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Development of Ecological Agriculture in Xiantao City

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Abstract This paper takes ecological agriculture as the starting point. On the basis of field investigation and research on the basic situation of the development of ecological agriculture in Xiantao City, this paper focuses on the development models of ecological agriculture in some typical regions such as Xianfeng Village, Zhanggou Town, Chenchang Town and Shazui Street Office in Xiantao City. This paper analyzes many problems that affect and restrict the development of ecological agriculture in Xiantao City, and puts forward some measures and suggestions to promote the development of ecological agriculture in Xiantao City.

Key words Xiantao City, Ecological agriculture, Sustainable development

1 Introduction

As people's demand for "blue sky and white clouds, green ecology" is becoming more and more urgent, the improvement of rural production and living environment has more practical significance. At present, China's economic development has entered a new normal, and the development of ecological agriculture is also facing new challenges: there are many problems including the over-exploitation of agricultural resources, the aggravation of rural pollution, and the difficulty of ecological transformation; the small-scale rural production makes it difficult for new science and technology to give full play to its role; the new model of eco-agricultural development is mostly limited by region, resources and other factors, and the implementation effect is not good; the concept of ecological agriculture is not well publicized in rural areas, it is difficult for most farmers to accept, and there are even fewer practitioners. These problems make the development of ecological agriculture difficult. The party and the government require the people of the whole country to actively adapt to the new normal of economic development, further promote rural reform, and at the same time promote the construction of the rule of law in rural areas in accordance with the general requirements of stabilizing grain production and increasing income, improving quality and efficiency, and driving innovation, so as to realize the simultaneous development of new industrialization, informatization, urbanization and agricultural modernization. It is necessary to tap new potential for improving grain production capacity, open up new ways to optimize agricultural structure, seek new breakthroughs in changing the mode of agricultural development, achieve new results in increasing farmers' income, and take new steps in building a new

countryside^[1]. In this context, the development of ecological agriculture is becoming more and more important.

2 Typical case analysis of ecological agriculture in Xiantao City

At present, according to the requirements of the development of ecological agriculture in Xiantao City, several models of ecological agriculture have been introduced, which have reasonable planning and design, outstanding characteristics of ecological agricultural products, solid mass foundation and steady and orderly progress. It has a demonstration effect on the development of ecological agriculture in other areas of Xiantao City.

2.1 Ecological model of Xianfeng Village, Zhanggou Town

2.1.1 Ecological model. Xianfeng Village is located in the southeast of Zhanggou Town. This village has set up a comprehensive industrial cluster with planting and breeding industry as the main body, processing compatible with sales, integrating trade, industry and agriculture, combining production, processing and sales. The ecological model of Xianfeng Village, Zhanggou Town, is combined with horizontal pattern design and vertical pattern design, making use of the local rich water resources and the climatic conditions of rain and heat at the same period, and it has formed an ecological model of raising eel, feeding ducks and planting rice.

As shown in Fig. 1, weeds, plankton and bacteria in rice fields can be eaten by eels and ducks. The feeding and activities of eels and ducks have the effects of enlivening water, aeration, increasing oxygen and loosening soil, which are convenient for rice aeration, photosynthesis, root growth and effective tillering. On the other hand, the feces from eels and ducks can be used as fertilizer for rice, and the carbon dioxide emitted can contribute to rice photosynthesis. Rice not only requires high yield, but also sufficient fertilizer and good aeration, while eels and ducks require good water quality, high dissolved oxygen content and rich feed. In the paddy ecosystem, abiotic components are also necessary for

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the life of eels and ducks. The three ecological conditions complement each other and co-exist in such a benign ecosystem.

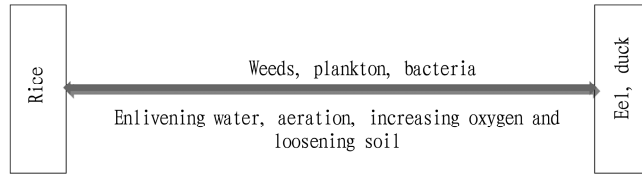


Fig. 1 Ecological model of Xianfeng Village, Zhanggou Town

2.1.2 Benefits and problems. Ecological benefits: various substances in the system can carry out a virtuous cycle to form a circular economic system that uses and promotes each other and takes what they need at the same time, thus forming a three-dimensional ecological structure that enables soil, water, and time and space to play a role. At the same time, the amount of waste is reduced, the utilization rate of chemical fertilizers and pesticides is reduced, and the ecological environment is greatly improved.

Economic benefits: through the formation of production chains of supply and distribution enterprises in planting, breeding, special aquatic products, food processing, feed processing, *etc.*, an enterprise group combining science and technology, agri-

culture and industry, commerce and trade is formed. Zhanggou Town has launched local characteristic aquatic products to the outside world, which has produced high economic benefits. In 2015, the per capita net income of Xianfeng Village exceeded 5 000 yuan, and the average income of each household was about 25 000 yuan.

Social benefits: this model improves the life of farmers, improves their quality of life, increases their enthusiasm for entering the market organization and participating in the process of co-building ecological villages, and accelerates the process of rural economic restructuring and agricultural industrialization.

There are problems: this model is limited by the division of regions and resources, and can not make full use of agricultural machinery, so it is difficult to form scale effects.

2.2 Ecological model of horticulture farm in Chenchang Town

2.2.1 Ecological model. The ecological agriculture model of Chenchang Town is to adjust the agricultural industrial structure, change the single production structure based on planting in the past, and establish a compound ecosystem of agriculture, forestry, animal husbandry and fishery.

Table 1 Ecological model of horticulture farm in Chenchang Town

Functional zoning	Main crops	Interaction
Fruit tree area	Navel orange	Rotten fruits and pests used as chicken and duck food
Livestock and poultry area	Chickens, ducks and pigs	Manure as fertilizer for grain production
Grain area	Rice and wheat	Returning rice straw and wheat straw to the field
Vegetable area	Vegetables in season	Vegetable leaves to fertilize the field
Processing area		Processing navel oranges, livestock slaughtering, animal and plant products
Biological material processing area		Gasification of straw and rice husk and treatment of livestock manure

As shown in the above figure, navel oranges are mainly planted in the fruit tree area, and seedlings and vegetables are planted between the rows of fruit trees before the fruit trees grow into forest, so as to make full use of the living habits of crops for mutual use and joint growth. Chickens, ducks and pigs are free-range in poultry and livestock areas, and their manure can be used as organic fertilizer for grain production and vegetable cultivation. In the grain area, rice is mainly produced, and wheat is also grown. During the harvest season, the straw can be used as a source of feed. The vegetable area is dominated by the cultivation of seasonal vegetables, and the abandoned vegetable leaves can not only be used to fertilize the field, but also can be eaten by chickens and ducks. The processing zone is mainly used for processing navel oranges, slaughtering livestock and processing a variety of animal and plant products, promoting product sales and so on. The biological material processing area mainly deals with the gasification engineering of straw and rice husk and livestock manure for recycling and reuse.

Ecological benefit: after a period of experiment, the average amount of chemical fertilizer used in one hectare of cultivated land in Chenchang Town has decreased from 125 kg to less than 30 kg,

and orange production has basically abandoned the use of chemical fertilizer. The content of soil organic matter is also increased while saving fertilizer and reducing the pollution of chemical fertilizer to the environment. Such a benign ecological cycle has enabled almost all the organic waste of the ecological horticulture farm to be fully utilized, and the ecological environment has been greatly improved.

2.2.2 Benefits and problems. Economic benefits: Chenchang Town has stepped into the benign development track of regional planting, large-scale management and clean production, and the advantages of large-scale orange planting have been continuously consolidated and improved. The existing area of citrus and navel orange is 73.33 ha, and the animal and plant products and processed agricultural products have achieved good economic benefits. Its agricultural products are favored by customers, supply exceeds demand, and sales are good, which makes the average annual income of farmers in Chenchang as high as 4 500 yuan per person.

Social benefits: Chenchang Town's ecological cultivation of navel orange has been recognized by relevant departments. "Chenchang Orange" has been included in the national pollution-

free food plan, and local residents are very proud of it. The ecological model of horticulture farm in Chenchang Town has also become a typical model of ecological agriculture.

Existing problems: according to the investigation, the division of labor of the horticulture farm is not clear, the quantity of agricultural machinery is small, and it has not been fully utilized. In addition, there is monopoly management of navel orange, and farmers' participation is low.

2.3 Ecological model of Duliu Village, Shazui Street Office

2.3.1 Ecological model. Duliu Village is located in the west of Shazui Street Office, at the entrance to Yihuang Expressway in Xiantao City, and is the south gate of Xiantao City. It has superior geographical location, good infrastructure, orderly villagers' housing planning, with village-level roads extending in all directions, convenient transportation, complete water supply and drainage facilities, known as "Xiantao face". At the end of 2005, on the basis of learning from "agritainment" in the suburbs of Chengdu and Changsha, Xiantao Municipal Party Committee and Municipal Government decided to carry out the pilot project of "agritainment" eco-agricultural model in Duliu Village.

This model is an ecological model with the agritainment project as the carrier. Relying on the location advantages of being close to the city and close to the entrance to the expressway), it attracts urban residents and businessmen to come for rest and sightseeing. It reasonably develops local agricultural resources, vigorously develops ecological agriculture, forms ecological plantations, and makes use of the advantages of natural resources such as courtyards, ponds, nurseries, vegetable plots and rural cultural resources to develop "pure natural" eco-tourism. In addition, the Duliu Village government also strictly restricts the discharge of pollutants, implements the "smokeless" project of agricultural houses, reasonably and effectively controls the discharge of industrial smoke and dust, carries out non-power treatment of sewage and wastewater, and achieves up-to-standard discharge. It also advocates the cultivation of agricultural products to use little or no pesticides and fertilizers to really form a green and ecological paradise of "blue sky, clear water".

2.3.2 Benefits and problems. Ecological benefits: reduced discharge of pollutants, shady trees, flowers and plants everywhere, beautified ecological environment, optimized living environment of residents.

Economic benefits: by participating in the business activities of agritainment, the local residents can carry out business activities in various forms: they can not only operate by the family as a unit, but also rely on the location advantages of the homestead to lease the house. This way enhances the enthusiasm of farmers to participate in agritainment. It is predicted that after the completion of the project, the annual reception capacity of Duliu Village agritainment will reach 1.4 million people at a time, with an average income increase of 10 000 yuan per household. After the completion of the second phase of the project, the annual reception ca-

capacity can exceed 2 million people at a time, tourism income can reach more than 50 million yuan, and the average income of each household can be increased by 45 000 yuan.

Social benefits: the rise of "agritainment" has solved the employment problem of more than 1 000 labor forces, increased the income of villagers, and improved the quality of life of residents. This not only finds a good place for urban people to find run and return to nature, but also enables villagers to integrate into the new life of the city. At the same time, it improves the living environment of rural life and enhances the civilization of farmers.

Problems: due to the lack of reasonable planning, some parts of Duliu Village have been forcibly transformed, which has brought damage to the ecological environment. In addition, the farmland of many residents is occupied, resulting in a lot of adverse social effects.

Through the successful practice of these models, it further explores the objective inevitability of the development of ecological agriculture in Xiantao City. Its remarkable economic, social and ecological benefits fully reflect the concept of sustainable development, but there are still many problems left behind.

3 Problems in the development of ecological agriculture in Xiantao City and cause analysis

In the process of the development of ecological agriculture, Xianfeng Village, Zhanggou Town, Chenchang Town and Duliu Village, Shazui Street Office, have taken a series of effective measures, which have laid a certain foundation for the sustainable development of agriculture, but there are also many problems, mainly reflected in the following aspects.

3.1 Weak ecological consciousness of people In Xianfeng Village, Zhanggou Town, before the implementation of the ecological model of rice fields, ducks and eels, far-sighted entrepreneurs tried it in advance. After many times of publicity to the villagers and taking the actual economic benefits as an example, they persuaded the villagers to join the Eel Breeding Association and achieved the present results. Farmers in Chenchang Town do not participate much in the construction of navel orange orchard. On the one hand, farmers do not understand the planning of navel orange orchard, do not know the development prospect of navel orange orchard, and do not have enough enthusiasm. On the other hand, the production of navel orange orchard needs sufficient funds and advanced technology, and developers monopolize it in order to reap huge profits. At the beginning of the implementation of this "agritainment" model in Duliu Village, Shazui Street Office, many villagers did not know what benefits this model would bring. In the planning process, many residents refused to move, causing a lot of unnecessary disputes. All these are due to the lack of ecological awareness and foresight of agricultural laborers. Thus it can be seen that most of the villagers only pay attention to the immediate pecuniary benefits while neglecting the long-term eco-

logical benefits. This phenomenon seriously hinders the promotion and innovation of ecological agriculture model in Xiantao City.

3.2 Aggravating pollution of agricultural environment and difficult development of ecological agriculture

In most areas of Xiantao City, a large number of pesticides and fertilizers were used in the past, resulting in large-scale pollution of agricultural land. In areas where water shortage is serious, groundwater is taken for crop water supply. The increase of diseases and pests for crop growth has also intensified the use of chemical fertilizers and pesticides, forming a vicious circle, the agricultural environment has been seriously damaged, and the development of ecological agriculture in Xiantao City is difficult. The destruction of agricultural environment, on the one hand, increases the cost and difficulty of the treatment of agricultural environmental pollution. On the other hand, the growth environment of crops has deteriorated and even has a direct impact on human health. Due to the massive application of chemical fertilizers and pesticides and the irrigation of untreated sewage, carcinogenic, teratogenic, and mutagenic pollutants enter the human body in large quantities through vegetables, grain, meat, eggs, milk, aquatic products and so on, becoming a chronic killer threatening human health^[15]. For example, the production of Chenchang orange is a pollution-free green food formed through strict procedures after spending a lot of manpower and material resources. The development of the "agritainment" ecological model of Shazui Street Office has cost 100 million yuan on residents' relocation, pollutant treatment and control. The extensive destruction of agricultural environment makes it extremely difficult to popularize the eco-agricultural model in Xiantao City.

3.3 Lack of motivation for scientific research and innovation

In many areas of Xiantao City, most workers are engaged in the secondary and tertiary industries or go out to work. Most of the rural surplus labor force has low academic qualifications, and there is serious brain drain. The scientific research institutions are imperfect and it lacks a scientific research team focusing on the development of ecological agriculture. The second is the lack of scientific research funds, and the lack of sustainable support for the development of ecological agriculture in Xiantao City. In the development of ecological agriculture model in Xianfeng Village, Zhanggou Town, Chenchang Town and Duliu Village, Shazui Street Office, no separate R & D institutions have been set up, which has greatly affected the long-term sustainable development of ecological agriculture.

From the above analysis, it can be seen that in the process of the development of ecological agriculture in Xiantao City, the formation of farmers' ecological concept, the treatment of agricultural environmental pollution, the improvement of agricultural management system, scientific research innovation and so on are very important. It has a far-reaching impact on promoting the sustainable, stable and coordinated development of agriculture in Xiantao City.

4 Measures and suggestions for promoting the development of ecological agriculture in Xiantao City

4.1 Changing the concept of development

In order to promote the breakthrough of farmers' concept of development, first of all, it is necessary to set up special training and publicity institutions for "ecological agriculture" in various villages in Xiantao City, so as to encourage farmers to actively participate in building a beautiful home and a harmonious new countryside. The content of publicity should include correcting farmers' misconception of "pollution first, then treatment; attaching importance to development and neglecting environmental protection; grasping the economy and losing ecology"; emphasizing the importance of environmental protection; earnestly attaching importance to the treatment of ecological protection and environmental pollution in agricultural production. Secondly, various areas of Xiantao City should set up a reward and punishment system, give material or financial rewards to the residents who advocate the development of ecological agriculture and make successful practice of ecological agriculture, give moral encouragement to the innovative eco-agricultural model for the village and protect its property rights. If the residents' proposal brings benefits to the development of ecological agriculture in this village, they can be given more generous returns. If villagers report deforestation and destruction of the ecological environment, they can be given certain rewards and the violators should be punished accordingly. In addition, if the village has some conditions, well-known scholars can be invited to conduct academic lectures to spread the concept of eco-agricultural development.

4.2 Focusing on scientific planning and layout and strengthening the government's management and support for ecological agriculture

In view of the destruction of agricultural environment in most areas of Xiantao City, the government should strengthen the management of environmental pollution control and the management of problems in the development of ecological agriculture, and make scientific plan and layout for rational distribution of rural resources. First of all, under the condition of understanding the development of characteristic ecological agricultural products in this region, the government should discuss with professional scholars, make scientific and rational plan for the region, choose a suitable development model of ecological agriculture, and make a plan for the development of ecological agriculture in each village. According to the opinions of local residents, it is necessary to develop ecological agriculture and give guidance in the process of development. Secondly, it is necessary to formulate preferential policies conducive to the development of ecological agriculture, such as reducing taxes, providing production subsidies to enterprises developing ecological agriculture, and raising the purchase price of ecological agricultural products. In addition, the government should support the leading enterprises of ecological agriculture to promote regional development and promote the employment of rural surplus labor force. It is necessary to encourage en-

terprises and farmers to innovate various models of ecological agriculture, carry out cooperation through various channels, extend the chain of industrial development, and improve their ability to survive and develop.

4.3 Relying on advantages and demonstration drive and innovating the brand and characteristics of ecological agriculture in Xiantao City Relying on the geographical and resource advantages of various areas in Xiantao City, referring to the eco-agricultural development model of Xianfeng Village of Zhanggou Town, Chenchang Town and Duliu Village of Shazui Street Office, and drawing lessons from their successful experience, it is necessary to develop a suitable eco-agricultural development model and innovate the brands and characteristics of ecological agriculture in this region. First, it is necessary to promote exchanges and cooperation among various regions, give full play to their geographical and resource advantages, make rational plan, and make effective use of resources. Second, the government should set up a platform to give economically backward areas the opportunity to fully learn

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term effects in control of pollution caused by breeding, it is necessary to improve the legal system and manage it in accordance with laws and regulations. The education and training of practitioners should be strengthened. Relevant knowledge and skills that farmers of different scales should have are clarified. The employment access system is implemented to solve the problem of ignoring environmental protection in the livestock and poultry breeding industry from the source. It is necessary to strengthen the management of the "three areas" of livestock and poultry breeding. According to local conditions, combined with local people's living habits and economic development level, the red line of the "three areas" for livestock and poultry breeding is delineated scientifically. The density and scale of livestock and poultry breeding in each area are determined scientifically. Livestock and poultry breeding activities in accordance with laws and regulations are supported. This can not only maintain the healthy and stable development of breeding, but also protect the ecological environment. It is necessary to establish treatment facilities for diseased livestock and poultry and carcasses arising from breeding. Illegal acts of purchasing, trading, processing and operating diseased livestock and poultry and their carcasses are cracked down severely. The construction of the pastoral administration and law enforcement team is strengthened, the pastoral administration and law enforcement is enhanced, and illegal breeding activities are banned and cracked down. In particular, it is necessary to severely investigate and punish those breeding owners who have caused serious damage to the ecological environment, and those that constitute a crime

from the experience of successful development of ecological agriculture, and to provide financial support for the development of ecological agriculture in areas where agricultural development is backward. Third, all regions of Xiantao City should focus on developing their own characteristic agricultural products and promote the concentration of resources and funds to superior industries and products.

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are transferred to the judicial organs, so that breeding development and ecological protection complement each other, coordinate and promote each other.

4 Conclusions

The construction of ecological civilization is a major strategy for China's economic and social development. The breeding industry is the basic industry of China's national economy, and it is related to people's livelihood and effective supply of the market. Under the current important task of ecological civilization construction, how to make the breeding industry prosperous and the environment ecologically livable is an important issue faced by the development of breeding industry and a hurdle that must be overcome. We firmly believe that party committees and governments at all levels and practitioners will be able to emancipate their minds, seek truth from facts and explore a new way for the breeding industry to adapt to the economic and social development of the new era.

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