Analysis of land carrying capacity of livestock and poultry breeding in China from the perspective of combination of planting and raising

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Abstract. The separation and imbalance of planting and raising are the key issues to be solved urgently in China's agricultural development. In order to solve these problems, based on livestock manure nutrient supply and crop nutrient demand, this study uses the method released by the National Animal Husbandry Station to calculate and analyze the land carrying capacity of livestock and poultry breeding in China. The results indicate that, the supply of manure nitrogen from livestock and poultry was greater than that of phosphorus in 2017, there were large differences in the supply of livestock manure nitrogen and phosphorus from different livestock and poultry types and provinces, which was caused by the number of livestock and poultry in slaughtering, stock, breeding cycle, nutrient content of manure and the type in various provinces. The input of nitrogen and phosphorus in crops had exceeded the demand, which verified that it is feasible to reverse the problems of excessive fertilization and low utilization rate by reducing the amount of fertilization and replacing livestock manure with livestock manure. The index of land carrying capacity of livestock and poultry breeding in China was 0.48 and the number of livestock and poultry that could be carried was 5.921 billion pig equivalents, indicating that China's land could absorb livestock and poultry manure. In order to promote the combination of breeding and farming and the green development of agriculture, it was proposed to carry out the action of replacing fertilizer with manure for livestock and poultry according to local conditions, formulate a reasonable breeding policy based on the carrying capacity of livestock and poultry and propose countermeasures for coordinated development of planting and breeding.

1. Introduction
Chinese farmers have been using animal and poultry manure since ancient times. "Feces bring fertile soil" recorded in the "Hsun-Tzu: Rich Country" in the Warring States Period recorded, "Treading on excrement " recorded in Qi Min Yao Shu of Northern Wei Dynasty and "captive accumulated fertilizer" recorded in Nung Cheng Chhuan Shu during the Ming Dynasty are the traditional method of applying livestock manure[1]. As a carrier for the supply of organic matter and nitrogen, phosphorus, potassium and other elements, livestock manure has become the most important input element in the history of agricultural development[2]. However, in order to achieve effective supply of agricultural products, China has increased its support for the fertilizer industry after the reform and opening up[3-4], which led to the widely adaptation for fertilizers that could greatly increase the output of agricultural products in a short period. At the same time, due to the rapid development of livestock and poultry breeding industry, the production of manure was large and concentrated. Although the current comprehensive utilization rate of livestock and poultry manure in China has reached 70%, it is subject
to seasonal restrictions, slow fertilizer efficiency, wasting labor and materials and inconvenient transportation, farmers tend to replace fertilizer with livestock manure, which has exacerbated the separation and imbalance of planting and breeding. At present, due to the decline in the proportion of livestock manure application, the long-term excessive input of nitrogen and phosphorus and the unbalance in planting and breeding\(^{[5-9]}\) and destroyed the soil structure\(^{[10-11]}\), resulting in decreased fertility, soil acidification, and reduced organic matter content as well as the degradation of agricultural products and other issues\(^{[11-17]}\).

In order to cope with the challenge of increasing resource and environmental "hard constraints", the country has implemented the combination of farming and breeding, resource utilization of livestock and poultry manure, substitution of chemical fertilizers for fruit, vegetable and tea with organic fertilizers and the policy of zero growth in chemical fertilizers in the context of the implementation of rural revitalization strategies and promotion of green agricultural development. Through using livestock and poultry manure resources, optimizing the fertilizer application structure, improving soil fertility, the quality of agricultural products has been improved. Then, in order to achieve the above policy goals and make up for the lack of research on the supply of livestock manure nutrients and land carrying capacity from the perspective of national level and regional differences\(^{[18-25]}\), this study intends to calculate the nutrients of livestock manure in China based on the supply of animal manure in China, further explore the land carrying capacity of livestock and poultry manure, and combined with the analysis of regional differences, put forward countermeasures and suggestions to promote the combination of planting and raising and develop green agriculture.

2. Methods and data

2.1. Formatting the title
Based on the existing research\(^{[18-25]}\), the methods of measuring livestock manure nutrients and land carrying capacity are not uniform and the accuracy and rigor of the results are also debated. In view of this, this study uses the calculation method released by the authoritative department, which comes from the "Technical Guide for Land Carrying Capacity Calculation" ("Guide" for short) compiled by the National Animal Husbandry Station, the China Feed Industry Association, and the National Science and Technology Innovation Alliance for the Utilization of manure from Animal and Poultry Farming\(^{[26]}\). The "Guide" regulates and clarifies the demand and supply for nitrogen (phosphorus) nutrients for livestock and poultry manure and the calculation method of the land carrying capacity index for livestock and poultry manure.

**Demand for nitrogen (phosphorus) nutrients in livestock and poultry manure**

The formula for calculating the nutrient demand of livestock and poultry manure is as follows:

\[
A_{n,m} = \frac{\left(\sum P_{r,i} \times Q_{i} \times 10^{-2}\right) \times FP \times MP}{MR}
\]

Where, \(A_{n,m}\) is the demand of crops for nutrients of livestock and poultry manure (unit: t/year), \(P_{r,i}\) is the total output of the \(i\) kind of crop (unit: t/year), \(Q_{i}\) is the amount of nitrogen (phosphorus) required for 100kg product of the \(i\) crop (unit: Kg), \(FP\) is the proportion of nutrients supplied by fertilization in the total nutrient demand of crops and is equal to 45%, \(MP\) respectively denotes the proportion referred that the demand for nutrients from livestock and poultry manure accounts for total fertilized nutrients and is equal to 50% and \(MR\) is the seasonal utilization rate of manure. According to the "Guide", the seasonal utilization rate of nitrogen and phosphorus are respectively taken as 27.5% and 32.5%.

**Nitrogen (phosphorus) nutrient supply of livestock and poultry manure**

The formula for calculating the nutrient supply of livestock and poultry manure is as follows:
\[ Q_{r,T} = \sum Q_{r,T,i} = \sum \left( \sum \left( AP_{r,i} \times MP_{r,i} \times T_i \times 10^{-4} \right) \times PL \right) \times PC \]

Where, \( Q_{r,T} \) is the amount of nutrients supplied after the treatment of livestock and poultry manure (unit: t/year), \( AP_{r,i} \) (unit: head (only)) and \( MP_{r,i} \) (unit: g/(day·head)) represent respectively the average annual inventory and the Daily production of nitrogen (phosphorus) of the \( i \)-kind of livestock and poultry, \( PL \) is phosphorus collection rate. According to the "Guide", the \( PL \) of nitrogen and phosphorus are 87.5% and 95%. \( T_i \) (unit: t/year) is the livestock and poultry breeding cycle and its value is referring to relevant literature[27], \( \sum \left( \sum \left( AP_{r,i} \times MP_{r,i} \times T_i \times 10^{-4} \right) \times PL \right) \) (unit: t/year) is the amount of nutrients collected in livestock manure, \( Q_{r,T,i} \) (unit: t/year) is the supply of nutrients after the treatment of the \( i \)-kind of livestock manure and \( PC \) is the retention rate of the nitrogen (phosphorus) nutrients after treatment. According to the "Guide", the \( PC \) of nitrogen and phosphorus are 66% and 78%.

**Livestock manure soil carrying capacity index** The formula for calculating the land carrying capacity index of livestock manure is as follows:

\[ I = \frac{Q_{r,T}}{A_{nm}} \]

Where, \( I \) is the land carrying capacity index of livestock and poultry manure, When it is greater than 1, it indicates that the livestock and poultry breeding volume is overloaded, and the breeding volume needs to be reduced; when it is less than 1, it indicates that the livestock and poultry breeding is not overloaded.

In order to explain the land carrying capacity of livestock and poultry manure more clearly, this article intends to use pig equivalent as a conversion index and convert the above formula into the following three formulas.

The formula for calculating the amount of manure equivalent manure nutrient supply is as follows:

\[ NS_{r,a} = \frac{Q_{r,T} \times 1000}{A} \]

Where, \( NS_{r,a} \) is the amount of manure equivalent manure nutrient supply (unit: kg/(pig equivalent·year)), \( A \) is the conversion factor of pig equivalent is converted into the total pig equivalent feeding unit (unit: pig equivalent), which is converted according to the "Guide".

The formula for calculating the land carrying capacity of livestock and poultry manure is as follows:

\[ R = \frac{A_{n,m}}{NS_{r,a}} \]

Where, \( R \) is the maximum breeding amount of livestock and poultry based on crop manure nutrient demand, pig equivalent.

The formula for calculating the land carrying capacity index of livestock manure is as follows:

\[ I = \frac{A}{R} \]

2.2. Data Sources
According to the requirements of the research method on the data and the reliability of the data, the data referred to this study comes from the statistical yearbook published by the state and various ministries. Among them, the slaughter and stock of livestock and poultry come from the "China Animal Husbandry
and Veterinary Yearbook" in 2018 and the source of crop yield comes from the "China Statistical Yearbook" in 2018. Based on the data availability and timeliness, this study will calculate the land carrying capacity of China’s livestock and poultry in 2017.

3. Analysis of supply and demand of nutrients for livestock and poultry manure

3.1. Analysis of nutrient supply of livestock and poultry manure

From the overall situation, the supply of nitrogen and phosphorus in livestock and poultry manure reached 9.9018 million tons and 2.0217 million tons respectively in 2017 (Table 1.). Compared with the amount of agricultural fertilizer application in China in 2017, the nitrogen and phosphorus supplied by livestock and poultry manure are 44.56% and 25.41% of the application amount of agricultural nitrogen fertilizer and phosphate fertilizer (excluding the conversion of compound fertilizer), it indicates that livestock and poultry manure can partially replace chemical fertilizers. Although the substitution ratio is relatively low, but it can promote the improvement of the fertilizer application structure and the improvement of the agricultural production environment. At the same time, it can effectively promote the policy of livestock manure substitution fertilizer, the combination of planting and raising and the agricultural green development. In general, the nitrogen supply of livestock and poultry manure is greater than the phosphorus supply, and the potential for nutrient supply of livestock and poultry manure and the potential for replacing chemical fertilizers are greater, which meets the requirements of the implementation of the rural revitalization strategy.

From the perspective of livestock and poultry species, pig manure has the largest nitrogen supply, reaching 419.00 million tons, accounting for 42.32% of the total supply, followed by beef manure, sheep manure, cow manure, and poultry manure. The nitrogen supply of rabbit manure is the least, only 214,400 tons, accounting for 2.16% of the total supply; the phosphorus supply of pig manure is also the largest, reaching 789,600 tons, accounting for 38.95% of the total supply, and then it is beef manure, rabbit manure, sheep manure, poultry manure, and cow manure has the least nitrogen supply, only 93,500 tons, accounting for 4.61% of the total supply. In general, the supply of pig manure nutrients is the largest, but there is a difference in the order of nitrogen and phosphorus supply of livestock and poultry species, which is related to the number of livestock slaughter, inventory, breeding cycle and fecal nutrient content.

From the perspective of provinces, Sichuan, Shandong and Henan rank among the top three in terms of nitrogen supply and phosphorus supply (Fig.1). The three provinces’ nitrogen supply and phosphorus supply account for the total nitrogen supply and phosphorus supply. The amount of nitrogen supply is 24.09% and 29.61%, of which, the supply of nitrogen and phosphorus in Sichuan Province are the largest, reaching 878,200 tons and 280,500 tons, respectively. The last three provinces are Tianjin, Beijing and Shanghai. The nitrogen supply and phosphorus supply of the three provinces accounted for 0.81% and 0.74% of the total nitrogen supply and the total phosphorus supply. Among them, Shanghai had the least nitrogen supply and phosphorus supply, respectively 15,800 t and 0.31 million t. In general, the differences in the amount of nitrogen and phosphorus supplied by livestock and poultry manures vary greatly by province, which is related to the scale and type of livestock and poultry breeding in each province, especially the relatively high levels of nitrogen and phosphorus supplied by livestock and poultry. (Live pigs, beef cattle, sheep, etc.) more provinces. In addition, it is also related to the economic development level of each province and the development level of agriculture. The last three provinces are particularly obvious.

| Poultry species | Nitrogen | Phosphorus |
|-----------------|----------|------------|
|                 | Supply (10,000 tons) | Share(%) | Supply (10,000 tons) | Share(%) |
| Hog             | 419.00   | 42.32      | 78.96          | 38.95      |
| Beef cattle     | 287.85   | 29.07      | 47.44          | 23.40      |
3.2. Demand analysis of livestock and poultry manure

From the overall situation, the demand for nitrogen and phosphorus in Chinese crops reached 20.587 million tons and 4.5562 million tons in 2017 (as shown in Table 2), compared with the amount of agricultural fertilizer application in China in 2017 (data from 2018 "China Statistical Yearbook" in 2012), the nitrogen and phosphorus required by crops are 92.66% and 57.12% of the agricultural nitrogen fertilizer and phosphorus fertilizer application (excluding compound fertilizer conversion). Combined with this result, the current yield of crop nitrogen and phosphorus requirements is guaranteed. The amount has not yet reached the current application rate. If the conversion of compound fertilizer is added, the proportion of crop nutrient demand in the application amount will also decrease, indicating that there are still excessive problems in the application of chemical fertilizers to crops in China, and there is still potential for fertilizer utilization. Was dug. In general, the demand for nitrogen in crops is greater than the demand for phosphorus. The application of nitrogen and phosphorus in crops has exceeded the demand for nitrogen and phosphorus in crops. It is urgent to reduce the application of fertilizers and replace manure with livestock and poultry manure. Excess and low utilization issues.

From the perspective of crop types, food crops have the most demand for nitrogen and phosphorus, reaching 12.2654 million tons and 2.693 million tons respectively, accounting for 59.58% and 59.12% of the total demand, of which rice, wheat and corn have nitrogen. The demand for phosphorus is relatively large. The second and third places are vegetables and oil crops. The three crops with the lowest demand for nitrogen and phosphorus are tea and hemp crops and tobacco leaves. The reason for this distribution is mainly related to crop output, such as the high output of food crops, which reached 213 million tons in 2017, making its demand for nutrients relatively more. Generally speaking, food crops, vegetables, fruits and other large-area crops with high total output demand more nutrients.

From the perspective of provinces, the top three in terms of nitrogen demand and phosphorus demand are Henan, Shandong and Heilong province. The three provinces' nitrogen demand and phosphorus demand account for the total nitrogen demand and total phosphorus demand. 28.27% and 26.14% of the total amount, of which, the demand for nitrogen and phosphorus in Henan Province are the largest, reaching 2.307 million tons and 504,400 tons respectively. The last three provinces are Shanghai, Tibet Autonomous Region, and Beijing. The three provinces' nitrogen and phosphorus requirements account for 0.41% and 0.44% of the total nitrogen demand and total phosphorus demand. Among them, Beijing's nitrogen demand and the phosphorus demand are the least, which are 19 thousand tons.

|   | Cow  | Sheep | Poultry | Rabbit |
|---|------|-------|---------|--------|
| Nitrogen | 44.61 | 117.69 | 99.59 | 21.44 |
| Phosphorus | 4.51 | 11.89 | 10.06 | 2.16 |

|   | Total |
|---|-------|
| Nitrogen | 990.18 |
| Phosphorus | 100.00 |
and 0.43 million tons respectively. The reason why these three provinces have the least demand for nitrogen and phosphorus is that the three provinces have the smallest crop planting area. In general, the provinces of nitrogen demand and phosphorus demand vary greatly, which is mainly related to the crop planting scale of each province, especially the provinces with large crop planting area and high total output. In addition, it is also related to the economic development level of each province and the development level of agriculture. The last three provinces are particularly obvious.

Table 2. Statistical of nutrient requirements based on crop types

| Crop type       | Nitrogen Demand (10,000 tons) | Share(%) | Phosphorus Demand (10,000 tons) | Share(%) |
|-----------------|-------------------------------|----------|-------------------------------|----------|
| Grain crops     | 1226.54                       | 59.58    | 269.38                        | 59.12    |
| Rice            | 382.82                        | 18.59    | 117.79                        | 25.85    |
| Wheat           | 329.73                        | 16.02    | 93.00                         | 20.41    |
| Corn            | 487.52                        | 23.68    | 53.81                         | 11.81    |
| Bean crops      | 102.42                        | 4.97     | 16.73                         | 3.67     |
| Soybean         | 90.02                         | 4.37     | 7.91                          | 1.74     |
| Potato crops    | 20.54                         | 1.00     | 2.29                          | 0.50     |
| Oil crops       | 207.08                        | 10.06    | 38.60                         | 8.47     |
| Peanuts         | 100.55                        | 4.88     | 10.50                         | 2.30     |
| Rapeseed        | 80.37                         | 3.90     | 22.97                         | 5.04     |
| Cotton          | 54.10                         | 2.63     | 11.90                         | 2.61     |
| Hemp crops      | 0.62                          | 0.03     | 0.06                          | 0.01     |
| Sugar crops     | 19.60                         | 0.95     | 1.96                          | 0.43     |
| Tobacco leaf    | 0.12                          | 0.01     | 0.88                          | 0.19     |
| Vegetables      | 266.08                        | 12.92    | 67.06                         | 14.72    |
| Tea             | 12.88                         | 0.63     | 1.50                          | 0.33     |
| Fruit           | 148.75                        | 7.23     | 45.26                         | 9.93     |
| Total           | 2058.73                       | 100.00   | 455.62                        | 100.00   |

3.3. Analysis of the carrying capacity of livestock and poultry farming

From the overall situation, in 2017, China's livestock and poultry manure land carrying capacity index (referred to as the index) did not exceed 0.50, of which, the index calculated based on nitrogen supply and demand was 0.48, and based on phosphorus supply and demand The measured index is 0.44, and
the difference between the two angles is small. The results show that the land in China can absorb livestock and poultry manure, and not overload. From another perspective, the possibility of replacing chemical fertilizers with livestock and poultry manure in China has been verified, and may not yet meet the needs of crops. In order to make the calculation more rigorous, the carrying capacity of livestock manure land was also calculated based on the pig equivalent. The number of farmed livestock and poultry is 2.848 billion pig equivalents, and the nitrogen supply of pig manure per pig equivalent is 3.48 kg / pig equivalent and the phosphorus supply is 0.71 kg / pig equivalent. According to this, the number of livestock and poultry that can be carried by China is 5.921 billion. The equivalent of head pigs and 6.401 billion heads of pigs indicate that China still has room for improvement in the scale of livestock and poultry farming. In general, the combination of breeding and breeding angle calculations shows that the land carrying capacity index of livestock and poultry manure in China is 0.48 (take a relatively high value), and the number of livestock and poultry that can be carried is 5.921 billion pig equivalents, that is, the land can accommodate livestock and poultry manure.

Table 3. Statistical of carrying capacity of livestock and poultry manure

| Item                                      | Species                          | Value   |
|-------------------------------------------|----------------------------------|---------|
| Unit pig equivalent manure nutrient supply| Nitrogen (kg / pig equivalent)   | 3.48    |
|                                           | Phosphorus (kg / pig equivalent) | 0.71    |
| Carrying capacity of livestock and poultry manure | Actual number in 2017 (100 million pig equivalents) | 28.48   |
|                                           | Bearing capacity of nitrogen angle (100 million pig equivalents) | 59.21   |
|                                           | Bearing capacity of phosphorus angle (100 million pig equivalents) | 64.01   |
| Livestock manure soil carrying capacity index | Index of nitrogen angle | 0.48    |
|                                           | Index of phosphorus angle        | 0.44    |

From the perspective of provinces, 4 provinces have a land carrying capacity index of livestock and poultry manure exceeding 1, of which the land carrying capacity index of livestock and poultry manure in Tibet and Qinghai exceeds 2, and the land carrying capacity of livestock and poultry manure in Tibet The force index reached 6.04 (index of nitrogen angle) and 5.10 (index of phosphorus angle), and the land carrying capacity index of livestock and poultry manure in Qinghai reached 4.25 (index of nitrogen angle) and 2.60 (index of phosphorus angle). The main reason for the high value of the provinces is that they are located in the Qinghai-Tibet Plateau area, where animal husbandry is the main reason, and the cropping industry is relatively weak. The animal husbandry mainly breeds cattle. Come to use, without causing serious environmental pollution problems; Beijing ranks third in the country, and the land carrying capacity index of livestock and poultry manure reaches 1.33 (index of nitrogen angle) and 1.12 (index of phosphorus angle), the reason is that Beijing The crop planting area is shrinking year by year, and the total output is falling rapidly. To ensure the supply of meat, egg and milk, the livestock and poultry industry has developed steadily. Two reasons have caused the difficulty of livestock and poultry manure. Consumption; the land carrying capacity index of livestock and poultry manure in Sichuan Province has reached 0.80 (index of nitrogen angle) and 1.10 (index of phosphorus angle). The reason is that Sichuan is a large province of livestock and poultry farming such as pigs, and the cultivation industry Restricted by the terrain, the relative development is relatively weak, which makes it difficult for the land to absorb all livestock and poultry manure; the land carrying capacity index of livestock and poultry manure in other provinces does not exceed 1, and the provinces close to 1 include Yunnan, Fujian, and Hainan. The three provinces with the lowest index are Anhui Province, Jiangsu Province and Heilongjiang Province. In general, most of the provinces have good land carrying capacity for livestock and poultry manure. In addition to Tibet and Qinghai, Beijing and Sichuan need to reduce the
amount of breeding or increase crop planting and other methods to achieve the balance of planting and breeding and coordinated development of planting and breeding.

![Distribution map of China's livestock and poultry manure land carrying capacity index](image)

**Figure 3.** Distribution map of China's livestock and poultry manure land carrying capacity index

4. **Conclusion and suggestion**

Through the above analysis, this article draws the following conclusions:

First, in 2017, the nitrogen supply of livestock and poultry manure in China was more than that of phosphorus, and the nitrogen content in livestock and poultry manure was higher than that of phosphorus, making the above laws appear in different years and different provinces. Different livestock and poultry types and provinces have large differences in the supply of livestock manure and nitrogen and phosphorus. This is related to the number of livestock and poultry slaughter, inventory, breeding cycle, manure and nutrient content, and the types of livestock and poultry raised in each province. For example, live pigs as slaughtered pigs with a large number of stocks, long breeding cycles, and high manure nutrient content have relatively large amounts of nitrogen and phosphorus in large provinces of pig breeding.

Second, the demand for nitrogen in crops is greater than the demand for phosphorus. The nitrogen and phosphorus supplied by crops with chemical fertilizers have exceeded the demand for nitrogen and phosphorus for crops. Among them, large-scale cultivation of food crops, vegetables, fruits and other crops with high total output have more demand for nutrients. In addition, provinces with large crop areas and high total output have relatively high demand for nitrogen and phosphorus. The above conclusions verify the feasibility of reversing the problems of excessive fertilizer application and low utilization rate through policy measures such as reduced fertilizer application and replacement of manure with livestock and poultry manure.

Third, the combination of farming and breeding angles calculated that China’s livestock and poultry manure land carrying capacity index is 0.48, and the number of animals and poultry that can be carried is 5.921 billion pig equivalents. That is to say, the current agricultural land in China can absorb livestock and poultry manure. In addition, the bearing capacity of livestock and poultry manure in most provinces is in good condition.

Based on the above research conclusions, this article puts forward the following three suggestions to promote the combination of cultivation and farming and green development of agriculture.

First, carry out actions to replace chemical fertilizers for livestock and poultry manure according to local conditions. Scientifically calculate the effective supply of nutrients for livestock and poultry manure, and evaluate the effective supply of livestock and poultry manure in local and surrounding areas in conjunction with the calculation of nutrient requirements of crops, and optimize the allocation of livestock and poultry manure in and around the area to meet the requirements for livestock Demand for poultry manure. At the same time, it is also necessary to reasonably promote the utilization of livestock and poultry manure resources, combined with the local actual situation, to develop and promote a
resource utilization method that is suitable for the harmless local livestock and poultry manure, and fully excavate and retain nutrients for livestock and poultry manure. Reduce nutrient loss.

Second, formulate differentiated breeding policies based on the different degrees of carrying capacity of livestock and poultry farming. Under the premise of scientifically calculating the carrying capacity of livestock and poultry farming, based on the difference in carrying capacity values, formulate targeted breeding policies. For example, in areas with overloaded livestock and poultry farming, it is necessary to consider reducing the number of animals under the conditions of ensuring the demand of local meat, egg and milk. Livestock and poultry farming scale, optimization of livestock and poultry farming structure, etc.; Livestock and poultry farming is close to overloaded areas, it is necessary to control the scale of livestock and poultry farming, and optimize the structure of livestock and poultry farming according to the nutrient requirements of crops; In line with the current requirements for livestock and poultry farming, the scale of livestock and poultry farming is reasonably increased, and manure for livestock and poultry can be deployed from the surrounding overloaded areas to meet the needs of local crop cultivation.

Third, promote the coordinated development of breeding. Pay attention to the role of the combination of breeding and animal husbandry in mitigating the environmental pollution of planting and animal husbandry, and guide the combination of planting and animal husbandry, especially on the basis of understanding the nutrient requirements of different crops and the supply of nutrients of different livestock and poultry varieties, and rationally matching crop planting and poultry farming not only achieves the combination of breeding and breeding, but also realizes the coordinated development of breeding and breeding. In addition, agricultural scientific research departments and agricultural technology extension departments, through publicity and training, guide farmers to understand the advantages of coordinated development of breeding and breeding, and promote farmers to practice the combination of breeding and breeding, coordinated development of breeding and breeding.

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