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Development Model and Prospect of Circular Agriculture under Rural Revitalization Strategy

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Abstract

With the implementation of the rural revitalization strategy, circular agricultural management based on the most efficient use of resources and environmental protection has become an effective means of rural revitalization. In this paper, several application models of circular agriculture operation are studied, and the development prospect of circular agriculture in rural revitalization is proposed, which can provide reference for the realization of new urbanization construction and rural revitalization strategy.

Keywords

Circular Agriculture; Rural Revitalization; Model; Prospect.

1. Introduction

Countryside is a regional complex with natural, social and economic characteristics. It has multiple functions such as production, life, ecology and culture. It promotes and co-exists with cities and towns, constituting the main space for human activities. The report to the 19th National Congress pointed out that issues concerning agriculture, rural areas and farmers are fundamental to the national economy and people's livelihood. We must always make solving problems concerning agriculture, rural areas and farmers a top priority in the whole Party's work and implement the rural revitalization strategy.

Circular agriculture is to adjust and optimize the internal structure and industrial structure of the agricultural ecosystem on the basis of protecting the agricultural ecological environment by using the idea of sustainable development, the theory of circular economy and the method of ecological engineering, so as to improve the multistage recycling of the matter and energy of the agricultural ecosystem. In the process of agricultural production, the input of means of production, the recycling and recycling of wastes are organically combined to demonstrate an agricultural development approach of low input, low emission and high yield [1]. Therefore, circular agriculture provides a new opportunity for rural revitalization with its high utilization of resources, improved ecological environment and labor-intensive operation model. Only by adopting the circular agricultural operation based on the most efficient use of resources and environmental protection, can the sustainable development of rural areas be effectively implemented and rural revitalization be realized.

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2. Circular Agriculture Business Model

2.1. Time Rhythm Structure Model

By taking advantage of different crop maturity times, species of different growth stages should be reasonably matched, such as deciduous fruit trees interplanting spring crops in autumn in planting industry, so as to fully improve the utilization rate of land and other natural resources and achieve increased production. In addition, the construction of greenhouses and solar greenhouses in most areas of north China can make the land resources be used reasonably in autumn and winter when the temperature is low, make full use of the time difference between production seasons, and transform seasonal production into annual production.

2.2. Spatial Chimeric Structure Model

Due to the limited area, we must give full play to the spatial potential of rural courtyards. According to the principle of vertical structure of agricultural system, we must break through the plane reclamation model and develop to the three-dimensional, ecological and comprehensive aspects. Such as garden ground planting fruit, vegetables, flowers and cultivation of edible fungi, the development of animal husbandry pig, chicken, rabbit, etc., aerial scaffolding kind of grapes, luffa, etc., low-lying ponds for fish and lotus root, underground construction of biogas digester, so as to achieve three-dimensional development, stratified management. In addition, fruit trees interplanting seasonal vegetables is also a complex way to make full use of space. In this way, species matching and overlapping operation can make full use of natural resources such as light, water and nutrients, and increase the type and quantity of output per unit area[2].

2.3. Food Chain Combination Structure Model

This model uses the basic principle of artificial food chain to transform a large number of agricultural and sideline product resources stored in rural courtyards into products and waste products into economic products through the transformation of artificial biological populations. Through multistage and multiple utilization, a small production system with economic and efficient energy conversion in a virtuous cycle has been formed. The "dike-pond" system model in the Pearl River Delta region, the "rice-fish farming" system model in the Jiangnan region, the "four-in-one" system model in the north, and the "pig-bog-fruit" system model in the south are all circular agricultural management models based on food chains.

2.3.1. Rice-fish (Duck) Farming Model

Rice-fish farming has been widely popularized in south and some areas of north of our country. The specific practice is to irrigate the rice padiculture and release a certain amount of herbivorous fish seedlings after rice transplanting and greening. The rice provides shade, appropriate water temperature and sufficient bait for the fish. In turn, fish weed and insect control, oxygenate and fertilize the paddy fields. The symbiosis of rice and fish not only promotes the development of aquaculture, but also improves the fertility of the soil[3].

2.3.2. "Pig - bog - fruit (Fish, Vegetables)" Model

This model is based on the biogas digester as the core, pig breeding, human and animal manure fermentation to produce biogas for cooking, lighting and other daily energy, the use of biogas slurry, biogas residue planting fruit, vegetables, food or fish farming[4]. This is a three-dimensional ecological agriculture model that fully extends agricultural production chain and biological chain, and effectively combines rural energy construction with economic development. The organic combination of planting, breeding and microbial agriculture can be realized, and gas production and fertilizer accumulation can be synchronized. It is a biological system with rapid and coordinated circulation of flow and logistics.

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2.3.3. "Four-in-one" Model

In order to solve the problem that the biogas digester can not be used or the utilization rate is not high because of the low temperature in winter, and make up for the problems of short illumination time, low temperature and insufficient carbon dioxide gas in the solar greenhouse in winter, according to the characteristics of the solar greenhouse, pig farming and biogas digester and the relationship between them, The solar greenhouse vegetable production, biogas digester, pig house and toilet are organically combined to form a "four-in-one" comprehensive utilization model [5].

"Four-in-one" model focuses on solar greenhouses to improve energy efficiency and provide out-of-season fruits and vegetables, etc. CO_2 exhaled by pigs is an important raw material for photosynthesis of green vegetables. Raising pigs in greenhouses improves the concentration of CO_2 in the greenhouses and enhances the photosynthesis of vegetables. Vegetables are used to produce nutrients and release oxygen through photosynthesis, so that pigs have enough fresh oxygen. In addition, pigs in sheds have better permeability than indoor breeding, so that pigs grow faster and stronger, and emerge early. Biogas can also be burned in the greenhouse in winter, which can not only improve the temperature in the shed, but also produce CO_2 equivalent to leaf fertilization, so as to improve the quality and yield of vegetables. All kinds of substances use each other and promote each other, completing a virtuous cycle between cultivation, biogas and species.

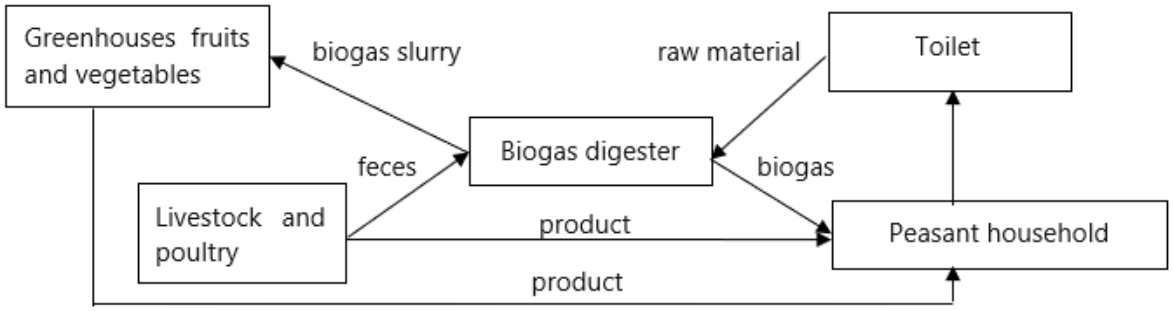

Figure 1. "Four-in-one" model operation diagram

2.3.4. Waste Utilization Model

Crop straws, forest tending and felling residues are good edible bacteria base material, which can be made into the culture substrate of bacteria sticks. The waste bacteria sticks and bacteria residue can be used as high-quality feed for livestock, and can also be used as organic fertilizer for agricultural planting. The spent mushroom sticks can also be used as fuel.

3. The Development Prospect of Circular Agriculture in Rural Revitalization

3.1. Development of Agricultural Structure based on Industrial Chain

The business model of circular agriculture, in line with the ideas of circular efficiency, comprehensive utilization and industrial upgrading, replaces large-scale agriculture with refined and three-dimensional agriculture, solves the problem of market price fluctuations by interbreeding, solves the problem of low output of single agriculture by combining planting and breeding, and transforms the means of production into treasures by extending the industrial chain, so as to promote rural revitalization. Based on the industrial integration method of the extension of agricultural industrial chain, it maximizes the production profits and shares the value of each link of the extension of the industrial chain through the one-stop process of agricultural production, addition and sale. Its applicability is wide, industrial and commercial

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capital, cooperatives, farmers can be more extensive participation, the technical threshold of some industries is also relatively low, the effect of driving farmers to increase income is relatively direct.

3.2. Development of Green Agriculture

Supporting and developing green organic agriculture in rural areas can not only meet the current market demand, but also help rural optimize agricultural resources and establish independent agricultural brand in rural areas. For example, fish culture can be vigorously developed in ecological water sources. Fish can independently eat various natural substances in water bodies, and farmers do not need to put extra artificial food. Farmers' breeding costs are significantly reduced, and fish without chemical substances have healthier meat quality [6]. In addition, rural areas need to build more organic vegetable bases and fruit bases, and reach long-term cooperative relations with enterprises.

3.3. Development of Leisure and Vacation Tourism

In line with the theme of developing green ecological functions and returning to nature, the tourism industry gradually develops from the traditional nature tourism to the leisure and vacation type. This not only increases farmers' income, improves rural environment, but also enables consumers to get leisure experience, taking into account ecological benefits, economic benefits and social benefits. Therefore, we should actively explore the collection of picking, fishing, leisure, folk customs, exhibition, sightseeing as one of the leisure vacation tourism, the development of rural tertiary industry.

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