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Environmental Protection Problems and Coping Strategies in Animal Husbandry

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Abstract: This paper studies the environmental protection of animal husbandry, analyzes the pollution problems, and clarifies the environmental challenges. This paper puts forward a response path to reduce the negative impact of animal husbandry on the environment through scientific management and technological innovation and promote green transformation and sustainable development. This paper provides a reference for researchers and helps the healthy and sustainable development of the animal husbandry industry in China.

Keywords: Livestock breeding; Environmental protection; Problem; Strategy

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1. Introduction

Environmental pollution restricts the development of animal husbandry, affects health, and forms a vicious circle. In recent years, environmental protection has been intensified, and animal husbandry environmental protection has been valued, but insufficient results have been achieved. Measures need to be improved to explore environmental protection issues and response paths. In this context, the research on environmental protection of animal husbandry is of great practical significance for sustainable development and health protection, promoting green transformation and ensuring people's well-being.

2. Analysis of environmental pollution of animal husbandry

2.1. Stool pollution

In the animal husbandry industry, animal manure has become a major source of pollution that cannot be ignored. If the farm is not equipped with an efficient manure treatment system, or the treatment measures are not implemented, these organic-rich feces will be discharged arbitrarily, which will not only directly pollute the surrounding water sources, deteriorate the water quality, affect the safety of agricultural irrigation and drinking

water but also occupy the land space and destroy the natural landscape. Moreover, toxic microorganisms such as bacteria, viruses, and parasites bred in feces will spread with air, water, and other channels, posing a potential threat to the health of humans and other organisms. Taking pig breeding as an example, the annual manure volume of each pig can be as high as 2.5 tons. If not properly handled, the cumulative effect will make the problem of manure pollution in the farms increasingly serious, causing incalculable damage to the local environment. Therefore, strengthening the management of animal husbandry manure and popularizing scientific treatment technology has become an important topic to be solved urgently.

2.2. Feed pollution

In the process of animal husbandry, the quality and composition of feed have a profound impact on the environment. If the ubiquitous phytate phosphorus in feed cannot be fully absorbed and utilized by the animal digestive system, the remaining phosphorus will enter the environment with the excrement, leading to excessive phosphorus content in the soil and water, and then causing water eutrophication and destroying the ecological balance. At the same time, the amino acids in the feed, especially those that are not easily absorbed by animals, will be converted into nitrogen compounds in the digestion process, and some nitrogen elements will be released into the atmosphere in the form of ammonia and nitrogen, resulting in nitrogen pollution. Nitrogen pollution will not only lead to the decline of air quality but also may cause secondary damage to the surface ecosystem through acid rain and other forms, seriously threatening the living environment and health of human beings and other organisms. Therefore, while pursuing efficient production, animal husbandry must pay great attention to the problem of feed pollution and take effective measures to reduce its impact on the environment [1].

3. Environmental protection challenges facing animal husbandry

3.1. Farmers have weak environmental awareness

In the current animal husbandry industry, a problem that cannot be ignored is the general lack of environmental protection awareness among farmers. Especially for the individual farmers in rural areas, they tend to pursue the short-term economic benefits too much and ignore the long-term environmental protection goals. This short-sighted behavior leads to their lack of scientific and systematic aspects in animal waste treatment, drug residue management, and feed use, and lack of necessary expertise and technical guidance. Due to the lack of effective pollution control measures, pollutants such as animal feces and drug residues are discharged at will, which not only pollutes the soil, water, and air but also breeds a large number of harmful microorganisms, causing serious damage to the ecological environment. These contaminants may also pass through the food chain, posing a potential threat to human health. In addition, with the increasingly serious environmental pollution problem, the normal life of the surrounding residents has also been affected to varying degrees. Problems such as declining air quality and water pollution not only affect the quality of life of residents but also may cause various health problems. Therefore, strengthening the environmental awareness education and technical training of farmers, and promoting scientific breeding management and pollution control technology, has become an important task for the healthy and sustainable development of animal husbandry [2–5].

3.2. There are loopholes in the environmental protection supervision system

In the rapid development of animal husbandry in China, the problem of inadequate environmental protection

supervision has become increasingly prominent. Although China's environmental protection cause has made remarkable progress in recent years, and the environmental protection policy system for animal husbandry has been gradually improved, there are obvious shortcomings in the implementation of the supervision work. Due to the relative lag in the development of environmental protection in animal husbandry, many environmental protection measures are difficult to truly implement, leading to the greatly reduced effect of the policy. In practice, there is often the phenomenon of perfunctory and hasty coping, which makes the environmental pollution problem in the process of animal husbandry not effectively solved and even appears a deterioration trend in some areas. The supervision of environmental pollution control is also insufficient. At present, many places focus more on post-treatment in environmental governance and ignore the prevention and control work in advance. This approach of "heavy treatment, light prevention" is not only difficult to fundamentally solve the problem of environmental pollution, but also may lead to the waste of resources and the increase of treatment costs. Therefore, to improve the comprehensive quality level of environmental protection of animal husbandry, it is necessary to strengthen supervision, ensure the effective implementation of relevant policies, and pay attention to the prevention and control work in advance to reduce the occurrence of environmental pollution from the source [6].

3.3. The direct threat to the environment

In the digestive cycle of ruminant organisms (such as cattle, sheep, and so on), there is a specific and significant ecological effect step. After their large amounts of herbivore feeding, various microbial communities coexist in their digestive system. These microorganisms perform fermentation functions and break up food, both helping animal nutrient intake and accompanied by the production of methane, ammonia, and other by-products. What is particularly noteworthy is that methane, as an extremely efficient greenhouse gas, has a greenhouse potential of far more than carbon dioxide, and plays a significant role in aggravating global warming. With the rapid expansion of global livestock scale and the surge of livestock numbers, the amount of greenhouse gases released into the atmosphere is accumulating year by year, becoming another important driver of global climate change. What is particularly urgent is that this emission growth trend has not been effectively contained, and the continuous rise of greenhouse gas emissions in animal husbandry has posed an increasingly severe burden on environmental protection and ecological balance. Given this, it is urgent to pay attention to the problem of greenhouse gas emissions in animal husbandry, and it is urgent to formulate and implement targeted strategies and measures to mitigate their adverse impact on the environment and promote sustainable development [7–10].

4. Innovation of environmental protection strategy for animal husbandry and breeding

4.1. Science and technology-driven and innovative application strengthening

In the field of animal husbandry, scientific and technological innovation and application are leading the industry in the green, efficient, and sustainable direction. In the face of the severe challenge of environmental protection, animal husbandry must change the traditional production mode and actively adopt advanced breeding technology, especially waste treatment and resource utilization technology, to achieve a win-win situation of economic and ecological benefits. Traditional waste treatment methods are often simple and extensive, leading to the direct discharge of a large amount of organic waste without effective treatment, seriously polluting the water source, soil, and air, and destroying the ecological environment. Modern and

advanced fecal treatment techniques, such as biological fermentation and anaerobic digestion, provide a scientific solution to this problem. These technologies can not only efficiently decompose the organic matter in feces and reduce the emission of pollutants but also convert waste into valuable resources, such as high-quality organic fertilizers, biological gases, and biomass fuels. Biological fermentation technology uses the metabolic effect of microorganisms to transform the organic matter in feces into stable humus and produce organic fertilizer rich in nutritional elements. This fertilizer can not only improve soil fertility and promote crop growth, but also improve soil structure, reduce the use of chemical fertilizer, and reduce agricultural non-point source pollution. Anaerobic digestion technology transforms feces into biological gases and organic residues through the decomposition of microorganisms under anaerobic conditions. Biogases can be used as clean energy for power generation, heating, or as fuel for transportation, realizing energy recycling. The organic residue can also be used to make fertilizers or soil amendments, further exploring the potential value of manure. Through the promotion of these advanced waste treatment and resource utilization technologies, animal husbandry can not only significantly improve production efficiency, but also effectively reduce environmental pollution and damage. This is not only in line with the current global environmental protection trend but also the only way to achieve sustainable development of animal husbandry [11–14].

4.2. Improvement of policies and regulations and the supervision system

4.2.1. Build a sound road of policies and regulations

In the vigorous development of the animal husbandry industry, environmental protection has become an issue that cannot be ignored. Improving policies and regulations and building a sound legal system for animal husbandry environmental protection are the keys to ensuring the sustainable development of this industry. This is not only the norm of the existing breeding behavior, but also the maintenance of the future ecological balance. To achieve this goal, it is necessary to formulate and implement targeted and operational laws and regulations. These regulations should clearly define the responsibilities and obligations of farmers in waste treatment, wastewater discharge, waste gas control, and other aspects, set scientific and reasonable industry standards and emission limits, and provide solid legal support for environmental protection. At the same time, with the development of animal husbandry and the change in environmental protection needs, these laws and regulations need to be constantly revised and improved to adapt to the new situation and new requirements. In the process of law implementation, it is crucial to strengthen supervision and law enforcement. Government departments at all levels and relevant institutions should establish a regular supervision mechanism to carry out regular or irregular ecological environment reviews and hidden trouble screening for livestock breeding farms. Violations found should be punished following the law to ensure the seriousness and authority of the regulations. At the same time, through public exposure, social supervision, and other ways, the formation of a strong public opinion pressure on illegal behavior, improves farmers' environmental consciousness and law-abiding awareness. Strengthening environmental protection publicity and education work is also an indispensable link. Through holding training courses, distributing publicity materials, carrying out on-site guidance, and other ways, to popularize environmental laws and regulations and environmental protection knowledge to farmers, improve their environmental awareness and sense of responsibility. At the same time, farmers are encouraged and supported to adopt advanced environmental protection technology and equipment to improve the efficiency of resource utilization and reduce environmental pollution and ecological damage. Perfecting policies and regulations is the only way to strengthen the environmental protection of animal husbandry and the aquaculture

industry. By establishing a sound legal system, strengthening supervision and law enforcement, and publicity and education measures, it can provide a strong legal guarantee and environmental support for the sustainable development of animal husbandry, and jointly protect the beautiful home for survival [15].

4.2.2. Strengthen the supervision in the field of animal husbandry

In the vigorous development of animal husbandry, it is particularly important to strengthen its management and supervision. This is not only related to the sustainable development of the industry but also directly affects the protection of the ecological environment and the maintenance of public health. To build an efficient, orderly, and environmentally friendly animal husbandry system, it is necessary to comprehensively strengthen the supervision of animal husbandry from many aspects. The establishment of a perfect management system is the cornerstone of strengthening the supervision of animal husbandry. This includes clarifying the scope of responsibilities of the management agencies at all levels to ensure the orderly conduct of management activities. A comprehensive management framework should be set up to form a closed-loop management system from the formulation and implementation of policies and regulations to supervision and feedback. At the same time, effective communication and coordination mechanisms should be established to ensure the smooth flow of information and jointly promote the healthy development of animal husbandry. Improving the professional quality and supervision level of the supervision team is the key to ensuring the effective implementation of management activities. Supervisors need to have solid professional knowledge, rich practical experience, and good professional ethics. Therefore, management should pay attention to the construction of the supervision team, and constantly improve their professional quality and supervision ability through training, assessment, and other ways. At the same time, a sound incentive mechanism and restraint mechanism should be established to stimulate the work enthusiasm and responsibility of the supervisors and ensure the fairness and effectiveness of the supervision work. In terms of technical means, modern scientific and technological means should be fully utilized, such as the Internet of Things, big data, artificial intelligence, and so on, to continuously monitor and collect data on pollutant emissions from animal husbandry farms. These advanced monitoring technologies and tools can reflect the pollution situation of the breeding farms in real time, and provide timely and accurate data support for the regulatory authorities. Through data analysis, problems can be quickly found, and effective measures are taken to deal with them, to effectively prevent the occurrence of environmental pollution incidents. Building an open animal husbandry information platform is also one of the important means to strengthen the supervision of animal husbandry. Through the information platform, policies and regulations, industry trends, technical guidance, and other information can be released promptly to provide convenient services for livestock farmers. In addition, the information platform plays a key role as the channel of public supervision, allowing multiple social forces to understand the actual situation of animal husbandry supervision, and strengthening the transparency and openness of management measures. At the level of law enforcement and punishment, resolutely implement legal principles and severely punish any behavior that damages the environment. In the face of serious environmental violations of animal husbandry subjects, they will be severely punished according to law, supplemented by forced suspension of production and rectification means. Such strict law enforcement and punishment mechanisms aim to deepen the concept of the rule of law and responsibility for environmental protection, encourage them to actively follow environmental protection laws and regulations, and reduce pollutant emissions. Enterprises are encouraged to actively adopt advanced environmental protection technology and equipment to improve the efficiency of resource utilization and reduce pollutant emissions.

Through the joint efforts of enterprises and regulatory authorities, the sustainable and healthy development of the animal husbandry industry can be jointly promoted [16].

4.3. Improvement of environmental awareness and skills of farmers

On the road to green transformation and sustainable development of animal husbandry, it is crucial to enhance the environmental awareness of farmers and improve their professional skills. Effective measures must be taken to guide and support farmers to take a solid step in environmental protection. Diversified training and educational activities are needed to encourage farmers to deeply realize the importance of environmental protection. This includes but is not limited to organizing regular training courses, special lectures, and publicity activities to popularize environmental protection knowledge to farmers in an easy-to-understand way, reveal the far-reaching impact of animal husbandry on the environment, and the urgency and necessity of taking effective measures to protect the environment. These activities aim to guide farmers to establish the correct concept of environmental protection, stimulate their environmental protection initiative and enthusiasm, and make them become active participants in environmental protection actions. Given the common ecological problems in animal husbandry, special skill training and operational guidance are needed. This includes teaching farmers of scientific feeding management knowledge, reasonable feed ratio technology, and effective disease prevention and control methods, to reduce the negative impact on the environment. Cooperate with local animal husbandry associations or scientific research institutions to jointly set up benchmarking farms or model families. These benchmarking units will serve as a display window of environmental protection technology and breeding mode, showing the successful cases and business models of energy conservation and emission reduction to the majority of farmers. Through field investigation, experience sharing, and interactive exchange, it can help farmers to deeply understand the application effect and economic benefits of environmental protection technology, stimulate their learning interest and enthusiasm, combined with the specific needs and current situation of farmers, and carry out targeted technical teaching and on-site teaching. By organizing expert teams to go deep into the farmers for technical guidance, and to answer the specific problems encountered by the farmers in the environmental protection practice, they can better master and apply the environmental protection skills. At the same time, it can also provide farmers with personalized technical improvement plans and management suggestions to help them realize the green development of animal husbandry [17].

5. Conclusion

Animal husbandry plays an important role in China's agriculture, so experts need to conduct in-depth research, optimize management, and pay attention to environmental impact. Relying on the laws and regulations, experts should take measures to protect the environment and improve the benefits of animal husbandry. Reasonable supervision can ensure green development, promote economic benefits, promote the sustainable development of animal husbandry, and contribute to the construction of ecological civilization.

Disclosure statement

The author declares no conflict of interest.

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