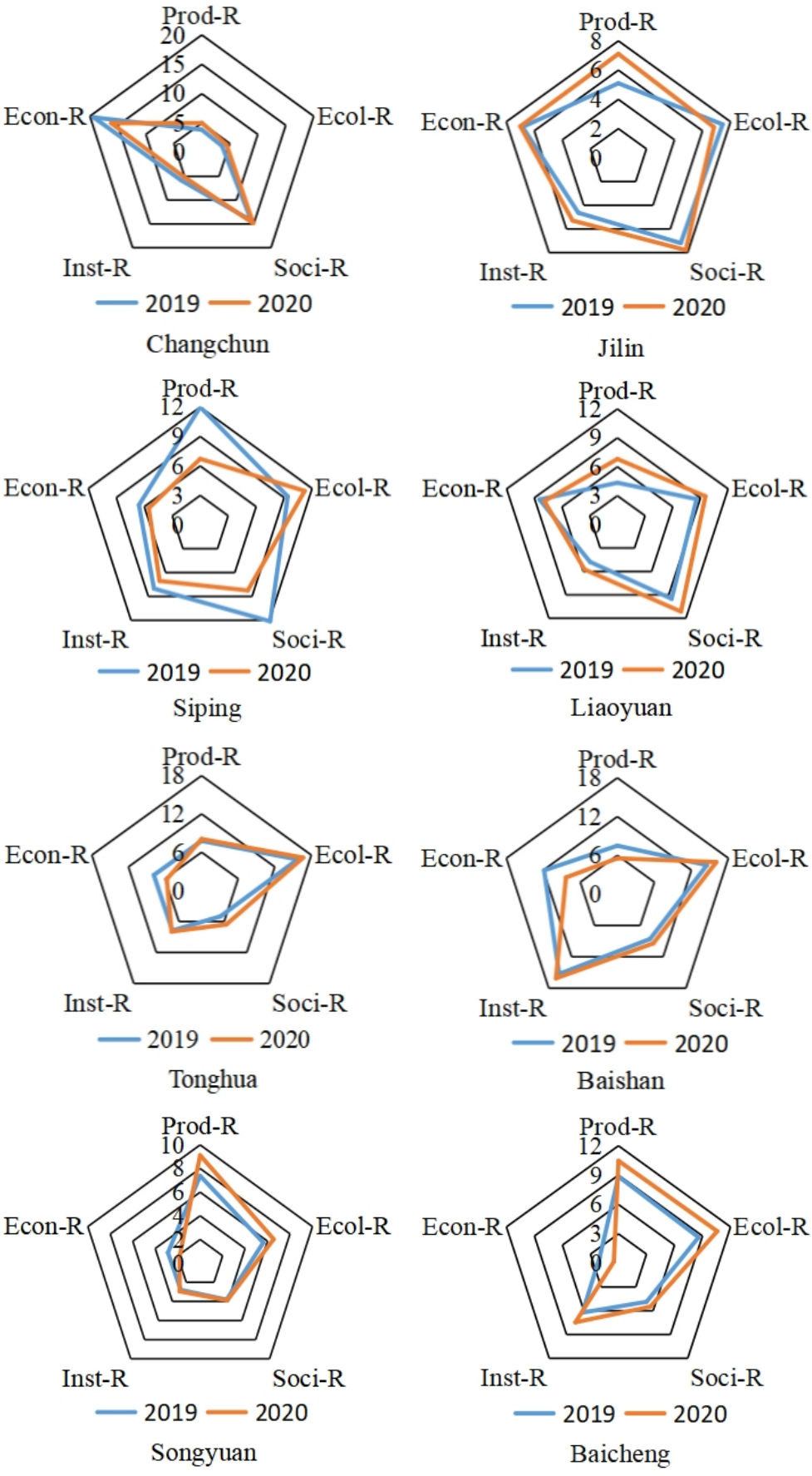



**Figure 3.** Dimension weight of rural comprehensive resilience in Jilin Province before and after the pandemic.

*4.3. Comparative Analysis of Dimensional Resilience in Different Regions*

Figure 4 shows the comparison of dimensional resilience in regions of Jilin Province before and during the pandemic. Based on the distribution characteristics of each dimension of resilience, the rural dimensional resilience in various regions of Jilin Province could be divided into two types: relatively balanced development and unbalanced development. Rural regions with relatively balanced development of productive, ecological, social, institutional, and economic resilience included Jilin City, Siping, and Liaoyuan, while rural regions with unbalanced development included Changchun, Tonghua, Baishan, Songyuan, Baicheng, and Yanbian. Among these, Changchun has strong economic resilience; Tonghua, Baishan, and Yanbian have strong ecological resilience; and Baicheng and Songyuan have strong productive resilience. Because of the pandemic, with the exception of Jilin City, the economic resilience of the other eight regions has significantly decreased. Furthermore, the productive resilience of Jilin City, Liaoyuan, Baishan, Songyuan, and Baicheng was strengthened. The ecological resilience of Siping and Baicheng increased significantly. No significant changes were observed in other regions. The social and institutional resilience of all regions were relatively stable, with little change. In summary, the most serious impact of the pandemic on rural resilience was economic resilience. However, rural ecological resilience increased during the pandemic.

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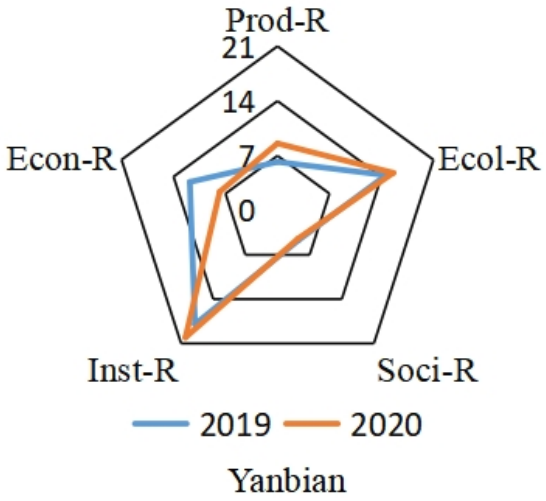


**Figure 4.** Comparison of dimensional resilience in different regions of Jilin Province before and after the pandemic.

*4.4. Comparative Analysis of Rural Comprehensive Resilience*

Figure 5 shows the comparison of rural comprehensive resilience in different regions of Jilin Province before and during the pandemic. Before and after the pandemic, except for Changchun, Siping, and Baishan, the rural comprehensive resilience of the other six regions increased. The rural comprehensive resilience of Siping declined significantly, mainly because Gongzhuling City, whose jurisdiction had been under Siping, was under the jurisdiction of Changchun in 2020. The comprehensive rural development level of Gongzhuling was at the leading level in Siping. Therefore, the separation of Gongzhuling led to a significant decline in Siping's rural comprehensive resilience. The decline in rural comprehensive resilience in Changchun and Baishan was mainly due to the obvious negative impact of the pandemic on rural economics. Figure 6 shows the rural comprehensive resilience ranking in Jilin Province before and after the pandemic. Before the pandemic, Baishan's rural comprehensive resilience ranked first. After the pandemic outbreak, Yanbian's rural comprehensive resilience rose to first place. Songyuan was always last. The rural comprehensive resilience of the three regions in the east of Jilin Province (Yanbian, Baishan, and Tonghua) was at the forefront of the province. This was obviously related to the good local ecological environment and strong institutional guarantees of the three regions. A good ecological environment is conducive to the development of rural tourism, and the prosperity of rural tourism is the key to rural revitalization. However, Baicheng, Songyuan, and Siping, in the west of Jilin Province, are relatively deficient in ecological resources and backward in the economy compared to the east, so their rural comprehensive resilience was at a lower level. The rural areas of Changchun, Jilin, and Liaoyuan in the central part of Jilin Province were close to the provincial capital Changchun and were driven by the economic center of the provincial capital, so their economic development is relatively advanced, which has driven the development of rural comprehensive resilience. Although there were no excellent ecological resources as in the eastern region, their comprehensive rural resilience was stronger.

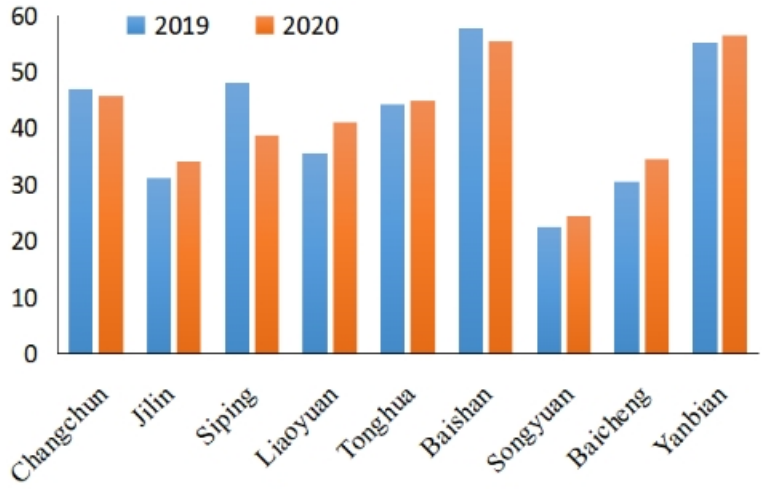


**Figure 5.** Comparison of rural comprehensive resilience in different regions of Jilin Province before and after the pandemic.

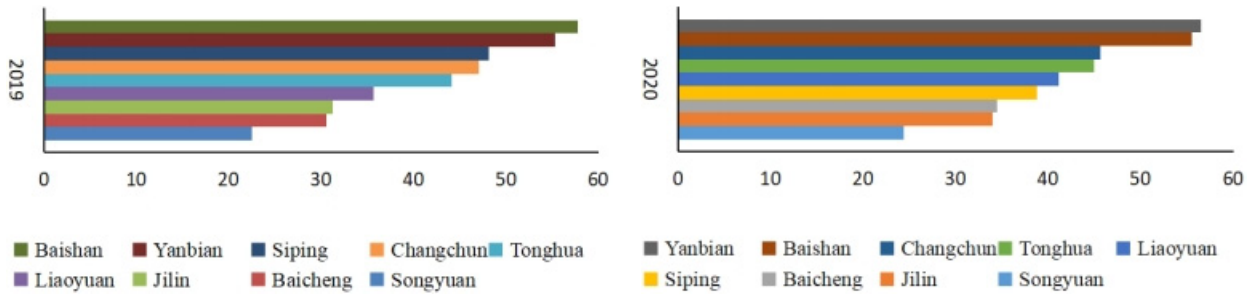


**Figure 6.** Rural comprehensive resilience ranking in Jilin Province before and after the pandemic.

## 5. Discussion

The results showed that villages with strong ecological resilience have a strong ability to resist the impact of COVID-19; therefore, villages should pay attention to the development of the rural ecological environment; actively play the role of agricultural eco-tourism, sightseeing, and leisure; and create distinctive rural tourism plates in combination with the construction of beautiful villages; thus, lucid waters and lush mountains can truly become invaluable assets [50]. The evaluated results also showed that the resilience of rural areas near the economic center was stronger. Therefore, villages near the economic center should actively integrate into urban development; coordinate with urban development; develop rural tourism, leisure farms, and other industries; optimize the agricultural operation layout; broaden the agricultural industry chain; and expand the employment opportunities of farmers [51]. Compared with urban areas, rural regions have sparse population, good ventilation, and a high self-sufficiency rate of food, and the probability of infection is far less than urban areas [52]. On the premise of taking adequate preventive measures, adhering to ecological priority and green development, rural regions would be able to cope with the impact of the pandemic. Under the normalization of COVID-19, although rural China has suffered the most serious internal and external impact in recent years, new opportunities can be provided for rural development through the following measures: Including the development of green agriculture, ecological agriculture can promote sustainable development of rural areas; the new industries, new forms, and new models—such as agriculture + e-commerce, agriculture + tourism, agriculture + health care, and agriculture + characteristic towns—can provide greater development space for rural areas. By issuing consumption vouchers, the capacity of rural consumption can be strengthened; by strengthening financial support, we can promote the development of the

rural economy and consumption; and by improving the rural social security system, we can consolidate the achievements of poverty alleviation [53].

The theory of rural resilience provides a new perspective for deeply revealing the evolution of the rural regional system, the response of the rural system to external disturbances, and its regulation path. It is of pragmatic value for the scientific promotion of rural sustainable development. The evaluation index system of rural comprehensive resilience only used the rural statistical data of nine cities (prefectures) of Jilin Province in 2019 and 2020 as an example to demonstrate the impact of the pandemic on rural areas, which has certain limitations. With the extension of statistical data over time, we can explore the changes in rural comprehensive resilience under the situation of pandemic normalization. In addition, due to the limitation of data sources, the selection of some indicators has certain limitations.

## 6. Conclusions

An important and feasible research method is to quantitatively evaluate comprehensive rural development by constructing an evaluation index system. Combined with the strategic policy of rural revitalization in China, the evaluation index system of rural comprehensive resilience was constructed from the five dimensions of productive resilience, ecological resilience, social resilience, institutional resilience, and economic resilience, which helped to determine the advantages and disadvantages of rural development and provide references for rural development planning and decision making. This study used the rural statistical data of nine cities (prefectures) in Jilin Province, China, in 2019 and 2020, as an example to verify the impact of COVID-19 on the development of rural comprehensive resilience. The results showed that the pandemic has the most obvious impact on rural economic resilience; rural areas with high ecological resilience have a strong ability to cope with the pandemic situation; and rural areas with excellent ecological environment resources have strong comprehensive resilience.

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