Introduction of Rural Ecological Environment and Circular Economy Development Mode of Eco-agriculture and Forestry

SU Jian-lan[1,2]*, LIN Shi-wen[3], LIU Na[2]

1. School of Economics and Management, Southwest Forestry University, Kunming 650224, China; 2. School of Economics and Management, Beijing Forestry University, Beijing 100083, China; 3. English Department, Southwest Forestry University, Kunming 650224, China

Abstract Major causes of ecological environment situation and rural environment issues in the construction of new socialist countryside in China are analyzed. Two necessities of introducing circular economy development mode of eco-agriculture and forestry into the construction of new socialist countryside are expatiated. One is the needs of the rural eco-environmental situation, and the other is to realize the fundamental change of agricultural growth mode. Specific characteristics, existing foundation and current resistance of the circular economy of eco-agriculture and forestry are studied. Major principles in introducing circular economy mode of eco-agriculture and forestry into the construction of new socialist countryside are presented. Support system for constructing the circular economy mode of eco-agriculture and forestry is discussed, including the improved government function and regulatory mechanism, marketing organization, farmers professional cooperative organization, leading enterprise, circular economic market system of eco-agriculture and forestry, and human resources. Taking Huaping County, Lijiang City, Yunnan Province, China as an example, "919" circular economic model in this county and its development result are analyzed.

Key words Ecological environment; Circular economy; Development; Introduction; China

At present, ecological environment in many rural areas of China has begun to threaten the food safety of agricultural products, farmers' health, agricultural sustainable development and social harmony in rural areas. Among them, the biggest problem is the contradiction between population and cultivated land, which leads to vegetation degradation, soil erosion, soil desertification, shortage of water resources, and rural soil and water pollution. Therefore, extensive agricultural development mode of "Resource – Product – Pollution" with high consumption and high pollution must be changed into the circular economy mode of eco-agriculture and forestry of "Resources – Product – Renewable resource" with the objective of realizing eco-environmental restoration and harmonious development between human and nature. It is a fundamental means to restore ecology and reduce pollution, as well as an important way to realize the sustainable development of rural China and the only way to build a socialist new countryside. However, the strong inertia of traditional economy has hindered the generation and development of new economic development mode. Therefore, how to effectively introduce the circular economy mode of eco-agriculture and forestry becomes the key for the construction of socialist new countryside.

1 Situation and causes of ecological environment during the construction of socialist new countryside

1.1 Depressing ecological situation According to statistics, forest coverage of China is only 13.92%, which is far lower than the average level (27.00%) and ranks the 104th in the world. Grassland area at present is 390 million hectares in China. Due to the overgrazing and over reclamation, more than 90% of the natural grassland is under degradation. Among them, 87 million hectares grassland are suffering from severe degradation, desertification and salinization with the increasing speed of 2 million hectares each year, which has exacerbated the soil erosion and sand hazards in grassland and has deteriorated the grassland ecology. This situation is extremely unfavorable to the sustainable utilization and soil and water conservation in China. Area of soil and water loss reaches 3 555.6 thousand square kilometers, accounting for 37.42% of the total national land. Loss of topsoil is more than 5 billion tons each year and is expanding with the speed of 2 460 hectares each year, which leads to desertification of soil, reduction of arable land, rapid decline of soil fertility, siltation of rivers and lakes, and formation of vicious circle. China is one of the most serious desertification countries in the world. Its desertification land is 262 million hectares at present, which accounts for 27.3% of the total land area and is equivalent to 14 times of the area of Guangdong Province. According to the current speed, desertification land will increase from 33.3 million hectares to 40.0 million hectares within 50 years, which is equivalent to 10 times of the area of Taiwan. Moreover, land desertification area also shows a rapidly increasing trend, which is extremely unfavorable to the soil and water conservation and sustainable use of China.

1.2 Aggravating soil and water pollution Pesticides have significant effect on pests control in China. Each year, 1.53 hectares of pesticide is applied with the average amount of over

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* Corresponding author. E-mail: sujianlan069@163.com

2.3 kilograms per hectare. Application of chemical fertilizer reaches 29 300 thousand tons each year, but the effective application rates of pesticide and fertilizer are only 30%. The rest are evaporated into the atmosphere or are washed into the soil, rivers and lakes, causing eutrophication of water body and the standard exceeding of nitrate content. In particular, extensive use of nitrogen fertilizers causes soil compaction, acidification or alkalization. Pesticides not only pollute the soil and water body, but also destroy the ecological balance and threaten biological diversity. Pesticide residues in grain, fruit and vegetable harm people's health through the enrichment of food chain. Production of agricultural film reaches 1 million tons each year in China, among which, plastic film accounts for a half and the residual rate is 20% –30%. There are about 75 kilograms plastic film residues per hectare, having great impact on soil physical properties[1]. Agricultural wastes produced each year is more than 4 billion tons, among which, livestock and poultry manure reach a total of 2.51 billion tons. Since many large-scale farms are separated from agriculture, most of the feces can not turn into field and are piled up in the open field without processing. " Public Harm in Livestock Production" has followed the old path of developed countries, causing increasingly serious environmental pollution in China[2]. Crop straw reaches 700 million tons with less than 25% of pollution-free treatment rate. These agricultural wastes have caused pollution of surrounding environment. After discharged into water bodies, they result in eutrophication of rivers, lakes and waters, which has seriously affected the normal cycle of rural ecological environment. Many soil layers of farmland become hardening or have over-standard harmful elements of cadmium, arsenic, chromium, lead and other heavy metals, leading to excessive heavy metals, or close to the threshold, in grain, vegetables and fruits. What's more, water pollution in many areas becomes a direct threat to the life of farmers, as well as one of the reasons for the poverty in rural household.

1.3 Problems of rural ecological environment The first " havoc" of terrestrial ecological vegetation in China occurred in the 1950s under a series of erroneous policies, such as the " Great Leap Forward" , reclaiming lakes for farmland, and destroying forests and grassland for reclamation, which have resulted in catastrophic ecological and economic consequences. Since the reform and opening up, the state has paid more attention to the protection and management of ecological environment, has vigorously carried out afforestation, reforestation and closed forest, and has achieved a certain degree of success in restoration of ecological vegetation. However, special efforts must be made for vegetation restoration due to the excessive damage of ecological environment. Currently, phenomenon of encroach on ecological vegetation happens all the time due to the huge pressure on the survival of people. Relationship between economic development and environmental protection is not treated well. For instance, many places destroy forests and grassland for construction; most rural areas use firewood as the main energy for life. Destroy of ecological vegetation is the main reason of desertification, water and soil loss, pests and flood disasters. Ecological environment degradation in rural areas has close correlation with the problem of poverty. Most farmers still live on land and conduct extensive operation. On the one hand, they have to enlarge reclamation in order to maintain basic subsistence. On the other hand, they have to face the deterioration of ecological environment. Thus, a vicious circle of " disaster – poverty – greater disaster – more poverty" is formed.

2 Necessity of introducing circulation economy development pattern of ecological forest in new socialist countryside construction

2.1 Requirement of rural ecological environment at present Without controlling ecological and environmental problems in rural areas, a more complex and passive state of urban environment will be caused, which is even harder to control. Ecological damage is a fundamental problem related to the long-term development. Once the rural ecological environment is damaged, it would take several generations to recover it. Developing ecological circular economy is conducive to ecological and environmental protection. Agricultural production is an interaction process of natural production and the economic reproduction with the object of living plant and animal, which has a natural dependence on natural resources. In order to reduce the pressure of agricultural economic development on resource supply, natural and economic laws should be combined together in order to achieve the normal operation of eco-system. Therefore, circular economy development mode of eco-agriculture and forestry must be introduced, so as to promote the efficient and recycling use of resources, which has become an important and urgent task for the new countryside construction. At present, end treatment is an important way to solve environmental problems in China, which is difficult to fundamentally ease the pressure on the rural environment. Only by developing circular economy and promoting clean production, can we reduce the effect of agriculture and forestry production activities on natural resource and ecological environment to the minimum degree. Therefore, we can achieve sustainable growth of agricultural economy by using the minimum resource consumption and environmental costs, so as to find a civilized development road with ample life, good ecology and developing production[3].

2.2 Fundamental change of agricultural growth mode Developing circular economy of eco-agriculture and forestry is a specific practice of new socialist countryside construction, which aims to change the growth mode of agriculture and forestry, to improve the overall efficiency of industry, and to enhance peasant's income by increasing input. Ecological law is required to organize the agriculture and forestry production and management into a feedback cycle of " resources – products – renewable resources – recycled products" , so as to achieve the goal of cyclic utilization, energy saving, environment optimization and changing waste into valuables, to improve the efficiency of resource utilization, to promote the virtuous circle of ecology and to realize the sustainable development. This plays a positive role in developing effective agriculture and forestry, in-

creasing peasant's income, promoting the rural industrial structure adjustment and enhancing production and living environment. The most typical mode is circular economy of eco-agriculture and forestry with methane as a link, such as "pig – methane – fruit", "pig – methane – tea", "pig – methane – vegetable", "pig – methane – melon" and "pig – methane – grain". During the development of economic globalization, function of tariff barrier is weakened, including green barrier and other non-tariff barriers, which needs great attention during the new countryside construction. Therefore, agriculture and forestry products become gradually in accordance with the international standards of resources and environmental protection by developing sustainable agriculture and forestry of eco-cycle model, changing traditional economic development model, producing green food and extending the industrial chain of agricultural products processing.

3 Adaptability of circular economy development mode of eco-agriculture and forestry during the construction of new socialist countryside

3.1 Characteristics of circular economy of eco-agriculture and forestry Characteristics of circular economy of eco-agriculture and forestry include rational use of fertilizers and pesticides, reduction of resource consumption, pollution of soil and water body by residues, and degradation control of land quality. Wastes in rural areas are mostly organic matters. And indiscriminate disposal of them may cause difficult control of pollution. Therefore, collection and fermentation treatments are needed in order to replace other energy sources by methane, which can also obtain high-quality organic fertilizer, further reduce the use of chemical fertilizers, and produce green food. Diversified economy in rural areas is an expression form of eco-agriculture and forestry, as well as a vast world of circular economy. Planting, breeding, animal husbandry, agriculture and forestry product processing industry, as well as the emerging tourism and service industries, together can form an ecological chain or ecosystem based on the principles of virtuous eco-cycle. Therefore, circular economy development mode of eco-agriculture and forestry is suitable for the construction of new socialist countryside.

3.2 The existing foundation

3.2.1 China has thousands of years of history of circular economy of simple eco-agriculture and forestry. It also has a very long history in developing circular economy of eco-agriculture and forestry. As early as the Tang Dynasty, there was a mode of "Mulberry – Dyke – Fish – Pond" in the Pearl River Delta. The ecologist Wang Rusong points out that circular economy is created by the Chinese people. Traditional agriculture with more than 7 000 years of history is a typical circular economy. In the past, straw, green manure, methane slurry, feces and garbage of urban and rural residents were valuable sources of fertilizer for farmland. A harmonious rural eco-system of livestock, fish, mulberry, silkworm, earthworm, methane, vegetable crop, farmland, fish pond and wood is formed. Crop rotation, intercropping, wetland purification, biological degradation and other temporal and spatial niches are fully utilized. Renewable resource cycles can be realized at low productivity level in small spatial and temporal scale.

Wen Tiejun, president of the School of Agricultural Economics and Rural Development, Renmin University of China, pointed out that China has the traditional custom for the development of agricultural circular economy. In the past, "Circular Economy" in rural areas used to apply human excrement into farmland. And crops grown from it are for people to eat. There were few wastes and garbage in rural areas, because most of the household garbage is used as fertilizer for recycling[4].

3.2.2 Experience accumulation of pilot projects in recent 20 years. In the year 1993, China turned 50 counties into eco-agriculture counties at state level and formulated the planning and practice guidelines, in order to bring eco-agriculture and forestry into a planned and organized new stage with standardized and scientific features. Starting from the eco-household, eco-village and eco-town, China soon entered a phase of county unit. During the large-scale implementation of eco-agriculture and forestry, there are a number of typical areas with different ecological types, offering valuable experiences. Since the year 2000, the state has started up the second round of national eco-agriculture county construction and green home activity. Through active exploration, more than 100 modes in the fields of planting, breeding industry, and agricultural products processing are summarized. Eco-agriculture and forestry has become one of the most successful modes of sustainable agriculture and forestry movement in the world. In a word, development of eco-agriculture and forestry already has practical basis under the pattern of circular economy.

3.2.3 Small-scale production management mode with rural household as the main body meets the demand of ecological circular economy of agriculture and forestry. Circular economy of eco-agriculture and forestry seeks for the miniaturization of production management. Small unit only needs a small amount of resources, which is very important when most resources have become scarce and difficult to obtain. Small unit can be used to disperse population uniformly, to better utilize the space, and to avoid the jam. More importantly, large number of small units can make better use of the employees than the few big ones.

3.3 The resistance Circular economy of eco-agriculture and forestry requires peasants having high-quality ecology and high-tech consciousness. In recent years, China has made some achievements in the application of circular economy in eco-agriculture and forestry. But it is still in its initial stage and the overall situation is not optimistic due to the strong resistance. For instance, though conservation tillage technology, such as not burning straw and canceling tillage, is common in some developed countries, China is only at the initial stage. Flood irrigation is still the main form of agricultural irrigation and the use efficiency of water is very low. Cultural level of most of the agricultural producers in China is relatively low. And insufficient at-

tention to economic benefits from cleaner production and waste re-use of agriculture and forestry industry has led to the loss of economic benefits of recycling use, which impedes the promotion of recycling technology. Comprehensive utilization of "Marsh Gas Pool with Three Functions" can realize the integrated development of fertilizer application, seed soaking, pig and fish feeding, fresh keeping, and power generation, having significant ecological, economic and social benefits. And the economic benefit is 3 – 5 times of the energy benefit. However, during the production in the rural areas, the awareness level of peasant households is limited and they only use methane for cooking and lighting, not to mention the comprehensive utilization of methane.

4 Specific methods for introducing the circular economy development mode of eco-agriculture and forestry

Based on the above analyses, it is necessary to introduce the circular economy development mode of eco-agriculture and forestry in the construction of new socialist countryside. The specificity of problems has made the support of government become indispensable during introduction. Therefore, it is necessary to build a number of support forces to form a joint force under the special principles, which may support the peasants to develop circular economy of eco-agriculture and forestry and to form an effective combination of industries in order to increase peasants' income and to promote the restoration of ecological environment.

4.1 The main principles

4.1.1 Taking income increase of peasants and restoration of ecological environment as the objectives. Rural-urban segmentation system has led to the single means of income increase of peasants. Backward rural social security has resulted in the absolute poverty of some peasants, as well as the behaviors of overgrazing, over-reclamation and excessive logging. Income increase of peasants is the key to solve the "Three Agriculture Problems" and to construct the socialist new countryside. Under the household contract management in rural China, investment, production and operation are carried out with family as the unit. Therefore, income incentive is particularly important. And income increase directly determines the attitude of peasants towards circular economy of eco-agriculture and forestry. Meanwhile, the long-term increase depends mainly on the restoration of ecological environment; income increase based on destroying the ecological environment is only short term. Therefore, income increase of peasants and restoration of ecological environment should be taken as the objectives and should be organically combined together[5].

4.1.2 Doing things step by step according to local conditions. Adapting to local conditions means to introduce circular economy development mode of eco-agriculture and forestry according to the specific local circumstances and conditions. China has a vast territory and different foundations and conditions for socio-economic development due to various geography, climate, culture and resources. Therefore, circular economy development mode of eco-agriculture and forestry should be designed according to the specific conditions. At the same time, it should be adjusted according to the development stage. Design ahead of, or behind, the development stage may hinder the effective development of circular economy.

4.1.3 Government promotion. Firstly, change in economic model happens within the economic field. And it also needs the reform of social field. In rural areas, since traditional concepts are deep-rooted, the change of development mode, production and life style is not an easy thing. Secondly, peasants in China are mostly conservative, lack the awareness of risk and are unwilling to bear the risks. But there are always risks when developing circular economy of eco-agriculture and forestry under market economy. Secondly, due to the improvement of ecological environment, there is a strong externality of peasants engaged in eco-agriculture circular economy. Benefits obtained are only part of the social benefits. And the balance needs to be compensated in order to reflect the social fairness. Finally, rural cooperative economic development is still immature with slow development and low level in China at present. Therefore, government should play a strong role in promoting the circular economy development mode of eco-agriculture.

4.1.4 Participation of peasants. Circular economy of eco-agriculture and forestry is a kind of localized economy to a large extent, having distinctive regional characteristics and needed to be closely combined with the local culture and society. Because introduction of development mode is closely related with the interests of peasants, peasants should participate in the decision-making process regardless of their low quality, low literacy level and backward concept. After participating in this complex process, farmers may fully aware of its feasibility and be willing to cooperate actively, which will promote the introduction of circular economy mode of eco-agriculture and forestry.

4.1.5 Region in large scale and appropriate scale of production unit. Regional large-scale procurement and sale can help to reduce the costs, to form the advantages in large-scale marketing, improve overall and unit efficiency, to cultivate the join force of regional marketing, to exert the clustering effect of regional industry, and to set up a complete industrial chain. Circular economy of eco-agriculture and forestry is different from the traditional scale economy. The latter usually emphasizes the scale individual economic subject; while the former stresses on the region in large scale. Appropriate scale of production unit is characterized by relatively small spatial distribution and limited production scale. There are several reasons for this. Firstly, circular economy takes waste as the main source of raw materials. Secondly, fossil fuel is replaced by the renewable energy. Thirdly, there are many material exchanges among the active subjects of economy. Fourthly, we should maintain the balance between surrounding environment in material input and output.

4.1.6 Cooperation of social operation and management. Circular economy of eco-agriculture and forestry requires the cooperation among departments and subjects. And the relationship between production and operation subjects will become

close, as well as the relationships among social departments, which puts forward new requirements for the social operation and management mechanisms. It is extremely important to establish and coordinate the "nervous systems" of subjects and departments. Active participation of economic subjects, planners, NGOs sponsors and managers will promote the formation of networking and the sustainable level of regional development.

4.2 Support system for the construction of circular development mode of eco-agriculture and forestry

4.2.1 Improving government function and regulatory mechanism. Introduction of circular economic development mode of eco-agriculture and forestry needs to follow the laws of the market. And promotion of government is the key of it. Guidance and management of government in a variety of ways are needed when effectively overcoming the shortcomings of decentralized operation and taking the road of large-scale industrialization, such as offering policy guidance, information services, technical training and price subsidy, attracting storage processing marketing company, and establishing professional market. At the sane time, we should also strengthen the coordination, guidance, organization and service function of governments, implement the circular economy development strategy of eco-agriculture and forestry, establish social service system and provide improved social services, such as legal, security, infrastructure, information technology, and education services. Government should change its function, promote the coordination of industrial economic benefit, social benefit and ecological efficiency, and enhance the healthy development of rural economy.

4.2.2 Marketing organization of circular economy of regional eco-agriculture and forestry. Under the increasingly open domestic and international market condition, circular economic development of regional ecological agriculture and forestry needs to extend to the outside world. In other words, local eco-green products should be sold to other areas. Meanwhile, enterprises with good external capital, technology and marketing should be introduced with high efficiency. The scattered peasant households are weak in strength and poor in marketing. Therefore, it is urgent to take circular economy of eco-agriculture and forestry at region (county, town or village) level as a whole when marketing. Circular economy marketing organization of regional eco-agriculture and forestry must be led by the government with the participation of agriculture, forestry, industry and commerce, tax department, peasant representatives, financial institutions, relevant educational research institutions, and agricultural products processing trade enterprises. Its main duties are as follows:

(1) Strengthening the related market researches on circular economy of eco-agriculture and forestry. Keep up with the new technology and new trend of eco-agricultural circular economy at home and abroad; grasp the latest market trends in time; and guide the internal adjustments of industry in order to maintain relatively strong market competitiveness.

(2) Strengthening the regional brand building and communication of eco-agricultural circular economy. Under the economic globalization, regional brand has shown unprecedented dynamism. Regional brand refers to an industry or product having certain scale, strong production capacity, higher market share and influence within the range of certain administrative geographical area. It has strong regional characteristics, usually representing the subject and image of a local industry and product and playing an important role in local economic development. Therefore, brand consciousness of peasant households should be cultivated in order to promote regional circular economy development of eco-agriculture and forestry by brand construction and promotion.

4.2.3 Farmer cooperation organization. According to the decentralized production and operation status of peasants, farmer cooperation organization for circular economy of eco-agriculture and forestry should be established. During the production, we should carry out cooperation in capital, technology, manufacturing, marketing and information, provide services in a all round way, fully exert the functions of services, coordination and guidance, and promote the sound development of industry. Farmer cooperation organization is a kind of organization based on household contract management, which helps to exert the advantages of contract management, to enhance the organization degree of farmers, to improve the market control ability, and to realize the effective circular economy of eco-agriculture and forestry[6].

4.2.4 Leading enterprises. Circular economy of eco-agriculture and forestry needs the driven of leading enterprises, paying attention to the development of processing and marketing enterprises and the enhancement of products added value. Technical research, production and market promotion of ecological food can not be achieved only by the small peasant households, but need the participation of leading enterprises in market competition. Leading enterprise is the linkage of peasant household and market, having relatively great radiation and stimulation effects. Government should implement green marketing strategy in the aspects of funds and tax in order to support the leading enterprises, develop foreign trade, and support the cooperation among agricultural colleges, leading enterprises and research institutions, so as to enhance the innovation capability of green technology.

4.2.5 Market system of circular economy of eco-agriculture and forestry. Construction of market system includes the construction of the local physical market and the extension of foreign invisible market.

(1) Cultivate leading market; speed up the construction of trade market of eco-agriculture and forestry products; further improve the level of market; strengthen the hardware and software construction of market; and expand the information function, service function, radiation function and scientific and technological exchange and quality control functions of market.

(2) Speed up the application of circular economy of local eco-agriculture and forestry in large and medium cities of China; and encourage the farmer agents, professional households and leading enterprises to set up stores and sales windows in

large and medium cities.

(3) Accelerate the development of foreign trade leading enterprises; actively explore the international market; open up foreign windows; and increase foreign exchange earnings.

4.2.6 Human resource development of circular economy of eco-agriculture and forestry. Cultivating and abstracting talents is the key to introduce circular economy of eco-agriculture. We should enhance the talent consciousness, improve the cultivation of innovative talents, prevent the loss of talents, vigorously promote talents introduction and training of work force, and create basic human resources for the industry chain system construction of eco-agricultural circular economy.

Firstly, adopt effective measures to create conditions for technical talents, so that they can fully exert their own advantages. Under the guidance and help of experts, outstanding scientific talents with innovation capacities and co-operative spirit can be cultivated in order to establish a capable talent group. Secondly, through multi-form and multi-channel technology training, a large number of highly skilled workers are cultivated to promote the circular economy development of eco-agriculture. Thirdly, pay attention to the basic role of talents in the introduction of circular economic mode of eco-agriculture and forestry; fully explore the business management personnel under market condition; and allow them to increase their abilities during development.

4.3 Establishing industrial system of circular economy of eco-agriculture and forestry Circular economy system of eco-agriculture and forestry involves three major industries: the eco-agriculture and forestry industry that develops the pollution-free agriculture and forestry products, green food and organic food; the eco-forestry product processing industry that promotes the cleaner production process and resource comprehensive utilization; ecological service industry that develops eco-tourism, green hotels and various green services. The substance of circular economy of eco-agriculture and forestry is to take microbial treatment on wastes generated by eco-agriculture and forestry as the link to form an annular "food chain" (closed materials circulation). It has positive external benefits, but no negative external cost on ecological environment[7]. Through the microbial treatment of waste and the formation of annular "food chain", eco-agriculture and forestry industry has formed various industrial combinations. At present, the most typical combination is the circular economy of "pig – methane – fruit" and "pig – methane – vegetable" based on household economy.

5 Case analysis

5.1 "919" circular economy development mode of eco-agriculture and forestry established in Huaping County, Lijiang City, Yunnan Province, China "919" circular economy development mode of eco-agriculture and forestry established in Huaping County has become a successful mode during new socialist countryside construction in Yunnan Province. This mode takes individual peasant household as the subject with more than 9 annual penned high-quality livestock per household, one efficient methane pool above 8 cubic meters, and economic fruit forest more than 0.6 hectares. This project takes sustainable development and coordination of rural economy, society and environment as the objectives with methane as the link. It also vigorously promotes the "livestock – methane – fruit" in order to improve the income of farmers, the efficiency of agriculture and forestry and the rural eco-environment. Its objective is to establish circular economy system of eco-agriculture and forestry in Huaping County with methane as a link in the year 2010. And a total of 85% peasant households will have more than 9 penned domestic animals, 1 methane pool above 8 cubic meters, economic fruit forest more than 0.6 hectare, and net income more than 10 919 yuan[8].

5.2 Organization and implementation of "919" circular economy development mode Since the year 2001, Huaping County has introduced the "919" circular economy development mode of eco-agriculture and forestry, according to the concept of "preferential distribution, multiple demonstration, leader guidance, classified guidance, technology support, and high efficiency". This project is effective due to the guidance of government. County government selects Longtou and Sanmaqing as the two demonstration villages, setting fine examples to achieve the overall effect. And a vice leader of a county is responsible for the construction of methane. 43 peasant households in the total 49 households of Sanmaqing Village have achieved the objectives within only 2 years. Sanmaqing Village has more than 100 hectares mango trees with per household mango trees about 2 hectares. Each peasant household has one methane pool, more than 9 pigs and cows, and 10 avian. At the same time, Sanmaqing Village has challenged the out-of-date customs with thousands of years and has improved the conditions of kitchen, toilet, storage pit and other sanitary conditions. Now, the wealthy Sanmaqing Village has become a banner of ecological homeland project in the whole Huaping County.

County government has also organized the experts and technical staff to edit and publish the Practical Technology Guide for "919" Eco-household Project with about 40 million words, which has lasted for several years. It comprehensively introduces the practical technologies of planting industry, breeding industry, methane and modern agricultural production, which is a popular science book very suitable for the circular economy of eco-agriculture and forestry in Huaping County. With the accelerated pace of methane construction, county energy station has implemented the relation card for methane pool, has been staffed with methane administrator, and has offered free technical services in order to strengthen the supporting management. Besides, county NPC has discussed the "919" Implementing Method and has defined it in the form of local regulation, which offers policy support for the circular economy development of eco-agriculture and forestry.

5.3 Development achievements of "919" model Promotion of methane comprehensive utilization technology has greatly mobilized the enthusiasm of peasants in developing circular economy of eco-agriculture and forestry. A group of related in-

dustries have quickly risen all over the county. At present, pollution-free mango and vegetable production bases have emerged throughout the rural areas of Huaping. And "livestock – methane – fruit", "duck – methane – fish" and other industrial combinations are born with methane as a link. Developing pollution-free livestock, poultry, fruit, vegetables, aquatic products and high-quality rice has become the leading industries in agroforestry in Huaping. Since the products are sold in Chengdu, Panzhihua and northeast markets, agriculture and forestry have achieved sustainable development. The project fully reflects the will of peasants and solves the most direct and practical interests of farmers. Thus, it is popular among farmers with 100% participation rate. After the implementation of this project, newly added economic fruit reaches 3.9 thousand hectares in the whole county; and forest coverage rate has improved from 28% to 48.2% in the year 2000. Therefore, eco-environment within the county has improved effectively.

6 Conclusion

Circular economy development mode of eco-agriculture and forestry has a positive role in increasing farmers' income, recovering the degraded eco-environment in rural areas, realizing the new socialist countryside construction and the regional sustainable development in rural areas. The key of circular economy development mode is how to introduce it effectively. Due to the inertia of traditional development mode and the conservative consciousness of farmers, government promotion is necessary during its introduction. Therefore, support and promotion forces should be formed from various aspects and the active and broad participation of the farmers should be encouraged. Meanwhile, implementation of relevant functions and policy measures of government is the key to mobilize the enthusiasm of farmers.

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农村生态环境形势及生态农林业循环经济发展模式的导入

苏建兰[1,2],林诗文[3],刘 娜[2]
(1. 西南林学院经济管理学院,云南昆明 650224;2. 北京林业大学经济管理学院,北京 100083;3. 西南林学院外语系,云南昆明 650224)

摘要 分析了中国社会主义新农村建设面临的生态环境形势及农村环境问题的主要成因。阐述了在社会主义新农村建设中导入生态农林业循环经济发展模式的2点必要性:一是当前农村生态环境形势的需要;二是为了实现农业增长方式的根本转变。研究了生态农林业循环经济的具体特性、现有基础及面临的阻力。介绍了在社会主义新农村建设中导入生态农林业循环经济模式应遵循的主要原则,探讨了构建生态农林业循环发展模式所需要的支撑体系,包括完善的政府职能和监管机制、营销组织、农民专业合作组织、龙头企业、生态农林业循环经济市场体系和人力资源等。以中国云南省丽江市华坪县为例,分析了华坪县创建的"919"生态农林业循环经济模式及发展成果。

关键词 生态环境;循环经济;发展;导入