Scholar Publishing Group
Zoology and Animal Physiology
https://doi.org/10.38007/ZAP.2021.020101
ISSN 2789-8369 Vol. 2, Issue 1: 1-11

Animal Epidemic Prevention on the Reproduction Quantity in the Rural Animal Husbandry Investment Cooperative

Shihui Xiang*

Panyapiwat Institute of Management, Nonthaburi, Thailand

**corresponding author*

Keywords: Animal Epidemic Prevention, Rural Animal Husbandry, Cooperative Organization, Breeding Quantity

Abstract: To explore the effect of animal epidemic prevention on the reproduction quantity of rural animal husbandry investment cooperatives. Based on the public management theory and economic theory, this paper mainly adopts the methods of comparative research and statistical research, static analysis and dynamic analysis, empirical research and normative research to analyze the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives, solve the dilemma brought by the animal epidemic crisis, and push forward The development of animal husbandry. In 2019, the total output value of animal husbandry in China has reached 3063.227 billion yuan. Xinjiang is an important province for the development of animal husbandry in China. In 2019, the number of professional cooperatives in Xinjiang has reached 20960, of which 9680 are related to animal husbandry, accounting for 46.2%. The cost of disinfection in epidemic areas varies from region to region, so the consumption is different. Among them, Ma'anshan City in Anhui Province has a small number of culls, only 17000 feathers, and the cost is 200000 yuan. In Xi'an City, Shanxi Province, the number of culls is large, reaching 637000, and the cost is as high as 3.05 million yuan. Animal disease is becoming more and more complex and changeable, which increases the risk of animal husbandry and brings new crisis and challenge. Animal epidemics, and cooperatives can rely on its scale to improve the level of security and protect the interests of farmers. The rural animal husbandry based on the cooperative can be said to be the ballast stone of the development of animal husbandry in our city, which will guarantee the development of animal husbandry in our country.

1. Introduction

In many battles of wisdom and courage with animal epidemics, we have explored and summed

up effective experiences such as "early discovery, early isolation", "early, fast, strict and small". The foundation of animal epidemic prevention has been continuously consolidated and strengthened. In recent decades, with the progress of science and technology, the rapid development of means of transportation has greatly accelerated the speed of transportation, further shortened the distance between countries, and made animal epidemics spread to all parts of the world at a faster speed than before. This has provided a good hotbed for the spread of animal epidemics, increased its impact on animal husbandry, and also increased the prevention and control of all countries in the world The difficulty of animal epidemic makes animal epidemic prevention in the world meet new challenges, and the form is increasingly severe.

At the same time, the establishment of new China, reform and opening up and other historical events continue to promote the development of China's animal husbandry, gradually forming a large-scale breeding, and under the encouragement of the state has made great progress, we often say that cooperatives are one of the ways [1]. With China's continuous entry into the international arena and the increasingly close ties between countries around the world, a little bit of international agitation will affect individuals [2]. Cooperatives can reduce the instability and vulnerability of the individual economy, and improve the ability to resist risks, whether social or natural, when encountering risks by virtue of their unique nature [3]. Sometimes, the formation of a certain scale of cooperatives with certain strength can even avoid risks in advance [4]. However, we should be aware that there is still a lot of room for improvement in the unique development mode of the combination of rural animal husbandry and cooperatives in China [5]. Compared with the advanced foreign standards, the current production mode of animal husbandry in China is still lack of science, and there is still a large amount of waste of resources in some areas. On the other hand, China's epidemic prevention conditions are poor [6]. Although China's animal epidemic prevention system is relatively sound, there are problems in team building, such as aging, lack of motivation, etc., which are not conducive to the operation of the system and cannot play a good role in the epidemic prevention system [7,8].

Based on the theory of public management and economics, this paper mainly adopts the methods of comparative research and statistical research, static analysis and dynamic analysis, empirical research and normative research to analyze [9,10]. On the one hand, this paper will comprehensively review the research results of "animal epidemic prevention", "rural animal husbandry" and "cooperatives" at home and abroad and the relationship between them, and summarize the relevant data to lay a theoretical foundation for this study [11,12]. On the other hand, it focuses on the analysis of the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives. Based on the theory of international trade, this paper analyzes the mechanism of animal epidemic prevention on the reproduction quantity of rural animal husbandry investment cooperatives from the perspective of trade economy, and deeply analyzes the impact of animal epidemic prevention on the reproduction quantity of rural animal husbandry investment cooperatives [13]. On this basis, combined with the actual situation of our country, this paper puts forward feasible suggestions and suggestions for the development of livestock and poultry breeding industry and the management and control of animal diseases, which has certain practical significance and reference value.

2. Overview of Animal Epidemic Prevention and Investment in Rural Animal Husbandry

2.1. The New Crisis of Animal Epidemic Prevention in the 21st Century

Before the reform and opening up, China carried out the planned economy, and all walks of life were arranged by the state. During this period, the scale of rural animal husbandry was small, the

number of employees was small, and the impact on society and the people was less. Therefore, the whole society has not realized the harmfulness of animal epidemics and the importance of building animal epidemic prevention system. After the reform and opening up, all walks of life have seized the historic development opportunity, been continuously injected with new vitality and ushered in the development peak. China's rural areas have also been activated, under the leadership of the party and the state, full of vitality. With the continuous development of rural animal husbandry, the number of employees has increased significantly, and the scale of breeding has been expanding, which has gradually increased its contribution to the development of the whole agricultural and rural economy and promoted the continuous development of the country. At the same time, animal epidemics also broke out from time to time, each outbreak has brought different degrees of loss to the country and people. Animal epidemic prevention has gradually entered people's vision, and has also been paid attention by the state. The country began to invest in animal epidemic prevention with continuous human and material resources, gradually established animal epidemic prevention system, trained a large number of epidemic prevention teams, guaranteed the development of animal husbandry, and improved the safety of animal products and social public. In the 21st century, animal epidemics are becoming more and more complex and changeable, which brings new crises and challenges to the epidemic prevention work of various countries. The specific performance is as follows:

(1) The challenge brought by the contradiction between the slow construction of animal epidemic prevention system and the rapid development of rural animal husbandry. Although remarkable achievements have been made in the construction of animal epidemic system in China, the rapid development of rural animal husbandry is far faster than the construction speed, so that the existing system and mechanism cannot solve problems in a timely and comprehensive manner, and cannot meet the needs of animal epidemic prevention. At the same time, the structure of the existing epidemic prevention team is unbalanced, the education level of relevant staff is relatively low, and the age is too old. Once an animal epidemic breaks out, there is not enough experience to deal with it. On the other hand, the infrastructure is aging and has not been updated in time; it is difficult to apply for daily funds, which has even reached the limit in some areas

(2) The outbreak and detection of major animal diseases meet the challenge brought by the contradiction of delay.

On the one hand, there are more and more kinds of animal epidemics, which are more and more complex. The detection methods of animal epidemics are backward, the analysis time is long, and the analysis accuracy is not good. It cannot be quickly and timely predicted and monitored before the emergence of animal epidemics or before the outbreak. On the other hand, when an animal epidemic breaks out, effective measures cannot be taken in time to delimit the infected area, cut off the source of the infection, kill the animals infected with the epidemic, slow down the spread of the epidemic to the greatest extent and narrow the infected area of the epidemic.

(3) The challenge brought by the imbalance of animal epidemic prevention system construction. The imbalance of the construction of animal epidemic prevention system mainly includes the development of animal epidemic prevention system in the eastern region, the backwardness of the central and western regions, the improvement of urban testing equipment, and the shortage of equipment in rural areas. Compared with the developed countries, China's leisure law is not comprehensive enough and even there are many legislative gaps.

2.2. Rural Animal Husbandry Based on Cooperatives

With the development of science and technology and the acceleration of globalization, global village has become a reality. It's hard for anyone not to be influenced by other things. Before

China's rapid development, and before globalization, individual animal husbandry developed steadily. However, with the rapid change of social environment, the disadvantages of this mode of production and operation are constantly exposed. First, the small scale of animal husbandry wastes a lot of human and material resources, and can not form scale effect and enjoy scale benefit, which hinders the individual animal husbandry to go to the track of specialization and scale. Second, the people engaged in animal husbandry have a low level of education, so they can't make scientific production and management. As a result, time and money are spent, but they don't get corresponding economic benefits. Third, there are risks in the market. It is difficult for individual small-scale farmers to seize market opportunities or even obtain effective market information, which makes production and sales disconnected and supply and demand broken. These factors have brought crisis to individual small-scale farmers, which makes them in a disadvantageous position in the market. In order to change their own predicament, farmers must go to alliance, and the development of scale economy accelerates the process of alliance. Cooperatives are the right choice to deal with these challenges. The cooperative is a kind of organization which is composed of people who have the same goal, mainly the same economic goal. The organization can meet the economic and social needs of its members, and it is an effective carrier to drive farmers into the changeable market. The state also encourages the development of cooperatives, encourages individual farmers to join cooperatives, and realizes the sharing of resources such as human, material and financial resources. In this way, the state can save a lot of resources, and farmers can also get more benefits, which can be described as "killing two birds with one stone".

The rural animal husbandry based on the cooperative has broken the previous small-scale breeding mode with individual or family as the unit, and has added insurance to the development of animal husbandry. In cooperatives, production and management can be classified, and different kinds of animals can be separated. Scientific methods can be adopted to delimit special areas and cultivate scientifically. Within cooperatives, members of organizations can actively exchange ideas, learn from each other advanced and simple methods, and achieve greater benefits. More importantly, when natural or social risks come, cooperatives can rely on their scale to improve

3. Research Program of Breeding Quantity in Rural Animal Husbandry Investment Cooperatives under the Background of Animal Epidemic Prevention

3.1. Research Methods

The research purpose of this paper is to analyze the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives by using the public management theory and economic theory, to solve the dilemma brought by the animal epidemic crisis, to promote the development of animal husbandry, to promote the economic exchange between countries, and to make the international trade develop well. In order to solve this key problem, this paper uses the methods of comparative research and statistical research, static analysis and dynamic analysis, empirical research and normative research to analyze. The method of combining comparative research and statistical research, in particular, is to collect the relevant research results of the impact of animal epidemic prevention at home and abroad on the reproduction quantity of rural animal husbandry investment cooperatives as far as possible, and to read and organize them to form organized and classified data, on the basis of which comparative analysis is carried out. In addition to extensive access to Chinese and foreign literature, you can also access more detailed and sufficient statistical data through Internet access to the WTO and other websites, to master the latest trends of the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives, and lay a solid foundation for the

theoretical and empirical Research of this paper. As for the method of combining static analysis and dynamic analysis, on the one hand, this paper will use the analysis method of partial equilibrium under static state to analyze the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives. Through the static partial equilibrium analysis, we can clearly see the changes of international equilibrium price of poultry products, domestic and foreign producers and consumers' surplus under the influence of animal epidemics. This analysis process will provide sufficient theoretical basis for solving a series of problems caused by animal epidemics. On the other hand, through the analysis of historical data, this paper determines the mechanism of the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives.

3.2. Research Ideas

After determining the key problems to be solved in the research, this paper analyzes the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives through the collected data and typical cases. With the help of the theoretical knowledge and research methods of trade economics, supported by the typical case analysis, this paper combines the theoretical analysis, quantitative analysis and case verification to draw useful conclusions and enlightenment, and gives effective countermeasures.

As for the research topic itself, this paper has a strong originality. This paper makes a special analysis of the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives, and makes a systematic analysis of this problem from three angles of theoretical analysis, empirical analysis and case verification. As far as the current situation of the relevant specialized research literature in China is not many, the Research of this paper lays a foundation for the later in-depth and detailed analysis A solid research foundation. This paper analyzes the impact of animal epidemic prevention on the breeding quantity of rural animal husbandry investment cooperatives, and provides suggestions for China to solve the crisis, and obtains some useful enlightenment, which has certain practical significance.

Because of the limited literature on the impact of animal epidemic prevention on the reproduction quantity of rural animal husbandry investment cooperatives before this paper, the author uses the theory of international trade to make a systematic analysis of relevant issues, but it is still not comprehensive, especially in the further analysis and deepening of the issues, which need further improvement by the follow-up researchers. In addition, many documents and statistical data about animal epidemic prevention to the breeding quantity of rural animal husbandry investment cooperatives are limited, which limits the data acquisition and analysis in the empirical analysis of this study, and to a certain extent affects the accuracy of the research conclusions.

4. Discussion on the Influence of Animal Epidemic Prevention on the Reproduction Quantity in the Rural Animal Husbandry Investment Cooperative

4.1. Analysis of Main Animal Diseases and Epidemic Prevention in China

According to the harm degree of animal epidemic diseases to animal husbandry and human health, the animal epidemic prevention law divides the existing animal epidemic diseases into three classes. Animal epidemics of category 1 are the most harmful. They cause serious damage to people and animals in cities and need to be put out immediately. Class ii animal epidemics are those that cause significant economic losses and need to be controlled in time to prevent their spread. Animal epidemics of class iii are the most common, though less harmful, and require long-term monitoring and control.

Throughout the history of China, animal epidemics occurred more times and suffered serious losses. In 2018, common animal diseases in China are shown in Table 1. All 31 provinces and cities in China have been plagued by animal epidemics to varying degrees. According to statistics, since 2000, the average number of animal epidemics in China has reached at least 30. China's animal epidemic prevention situation has been relatively serious. With the country's attention, China's animal epidemic prevention system has been constantly improved, epidemic prevention work has been constantly promoted, and some achievements have been made. However, in the new century, new challenges have emerged in epidemic prevention and we need to make breakthroughs.

Table 1. Statistics of common animal diseases in China (2018)

Project	Number of cases	Number of deaths	Number of culls
Equine infectious anemia	39	0	39
Sheep pox and goat pox	19620	1959	13340
swine fever	194479	150465	9658
Newcastle disease	1882139	697744	305368
Bluetongue disease	10	2	0
Erysipelas	100056	17207	917
Duck plague	554794	254414	34271
Avian cholera	308219	810101	96354

4.2. Analysis of China's Total Output Value of Animal Husbandry in 2011-2019

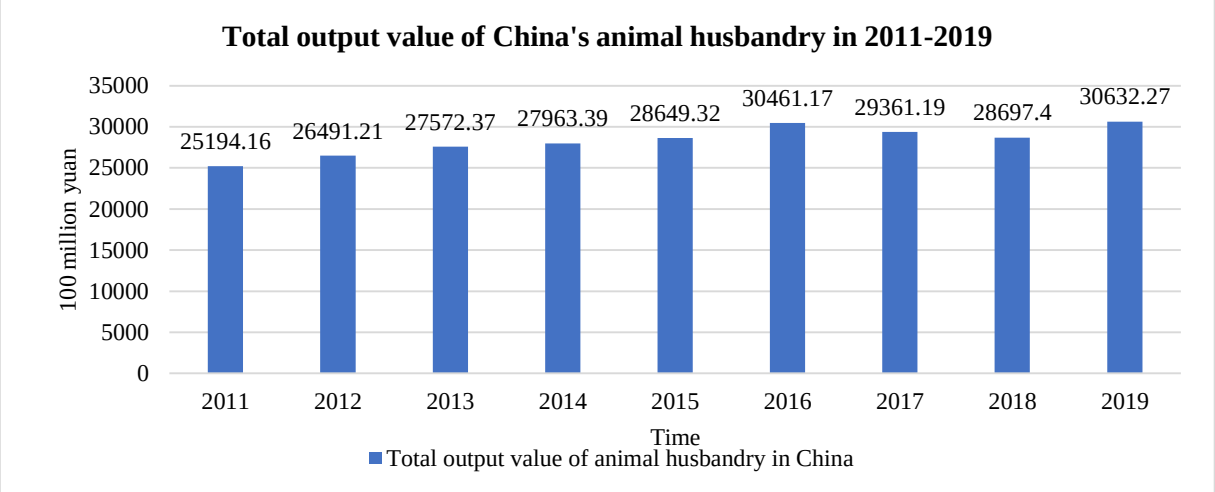

Figure 1. Bar chart of total output value of animal husbandry in China from 2011 to 2019

Since the reform and opening up, especially since the beginning of the 21st century, China's economy has developed rapidly and people's living standards have improved remarkably. We have achieved the goal of not having enough to eat and not having enough to wear. 2020 is a particularly critical year for our country. In this year, we will win the battle against poverty as scheduled and complete the building of a moderately prosperous society in all respects. Our people's living standards will reach a new level and enter a new stage of development. On the one hand, animal husbandry and crop cultivation occupy an important position in agriculture, and the development of animal husbandry directly affects the development of agriculture. Under the attention and encouragement of the country, the whole development of animal husbandry in China is good. On

the other hand, with the increasing improvement of people's living standard, the demand for meat, eggs, milk and other products related to animal husbandry is also increasing. For example, the total output value of China's animal husbandry from 2011 to 2019 is shown in figure 1. The total output value of China's animal husbandry from 2011 to 2019 shows a rising trend on the whole. Which animal husbandry output value of 2.519416 trillion yuan in 2011, after years of steady rise, in 2016 China's animal husbandry output value as high as 3.046119 trillion yuan, in 2017 and 2018, animal husbandry output value is affected by various factors decreased, but in 2019, animal husbandry output value began to rebound even more than before the decline in output, output value reached 3.063227 trillion yuan. Our country animal husbandry development prospect is bright, still have very big rise space. With the improvement of people's living standards and the development of related technologies, animal husbandry will also develop.

4.3. Analysis of Proportion of Xinjiang Professional Cooperatives in 2019

The emergence of cooperatives can be said to be the product of China's construction process, which can effectively improve the vulnerability and security of individual smallholders. Cooperatives in China have been relatively mature in development, with a sound system and rich experience, among which xinjiang is the most mature and outstanding one. Xinjiang autonomous region is an important agricultural province in China, and animal husbandry is one of its pillar industries. At present, there are four operating modes of specialized rural cooperatives in xinjiang, which are grass and livestock joint operation mode, full trusteeship operation mode, semi-trusteeship operation mode and traditional service-oriented operation mode. A variety of operating modes give farmers a variety of choices, farmers can choose the appropriate operating mode according to their specific conditions, with great flexibility. The pie chart of the proportion distribution of professional cooperatives in xinjiang in 2019 is shown in Figure 2. In 2019, the number of specialized cooperatives in xinjiang has reached 20,960, among which the number of specialized cooperatives related to animal husbandry has reached 9,680, accounting for 46.2 percent. During the outbreak of animal diseases and epidemic prevention, although the impact on animal husbandry was great, xinjiang's mature cooperative operation model may minimize the impact of animal diseases on it, and more firmly invest the confidence of cooperatives in the process of animal epidemic prevention again and again. Although animal diseases will affect the breeding number of rural animal husbandry investment cooperatives, in the long run, rural animal husbandry investment in cooperatives will continue to increase, and breeding proficiency will also increase.

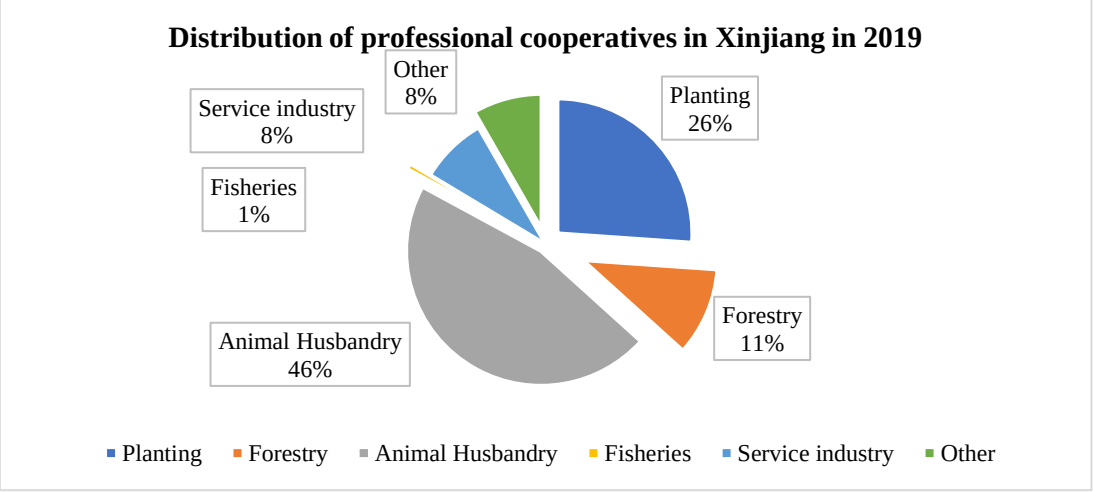

Figure 2. Sector chart of proportion distribution of professional cooperatives in Xinjiang in 2019

4.4. Analysis of the Impact of Animal Disease on the Breeding Quantity of Rural Animal Husbandry Investment Cooperatives

Animal epidemics have a direct impact on the development of animal husbandry. A class of animal epidemics will cause a large number of livestock and poultry deaths and the loss of related products. It will also affect the normal life of the people and pose a threat to the society. Animal epidemics can produce four effects, which affect the rural animal husbandry investment cooperatives. Each effect will lead to different effects of animal disease on the reproduction quantity of rural animal husbandry investment cooperatives. The four effects are market supply effect, market demand effect, fiscal effect and external effect. First of all, the market supply effect means that the outbreak of animal disease will lead to the decrease of production or the increase of production cost, which further leads to the decrease of domestic supply and the rise of the price of related products. When the market supply effect plays a role, rural animal husbandry will increase its investment in cooperatives, and the number of breeding will naturally increase. Secondly, market demand effect refers to the fact that the outbreak of animal epidemics will lead to the implementation of embargoes in importing countries, while the export of exporting countries will be reduced, the surplus poultry products can only be digested in China, and the natural product price will be reduced. China is an important export country in the world. When there is a major animal epidemic in foreign countries, China's export is blocked. Rural animal husbandry will correspondingly reduce its investment in cooperatives, and the number of breeding will naturally decrease. Best of all, although the financial effect and external effect can not directly affect the rural animal husbandry investment cooperatives, the outbreak of animal disease and epidemic prevention will increase the social cost, thus increasing the pressure of animal husbandry, thus affecting the rural animal husbandry investment in cooperatives. The outbreak of animal epidemics will make the government strengthen the expenditure of disease prevention and control and animal husbandry subsidies, and increase the financial pressure of the government, which is the so-called financial effect. The external effect has a greater impact on animal husbandry. How much lower people's confidence in the safety of poultry products will lead to reduced consumption in this area. At the same time, it will affect the reduction of the number of people engaged in animal husbandry, and have a series of adverse effects on catering, tourism and other related industries. All things in the world are interconnected, which will affect the breeding number of rural animal husbandry investment cooperatives.

Figure 3 shows the cost of disinfection in epidemic areas. Due to the different epidemic situation in each area, the consumption is different. Among them, Ma'anshan in Anhui Province has a small number of culls, only 17000 feathers, and the cost is 200000 yuan. In Xi'an City, Shanxi Province, the number of culls is large, reaching 637000, and the cost is as high as 3.05 million yuan. It can be imagined that in these epidemic areas, the development of animal husbandry is greatly hindered, and the development is sluggish. Rural animal husbandry will reduce its investment in cooperatives, and the number of breeding will naturally decrease.

The price changes of live pigs and pork products in major pork countries from 2000 to 2003 are shown in Figure 4. The data in the figure can be analyzed with the market supply effect and market demand effect. Take foot-and-mouth disease as an example. Foot-and-mouth disease has affected importing countries and exporting countries to different degrees, among which the price of poultry products is the most obvious. For example, the outbreak of foot-and-mouth disease has also had a huge impact on the prices of live pigs and pork products, which can be divided into three stages: the stage of rapid price decline, the stage of slow price rise and the stage of gradual price stabilization.

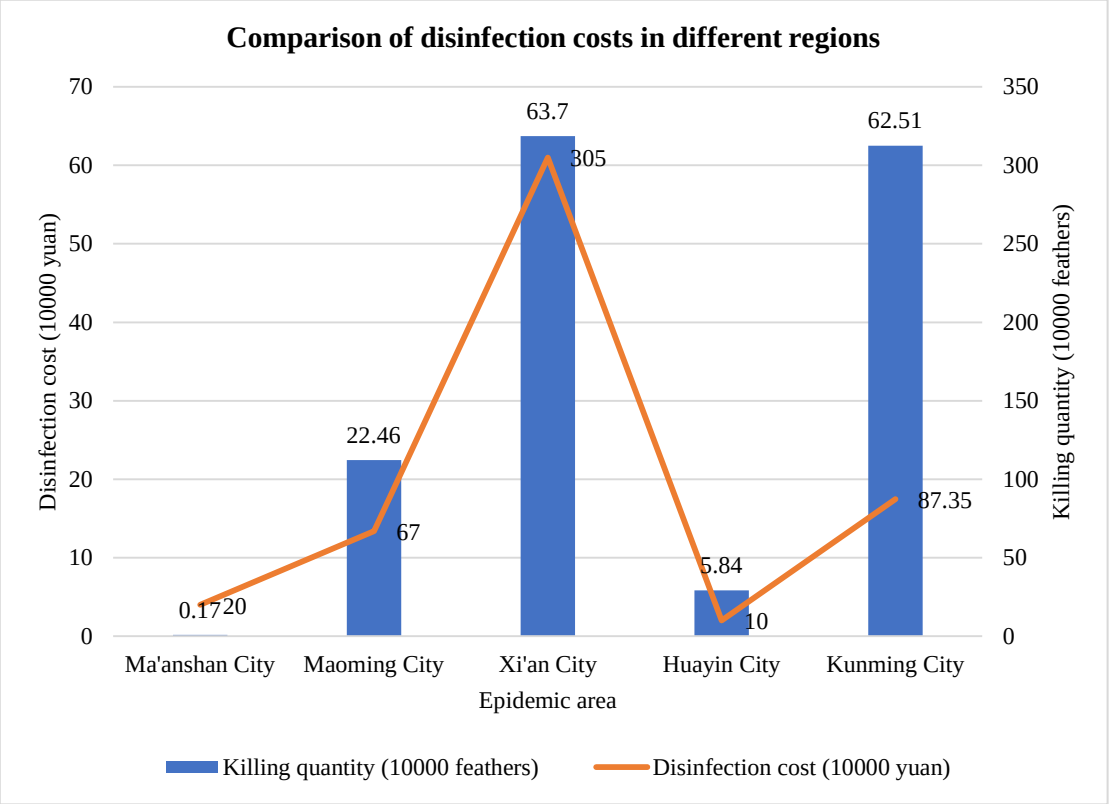

Figure 3. Comparison of disinfection costs in different regions

The changes in the prices of live pigs and pork products in countries around the world following the outbreak of swine blister disease are all experienced in these three phases, especially in countries where swine blister disease occurs or is more prevalent. Before the outbreak of blister disease in Brazil in 2001, the price of live pigs in various countries was basically between 13 yuan/kg and 14 yuan/kg. However, after the outbreak of pig blister disease, people were afraid to eat pork due to the fear of pig blister disease, and the demand for live pigs decreased sharply. As a result, the price of live pigs declined rapidly for one year. During this period, the price of live pigs was at a low level, and in 2001, the price of live pigs dropped below 8 yuan/kg. When the blister disease in pigs subsided, the fear in people's hearts also decreased continuously. At this time, people's demand for live pigs increased, so the price of live pigs also increased constantly. After a year or so of recovery, it was not until 2003 that the price of live pigs recovered to the level before the outbreak of blister disease in pigs. Accordingly, the influence of pig blister disease on the price of pork products can be divided into three stages: rapid decline, slow rise and gradual decline. China's rural animal husbandry in these three stages of the investment in cooperatives are also different. The rapid decline in domestic poultry production has resulted in a decrease in investment in cooperatives by rural animal husbandry, followed by a decrease in breeding Numbers due to a decrease in investment. As the price of domestic poultry products rises gradually and gradually, people's demand for more poultry products increases, the investment of rural animal husbandry in cooperatives will increase in a timely manner, and the breeding population will increase in a period of time due to the increase of investment.

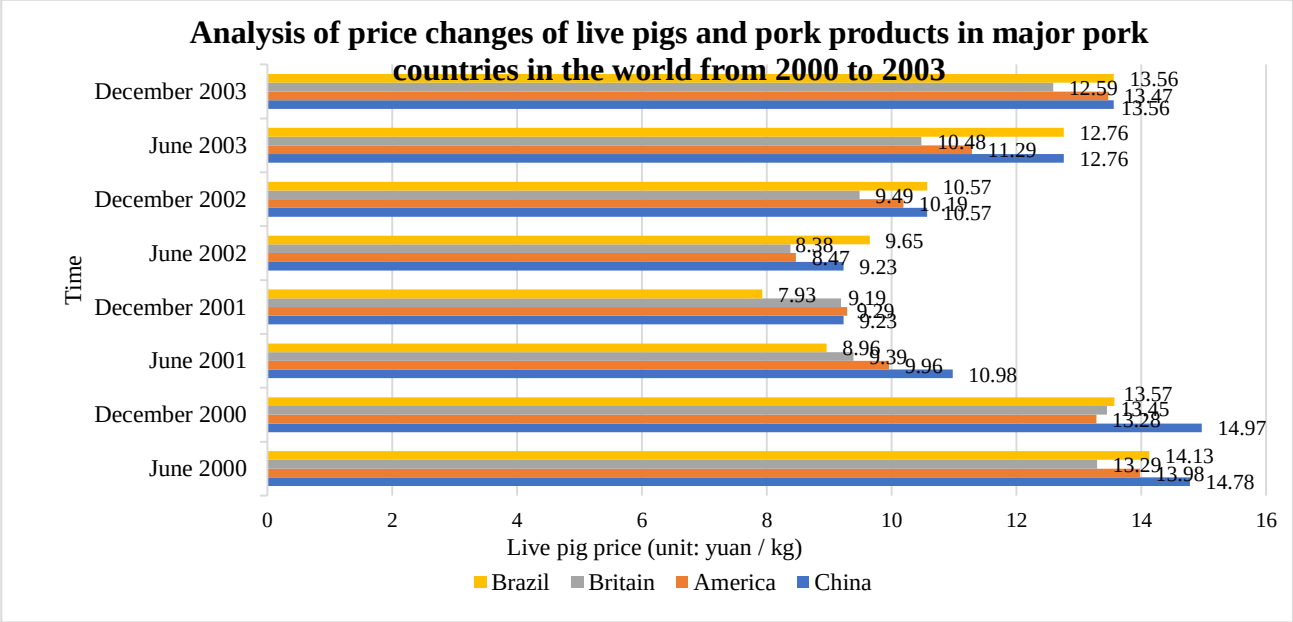

Figure 4. Analysis of price changes of live pigs and pork products in major pork countries in the world from 2000 to 2003

5. Conclusion

Animal disease is a hindrance to the development of animal husbandry, but it is also a subject that every inspection and quarantine personnel should explore and study. It has an important impact on the breeding quantity of rural animal husbandry investment cooperatives.

This paper analyzes the impact of animal epidemic on the number of breeding in rural animal husbandry investment cooperatives during the outbreak and epidemic prevention period, using the theory of international trade, analyzes the mechanism of animal epidemic prevention on the number of breeding in rural animal husbandry investment cooperatives from the perspective of trade economy, and deeply analyzes the resulting impact of animal epidemic prevention on the number of breeding in rural animal husbandry investment cooperatives influence. On this basis, combined with the actual situation of our country, this paper puts forward feasible suggestions and suggestions for the development of livestock and poultry breeding industry and the management and control of animal diseases, which has certain practical significance and reference value.

Although animal disease is becoming more and more complex and changeable, it increases the risk of animal husbandry and brings new crisis and challenge. However, China can improve the security of animal husbandry by its unique cooperative management mode, reduce the impact of animal disease on the breeding quantity of rural animal husbandry investment cooperatives as much as possible, protect the interests of farmers and safeguard the economic interests of the country.

Funding

This article is not supported by any foundation.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] Pleuss J D , Stamm J L H , Ellis J D.(2018). "Using Simulated Annealing to Improve the Information Dissemination Network Structure of a Foreign Animal Disease Outbreak Response", Nephron Clinical Practice, 15(3),pp.11149-11152. https://doi.org/10.1515/jhsem-2017-0008

[2] Bickett-Weddle D A , Sanderson M W , Parker E J.(2018). "Foreign Animal Disease Outbreaks", Veterinary Clinics of North America Food Animal Practice, 34(2),pp.341-354. https://doi.org/10.1016/j.cvfa.2018.02.005

[3] Theyel B.(2018). "Animal Models in Psychiatric Disease", Harvard Review of Psychiatry, 26(5),pp.298-303. https://doi.org/10.1097/HRP.0000000000000193

[4] Hult R , Sancar F E , Jalalmaab M.(2018). "Design and Experimental Validation of a Cooperative Driving Control Architecture for the Grand Cooperative Driving Challenge 2016", IEEE Transactions on Intelligent Transportation Systems, 19(4),pp.1290-1301. https://doi.org/10.1109/TITS.2017.2750083

[5] Sato K , Ichinoi R , Mizukami R.(2018). "Diffusion-Cooperative Model for Charge Transport by Redox-Active Nonconjugated Polymers", Journal of the American Chemical Society, 140(3),pp.1049-1056. https://doi.org/10.1021/jacs.7b11272

[6] Lahra M M , Martin I , Demczuk W.(2018). "Cooperative Recognition of Internationally Disseminated Ceftriaxone-Resistant Neisseria Gonorrhoeae Strain", Emerging Infectious Diseases, 24(4),pp.735-740. https://doi.org/10.3201/eid2404.171873

[7] Yasaman Khazaeni, Christos G. Cassandras.(2018). "Event-Driven Cooperative Receding Horizon Control for Multi-Agent Systems in Uncertain Environments", Ieee Transactions on Control of Network Systems, 5(1),pp.409-422. https://doi.org/10.1109/TCNS.2016.2615162

[8] Zhihan Lv, Dongliang Chen, Hailin Feng, Hu Zhu, Haibin Lv. (2021). "Digital Twins in Unmanned Aerial Vehicles for Rapid Medical Resource Delivery in Epidemics". IEEE Transactions on Intelligent Transportation Systems. https://doi.org/10.1109/TITS.2021.3113787

[9] Lai C H , Chang L L , Lin J N.(2015). "Association of Human Fever with Animal Husbandry, Taiwan, 2004–2012", Emerging Infectious Diseases, 21(12),pp.2217-2220. https://doi.org/10.3201/eid2112.141997

[10] Han W , Wang P , Dong H. (2020). Influence of Egoistic and Altruistic Bequest Motives on the Willingness to Participate in Reverse Mortgages in China. Asian Economic Journal, 34(4), pp.430-463. https://doi.org/10.1111/asej.12225

[11] Narayanan, Yamini.(2016). "Where are the Animals in Sustainable Development? Religion and the Case for Ethical Stewardship in Animal Husbandry", Sustainable Development, 24(3),pp.172-180. https://doi.org/10.1002/sd.1619

[12] Mohamed Bisher Zeina, (2020). Erlang Service Queueing Model with Neutrosophic Parameters, International Journal of Neutrosophic Science, 6(2), pp. 106-112. https://doi.org/10.54216/IJNS.060202

[13] Diksha Patel, Sudhanand Prasad Lal.(2017). "Variables Predicting the Role Performance of Field Extension Functionaries in Animal Husbandry Sector of Karnataka: A Multivariate Approach", Indian Journal of Animal Sciences, 87(4),PP.506–511.