

Exploring the innovative practice of green organic agriculture —Taking Malipo county as an example

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Abstract. With the increasing emphasis on environmental protection and sustainable development, green organic agriculture has become an innovative practice to promote ecological protection and agricultural development. Using the methods of case investigation and data analysis, this study examines the current problems and obstacles facing conventional agriculture, and explores the innovative practice of green organic agriculture by taking Malipo County as an example. The aim of this paper is to analyze the development status and sustainability issues of the practice, explore strategies and measures to promote green organic agriculture in Malipo County, and provide a copy of the results of successful case studies of the practice for the wider region, as a way to emphasize the importance of the innovative practice of green organic agriculture in promoting sustainable development. A call is made for wider adoption of the successful implementation of green organic agriculture initiatives in the case study in other regions.

Keywords: Green Organic Agriculture, Innovative Practice, Malipo County, Sustainable Development, Environmental Protection.

1. Introduction

With the increasing emphasis on environmental protection and sustainable development, green organic agriculture has become an innovative practice to promote ecological protection and agricultural development. This study focuses on the innovative practice of green organic agriculture in Malipo County. By analyzing the background, objectives, methods, results and conclusions of this practice, it aims to shed light on the significance and potential of green organic agriculture.

Malipo County, located in China's Yunnan Province, employs slash-and-burn traditional agricultural cultivation. Farmers' awareness needs to be raised urgently due to the incorrect use of chemical fertilizers and pesticides, which has led to soil degradation, water pollution and loss of biodiversity. Recognizing the need for sustainable development, Malipo County is actively implementing green and organic agricultural practices to address these challenges.

Innovative green and organic agricultural practices in Malipo County include a range of strategies and measures. These include the adoption of organic farming techniques, the implementation of water-saving irrigation systems and integrated pest management measures. Using these innovations, Malipo County aims to protect the environment, increase agricultural productivity and improve farmers' livelihoods.

This paper examines and tests the results and impacts of these innovative practices. This paper will assess the environmental and economic benefits of implementing green and organic agricultural practices in Malipo County. Data analysis and field surveys will be conducted to gather information on the success of these practices and their contribution to sustainable development.

This study documents the barriers encountered in the implementation of green organic agriculture practices in Malipo County as well as strategies to overcome these barriers. By highlighting the successes of these practices and ways to address the challenges, we aim to inspire and encourage other regions to learn from the successes of this agricultural practice and apply it widely to the development of green organic agriculture. The innovative practice of green organic agriculture in Malipo County is a successful example of ecological protection and agricultural development. Green organic agriculture has an important impact on promoting environmental protection, increasing agricultural productivity and improving farmers' livelihoods, and can contribute to the sustainable development of agriculture in the region. The purpose of this paper is to call on other regions to refer to the successful green organic agriculture practices in this case in order to promote innovative development in the agricultural sector.

2. Current situation of agricultural development in Malipo County, Yunnan Province

2.1. Agricultural resources and regional characteristics

Malipo County in Yunnan Province is strategically located and has rich agricultural resources. First, in terms of climate conditions, the county is located in southeastern Yunnan Province, with a mild and humid climate, average annual rainfall of 1,051 to 1,900 millimeters, and an average temperature of 13.1 to 23.1 degrees Celsius, which is suitable for the development of agriculture. Second, the county's topography is intricate, with large differences in altitude, uneven distribution of water and heat, and many soil types, characterized by "three-dimensional climate" and "three-dimensional agriculture". In addition, the county is extremely rich in biological resources, including specialty grains and oils, fruits, tea, coffee, Panax ginseng, dendrobium and other crops, as well as the cultivation of valuable and heavy medicinal herbs.

2.2. Analysis of the current state of agriculture

In recent years, Malipo County has focused on the development of specialty industries, accumulating more than 500,000 acres of konjac, tea, Chinese herbs and fruits [1]. The county 2022 completed the total output value of agriculture, forestry, animal husbandry and fisheries of 2.837 billion yuan, an increase of 5.2% over the previous year. Among them: agricultural output value of 1.683 billion yuan, an increase of 2.8%; forestry output value of 115 million yuan, an increase of 17.3%; pastoral output value of 904 million yuan, an increase of 14.1%; fishery output value of 52 million yuan, an increase of 61.2%; agriculture, forestry, animal husbandry and fishery services output value of 83 million yuan, an increase of 6.4%. The added value of the agriculture, forestry, animal husbandry and fisheries industries amounted to 1.78 billion yuan, an increase of 4.6% over the previous year.

The annual completion of the total sown area of crops was 837,900 acres, an increase of 0.4% over the previous year, of which: grain and bean crops area of 489,200 acres, an increase of 0.8%; cash crops area of 348,700 acres, a decline of 0.1%. Total grain production reached 110.13 million kilograms, an increase of 1.7% over the previous year [2].

The development of agriculture cannot be separated from government support and investment. The local government has increased its investment in agricultural science and technology research and development to promote the advancement of agricultural science and technology and to improve the quality and yield of crops. At the same time, the government has strengthened agricultural technology training to help farmers improve their production techniques. The level of agricultural mechanization has also increased, and the use of agricultural machinery has increased, raising the efficiency of agricultural production and farmers' incomes.

2.3. Agricultural structure and development trends

In terms of agricultural structure, Malipo County is moving towards an agricultural structure dominated by agricultural products with highland characteristics. The county actively promotes the cultivation of specialty agricultural products, such as konjac, vegetables, sugar cane, fruits, Chinese herbs, tea and so on, with local characteristics. At the same time, the county is fully promoting the measures of “one county, one industry” and “one village, one product” [3], standardizing, industrializing and standardizing to create a modern agricultural industry in Malipo County, strengthening the brand building and marketing of agricultural products, and improving the added value and market competitiveness of products.

Development trend, Malipo County agriculture will further promote the development of rural specialty industries. First of all, to strengthen the village-level collective economy, in-depth excavation of the village resource advantages, and actively promote the “one county, one industry” and “one village, one product” industrial development measures [3], and continue to increase the cultivation of local specialty industries. Secondly, strengthen external publicity, expand the popularity and influence of local specialty industries, continue to carry out the docking of agricultural products, and effectively solve the problem of difficult-to-sell agricultural products. At the same time, cultivate and grow new agricultural management main body, accelerate the process of agricultural industrialization.

As a very important area for agricultural development, Malipo County in Yunnan Province faces some problems in its sustainable agricultural development.

3. Sustainable development of agriculture in Malipo County, Yunnan Province

3.1. Environmental impacts and resource utilization

As the scale of agricultural production expands, the impact of agriculture on the environment becomes more and more obvious. Mountainous agriculture is a typical feature of agriculture in Malipo County, where the natural conditions for agriculture are poor, with 99.9% of the county being mountainous areas, 50% of which are karst landscapes. Cultivated land resources are few and of poor quality, and there is a general lack of water resources and serious soil erosion problems. In addition, the county has a total of 19,133.33 hectares of arable land, but the arable land occupied by farmers per capita is only 0.075 hectares. Farmers' comprehensive production capacity is low, and agricultural production often appears to be based on the business model of single-family production [4]. Therefore, it is particularly important to integrate resources and develop modern agriculture with scale effect.

3.2. Pesticide and fertilizer use and management

Malipo County is a typical mountainous agricultural county, with agricultural population accounting for 89% of the county's population [4]. However, the local area also has the problems of low arable land resources and poor quality, so in order to ensure the yield of agricultural products, most of the farmers will use chemical fertilizers and pesticides to improve these problems. As a result, in Malipo County, farmers may use pesticides and fertilizers excessively or indiscriminately due to the lack of proper knowledge and technology of their use, leading to environmental pollution and safety problems of agricultural products. Therefore, strengthening the management and supervision of pesticides and fertilizers, promoting scientific and rational use, conducting farmer training, and improving farmers' environmental awareness and management ability an important measure.

3.3. Quality of agricultural products and food safety

The quality of agricultural products and food safety in Malipo County has been a major concern due to the improper use of chemical fertilizers and local land resources constraining some of the infrastructure development. On the one hand, the imperfect agricultural production chain, difficulties in infrastructure development, decentralized production and operation, and weak supervisory teams have made it impossible to monitor and manage whether the quality of agricultural products meets the standards. On the other hand, some certification organizations, in order to seek economic benefits, do

not follow the relevant standards and certification procedures strictly, leading to the problem of confusion in the use of agricultural quality and safety certification and logo. Therefore, it is important to promote the use of organic fertilizers, regulate the use of chemical fertilizers in production, and encourage farmers to adopt the government-promoted model of standardized implementation of agricultural production. The establishment of a sound regulatory system for the quality and safety of agricultural products, the standardization of safety certification and the use of marks for the quality of agricultural products as well as the expansion of the regulatory team and the increase in funding.

3.4. Markets and marketing of agricultural products

Agricultural products market and marketing is an important link in the sustainable development of agriculture. Most of the farmers are still in the mode of production and management of individual households, and the sales channel channels of agricultural products in Malipo County are relatively narrow. In addition, brand building and promotion of agricultural products are still relatively weak, and agricultural products with regional characteristics are not well-known. Malipo County increases the creation and cultivation of brands, digs deep into the sustainable use of resources, creates brand and visibility effect, and vigorously promotes the local characteristics of agricultural products. It broadens the market channels of agricultural products, improves the added value of agricultural products and market competitiveness, so as to promote the sustainable development of agriculture.

In summary, the sustainable development of agriculture in Malipo County faces a series of problems such as environmental impact and resource utilization, pesticide and fertilizer use and management, agricultural product quality and food safety, and agricultural product market and marketing. Only by strengthening environmental protection and resource management, reinforcing the management and use of pesticides and chemical fertilizers, establishing and improving the quality and safety supervision system of agricultural products and food safety management system, growing the management force, and strengthening the construction of agricultural products marketization, reinforcing the brand effect and popularity of characteristic agricultural products, can the sustainable development of agriculture in Malipo County be realized, the quality of agricultural products be improved and the market scale be enlarged to have certain competitiveness.

4. Case Study: Successful Green Organic Agriculture Practices in Malipo County

4.1. Economic and environmental benefits arising from green and organic agricultural practices

Malipo County has successfully carried out a series of green and organic agricultural practices in recent years, bringing significant economic and environmental benefits. Firstly, in terms of the use of pesticides and chemical fertilizers, the county has been vigorously promoting and applying organic fertilizers, encouraging farmers to apply fertilizers in a scientific manner, slowing down and maintaining a combination of organic and inorganic fertilizers, so as to achieve high and stable agricultural yields [5]. These initiatives not only reduce production costs, but also control the environmental pollution caused by chemical fertilizers, improve soil and water quality, protect the ecological environment, and achieve sustainable development.

Second, the promotion of biological control and pest prediction and forecasting in green organic agricultural practices has effectively controlled the occurrence of pests and diseases, and promoted the healthy growth of crops and increased yields. In the area where the integration demonstration site was established [6], the promotion of the integration of TCP and green prevention and control has significantly improved the control effect, and the initiative has effectively controlled the cost, and the farmers' crop yield and income have increased. At the same time, to build a pest monitoring and early warning network [7], according to the pattern of disease and insect occurrence, monitoring results and weather forecasts, timely release of disease and insect intelligence, accurate guidance for the prevention and control of rice pests and diseases [8]. According to the field survey, 13 issues of pest and disease intelligence were issued in Malipo County throughout the year, distributed in 11 townships, with an accuracy rate of 96%. The control effect of rice pest and disease fusion area was 6%-24%

higher than that of farmers' self-prevention area, and the 1333.3hm² pest and disease fusion demonstration saved 896,000 RMB. And the 1333.3hm² rice pest and disease fusion demonstration increased the output by 1,048,000kg and the total output value by 4,040,000 RMB.

Green organic agricultural practices also led to the upgrading and transformation of the agricultural industry chain. The whole industry chain to build the modern agricultural industry in Malipo, formed the industrialization, scale, standardization, branding development layout, the leading industries continue to develop and grow, the strength of the village collective economy continues to strengthen, and the income of farmers continues to increase. The quality of agricultural products in Malipo County has been promoted through pest management and the use of organic fertilizers, which will accelerate the brand building and market promotion of agricultural products. The cultivation and processing of specialty agricultural products have developed, attracting more consumers and tourists and raising the income level of local farmers. At the same time, cultivate and grow new agricultural business subjects, give full play to the demonstration and driving role of leading agricultural enterprises, cultivate new agricultural business subjects, introduce new varieties, new technologies and new equipment for agricultural production, accelerate the process of agricultural industrialization, promote the diversified and high-quality development of countryside industries, and further ensure that farmers will increase their incomes and become rich.

4.2. Obstacles encountered and how to overcome them

In the process of practicing green and organic agriculture, Malipo County has also encountered some obstacles, but has been able to overcome them through practical measures and policy support. First, farmers have doubts and technical difficulties in reducing the use of pesticides and fertilizers, and the emergence of pests is so complex and variable that farmers are not highly motivated to adopt new technologies.

Through farmer training and technical guidance, the government has provided scientific and technical personnel with in-depth integration demonstration sites to popularize the scientific knowledge and technology of green and organic agriculture among farmers, and on-site explanations and observation can better help them understand the value of green and organic agriculture and encourage farmers to participate in the practice of green and organic agriculture.

Second, marketing and branding of agricultural products is also a challenge. The quality of agricultural products needs to be improved to match market demand and consumer tastes, and a sound supply chain and sales network also need to be established. The government organizes agricultural product promotion and exhibition activities, increases support for agricultural product branding, and continuously conducts agricultural product production and marketing docking to help farmers establish channels to dock with the market and promote the marketization and branding of agricultural products.

In addition, Malipo County should accelerate the transformation of agricultural scientific and technological achievements, improve the comprehensive benefits of agricultural production, and ensure the quality of agricultural products; explore the construction of agricultural science and technology-based leading enterprises and farmers' professional cooperatives [9], provide support for the research and development and promotion of new technologies and new varieties, and improve the scientific level of agricultural production.

In a word, the success of green and organic agricultural practices in Malipo County has benefited from the government's policy support and the active participation of farmers. By reducing the use of pesticides and chemical fertilizers, promoting biological control and pest prediction and forecasting in organic agricultural practices, upgrading the quality of agricultural products, and, at the same time, strengthening the marketing of agricultural products, we have succeeded in achieving a win-win situation in terms of both economic and environmental benefits. However, green and organic agricultural practices still require continued policy support, technological innovation and market promotion to ensure the continued improvement of agricultural product quality and food safety and to realize sustainable agricultural development.

5. Conclusion

Agricultural development in Malipo County has made certain achievements, with abundant agricultural resources, improving the quality of agricultural products and increasing farmers' income. Green and organic agricultural practices have achieved positive results in terms of agricultural product quality and food safety, environmental protection, and agricultural restructuring. Malipo County has embarked on the path of sustainable development.

However, there are still some limitations and shortcomings in practice. First, there is insufficient support from government financial resources and policies. Although government investment in agriculture has increased, there is still a need for greater financial support, more financial subsidies and policy support for farmers to promote the development of green and organic agriculture. Second, farmers' awareness and participation also need to be further improved. The popularization of farmers' environmental awareness and green production concepts still needs to be strengthened, and there is a need to increase farmers' training efforts to improve their environmental protection concepts and skills, and to further stimulate their enthusiasm and innovation in green and organic agriculture.

In order to further promote the sustainable development of agriculture in Malipo County, it is recommended to start from the following aspects: (1) Government support: Increase financial support, increase investment in agriculture, provide more agricultural subsidies and incentives, and encourage farmers to actively participate in green and organic agricultural practices. At the same time, specific policies and regulations should be formulated to clarify the guidelines and objectives for the development of green and organic agriculture. (2) Farmer training: Strengthen farmer training efforts to provide scientific knowledge of agricultural technology and training in green production skills. Increase farmers' attention to green control and protection of the environment, and cultivate farmers' awareness of integrated green control and prevention, in order to further promote the integration of large-scale specialized UCPD and green control and prevention. (3) Scientific and technological innovation: Increase investment in agricultural scientific and technological research and development, strengthen cooperation with scientific research institutions and universities, promote and apply new technologies and innovations, and improve the efficiency and quality of agricultural production. Go deeper into the fields and fully integrate local resource advantages to promote innovative agricultural development. (4) Expanding market channels: Continuing to carry out the production and marketing of agricultural products, and effectively solving the problem of difficulties in the sale of agricultural products. Further establish and improve the leading enterprises tied to cooperatives, cooperatives tied to farmers' "double tied" mechanism [10], the formation of specialized production business new pattern. Improve the new agricultural management main body small scale, weak strength of the problem. It has a great influence on further strengthening the construction of agricultural product marketization, improving the supply chain and sales network of agricultural products, and improving the level of agricultural product brand construction and market promotion. It can promote the diversified development of agricultural products and the specialized and large-scale development of the agricultural product processing industry, and increase the source of farmers' income.

In summary, the greening of agriculture in Malipo County has achieved positive results, but still faces some challenges. By strengthening government support, increasing farmers' awareness and participation, promoting scientific and technological innovation and broadening market channels, the sustainable development of agriculture in Malipo County can be further promoted and better economic, environmental and social benefits can be realized.

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