

Research on promoting agricultural high-quality development by planting and breeding cycle

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Keywords: Circular economy; High quality development; Modern agriculture

Abstract: At present, China's agricultural development is the key period for the structural reform of agricultural supply side and the development of agricultural low-carbon economy, and it is also in the initial stage of the country's efforts to develop "carbon emission reduction". While the scale of animal husbandry is expanding, some negative factors caused by it have actually attracted everyone's attention, such as how to deal with the polluted wastes generated in the process of animal husbandry scientifically and how to reduce the harm to the current ecosystem, especially to the agricultural ecosystem. This paper discusses the development situation of circular agriculture combining large-scale planting and breeding in China in recent years, as well as the problems in the development process. On the basis of increasing the income of breeding scale, how to solve the problem of environmental pollution and realize the recyclable and sustainable development of animal husbandry were discussed; Establish the system feedback analysis model. Promoting the high-quality development of modern agriculture is an inevitable requirement for the sustainable and healthy development of modern agriculture, and is also the fundamental way for the supply side structural reform of modern agriculture at present and in the future. This paper analyzes how to better promote the high-quality development of modern agriculture under the new situation.

1. Introduction

With the proposal of ecological civilization construction, China gradually advocates harmonious symbiosis, virtuous cycle and all-round development, and circular economy is becoming increasingly important. Although China's agricultural development has been greatly improved at present, the total grain output has continued to grow for 12 years, and has exceeded 1200 billion kg for three consecutive years. When the global per capita grain volume is only 351 kg, China has reached 475 kg [1]. Especially in remote agricultural areas, the whole small watershed is polluted, which restricts the sustainable development of animal husbandry and the construction of ecological environment. This problem has aroused great attention from government departments [2]. The development mode of circular agriculture combining planting and breeding refers to the development mode that takes biogas engineering as the main link, the recycling and resource utilization of feces as the key link, and mainly connects planting and breeding industries. The combination of planting and breeding is an ecological agricultural model that closely connects the planting industry and the breeding industry. It is a circular agriculture that takes the feces generated by livestock and poultry breeding as the fertilizer source of the planting industry. The planting industry provides feed for the breeding industry, and consumes the waste of the breeding industry, so that matter and energy can be converted between animals and plants [3]. Accelerating the development of circular agriculture with the combination of planting and breeding is an important measure to improve the utilization efficiency of agricultural resources, protect the agricultural ecological environment and promote the green development of agriculture. It can be concluded that the promotion and implementation of the agricultural model of combination of planting and breeding, rational planning of environmental resources and optimization of agricultural industrial structure can not only promote China's agricultural development, improve agricultural competitiveness and address agricultural environmental issues, but also comply with the requirements of policy development [4].

The mode of planting and breeding integration is to integrate agricultural resources well, and to achieve recycling and sustainable development. In agricultural activities, recycling technology and management means are adopted [5]. This mode can realize the clean production of agriculture, get green and organic agricultural products, recycle the breeding wastes, and meet the zero (minimum) emission of harmful effects of agricultural activities on the environment, and finally achieve the goal of solving the environmental pollution caused by unreasonable disposal of breeding wastes [6]. Faced with certain environmental pressure, the aquaculture industry also faces the problems of product quality and safety and environmental pollution caused by relying on chemical fertilizers and pesticides. How to promote the green and sustainable development of agriculture is the focus and difficulty at present. In order to grasp the basic characteristic of agricultural green development, which pays more attention to resource conservation, Rugao adheres to the principle of integrating agricultural development with environment, breaks through the bottleneck of animal husbandry development, speeds up the adjustment of planting structure, and strives to stimulate endogenous power and focus on agricultural green development. Therefore, the root correlation flow rate basic tree sequence modeling method is proposed [7]. Complex system modeling is the basis of understanding its system structure and realizing effective system feedback loop development and management. How to establish the structure model of complex system in a streamlined and standardized way is an important issue to be further studied. A structural model of the third-party pollution control system of planting and breeding combined with circular agriculture was established. According to the different links of raw material supply, fermentation production and output marketization of biogas project, and according to the root correlation flow rate basic tree entry sequence modeling method, a flow rate basic tree entry model with nine trees in the third-party governance system was established [8].

2. Consolidate the basic position of agriculture to promote high-quality development

2.1. Circular economy and circular agriculture

Circular economy refers to the core point of recycling and efficient utilization of resources, the basic principle of "recycling, reducibility and reusability", and the main characteristics of high efficiency, low emission and low energy consumption, which basically conforms to the concept of sustainable development. It is a complete change of the previous traditional model [9]. Accelerate the establishment and improvement of agricultural machinery operation standards and production management technical regulations that are compatible with the high-quality development of agriculture, and carry out the activities of establishing green organic food raw material standardized production demonstration parks (districts) and production bases. Actively promote the development of green, organic and healthy high-quality characteristic agricultural products, basically build and form a standard system covering the whole agricultural industry chain, and fully implement standardized production [10]. Further promote the integration of the whole agricultural industry chain, actively integrate agricultural machinery resources, update and purchase modern large-scale agricultural machinery, speed up the technical breakthrough of agricultural mechanization, and strive to build high standard agricultural fields that are concentrated and contiguous, ensure the harvest of drought and flood, high and stable yield, ecologically friendly, and suitable for mechanized operation. It is an economic development model characterized by resource conservation and recycling, which is harmonious with the environment. Its basic characteristics are efficient utilization, low emissions, and low exploitation, so that all energy and materials can be operated for a long time and effectively in the cycle of continuous operation, so that human activities can achieve the lowest degree of ecological damage. Recycling principle refers to that the product can be reused after its initial function is played, and at the same time, the related materials generated in the early production can also be reproduced and utilized. Reuse principle refers to that the product and outer package can be used repeatedly. In the process of product design and production, the primary idea is that the product can be used repeatedly, and the traditional idea of increasing product profits through single use is abandoned.

Developing circular agriculture combining planting and breeding is the need to promote the development of agricultural circular economy and an effective way to promote the green development of agriculture. Reasonable layout of farms, supporting construction of manure treatment facilities, development of farming-pastoral ecological breeding mode, reduction of pollution from the source, implementation of manure treatment and utilization technology, improvement of harmless treatment level of livestock manure, reduction of the impact of farms on the environment, realization of circular development of farming, aquaculture and biogas industry, and energy and fertilizer utilization of livestock manure. The concept of circular agriculture is an environment-friendly way compared with the concept of traditional agriculture. It specifically refers to the effective and multiple operation of various elements of agricultural resources in the farming system to achieve the perfect combination of economic, social and ecological effects, so as to achieve the purpose of increasing income and reducing emissions. Generally speaking, it is the use of material multiple utilization technology and recycling principle to achieve the reduction of pollutant emissions and the effective multiple utilization of resources.

2.2. Promote the green development of modern agriculture

Since the founding of China, the country has always placed the issue of "agriculture, rural areas and farmers" in a prominent position, and successively issued a series of "No.1 Document" issued by the central government to ensure the sustainable and healthy development of agriculture. From the guiding opinions of deepening the agricultural reclamation reform to the rural revitalization strategy, from the high-quality development strategy to the new round of the country's western development, agricultural workers should identify opportunities, seize opportunities and transform them, truly implement policy opportunities in agricultural production activities, highlight the characteristics of greening, quality improvement, specialization and branding, and strive to achieve the development goals of high-quality agricultural products, high industrial benefits, high production efficiency, high-quality operators, strong competitiveness and strong radiation driving force. According to the principle of paying equal attention to increasing production and increasing efficiency, supporting improved varieties and good methods, combining agricultural machinery with agronomy, and coordinating production ecology, we will speed up the construction of a technical system that is suitable for high yield, high quality, high efficiency, ecology and safety.

We will introduce modern information technologies such as the Internet of Things and artificial intelligence, improve agricultural precision, and improve land output, agricultural labor productivity, and agricultural benefits in an all-round way. Through the implementation of returning marsh residue and marsh liquid to farmland, we can realize the recycling of livestock and poultry breeding wastes, solve the environmental pollution problem in the breeding area, promote the sustainable development of the breeding industry, and improve the ecological environment of the breeding farm and its surrounding areas; Through the implementation of deep processing of organic fertilizer, a large number of concentrated or scattered livestock and poultry manure are processed into organic fertilizer, which is not only conducive to protecting the environment, but also can improve soil fertility, improve crop quality, effectively control the risk of water and air pollution caused by livestock and poultry breeding in the region, improve the quality of farmland soil, and improve the output of agricultural and livestock products and the environmental safety of the production area. Finally, the agricultural ecological environment is obviously improved, and the agricultural sustainable development ability is obviously enhanced. This agricultural model includes planting subsystem, breeding subsystem and biogas subsystem, which has distinct modern agricultural characteristics in this region. It can also verify the feasibility of applying emergy evaluation method to the integrated model of planting and breeding, and has far-reaching research significance. Through the application of this method, we can comprehensively evaluate the sustainable development ability of this research and development model, explore the coupling relationship among subsystems, and provide experience for the evaluation of integrated breeding and breeding model in other regions. To sum up, this agricultural circular economy model has higher emergy output rate, better economic development, and less pressure on local environment than the

traditional agricultural model, which reflects a higher level of sustainable development than the traditional agricultural model. Compared with the sustainable development of other agricultural ecosystems, this model has great advantages, and it also reflects the achievements of modern agricultural development at the current stage. However, for the development of modern and sustainable agriculture, the current integrated model of planting and breeding can't meet the needs of modern agricultural development well, and it still has great room and potential for sustainable capacity improvement.

3. Development and management of feedback loop of the third-party treatment system of farming-breeding-recycling agricultural pollution

3.1. Establish the structure model of the third-party pollution control system of planting and breeding combined with circular agriculture

The third-party treatment of environmental pollution refers to the business mode in which pollutant discharge entities, such as aquaculture units and farm operators, sign relevant agreements with government departments, and agree to hand over the treatment of pollutant discharge to a third party. As for the third-party pollution control mode of planting and breeding combined with circular agriculture, this mode is a complex feedback system that connects breeding and planting with biogas project as a link. Based on the theory of circular economy, the principle of circular economy is "recycling, reuse and reduction". Combined with practice, the practice of third-party pollution control embodies the principle of recycling of circular economy, that is, recycling of wastes. The waste in the system is pig manure and urine, and the waste resource products are biogas energy and biogas fertilizer resources. Based on the theory and practice, the annual pig manure urine volume, the annual biogas volume and the annual biogas fertilizer volume are determined as the flow level variables of the system. To sum up, the following nine groups of flow level and flow rate systems of the third-party treatment system structure of planting and breeding combined with circular agriculture pollution are determined.

The above innovative root related flow rate basic tree entry modeling method is used to establish the flow rate basic tree entry model of the third party treatment system of planting and breeding combined with recycling agricultural pollution:

First, based on the analysis of the correlation between flow rate variables, the causal chain sequence of flow rate variables characterizing the physical process of biogas engineering is obtained as follows:

$$R_2(t) \rightarrow R_3(t) \rightarrow R_7(t), R_2(t) \rightarrow R_5(t) \rightarrow R_6(t), R_9(t) \rightarrow R_5(t) \quad (1)$$

Therefore, the above arithmetic constitutes the basic tree-entry sequence of root correlation flow rate. If the three root correlation flow rates basically contain the same tree entry sequence, the tree entry sequence model describing the complete physical process of biogas project can be formed by the tree entry operation with the same variable linking force.

Based on the analysis of the correlation between the flow rate variables, the causal chain of flow rate variables describing the profit goal of the system development is obtained as follows:

$$R_2(t) \rightarrow R_1(t), R_6(t) \rightarrow R_4(t), R_7(t) \rightarrow R_4(t), R_9(t) \rightarrow R_8(t) \quad (2)$$

At the same time, three sequence models describing biogas engineering are established, and the sequence models describing the physical process of biogas engineering are as follows: At the same time, two series models describing the enterprise profits are established, and then other series models are established one by one. The series models describing the system profit target are as follows. Then, the basic flow rate into tree model of the third party treatment system of planting and breeding combined with recycling agricultural pollution is obtained. As shown in Figure 1.

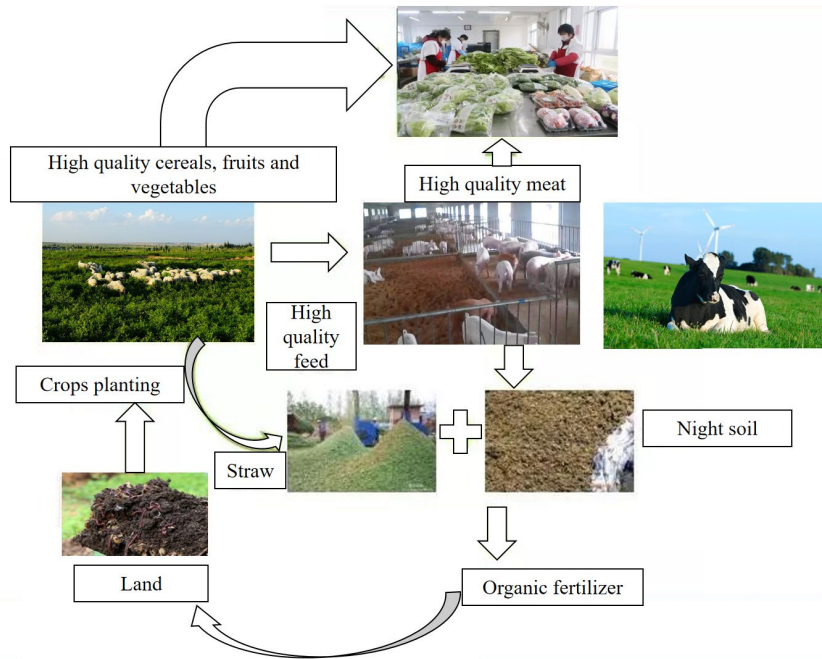


Figure 1 Basic flow rate into tree model of the third party treatment system for pollution from farming and breeding combined with recycling agriculture

All incoming trees are involved in the sequence formation. So far, a basic incoming tree model of the overall flow rate of the third-party treatment system of planting and breeding combined with recycling agricultural pollution has been established. It can be seen from the modeling process that the basic in tree modeling method of root related flow rate not only retains the simplified modeling characteristics of the basic in tree modeling method of flow rate, but also retains the integrity of the biogas project logistics process and profit target realization structure. It is an effective and standardized modeling method.

3.2. Model surface and descriptive statistical analysis

Through the questionnaire survey and on-the-spot investigation on the specific implementation of the integrated mode of planting and breeding in the research area, the statistical analysis results of farmers' participation in the integrated mode of planting and breeding are obtained. See Table 1 for details.

Table 1 Behavior of farmers participating in the integrated mode of planting and breeding

Type	Number	Percentage of valid samples
Number of households who have participated in this mode	122	53.51%
Number of households not participating in this mode	106	46.49%

According to the analysis of Table 1, among the survey samples, there are only 122 farmers who have participated in the integrated model of planting and breeding, accounting for 53.51% of the effective samples, while there are still 106 farmers who have not participated in the model, accounting for 46.49% of the effective samples. As for the main influencing factors of farmers' participation in the integrated mode of breeding and rearing, according to previous research and field investigation, this paper has constructed six influencing factors, including farmers' characteristics, personal cognition, family management characteristics, external environment characteristics and technical characteristics, which are subdivided into 24 influencing factors.

From the perspective of farmers' characteristics, whether to participate in specialized agricultural organizations is an important factor affecting farmers' behavior. During the communication with the staff of the local agricultural department, we learned that the local government has actively set up

specialized agricultural organizations at the township and county levels, and there are staff of the local agricultural department to solve agricultural problems for farmers, providing a better atmosphere for local agricultural technology guidance. Based on the theory of circular economy, the principle of circular economy is "recycling, reuse and reduction". Therefore, the annual pig feces and urine volume, annual biogas production, biogas liquid volume and biogas fertilizer volume are determined as the flow level variables of the system. Based on the analysis of historical statistical data, the waste pollution control of aquaculture industry is an inevitable requirement for the development of aquaculture industry. The profit of pollution control enterprises is the driving force for third-party pollution control, and the profit of planting industry is the driving force for the expansion of biogas fertilizer planting scale. The target variables of system development are the profits of pollution control enterprises and the profits of planting industry. Therefore, the annual profit of enterprises and the profit of planting industry are determined as the flow level variables of the system. According to the industry division standard, the third party pollution control system of just planting and breeding combined with recycling agriculture is divided into the breeding subsystem, the third party pollution control enterprise subsystem and the planting subsystem.

By implementing the strategy of attracting investment, we will actively attract and settle a number of major investment projects, promote the reform of mixed ownership and strategic reorganization, strive to create a favorable environment for all kinds of external investment, help more funds, technology, equipment, management and talents to come to the agricultural production field, realize the effective aggregation of all kinds of agricultural capital and strive for win-win development. To sum up, to promote the high-quality development of modern agriculture, manpower, capital, science and technology, land, innovation, system, capital operation and other elements are indispensable. Only by constantly improving the conditions of modern agricultural equipment, establishing a high-standard system of modern agriculture, strengthening the construction of agricultural standardization bases, enhancing the deep processing ability of agricultural products, extending the modern agricultural industrial chain, and further improving the modern agricultural cold chain logistics system, can we build a modern agricultural industrial system with the main characteristics of "clean production environment, green agricultural inputs, standardization of production process, recycling of industrial models, recycling of agricultural wastes, and quality supply of products", and accelerate the process of high-quality development of modern agriculture.

4. Conclusions

In recent years, with the sustained, stable and high-quality development of China's economy and society, and the acceleration of people's pursuit of a better life, China's animal husbandry is also gradually advancing, especially with more and more large-scale and centralized farming. However, the related government departments, experts and scholars attach great importance to the scientific and effective discharge and rational reuse of aquaculture wastes. The disorderly discharge has become a malignant disease of environmental governance, which has hindered the improvement of a good ecological environment. Therefore, it is imperative to establish the corresponding responsibility system from the source and the subject. According to the research idea of "model evaluation - resource planning - model optimization - model promotion", based on the method of constructing energy index system, multi-objective linear programming model and structural equation model, and on the basis of quantitative analysis, a methodological system for the evaluation, optimization and model promotion of integrated planting and breeding model is constructed from three aspects of economy, society and environment. SPSS and AMOS software were used to conduct follow-up processing on the survey data, and the key influencing factors in the promotion of the integrated planting and breeding model were finally obtained.

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