RURAL DEVELOPMENT AND METHODS FOR IMPROVING THEIR CAPACITY
EVIDENCE FROM DISTRICT G OF THE COVID-19 EPIDEMIC PREVENTION

Summary. The purpose of this article is tantamount to summarize the successful experience of rural epidemic prevention and provide a reference for other rural areas to enhance epidemic prevention and control capabilities. The second is to offer a reference for villages to enhance their ability to respond to future public health emergencies. Methodology. This article focuses on the literature of rural epidemic prevention and control in China and the practice of epidemic prevention and control in G counties, collects relevant information and compares and analyzes it. Results of the survey showed that prevention of the epidemic is not only the prevention and control of the epidemic itself, but also is required to meet the production and living needs of the villagers. From a national level, the country’s epidemic prevention capabilities are undoubtedly strong and successful, but it cannot reflect the actual situation of epidemic prevention in rural areas; from a rural micro perspective, the village itself undoubtedly lacks sufficient capacity to deal with the epidemic. It cannot explain why the prevention of the rural epidemic has been wealthy. Practice of County G shows that the county has the ability to spontaneously prevent epidemics, and the county-based epidemic prevention and control system is the basis for the rural epidemic prevention capabilities. Practical implications. County G successfully responded to the impact of the two waves of the epidemic under the current prevention and control system. The system successfully controlled the epidemic to a small area and achieved the goals of epidemic prevention and control, social stability and economic development. Value/originality. Taking county area as the research unit is undoubtedly a suitable choice, which is the novelty of this article.

Keywords: rural areas, epidemic prevention system, multiple participation.
Introduction. In the prevention of COVID-19 epidemic, China has demonstrated strong shared governance capabilities. At the macro level, Xuefeng He (2020) believes that one of the successful experience lies in the country's strong grassroots mobilization capabilities [1]. In practice, relying on sport management, mobilizing all entities to establish a "low-cost, high-efficiency" epidemic prevention and control system (2020) [2], implementing traffic control, contact tracing, quarantine, effectively curbing the further spread of the epidemic. From a personal point of view, Guolei Zhang (2020) believes that the reason why the rural epidemic can be controlled in the short term is that the expansion of epidemic risk has given birth to the individual rationality of villagers to "exclude others" and "self-enclosure", thus forming an achievement under the framework of villager autonomy. The collective consensus is expressed as a positive response to the national epidemic prevention mobilization [3]. Compared with many foreign countries, China's epidemic prevention measures are undoubtedly efficacious. From a domestic perspective, when the first wave of the epidemic broke out, the grassroots epidemic prevention and control measures and systems were still insufficient. The main problems were the lack of medical supplies, the lack of capacity of village officials, the lack of public awareness of prevention (2020) [4], and the lack of grassroots government management (2020) [5; 6] and the formalism in the grassroots (2020) [7], but the epidemic prevention and control in rural areas did have a positive effect, and the Wuhan epidemic did not spread to the countryside. Although the second wave of the epidemic broke out in rural areas, it was soon effectively contained. Discussing rural epidemic prevention and control capabilities cannot be separated from the country level regional opinion. This article analyzes the current epidemic prevention and control system in rural areas and the epidemic prevention experience in G County, and aims to summarize useful experience and lessons to help rural areas respond to possible emergencies in the future.

Rural epidemic prevention and control system. Since SARS in 2003, China's pastoral areas have basically formed a three-level rural public crisis emergency management-level organization system composed of county, township, and village (2014) [8]. The promulgation of relevant legal provisions allows the government to incorporate multiple subjects into the crisis management system and divide the responsibility boundaries of each subject. The government uniformly directs the epidemic prevention work in the territory in accordance with the law and administrative instructions. The villagers are isolated at home as required, which successfully prevented the spread of the epidemic in rural areas. From the perspective of scale, the unified prevention and control system based on the county is not only science to a certain degree, but also in line with the principle of cost-effectiveness.

Statutory epidemic prevention subjects. Existing legal provisions describe the subject of epidemic prevention as showing in Table 1. When responding to public health emergencies, in accordance with organizational systems and laws, governments at all levels have established a vertical management system, and various departments within the same level of government have established horizontal management System to form a unified command mobilization emergency system. Villagers actively cooperate with the government's home quarantine requirements. The statutory duties of towns and villages are information perception, reporting, personnel quarantine, publicity, drills, and auxiliary participation in prevention and control. Rural grassroots level spontaneously participates in epidemic prevention and control within the framework of autonomy and the rule of law. Due to the lag in the discovery and confirmation of the epidemic, when it is confirmed, a certain scale of the infected population is formed. In other words, for villages, the fulfillment of this obligation has positive significance for the prevention and control of imported epidemics in a short time. The county-level government makes timely epidemic prevention decisions, provides resources such as funds, materials, and venues, and supervises the decision-making execution system in the domain to ensure effective implementation of decisions. It can not only prevent the import of external epidemics, but also deal with the spread of small-scale internal epidemics.

Scale perspectives. Jeffrey West combines urban infrastructure issues with socio-economic dynamics and uses scaling as a powerful tool to give a quantitative and comprehensive system framework for understanding urban economic and social development. Infrastructure (gas stations, roads, pipeline lengths) and population show a sub-linear scaling of 0.85 (population doubled, infrastructure increased by 0.85), which represents this systemic economy of scale. The larger the city, the per capita fewer gas stations are required. Economic and social data (salary, GDP, number of crime, epidemics, number of patents) and population show a super-linear scale scaling of 1.15, reflecting the systematic growth of scale returns (2018) [9]. This article will borrow the concepts of super-linear scaling and sub-linear scaling in scale theory of roughly analyze the quantitative reasons for the success of epidemic prevention in County G, and the selected reference city is Wuhan. Regardless of the fact that it is not necessarily reasonable to treat G County as a whole city, this method provides us with a scientific perspective that can be referred to. From the
which is divided into 9 groups: the comprehensive epidemic prevention and control headquarters, County G from 2020 (Table 2) [10]. The information posted on the government website of prevention and control system in County G based on article analyzes the operational status of the rural development of the epidemic, with a total of 32 confirmed cases and no new confirmed cases since then. In early 2021, when the Hebei epidemic broke out again, it took about a month to stop the further development. The epidemic brought tremendous pressure to County G. With the joint efforts of the government and all sectors of society, it took about a month to stop the further development of the epidemic, with a total of 32 confirmed cases and no new confirmed cases since then. In early 2021, when the Hebei epidemic broke out again, there were no confirmed cases in G County. This is the primary line of defense to curb the spread of the epidemic into the countryside. The county has screened migrants and contacts who have gone back to their homestays, and conducted centralized quarantine and sent to county level medical institutions for treatment of suspected patients. In terms of patient treatment, therapeutic institutions in County G request support from the Provincial Chest Hospital as needed, and receive support from the Provincial Chest Hospital's expert team. The county level government received 11.51 million CNY in money and goods from 457 private enterprises in the county and 1.75 million CNY in money and goods donated by chambers of commerce in various regions. But the donation received by all the township government is no more than 0.5 million CNY. Epidemic prevention and control in County G shows a system in which the county government and medical institutions are the leading factor, the township governments and institutions are implemented, and the social organizations and individuals participate in the prevention and control system. All these show that the county-level government is the absolute main body in terms of external prevention of import, internal prevention of proliferation, reduction of the stock of infected people and resource protection.

| Laws and regulations | subject | responsibility |
|----------------------|---------|---------------|
| National Emergency Plan for Public Health Emergencies | towns and neighborhood committees, village committees assist health administration and other departments, medical institutions | Information collection, reporting, separation of personnel and implementation of public health measures |
| Public security management regulations | public security organs | All villagers are required to abide by the regulations on epidemic prevention and control |
| Emergency Response Law | village committee | Publicity and popularization of emergency response knowledge and necessary emergency drills |
| Law of Infectious Disease Control | rural primary medical institution | Undertake the corresponding infectious disease prevention and control work under the guidance of disease prevention and control institutions |
| | village committee | Organize villagers to participate in rural infectious disease prevention and control activities |
| | local Governments at different levels | Ensuring funds for the prevention of infectious diseases in rural areas |
| | Governments at or above the county level | Reserve epidemic prevention materials |
| | Governments at or above the county level | Announcement of cutting off transmission channels |
| | Governments at all levels | Improve the system to facilitate the society to participate in epidemic prevention (volunteer service, donation activities, etc.) |
### Table 2: Epidemic prevention information of each town in G County

| Town | 2020 Official epidemic prevention measures | 2020 Social participation | 2021 Official epidemic prevention measures |
|------|------------------------------------------|---------------------------|------------------------------------------|
| HDX | Traffic and party control, quarantine, and publicity; poor epidemic prevention and irregular office work were exposed by higher-level supervisory agencies | 350 volunteers, donation of 220,000 CNY, 2,100 masks, other equipment | Publicity; persuade villagers to comply with epidemic prevention requirements |
| LTX | Traffic and party control, quarantine, and publicity; | Donations and materials, voluntary services | Encourage villagers to comply with epidemic prevention requirements; village clinics receive fever and cough patients to report to the township health agency within 2 hours; strengthen the supervision of the rural epidemic prevention system |
| MFZ | Traffic and party control, quarantine, and publicity; | The society donated 193,000 CNY, 6,000 medical masks, 500 catties of alcohol, 90 bottles of disinfectant, and food and other materials worth about 15,000 CNY. | Encourage floating population to comply with epidemic prevention requirements; prepare vaccination knowledge; prepare adequate epidemic prevention materials, and strengthen the cleaning and elimination of key areas |
| NXDX | Traffic and party control, quarantine, and publicity; | 500 KF94 masks, the hotel provides rooms as quarantine points, and free meals for quarantined persons; | All public officials perform epidemic prevention duties; strengthen publicity and personnel screening |
| SLZ | Traffic and party control, quarantine, and publicity; | Donated more than 10,000 medical masks and 20 bottles of high-efficiency disinfectant; | Encourage the floating population to comply with epidemic prevention requirements and promote vaccination knowledge; master information on outsiders, prepare adequate epidemic prevention materials, and strengthen the cleaning and elimination of key areas |
| YPX | Traffic and party control, quarantine, and publicity; | Social donations of 24,000 CNY, 1,000 masks, food | Prepare sufficient supplies for epidemic prevention; establish a rapid response mechanism for epidemic prevention, unified command, and strengthen publicity |
| WXS | Traffic and party control, quarantine, and publicity; Unattended and unsupervised quarantine points were exposed by higher-level supervisory agencies | Social donations | Prepare sufficient supplies for epidemic prevention; establish a rapid response mechanism for epidemic prevention, unified command, and strengthen publicity |
| BQYZ | Traffic and party control, quarantine, and publicity; | Social donation 15,000 CNY | Prepare sufficient anti-epidemic materials, strengthen the cleaning and elimination of key areas; report symptoms of fever and cough to returnees from medium- and high-risk areas immediately |
| YHX | Inadequate control of the gathering of people was exposed by the superior supervision agency | | Encourage the floating population to comply with the epidemic prevention requirements and apply for health certificates; stop the gathering of more than 50 people; all public officials perform epidemic prevention duties |
| STPZ | Inadequate control of the gathering of people was exposed by the superior supervision agency | | |
| PPHZ | The ineffective review of epidemic prevention and control was exposed by higher-level supervisory agencies | | |
| ZQZ | Epidemic prevention and control are reviewed one by one and poor implementation of control measures is exposed by higher-level supervisory agencies | | Strengthen the screening of returnees; persuade villagers to comply with epidemic prevention requirements and reduce gatherings |
The towns implement decision-making and upload information, provide part of the funding and material guarantee, the public security organs manage the epidemic prevention behavior of residents in their jurisdictions in accordance with the public security management regulations, and the rural primary medical institutions implement corresponding prevention and control measures. At the village level, the statutory duty is to conscientiously perform organization, screening, and publicity work, provide services necessary for villagers' daily life and production, and organize villagers' home quarantine. Mainstream villagers have overcome the so-called "rural atomization" tendency, formed a collective consensus, and consciously abide by the epidemic prevention requirements. However, the information in Table 2 reflects the differences in the ability of towns to prevent and control spontaneous epidemics. Six towns have poor prevention and control, which were outlined by higher-level supervisory agencies. Although the epidemic has indeed been contained, this does not indicate that the so-called "low-cost, high-efficiency" rural epidemic prevention and control system is stable and reliable. This article believes that during the first wave of the epidemic, the reasons for County G's victory over the epidemic were not only the efforts of the grassroots, but also the following four aspects:

(1) G County timely adopted traffic control measures to block highway populations and railway entrances, effectively controlling the entry of virus carriers into its jurisdiction.

(2) Population density factors. The principal objective reason why rural areas can contain the spread of the epidemic is the low population density per square kilometer in rural areas. The total population of Wuhan is 14 million (2019), the area of Wuhan is 8569.15km², and the population density is 1,634 people/km². The county has a population of 860,000 (2019), an area of 1831km-2, and a population density of 470 people/km-2. The second is the low rate of the infected population. The cumulative number of people in Wuhan is 50,633 (February 18), accounting for the total The population ratio is 3.62*10-3, and the cumulative number of people in County G is determined to be 32, which accounts for 3.72*10-3 in the total population. According to the super-linear scaling calculation, the number of infected people is 2,046 (population) and 186 (Wuhan GDP 1,484,729 billion in 2019; G county GDP 23.052 billion); the number of confirmed diagnoses based on theoretical calculations is much smaller than the actual number of confirmed diagnoses, which shows that G county The epidemic at that time was not very serious. On the one hand, low population density is useful to epidemic prevention and control. On the other hand, the number of confirmed cases is unimportant, and there is no run on medical resources.

(3) Free treatment policy. The central agency guarantees the supply of funds to ensure that people do not abandon medical treatment because of concerns about costs, and ensure that medical treatment and epidemic prevention and control are not affected by funding problems; facing hundreds of thousands or even millions of medical expenses is a problem for farmers With unbearable pressure, farmers make rational choices and most of the infected will not go to quarantine and treatment. The introduction of the free national treatment policy has played a very important role in the prevention and control of the epidemic.

(4) Multi-agents jointly control the epidemic. Each independent entity cannot complete the epidemic prevention and control alone. The county government and medical institutions are led to conducting unified command and dispatch, and each entity cooperates with each other to perform their respective duties, which curbs the risk of the continued spread of the epidemic.

The reason for the success of the epidemic prevention and control cases in County G can be attributed to the country's sharp social governance capabilities. Wuhan lockdown measures reduced the continuous transmission of infected persons to the outside world, and avoided the collapse of the medical system and social unrest caused by the spread across the country. The Hebei epidemic was quickly contained within a small area, reflecting that the local government's ability to respond to the epidemic is improving. Although the three-level epidemic prevention and control systems have controlled the spread of the epidemic in rural areas, the problems reflected in the epidemic prevention and control cases in County G still cannot be ignored. These problems are reflected in the fact that some villages do not meet the requirements of decision-making and implementation, and some subjects lack sufficient crisis prevention awareness and response measures.

Conclusions. Improve the ability of managed-styled epidemic prevention and control. Whether it is to prevent epidemics within or outside the county, the county government increases its ability to prevent and control sudden epidemics. Governments at the county-level and above should conduct scientific calculations and assessments based on the probability of a major outbreak in the region, the possible scale of infection when the outbreak is confirmed, and the speed of the spread of the epidemic, etc., and use these data to evaluate the need to reserve epidemic prevention materials, supporting medical equipment and facilities, Relevant funds, prevention and control organization plan; establish an efficient donated material acceptance and distribution system; mobilize social forces to organize donations from enterprises, units and individuals, and organize volunteer service teams to participate in prevention and control work. County-level and upper medical institutions prepare prevention and control guidelines to improve the ability to manage and treat the epidemic, and tolerate misreporting of epidemic information by rural medical institutions to a certain extent.

The village organizes personnel to implement air defense tasks in accordance with the prevention and control guidelines and administrative instructions, and timely grasps the information of the floating population in the village. Carefully perform work such as temperature monitoring, personnel quarantine, identification of high-risk personnel, information reporting, and prevention and control information publicity, and promptly send suspects to county level medical institutions or centralized quarantine points; during the epidemic period, the public security organs shall be strengthened in accordance with the law on social security issues. At the same time, rural areas should pay more attention to the publicity and persuasion of
the village society to avoid increasing conflicts. Organize villagers with applicable equipment to carry out elimination work within the village. In order to give effect to the decision-making at the county-level and above, the county level government should increase inspections at the grassroots level during the mission period. While responding to the epidemic, rural cadres must also face the problems of farmers’ lives and agricultural production, and provide necessary daily necessities to villagers in a timely manner to reduce the chance of villagers going out. Village committees should conduct drills to respond to emergencies to enhance the sense of obligation and crisis sensitivity of ordinary people in preventing and controlling the epidemic.

**Improving the ability of scientific and technological epidemic prevention and control.**

Regardless of the fact that managed-styled epidemic prevention has been successful, its costs and side effects are also great, and it is not conducive to economic development and social stability. The advance of science and technology has improved the effectiveness of epidemic prevention and reduced costs. For example, the screening of personnel has undergone screening of floating population, screening of abnormal body temperature and nucleic acid screening, which have improved the accuracy of screening; using modern information technology to efficiently track close contacts. The development and production of cheap, efficient and easy-to-use detection reagents and vaccines help to reducing the cost and side effects of managed epidemic prevention. Only by improving the ability of scientific and technological epidemic prevention can we fundamentally solve the lack of rural epidemic prevention and control capabilities.

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