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Development Mode of Livestock and Poultry Waste Recycling Agriculture and Its Environmental and Economic Benefits

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Abstract: With the continuous development of China's agriculture, China's livestock industry is also increasingly prosperous, a variety of centralized, large-scale livestock farms continue to develop, making great contributions to China's food industry, at the same time, livestock manure and other wastes also cause certain pollution to the environment, affecting people's quality of life. This paper mainly studies the development mode of livestock and poultry breeding waste recycling agriculture and environmental economic benefits, through the investigation of livestock and poultry breeding industry, analyzes the characteristics of livestock and poultry breeding pollution, fully uses the theoretical knowledge of environmental economics to find out the economic reasons of breeding pollution, and provides the basis for the selection of manure treatment technology and mode. Based on the investigation of the current situation of livestock and poultry breeding, it is estimated that by 2020, ammonia emission will be 11659.6t, feces production will be 188523.9t, loss will be 33032.44t, sewage production will be 296574t, and loss will be 145087t; livestock manure farmland load in China has exceeded the environmental carrying capacity. The results show that although livestock breeding waste is not the most important problem of environmental pollution, it cannot be ignored. We should combine the development of circular agriculture to turn waste into treasure and bring economic benefits to people.

1. Introduction

1.1. Background and Significance

In recent years, the "vegetable basket" plan for enriching urban residents has been implemented

smoothly, but it has also led to a large number of waste environmental pollution problems, such as livestock manure, fecal water. According to preliminary statistics, the total amount of feces and fecal water in livestock farms and areas in China exceeds 1.7 billion tons every year. Many wastes are directly treated without resource utilization, which has a significant impact on the ecological environment. The main pollutants in livestock industry are organic waste, feces, stench, pathogens, antibiotics in feed additives and possible pollution of genetically modified organisms in the future. There are a lot of organic matter, nitrogen, phosphorus, suspended solids and pathogens in the aquaculture waste water. According to the research, each cow excretes 12.5 kg urine every day, including 129 g of nitrogen and 51 g of phosphorus. It can be found that the concentration of organic pollutants in animal feces is very high. According to the calculation, the daily sewage discharge of 2000 beef cattle farms is about 25 tons, if not treated according to the national standards It will inevitably cause serious pollution and pollute the soil and the surrounding air, which will be a major social risk and a waste of valuable fertilizer resources and energy. In the face of such serious livestock pollution, how to turn waste into treasure and livestock waste into resources.

1.2. Related Work

Wu Q pointed out that my country's animal husbandry management is under constant pressure to continuously reduce its impact on the environment. He summarized the previous research results and found a correct way for the accounting of ammonia emissions of livestock and poultry in my country, in order to provide theoretical and practical basis for the regional management and refined management of livestock. He listed methods based on nitrogen or total ammonia nitrogen flow and the models used. The advantages and disadvantages of each method or model are analyzed. At the regional level, the results of the TAN flow-based method are more accurate than the N-flow-based method, and the experimental results obtained are more valuable, but because the measurement process is more complicated, the amount of data obtained is less, and the persuasion Not enough [1]. Based on the planned behavior theory, Mao C uses 399 livestock and poultry farms and households in our province as samples to introduce risk perception variables. In addition, with the help of structural equation model (SEM) and partial least squares method (PLS), through the empirical analysis of antibiotic prevention behaviors of livestock and poultry farms and households in the production situation of "antibiotic-free", it is concluded that "antibiotic-free" The mechanism of production. However, due to the accidental sample taken by the experiment, the experimental conclusion also has a certain deviation [2]. Li F, Cheng S, Yu H believed that the risk of pollution caused by livestock and poultry farming was huge, studied the environmental Kuznets curve of animal husbandry, and evaluated the potential of livestock and poultry manure to generate biogas. The study shows that biogas projects in 2019 can be reduced by more than 2.2 100 million tons of carbon dioxide equivalent emissions. This conclusion intuitively illustrates the value of biogas, but because it only stays on the theoretical basis and is truly verified [3].

1.3. Main Content

In this paper, in the animal waste recycling program, through the development of waste water treatment technology and equipment for high load animals, rapid nitrogen removal, biological treatment and utilization technology, the production of fertilizer for waste water treatment. Based on different livestock scale, different environmental conditions, different investment capacity and management technology level, and the built-in water fertilizer coupling method of biogas, three practical circular economic models can be formed. Including "comprehensive utilization type", "energy saving type" and "standard discharge type", it can effectively reduce the dumping of animal

manure and achieve good ecological and economic benefits.

2. Livestock Breeding Waste Recycling Methods

2.1. Calculation Method of Excretion, Loss and Utilization of Livestock and Poultry Manure

In 2018, the Ministry of Agriculture issued guidelines for measuring the load capacity of land and livestock farming. The guideline defines land and livestock carrying capacity as the largest livestock farm in a specific area, and its estimation is based on the ability to remove poultry manure without exceeding the land used for farming [4]. The significance lies in the ecological potential of livestock. By limiting the amount of animal husbandry to the extent that livestock manure can be removed from farmland, a large surplus of livestock manure can be reduced, and environmental risk and nutrient loss have not been reduced. In this study, land can also be called cultivated land, which is the livestock breeding load of cultivated land.

(1) Delimit breeding area

Because animals in the pastoral area spend most of their time walking around the pasture during the feeding cycle, animal and poultry manure is discharged directly on the grassland, which is not normally recycled and returned to the field. So the data for this study did not include data on a farm scale.

In previous studies, two methods are usually used to determine the scope of agricultural areas: one is to calculate the data of all livestock without distinguishing between rural areas and pastures in China. The general experimental results are larger than the actual data and deviate from the reality. The other is that all animals and poultry raised in the four provinces are excluded, and the calculation results are too small, which is also inconsistent with the actual situation In this paper, the division of agricultural region is based on the total number of livestock raised in each livestock area and the animal statistics of pastoral and semi pastoral counties in the region, so as to obtain the percentage of captive animals, and then calculate the number of animals raised in agricultural areas. The calculation formula is as follows:

$$CR_i = (TN_i - (PN_i + SPN_i * 0.5)) / TN_i \quad (1)$$

Among them, CR_i refers to the feeding rate of livestock I in the pasture, TN_i refers to the total livestock and poultry of livestock I in the pasture, PN_i and SPN_i refer to the total number of livestock I raised in the pasture and semi pasture respectively, and I represents the type of livestock, including beef cattle, dairy cattle and sheep. Because the semi pasture cannot completely graze the livestock, so in this paper, we make the hypothesis that half of the livestock raised in the semi grazing area is grazing type, and the other half is whole sheep type. The adjustment parameter is 0.5.

(2) Determine the total number of breeding

Two indicators of livestock quantity obtained from China's Agricultural Statistics Department include the number announced in the current year and the number at the end of the year. Different kinds of livestock are different, so it is also necessary to distinguish different poultry species, with different feeding periods and years [5]. Combined with the actual situation and research purposes, determine the livestock with a growth cycle longer than one year, and select the total number of breeding at the end of the year as the total amount of breeding. The total amount of breeding in a year should be selected with a growth cycle less than one year. The average breeding season of pigs is 180 days, which can be released twice a year. Therefore, the number of pigs released in the year is taken as the number and calculation index of the year. The feeding cycle of cattle and sheep is

usually 365 days. Therefore, the total amount of cattle and sheep breeding at the end of the year is based on the output at the end of the year the column size is the same. There is no difference in the amount of laying hens, geese and ducks, all less than a year old. Because the national and provincial statistical data cannot distinguish different types of livestock and animals, so this paper takes the number of livestock out of the market as the basis of the total number of livestock breeding and calculation. Horses, donkeys, mules and camels usually last longer [6]. Generally, it will be longer than one year. At this time, the year-end stock is selected as the benchmark; rabbits are generally listed for about 140 days, so the total number of breeding in a year is the annual output.

(3) Determination of different breeding scale

The differences in the scale of livestock breeding lie in the total amount of aquaculture, the quality of feed, and the management of feces and herds. Reasonable classification of aquaculture scale is the first step in estimating the pollution load of aquaculture. According to the existing statistical data and the standards and knowledge of the first national survey on pollution, the scale of livestock breeding in China is divided into three types [7]. They are traditional livestock breeding type, livestock breeding professional households, scale farms.

(4) Calculation method of nitrogen excretion, utilization and loss of livestock and poultry

$$TPQ = \sum_{j=1}^{3} \sum_{i=1}^{14} AN_i * R_{i,j} * \theta_i \tag{2}$$

$$HL_j = PQ_j * (F_{j,NH3} + F_{j,N20} + F_{j,N2} + F_{j,NO3-}) \tag{3}$$

$$DL_j = (PQ_j - HL_j) * R_{discarding} \tag{4}$$

$$\begin{aligned} TL_j = (PQ_j - HL_j - DL_j) * [R_{fram} * (F_{fram,NH3} + F_{fram,N2O} + F_{fram,N2} + F_{from,NO3-}) \\ + R_{comp} * (F_{comp,NH3} + F_{comp,N2O} + F_{comp,N2} + F_{comp,NO3-})] \end{aligned} \tag{5}$$

$$AL_j = (PQ_j - DL_j - HL_j - TL_j) * (F_{NH3} + F_{N2O} + F_{N2} + F_{NO3-}) \tag{6}$$

$$TLQ = \sum_{j=1}^{3} DL_j + HL_j + TL_j + AL\,j \tag{7}$$

$$TRQ = TRQ - TLQ \tag{8}$$

Among them, TPQ represents the emissions of 14 kinds of livestock and poultry in the three feeding scales (traditional feeding, complex feeding and large-scale breeding farm); AN_i represents the total number of animals I raised, excluding the number of livestock in grazing areas; $R_{i,j}$ represents the percentage of total livestock I in the total livestock breeding; θ_i represents the nitrogen (n) index of livestock I in fecal waste; HL refers to the storage in livestock and poultry houses PQ in animal and poultry feeding system J is the N content in the secretion of all fecal species (14) in J feeding system; $F_{j,NH3}F_{j,N2O}F_{j,N2}F_{j,no3-}$ represents the parameters of ammonia (NH3) volatilization, no (N20) emission, denitrification (N2) and nitrogen leaching runoff of animal manure in poultry house and in the process of fecal storage; DL_j is the N content of feces directly discarded by farmers under farming system J; $R_{fram}, R_{comp}, R_{discarding}$ is the percentage of fertilizer produced by farmers themselves, animal excreta sold and discarded; TL_j refers to N element $F_{farm,NH3,}F_{fram,N2O}, F_{fram,N2}, F_{fram,NO3-}$ represents the loss of NH3 volatilization, N20 emission, denitrification and leaching loss index in the process of using manure to produce fertilizer, AL_j represents the loss caused by N loss in the process of using organic fertilizer in farmland in feeding

scale J; $F_{j,NH3}F_{j,N2O}F_{j,N2}F_{j,no3-}$ represents NH3 volatilization, N20 emission and denitrification in the process of using organic fertilizer in farmland(N2) emission and leaching (N03. 1) TLQ is the total amount of N lost in the process of collecting animal manure in the three feeding scales, collecting in the manure house, and burying fertilizer and using; TRQ is the total amount of livestock manure. There were 14 kinds of livestock in the study, including beef cattle, cows, pork, sheep, horses, donkeys, mules, camels, chickens, hens, ducks, geese and rabbits. The system includes traditional types, complex livestock farms and large-scale farms.

2.2. Classification Method of Circular Agriculture Mode

(1) Developing circular agriculture

The emergence of circular agriculture not only conforms to the development trend of the world, but also meets the needs of the development of modern society. Circular agriculture is a new concept and new measure aiming at the coordinated development of population, resources and environment. Circular agriculture is mainly through the progress and innovation of agricultural technology, continuous adaptation and optimization of the internal structure of agricultural ecosystem and related industrial structure, and the application of the concept of healthy and sustainable development and circular economy. In order to minimize environmental pollution and resource waste, we should strengthen the recycling of materials and energy in agricultural system, promote the sustainable development of agriculture, reduce environmental pollution, consolidate economic and environmental benefits, strengthen waste management in agricultural production, and strictly control the use of some harmful substances in agricultural production and the generation of some wastes in the process of agricultural production This must also be done in the production process [8]. To realize the simultaneous development of agriculture and the optimization of environment, keep a good circulation in the process of agricultural production, promote the healthy and sustainable development of agriculture, increase farmers' income, reduce pollution and damage to agriculture;

(2) Classification basis of circular agriculture model

There are many kinds of circular agriculture in China. There is not only one method to introduce classification, but also some circular agriculture models. According to the goal of industrial development, circular agriculture model can be divided into three types: agricultural product quality improvement mode, ecosystem type and waste resource utilization mode. From another point of view, there are three levels of industrial spatial distribution circular agriculture: micro, meso and macro. From a micro perspective, it is also known as "family type".

The circulation mode is mainly concentrated in large-scale specialized households. Agricultural production improves resource utilization efficiency and reduces emissions through scientific and technological innovation and technology, which has become a complete chain of production management and processing. Our province has studied how to use chemical fertilizer to recover chemical fertilizer from forest grass to produce biogas. The invention discovered the method of planting distilled grain, in which the seeds and straws of the initially infected isolation material were made into high-quality feed, and three methods for the utilization of cow manure waste were studied: producing edible fungi, mixing with cow urine to produce biogas, biogas residue is a model of high-quality organic fertilizer, The biogas slurry industry can be used to replace pesticides. The meso level model is also called "park type" agriculture. The main way is to focus on the Recycling Agricultural Industrial Park (zone) and establish the circular chain of companies and industries. In order to realize the best utilization of resources between enterprises and industries, the mechanism of agricultural circular economy takes the reuse and recovery of secondary resources as an important part, and establishes a regional agricultural recycling economy mechanism the macro

mode of unit is the so-called "regional" circular agriculture mode [9]. The regional circulation of agriculture has been established by connecting related industrial chains, such as planting industry, seed breeding industry, agricultural processing industry and agricultural service industry.

3. Experimental Design of Cycle Mode

3.1. Experimental Design of Livestock Waste Recycling Mode

(1) Livestock waste recycling preparation

The organic fertilizer production with recycling value was applied to the transformation center. The compost distribution, rapid start-up of compost, stable high-temperature detoxification, and appropriate fermentation control technology were used. For example, livestock manure composting nitrogen deodorization technology, organic and inorganic waste composting ecological detoxification technology, as well as comprehensive composting control technology system, oxygen supply, high composting process of mixture type operation, such as efficient repetition and particle formation facilities, can also use livestock waste as raw materials, mix other auxiliary materials, and add some functional substances and elements Mechanical fertilizer and compound fertilizer, as well as the establishment of crop demand obesity regulations in the region, combined with appropriate nutrient technology, and for the production of agricultural cash crops use and configuration. A recycling agriculture model was established to convert waste into functional organic fertilizer.

Through the integrated application model of important technologies, according to the production scale of aquaculture enterprises, we can locate and collect poultry manure - treatment, storage and transportation - organic fertilizer workshop processing - and primary distribution area - livestock waste collection - enterprise recycling and reprocessing - adding active substances to produce regional economic crops - and finally can be used for aquaculture Recycling mode, livestock breeding waste can be recycled [10].

(2) Experimental process of livestock waste recycling

A joint-stock company is a company specializing in the production of organic fertilizer. The circular economy demonstration project of its organic fertilizer department uses the animal fertilizer produced by the company to produce organic and inorganic fertilizer, realizing the large-scale commercial production of waste and improving the recycling of economic fertilizer. Advantages of the company: Pig Manure and mushroom sludge are used as raw materials for regulating water content, high composting temperature and fermentation temperature. In order to promote the production of organic fertilizers, the microbial strains have been selected for the production of organic fertilizers by extrusion, while the production of organic fertilizers has been controlled by the addition of microbial elements as shown in Figure 1.

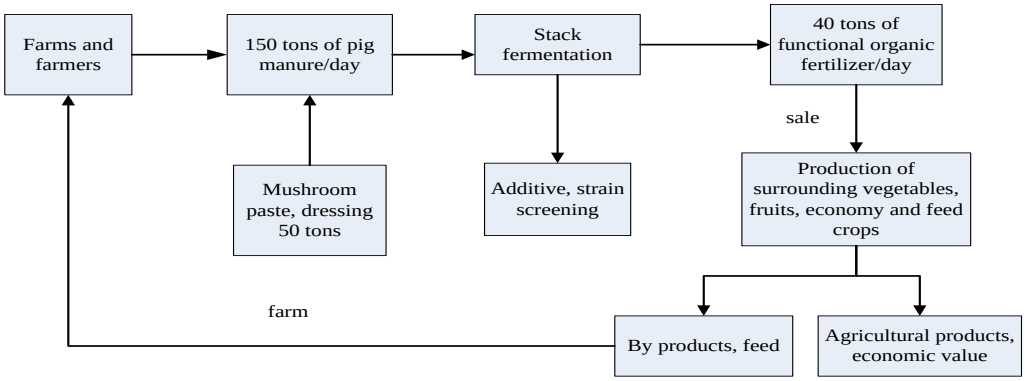

Figure 1. Pattern of waste recycling economy

This process uses poultry manure to add mushroom puree and other auxiliary materials. It can process 150 tons of fresh manure every day, and use 40,000 tons of manure from regionally dispersed farmers every year, which is equivalent to 1600 tons of pure nutrients. It can meet pollution-free green organic food. The demand for fertilizer in the production base is about 1800 mu (based on 100 kg per mu), and it replaces chemical fertilizer. The products produced by this circulation mode can be widely used in the production of pollution-free vegetables and fruit trees.

3.2. Circular Economy Model Design of Livestock Breeding Waste Water

The model focuses on animal waste water treatment, water, fertilizer and energy utilization, and uses a wide range of project research and development core technologies, and uses a bioecological cooperative measure to establish a combination of different circular economy models. Biological and ecological accumulation technology is applied to waste water treatment, reactor, rapid denitrification technology and Lipp tank technology. In the process of BOD and COD decomposition and digestion, N, P and other nutrients in water can be reasonably absorbed and transformed by aquatic plants, soil stability and agricultural economy. Anaerobic digested liquid can be used as water and fertilizer for irrigation and production of orchards, vegetables and edible plants. The organic matter contained in the waste water is hydrolyzed, oxidized and further treated in the secondary and tertiary anaerobic fermentation tanks; the methane gas produced is used in aquaculture plants, agricultural production and the livelihood of local villages; methane gas is used for further treatment and biotransformation, and forms sewage Coupled cycle model [11]; when the "biogas water cycle model" is adopted, the removal rates of COD, NHz-N and TN are higher than 95%, 93% and 90% respectively, which is suitable for large and medium-sized livestock breeding companies as shown in Figure 2.

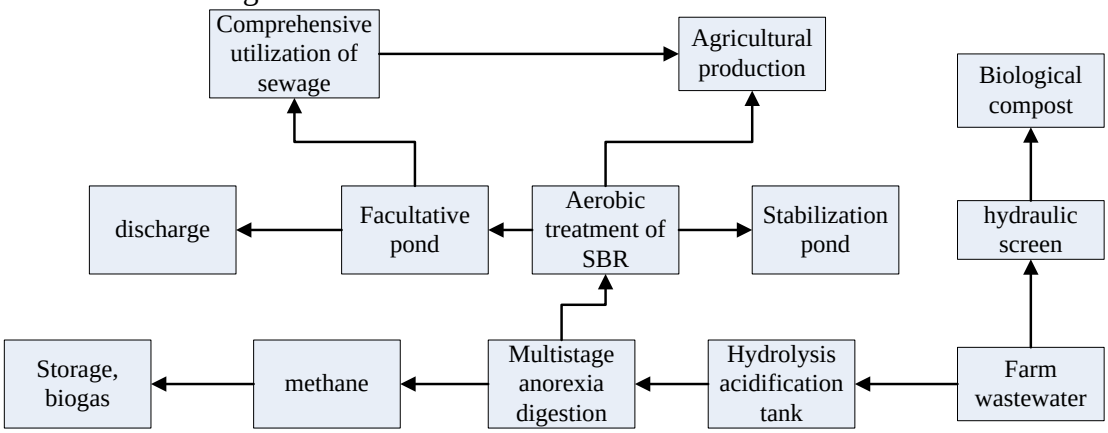

Figure 2. Biogas water fertilizer cycle economic model of poultry waste water treatment process

4. Analysis of Environmental and Economic Benefits of Livestock Breeding Wastes

4.1. Investigation and Analysis of Livestock Breeding Pollution

As an important part of large-scale agriculture, livestock and poultry breeding industry has developed rapidly in large-scale, high-speed and high-level in recent ten years. In 2020, 4.17 million live pigs, 782.8 million broilers, 86 million laying hens, 312.2 million ducks, 1.403 million beef cattle and 18.08 million mutton sheep will be put on the market in Beijing. The output value of animal husbandry will be 10.06 billion yuan, accounting for 46.4% of the total output value of large agriculture. The net income of livestock breeding households in Beijing is 11.08% As shown in Figure 3, animal husbandry in the suburbs of Beijing has solved the employment problem of nearly

100000 people and has become one of the pillars of suburban economy and an important way for farmers to become rich.

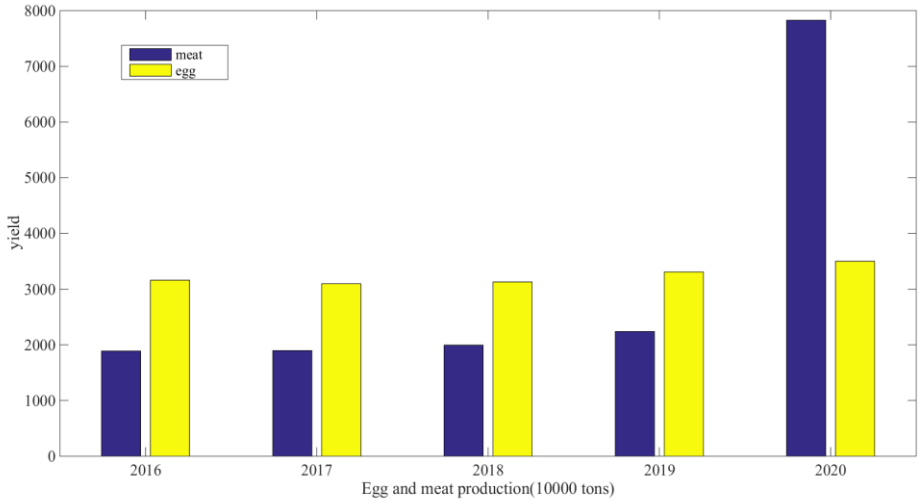

Figure 3. Production of poultry and livestock in 2016-2020

In our country, dairy cattle, laying hens, broilers, pigs, sheep and other breeding occupy a high proportion. Livestock manure has become a threat to the water source of life. We should take effective measures to control the breeding industry in County.

Through the systematic study of various methods for estimating livestock and poultry sewage discharge at home and abroad, the author thinks that there are usually two methods to estimate the amount of livestock and poultry and the amount of sewage discharge. One is the experimental measurement method. In the local representative farms, the methods of simulated rainfall and direct monitoring were used to test the excretion of feces and urine, and the inflow coefficient of local livestock and poultry manure was obtained, Then the nutrient content of different scale farms can be obtained by statistics, and then the total amount of water inflow can be obtained by multiplying the nutrient content with water inflow coefficient. The other method is the source intensity estimation algorithm often used by the State Environmental Protection Administration, also known as the emission coefficient method. It is an estimation method based on the quantity of various non-point source pollutants and their emission coefficient. After knowing the nitrogen and phosphorus production and pollutant discharge parameters of single livestock and poultry in different regions and different breeding conditions, the quantity of livestock and poultry breeding was considered to estimate. This method is currently the most commonly used method to estimate non-point source pollution from livestock and poultry breeding.

(1) Estimation of ammonia emission

The odor components of farms and surrounding areas are complex, which contains a large number of toxic and harmful components such as ammonia, sulfide, methane and so on. A large amount of ammonia gas will be emitted in the process of livestock and poultry breeding and manure storage and application. The increase of ammonia concentration in the atmosphere will increase the acid deposition in the atmosphere. Generally, each animal produces about 85-100 kg of nitrogen per year. Among them, 4, 6 and 17 kg of nitrogen volatilized in the form of ammonia during storage, stacking or spraying in the enclosure, as shown in Table 1. Livestock manure is considered to be the main source of ammonia emission, accounting for more than 80% of the total ammonia emission. In this paper, ammonia, a greenhouse gas with high concentration, is taken as an example to estimate the amount of ammonia emission by emission factors.

Table 1. Annual average ammonia emission of livestock and poultry

Species of livestock	Cage and fecal storage	Manure application	graze	total
cattle	7.396	12.2224	3.403	23.043
pig	2.251	2.836	0	5.357
poultry	0.091	0.154	0	0.248
sheep	0.381	0.693	0.623	1.697

In 2020, the ammonia emission will be 11649.6t. Among all kinds of livestock and poultry, the largest ammonia emission is poultry, accounting for 75%, followed by pigs, sheep and cattle, accounting for 6%, 15% and 4%, respectively, as shown in Figure 4;

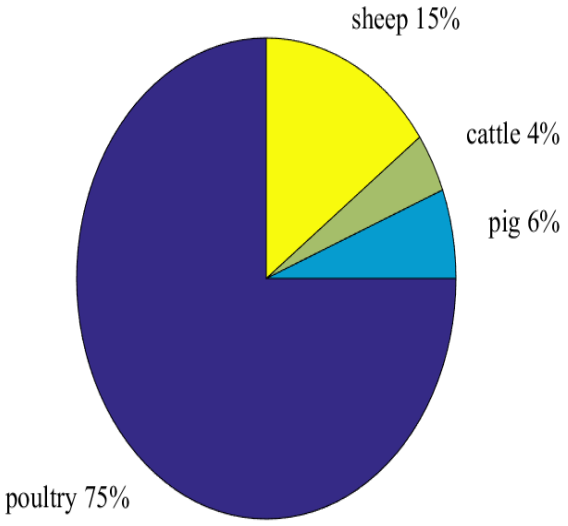

Figure 4. Proportion of ammonia emission from livestock

(2) Determine the division of long-term production system of livestock breeding in different scales

In this paper, the excretion coefficient of livestock manure was determined by the analysis of the excretion coefficient of livestock manure as shown in Table 2 and the literature.

Table 2. Division of livestock and poultry production system of different scales

Species of livestock	tradition	Breeding professional	Large scale farm
pig	<50	50-500	>500
cow	<5	5-100	>100
Beef cattle	<10	10-100	>100
sheep	<30	30-100	>100
egg	<500	500-20000	>200000
Broiler,duck,goose	<2000	2000-50000	>500000

Note: this classification standard is basically consistent with the first national pollution source census (npsc). For the species of animals that npsc did not investigate and could not find available information in the data, such as horses, donkeys, ducks, geese, etc., it is assumed that the three farming systems account for one third respectively.

(3) Determination of excretion coefficient of livestock and poultry

Through literature analysis and screening, the excretion coefficient used in the calculation of nitrogen excretion of livestock and poultry manure was determined, as shown in Table 3:

Table 3. N excretion coefficient of livestock and poultry manure used in this study

Species of livestock	Excretion coefficient	Species of livestock	Excretion coefficient
porker	4.87	egg	0.82
sows	16.78	broiler	0.09
cow	74.4	duck/goose	0.47
beef cattle	45.87	rabbit	0.45
sheep	11.23	camel	55.00

4.2. Research and Analysis of Waste Recycling

As a big animal husbandry country, our country produces a lot of livestock waste every year. According to conservative statistics, by 2020, China's livestock breeding will produce 4.1 billion tons of livestock manure every year, which will bring great challenges to the ecological environment. Although livestock waste is the main pollution source of agricultural environment, it is also a renewable energy with huge energy. If it is effectively treated and reasonably developed, it will become an important renewable resource. Therefore, the utilization of livestock waste resources is very important at present.

Livestock manure contains a lot of organic matter. After microbial fermentation, it will produce clean energy biogas, which can provide direct gas for people's kitchen life. If the livestock breeding waste is collected, centralized treatment, the construction of large-scale biogas station, it can generate enough biogas for power generation, and provide electricity for people's production and life. At the same time, methane and ethanol produced in the fermentation process of livestock manure can also be used as fuel to provide energy B for new low-carbon vehicles. Of course, in addition to organic matter, livestock waste also contains a large number of nitrogen, phosphorus, potassium and some trace elements, which is the preferred raw material for the production of organic fertilizer [12]. After deodorization, fermentation of bio fertilizer bacteria, nutrient concentration and harmless treatment, the biogas residue was processed into organic fertilizer and applied to farmland. Finally, the remaining biogas slurry can be used as the nutrient solution of economic crops to irrigate melons and fruits, which truly realizes the recycling. As shown in Figure 5, the resource recovery is maximized.

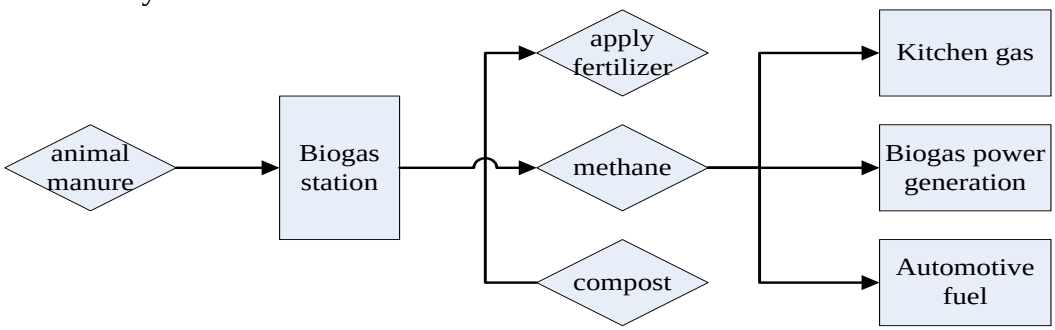

Figure 5. Flow chart of livestock breeding waste resource treatment

The biggest feature of this scheme is that the existing resource technology (biogas fermentation, composting, etc.) is scientifically combined to a certain extent, and the principle of "resource, reduction, harmlessness and ecology" is followed, so that the livestock manure can be recycled at multiple levels and the resource utilization rate is maximized. At the same time, the scheme is very friendly to the environment. The biogas fermentation of livestock manure can eliminate odor, kill bacteria and insect eggs, and solve the problem of livestock manure pollution at the same time of harmless treatment. The organic fertilizer made from biogas residue is not only rich in nutrients, but

also can secrete a large number of biological or active substances. Compared with common chemical fertilizer, bio organic fertilizer made from livestock manure can improve soil structure, increase soil organic matter content, alleviate common chemical fertilizer and solve soil hardening problem; In addition, bio organic fertilizer can also improve the ability of crops to resist insect pests and diseases, prevent the burning of seedlings caused by ordinary fertilizers, increase the yield and efficiency of crops, and greatly improve the quality of agricultural products. As for the application of biogas slurry to crops after treatment, the pollution of water resources caused by direct discharge without treatment is avoided.

5. Conclusion

The rapid development of livestock breeding directly leads to the discharge of a large number of livestock manure and wastes such as livestock manure, which limits the development of animal husbandry and seriously affects the living environment of surrounding residents. According to the structure of livestock breeding industry and the structure of livestock manure, we can actively choose effective fecal treatment facilities to realize the recycling of resources and improve the ecological environment. The main uses of livestock manure include energy conversion, feed conversion, fertilization and mushroom cultivation. Due to the spatial difference of livestock abundance, proper land treatment is needed for livestock in different areas. Therefore, it is necessary to prepare a statistical plan in advance, and construct a suitable fecal use mode for each area according to the fecal resources and the structure of fecal resources in each area.

Circular agricultural economy is also gradually deepening into the production and life of agricultural enterprises and farmers. In the face of livestock breeding waste, we should fully combine the circular agricultural economic model and use the recycling mode of "sewage biogas energy". Animal manure has huge biogas potential. Therefore, it is very important to construct biogas projects and utilize waste resources It uses biogas as fuel and can also be used for energy production. In the process of converting biogas into animal and poultry manure in different areas, it is necessary to explain the real situation in different areas. The development of biogas project with animal manure as the main fermentation substrate, poultry manure is based on the biogas project of livestock farm, and the resources of biogas and livestock manure are utilized. In areas with less livestock manure resources, biogas will choose other ways to utilize livestock and poultry manure resources. The reasonable operation of biogas project will bring huge benefits in the fields of energy, environment and economy. We must do a good job in the supervision and guidance of biogas projects, promote and spread biogas projects, provide technical support and guidance for policies, and promote the effectiveness of biogas projects and sustainable operation and achieving results that benefit all, energy and ecology.

In China, the annual chemical oxygen demand (COD) of feces of three major livestock, pigs, cattle and chickens, is more than 70 million tons, which is more than five times of the COD of major industrial pollution sources and industrial waste water in China. A large amount of chemical fertilizer loss leads to surface water eutrophication and groundwater nitrate pollution. Therefore, we should implement the principle of "reduction, reuse and resource utilization" and develop the "low consumption, low emission and high efficiency" circular agricultural development mode, which is more in line with the concept of sustainable economic development. This mode is a fundamental change to the traditional agricultural growth mode of "mass production, large consumption and large disposal".

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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.

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