

The Research of Developing Green Agriculture: Take Pengxi County of Sichuan Province as an Example

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Abstract: In recent years, hilly country of Sichuan province has discovered many specific ways to develop green agriculture. In this article, we choose Pengxi County as an example and went to 31 leading enterprises of city and county level at Pengxi County. We dissected and studied the way and strategies to developing the green agriculture, providing suggestions for “1025” planning and the strategy of the West Development. This paper intend to improve the development of the modern agriculture in Sichuan province and accelerate the step of building the large-scale, standard, high-efficiency, branding and environmental friendly agriculture, contribute to establish productive, high quality, high-efficiency, environmental friendly and safe modern agriculture industry system

Key words: Route Choice; Green Economy; Development Barrier; Countermeasure

1. ROUTE CHOICE

1.1 Follow the Way of Recycle Agriculture

Pengxi County put the modern animal husbandry as the core of the agriculture since 1998 and focus to discover “swine–swamp-fruit-grass–geese–fish” recycling agriculture among this the swine production is the most important step. In addition, they also pay attention to “crops-mushroom-vegetable-vegetable-vegetable” based on the food-mushrooms plantation, green aquatic product based on light catches, original ecological farming and forest farming.

In the first kind of recycling agriculture model, the division of modern production, modern plantation and the area of entertainment are clear-cut, operating closely and independently. The different area functions are recycling; complement each other to achieve ecological, environmental, safety, and efficiency. Take the Huanheng Taifeng PIC Pig breeding cycle Agriculture farm as an example; they have 20,000 square meter of breeding-ferment bed and 20,000 swine feces biological decompose. They have basically achieve target “zero pollution and zero emission”. The farm has constructed large-scale digester, biogas power generation equipment; wastewater treatment wetlands will be 1000 a pig excretion of feces and generate biogas, biogas as a fuel or power to solve farm electricity. The company also built a large fish ponds, planting fruit trees, 100 acres of flowers, the use of standardized, pollution-free farming and modern biotechnology, the theory of circular economy and energy saving technology, to achieve the Union animal husbandry, farming and recreational second line sightseeing agriculture. Such circulation patterns in the county agricultural standardization pigs, rabbits and other farm trials ecological success, are gradually promoted in the free-range raising farmers.

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The second recycling agriculture pattern has impulse the development of emerging distinctive industry. Take the “crops-mushroom-vegetable-vegetable-vegetable” build by Dashi County Wumu village as an example, the first year after the rice harvest; make full use of rice straw and other waste to plant mushrooms. Meanwhile we can grow Taiwan balsam pear outside the shed and the second year after the end of April to the February in the third year we can cultivate three quarters of continuous of vegetables. This three-dimensional, rotation, circulation patterns, the use of advanced planting technology, full utilize of light and heat resources, increase the multiple crop index, harvested five times in 2 years, and the use of facilities for cultivation lead to a substantial increase in the yield production. That will achieve high yield, high-quality, efficient, ecological and safe purpose. According to preliminary test production statistics, the value of the entire cycle is about 30,000 yuan per acre that is 16.3 times than a single cultivation value (1840 yuan). In 2009, the county introduced the professional mushroom cultivation, processing and marketing of leading enterprises, the development of mushrooms, edible fungus such as seed production, demonstration planting 8,000 acres of Science and Technology Park, to guide farmers to plant 12,000 acres.

It will change various types of crop straw into mushroom cultivation materials for instance, using fast-growing trees such as poplar, cedar and mulberry trees, peach trees, branches, etc., made of scrap wood labeled mushroom, mushrooms and other edible fungi output improve the value of trees, the farmers had cut down a tree can only sell 2-5 yuan, and now the development of mushrooms just tick each tree tree branches and other income of 10 yuan per year; mushroom out of post-waste the waste but also for the fast-growing trees, vegetables, fruit trees to provide fertilizer. This eco-cycle model can effectively protect agriculture sustainable use of forest resources and the ecological cycle of sustainable agricultural development.

The third cycle of agriculture, pheasant, pheasant run free killing of forest pests such smooth trap or light hunting forest pests, avoid using chemical pesticides and insecticide which will pollute the environment. Not only it can protect forest resources, but also take food from the insect. This method benefits the trees and landscaping and protects the ecological resources. Take Shanyou farm as an example according to expert's rough estimate, 20,000 pheasant can consumption more than 50,000 pounds *Parocneria furva*. That method effectively avoids the nearby forest pest outbreaks and provides for the development of green economy a good ecological environment.

1.2 The Development of Environmental Friendly Agriculture

Pengxi County from 2008, take the development of the original eco-geese as a breakthrough, step by step, guide farmers and owners, and control of environment of origin, input use, soil testing and fertilizer science, active application of bio-fertilizers, pesticides, feed, construction of high-quality grain, high-quality fruits, vegetables, finegreen ecological agriculture, livestock and poultry. Here, we choose two industries to analyze the county from the development of ecological agriculture practices and benefits.

The first one is original eco-geese industry. County in the development of the original eco-geese industry, first hire of Sichuan Agricultural University, Sichuan Animal & Veterinary school cooperation with the leading enterprises to track all over the world to master the ecological requirements of the quality of agricultural research to develop the first eco-geese from the original source to the market sales of the "Seven unity"(uniform for the species, a unified technology, uniform quality and unified collection, uniform processing, unified brand and unified sales) production standards and quality test standards. And then Then, the industrial base for production of pipeline construction as "the first workshop" which obligated by County Animal Husbandry Bureau of Food. The leading company of eco-geese distributes the unified goose seedling and leg to farmers and registration and the farmers keep the original eco-geese as well as foot ring numbers into computers, using computerized identification system management. Through the whole breeding process, company technicians offer hands-on-hands guidance, the poultry feeder should follow the “the product standard of original eco-geese in Suining city” and the production process of original eco-geese in Suining city”.

As part of the standardization of production processing and marketing, ecology, control of the original eco-geese through the company's self-test, sampling and quality inspection departments in Beijing, Shanghai, Chengdu and other five-star hotel chef tasting, meet the quality requirements of

high-end consumer market as Beijing, Shanghai, Shenzhen, Changsha and other cities specifically for large supermarket products. Farmers sell an original eco-geese price is 20 yuan per kilogram, higher than the general goose 8 Yuan, the price of one original eco-geese goose is higher than the common ones at least 30 yuan.

The second is *Zanthoxylum armatum* var. *novemfolius* industry. From one local green pepper grower to start, encourage him to cultivate the high quality breed. Let him to set up the company and build fabrication plant in order to leading farmers planted 30,000 acres, and increase brand and market development efforts by China Organic Food Certification. According to the survey, Muping value of more than 3,500 yuan, 1,000yuan cost per acre, the net income is 2,500 yuan per acre which is 10 times than planting of crops. In the construction industry, farmers voluntarily founded the "Branch+ Association" type of rural cooperative economic organizations (Pengxi nine cooperatives and pepper Yeh branch), the early members of the community has grown to 1, 566 thousand households, led farmers to more than 35,300 households.

1.3 The Branding Agriculture Way

Pengxi county has enhanced the cooperation with Sichuan Agricultural University, Sichuan Academy of Animal Science improve the pigs, geese, fruit, vegetables, tea and other agricultural service model compound technology experts to create "technology + Financial + Policy" service mechanism, the first nationwide implementation of the original eco-geese electronic ring which can be traced back quality standards, focus on building the PIC pigs, organic rice, low-late pomelo and Pengxi peach the standardization of production, testing and marketing system. Initial success of agricultural brand building, 51 million acre of cultivated land in the county in May 2009 by the Department of Agriculture certified pollution-free agricultural production base as a whole, pollution-free agricultural products certification report, the number of green food and organic food is up to 23. Yonghong low-late pomelo, Pengxi peach selling access to the Chinese name if the title was awarded China's quality peach county town, the high β -carotene in sweet potatoes is awarded by foreigner and Chinese Academy of Sciences experts and Professor called Pengxi super sweet potato.

1.4 Export-Oriented Agriculture

Pengxi County vigorously carry out high-quality, features and green agricultural products into metropolis and large market, for the plane named "Ten Facing" activities and "Three in" project, opening up the implementation of agricultural cooperation strategy to promote the importance of traditional agriculture to export-oriented features the development of modern agriculture. First, the implementation of export-oriented agricultural development, please come in strategy. Cited in accordance with the "big" drawing "strong" investment strategy, the introduction of foreign, national leading enterprises settled in building mushroom, chicory and boutique vegetables, 13 modern agricultural demonstration areas, showing the original eco-geese, eco-rabbits, quality vegetables and flowers. Invite the United States, Brazil and 8 well-known experts and professors, for instance as the Chinese Academy of Science FAN Yunliu and other 20 national agricultural, nutrition, medical experts. Programs in CCTV7, Farmer's Daily, other province and city level media, Guangyou vermicelli and Trust-Mart participate in the annual China bio-fortification projects and high β -carotene exhibition of new varieties of sweet potatoes, impulse t the sweet potatoes into the Pengxi advanced consumer market.

The second is the implementation of export-oriented agricultural development go strategy. To organize, participate in agriculture as a platform for exhibition, outside of agriculture into a vast market. Six leading enterprises have participated aerospace exhibition, Western China Agricultural Fair and the Shanghai Agricultural Fair, with great success. Particular in Shanghai Agricultural Fair the products made in Pengxi County has showed six characteristics 1) they become the most popular agriculture products of Sichuan Province. 2) The low-late pomelo is welcomed by people in Shanghai. 3) The super sweet potato and the *Zanthoxylum schinifolium* have sold at an amazing high price. Man-made vermicelli is sold at 20 yuan per kilogram, the fruit-carrot is sold at 20 yuan per kilogram, the original eco-geese egg is 8 yuan per one, low-late pomelo plant seed is 20 yuan per one, the low-late pomelo fruit is 30 yuan per one and the low-late pomelo miniature landscape is 1,500 per one. 4) The Pengxi County just intended to show their products at the exhibition, astonishingly the products were sold out quickly at the exhibition. 5) Lots of returned

customers. 6) Many products have sign the contract at the exhibition and they all find the co-operation partner at Yangtze River Delta.

The third one is borrowing the boat and selling the products abroad. With the help of some leading exports enterprise as Minzhong Fujian, Lvyu Tianjin and Lantian Sichuan, the Pengxi County has succeed in selling the mushrooms, original eco-geese and garden bean to abroad markets.

2. THE BARRIERS OF DEVELOPMENT

At present, the development of green agriculture has made amazing progress but it still faces some difficulties which will restrict its further growth.

2.1 Existing Problems

In general, there is “three deficiency and three low” problem in the development of the green agriculture.

1) The first deficiency is lacking green agriculture bases in large scale. That will lead to the low scale merit. Although a good many agricultural products such as "Wenjing chicken", fruit-carrots, low-late pomelo and green pepper, scattered planted and low yield due to small-scale base. “No one known because keeping in the private chamber” and no popular products in the market, there was once freak phenomenon exist in Sichuan Province. No one ask the famers to buy their products at the same time owners use high-price to acquisition the products and get nothing. Outside Province Company even overseas businessmen willing to sign the longtime contract with the company in the Pengxi County, but companies cannot "react". Korea raspberry company want to sign the long time contract with the county after they short visit the grapefruit industry. The Korea Company intends to import large quantities and sold the products to European Union but the Yonghong late-low pamelo turned down the requirement since the low production.

2) Lack green agriculture business in large-scale so the degree of production and marketing integration is low. There are few agricultural processing enterprises in Sichuan Province expect Gaojin, Meining in Chuanshan district and Tuopai in Shehong County. The deficiency of leading processing company will result that the famer can only sell primary agricultural products, industry chain is short and low added value. Actually, Pengxi is rich in grain production, high-quality rapeseed production base and famous for transferring swine. In 2009, total grain output has reached 350,000 tons; the total output oil is 40,000 tons and 990,000 slaughter pigs (PIC export number is more than 30 million), but at the market can we hardly see "Pengxi made" rice, flour, oil, and pork products.

3) Lack the well-known brands of green eco-agriculture so the degree of recognition in the market is low. The development of ecological agriculture and the establishment of brand in Sichuan Province are far behind with the advanced area. At the same time, it cannot satisfy the requirement of the green agriculture. For instance, in Pengxi County they have received three organic food and 2 green certifications, but most agricultural products limited in provincial and municipal level, not remarkable in national range. As a result the products are difficult to be recognized by consumers.

2.2 Restrict Factors

The current development of green agriculture has many constraints, such as weak infrastructure, poor drought prevention, less resources per capita of agriculture, the lower the quality of workers, low level of mechanization and the social service system is not perfect, but obviously in three aspects.

1) The distance between ideologies

On the one hand the traditional peasant mentality compete with the large market causing many farmers and cadres do not want to pay attention to the green ecological agriculture and mistakenly believe that traditional agriculture is reliable, although farmers cannot get rich (get rich by work outside the home) the traditional agriculture solve basic rations, they do not worry about market risk. They hold the negative attitude of the market, resulting in a fatalistic statement. The other cadres and the farmers have bias of green agriculture and they do not know what green agriculture is and how to carry out the green agriculture. What

is worse, they became afraid of the green agriculture. The cadres will simply task decomposition instead of intensive propaganda, organization and coordination, the people will "wait, rely on, ask" seeds. The farmers won't pay attention to the management which will cause a vicious circle.

2) The distance between standardized technologies. In one hand, there are standards for quality, inspection, production, processing, storage and sale of original eco-geese, green beans and other green ecological agriculture products but lack of uniform, standardized, easy operating and sequencing standard. Sichuan has begun the development of organic rice, eco-aquatic, it is fair to say that many places can not meet the requirements because either owners or farmers can keep the process in control. On the other hand, it is difficult to promote the agricultural standardization of green technologies. As for green beans Industries, since it is processed exports to the EU's green industry, so it has strict quality requirements. As part of the farmers planting, land, water and air quality are no problem according to technical requirements, however, lots of farmers do not pay attention to the cultivation and harvesting not on time. Naturally, the products can't meet quality standards and the company is not acquired. They have no choice but to throw the beans away without any profit.

3) Serious shortage of inputs. Nearly 2 years, Sichuan in the county were to gradually increase the development of green agriculture projects and funds to support the implementation of way to stimulate the enthusiasm of the owners invested, but the lag of the ways and means for financial services, resulting in farmers and owners cannot be let go boldly to expand the scale of the development of green agriculture. A chicken farm in Mingyue Town of Pengxi County is famous for its high quality, good taste and rich nutrition products and can't meet the market demand. The government decide to invest 1 million to build standardized farms, drive the around village more than 300 farmers engage in joint pheasant foster care, but venues and other infrastructure cannot be secured, banks can only engage in micro-credit loans, the amount is no more than 4 million. As a result the funding will do nothing to the development of the green agriculture.

3. COUNTERMEASURE

We have proposed those countermeasure based on the suggestions provided by the party and governmental cadres to solve the problem.

3.1 Specific the Target and Insist to Grasping the Development of the Green Agriculture

Situation is different in parts of Sichuan, the development of ideas will not be the alike, but the general idea is basically the same type. The guideline is the "Three Rural Issues" policy to develop modern agriculture and promote agricultural efficiency and rural incomes. The goal of building a harmonious new countryside, should be based on natural resources, relying on science and technology, promoting green eco-agricultural technology, establish and improve the ecological system of agricultural organization and management, production management system, improve the system of agricultural inputs, technical service system, supervision system and industrial management system, cultivate the leading enterprises, pay attention to enlarge the scale, standardization and specialization of the production and circulation. In addition, make effort to create pollution-free, environmental friendly and organic food brand expand the marketing of agricultural products market, raise the modernization of agriculture. In practice, we should let the work be oriented towards the future, to the world and appropriate development planning. Have a clear long-term development script and use the blue print and the experiences to guide the work, make every effort to promote the program and make obviously progress in each year. We plan to change appearance in 3 years, 5 years on the new stage and make a giant change within 10 years.

3.2 Continue the Work Step by Step According to the Target

According to "green economy in Suining area index system", we study and improve the long-term target of development of the green agriculture such as bases establishment index, profit index and so on. Focus on "grain, animal husbandry, vegetable, tea and medicine, fruit trees" five supported industries to make detail index in order to achieve short-term target. During the work, we should find the right direction and implement the pollution-free production, standard and large-scale operation. We plan gradually build a

well-known green and organic brand, origin geographical protected brand and try to be the “Star” industry in 2020.

3.3 Unity the Thinking and Continue the Work Firmly

The practice in Sichuan Province has demonstrated that if we want change the concept of some people we should begin with the propaganda work. Use the reality which shows the green ecological agriculture help farmers increase the income and educate the cadres to enhance the awareness and the importance for the development of the green agriculture especially for the feasibility of execution green agriculture. The purpose of the education is to tell the people don't be frustrated by a temporally success or failure. In the promotion work, we can utilize television, radio, magazine, posters and other means to carry out the propaganda work. Publicity in a large range set up the environmental awareness and creates a whole atmosphere of developing green agriculture. We should sum up the typical experiences and lessons conscientiously, analysis of the causes of poor efficiency, eliminate the negative impact; positively view the failure and the difficulties in the development and enhance the confidence. Finally we will change the statement from “require me to do” to “I desire to do”.

3.4 Create Spotting and Find Leading Models to Develop

1) Build the green ecological demonstration farm. Currently, the municipal government is focus on establishing 12 large-scale green ecological demonstration farms. These farms have played an important role in exploration the green ecological agriculture and promotion the development.

2) Build the demonstration green agriculture industry. According to the reality and the construction process, we state that every district should recognize the advanced industry and put it in priority for example, the boutique vegetables and flower seedling industry of Chuanshan district, edible fungi and green zanthoxylum industry in Pengxi County, the eco-production industry in Hongshe district, the green swine production industry in Anju district and the high quality rape industry in Daying County.

3) Build the demonstration ecological agricultural area. According to the requirement of “village has more than 100 acres, town has more than 1000 acres county has more than 10,000 acres and city has more than 100,000 acres”, focus to build demonstration and specific industry in order to build hundred acre demonstration spot, thousand acre demonstration district and the ten thousand acre demonstration zone.

3.5 Innovate Mechanisms to Ensure the Development of the Green Agriculture

1) Innovative eco-agriculture industry combines with the leading enterprises. Based on the equality and mutual benefit within the leading enterprise, specific organization and the farmers, try to build the economic system via contract, the joint stock cooperative system, cooperative operation double rebate and other methods.

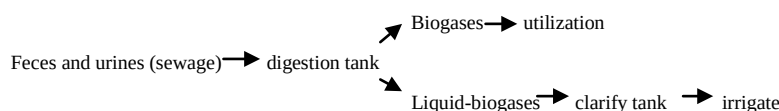
2) Establish the land-transfer mechanism and improve the development of the leading enterprise. According to the experience of the Tiangongtang village in Dashi Town, introduce the land concentrate to the operating owner and promote the large scale operation. Focus their efforts on the formation of cooperative land transfer; attract investment, developing construction agriculture, ecological agriculture, leisure and sight-seeing agriculture.

3) Innovate the input mechanisms. The government works like a guideline, leading enterprises, owners and specialized cooperative organizations as the main body and social scattered funds, credit and investment of foreign capital be executed as the power in order to add the investment of the ecological agriculture.

4) Grasp the agricultural risk prevention mechanisms. Enhance natural disasters and major plant and animal pest forecasting and early warning system to improve agricultural disaster prevention and mitigation capabilities.

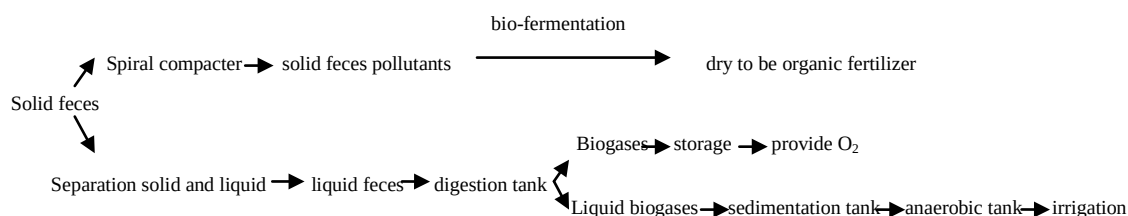
5) Set up scientific and technological support system to provide technical support for the development of ecological agriculture. Encourage the leading enterprises, specialized cooperative organizations, owners and institution co-operate closely in technology. Construct ecological agriculture production standard quality inspection system and the standardization of agricultural technology popularization system. In the

development of ecological animal husbandry, improve grain-saved type of husbandry. Promote feces recycling. The first one is digestion tank-clarify tank type.



The second one is solid-liquid separated drip irrigation type

A. swine farm area



B. swine production(pork purpose):

fermentation bed → organic fertilizer

The third one is bio-physical combination type

“collection tank +sprial compacter+sedementation tank+adjusting pH value tank+coordination tank+ fermentation tank+anerobic tank+sendimentation tank+active bio-filtration tank+ biological contact oxidation tank+sendementation tank+disinfection tank +filtriation+clarify tank”. After the treatment the emisson will meet the regulation of the national “ Discharge standard of pollutants for livestock and poultry breeding”(GB/8596—2001)

Index	COD _{Cr} mg/L	BOD ₅ mg/L	NH-N	SS(mg/L)	pH
Emssion standard	400	150	80	200	6-9

3.6 Focus on Standardization of Agricultural Production and Create Famous Brand.

Encourage and guide enterprises to become the main body in the process focus on creating local characteristics and the famous brand, striving for Sichuan Famous Brand, China top brand even world well-known famous brand. Meanwhile brand publish and protection.

3.7 Improve the Ecological Agriculture System.

Active develop the multi-market economy system. Accelerate cultivate rural broker, agricultural marketing and rural types of large circulation intermediary organizations, to encourage various types of businesses through acquisitions, mergers, equity and franchise and other business methods. In addition, provide funding and policy support to execute “green path” policy.

Now, we are facing the “1025” development policy and the Western Development policy, Sichuan Province should seize the opportunity. Focus on the development of the modern agriculture to promote the step to standardization, large-scale, high efficiency, ecological safety, branding agriculture. Contribute to building high yield, perfect quality, effective, safe and environmental friendly modern agricultural system and explore the way of development in hilly area at the leading place.

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