Development model and optimization path of Guizhou modern mountainous high-efficiency agricultural industrial chain—a case study of vegetable industry

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Abstract: In order to understand the present situation and future development direction of the large ecological industrial chain. Taking the vegetable industry in Guizhou as an example, this article analyzes the development status, model, structure, and existing problems of the vegetable industry chain based on the development of "ecological utilization" industries, and proposes a reasonable and effective optimization path for the development of future ecological industries. The results showed that although the vegetable industry in Guizhou Province is widely distributed and has stable development, there are problems such as a short industrial chain, low brand building and publicity, infrastructure construction, and the need to improve the government's institutional protection; It is recommended to optimize the development of ecological agriculture by innovating the industrial chain model, optimizing the layout, and integrating multichannel publicity to create distinctive industrial product brands, strengthen facility construction and policy guarantee mechanisms, explore ways to realize the value of ecological products, and form a competitive and orderly ecological product market system. Based on the analysis of the development of Guizhou Province 's modern mountainous and highly efficient agricultural industry chain, the development model and existing problems of Guizhou’s mountainous and highly efficient agricultural industry chain are clarified. From the perspective of regional development, relevant suggestions are put forward for modern mountainous and highly efficient agriculture and even for promotion Provide theoretical basis for the implementation of ecological civilization.

1. Introduction
Agriculture is the foundation of the development of the national economy and a basic industry for the survival and development of human beings. China is a traditional agricultural country with a long history of agricultural development. With the development of society, our agriculture has gradually changed from traditional agriculture to ecological agriculture. Scholars have also conducted a series of researches on ecological agriculture. In the study of the connotation of the circular agricultural ecological industrial chain, Yin Q, et al believed that the ecological industry chain is to optimize the mutual relationship between industries and to create a new type of industrial system innovation activity under the guidance of ecological principles to increase the natural resource stock. Qi ZH, et al believes that the essence of the agricultural ecological industrial chain is to change the traditional agricultural production mode, adjust the industrial structure, and promote the ecologicalization of the
agricultural industry. The industrial chain is usually divided into two types: vertical supply chain and horizontal cooperation chain [6]. In the construction of agricultural circular economy, Sheng YW and others believe that by transforming the extensive development mode of traditional agriculture “high input, high consumption, high pollution, low output”, a circular agricultural ecology of “resources-products-waste-renewable resources” is formed. The industrial chain has become an important means of building low-carbon green recycling agriculture [1]. In terms of agricultural ecological efficiency, Pan Dan et al[7] believed that in order to comply with the concept of sustainable development, agricultural ecological efficiency should fully and reasonably produce products under the premise of consuming less agricultural natural resources and minimizing environmental damage. Production reaches the "3R" goal advocated by the circular economy [8]; Wang BY [9] pointed out that the relationship between agricultural input, output and ecological impact should be balanced in the agro-ecological industry, and the long-term benefits and ecological benefits should be strengthened in the agricultural production process.

The development of circular economy is an inevitable trend of the sustainable development of human society, and it requires the guidance of human economic activities with ecological laws [10]. The eco-industrial chain is a concept that advances with the times and is unified with the concept of sustainable development. As an important carrier of the development model of circular economy, the ecological industry chain is an important tool for achieving sustainable economic development [11]. Ecological agriculture is an agricultural development model based on the protection and improvement of the agricultural ecological environment, in accordance with ecological laws, the application of systems engineering methods and modern science and technology, and intensive management [12,13]. At present, there are few studies on high-efficiency agriculture with mountain characteristics. Teng Mingyu and others have conducted some analyses on modern high-efficiency agriculture with mountain characteristics from the perspective of text, agricultural history and agricultural form [14]. The interpretation and definition of high-efficiency agriculture in modern mountainous areas has not been clearly defined [14,15]. China is the largest country in the world for vegetable production and consumption. The vegetable industry has become a pillar industry for agricultural and rural economic development [16], and has played a very important role in agricultural and rural development and in promoting farmers' income increase [17]. Guizhou has benefited from the unique natural resources. Guizhou benefits from the unique natural resources, and the ecological industry has developed rapidly in recent years. Therefore, this article uses the vegetable industry as an example to analyze the current status of the ecological industry, and to clarify the development status and model of the mountainous and highly efficient agricultural industry chain and its existing problems. Proposed relevant suggestions from the perspective of regional development provide theoretical basis for the development of agricultural industry chain.

2. Overview of Vegetable Industry in Guizhou Province

In response to the layout of Guizhou’s vegetable industry, Yan X [18] analyzed and summarized the status quo and problems of its industrial development, and proposed relevant development proposals for the high-tech positioning of the vegetable industry and the standardized production of organic vegetables. The area, low cost and sustainable production of high-quality vegetable cultivation provide theoretical references. According to the analysis of the annual implementation of industrial poverty alleviation and spatial distribution data of Guizhou Province, Guizhou Province is the key area for planting summer and autumn vegetables in Yunnan-Guizhou Plateau. The vegetable industry is spread all over the province (Table1), mainly cabbage and pepper, and other vegetable industries such as radish, green onion, eggplant and Tomatoes are scattered in counties and cities. In terms of production scale, the province's vegetable production is larger in the northwest than in the southeast. The largest production scales are Weining County, Bozhou District and Suiyang County. The production scale in 2017 is between 50.1-800,000 mu. The vegetable industry has a great driving effect on the local poverty alleviation work. In 2017, the three largest counties with the largest production scale have driven the poverty-stricken population to reach 360 million, 167.96 million and 121.4 million people.
and the industrial poverty alleviation has achieved remarkable results. From the perspective of each city and state, the vegetable production scale of Zunyi City, Bijie City and Qiannan Prefecture has always been at the forefront, and the vegetable industry of each city and state has developed steadily.

Table 1. The vegetable industry planting area layout in Guizhou Province

| City (state)       | 2017 status / 10,000 mu | 2018 target mission / 10,000 mu | 2019 target mission / 10,000 mu |
|--------------------|-------------------------|---------------------------------|---------------------------------|
| total              | 3870.96                 | 3575.22                         | 3927.18                         |
| Guiyang City       | 163.96                  | 147.00                          | 153.00                          |
| Zunyi City         | 460.43                  | 373.00                          | 410.00                          |
| Anshun City        | 152.02                  | 143.00                          | 152.00                          |
| Liupanshui City    | 74.02                   | 88.00                           | 97.00                           |
| Bijie City         | 273.12                  | 300.60                          | 338.60                          |
| Tongren City       | 181.92                  | 155.00                          | 172.00                          |
| Southeastern Guizhou | 188.12                | 185.00                          | 194.00                          |
| Gannan             | 333.42                  | 276.01                          | 313.99                          |
| Southwestern Guizhou | 108.47               | 120.00                          | 133.00                          |

In the decade from 2006 to 2016, the total agricultural output value of Guizhou Province ranked first in the total output value of agriculture, forestry, animal husbandry and fishery, and the output value increased steadily year by year (figure 1 and figure 2), which is closely related to the unique natural environment and ecological industry development in Guizhou. The development of mountainous agriculture in accordance with local conditions and the breaking of topographical restrictions have made Guizhou's agriculture more diversified and three-dimensional. The vegetable industry in Guizhou has a relatively large proportion in agriculture. Since 2006, the vegetable planting area and product output of Guizhou Province have continued to grow, reaching 1,050,000 hectares and 18.78 million tons in 2016 respectively. Compared with 2006, the vegetable industry has planted areas. And the output of the products has increased several times. In 2016, the planting area of the vegetable industry and the increase in product output accounted for the first increase in crops. The vegetable industry has become one of Guizhou's agricultural industries with relatively rapid development and high ecological benefits in recent years. This is closely related to Guizhou's vigorous implementation of industrial poverty alleviation and development of ecological industries.
Figure 1. The gross output value of agriculture, forestry, animal husbandry and fishery in Guizhou province from 2006 to 2016

Figure 2. The planting area and product yield of vegetables in Guizhou province from 2006 to 2016

3. Analysis on the current situation of vegetable industry chain development

3.1. Vegetable industry chain development model
The typical development model of Guizhou's eco-industrial chain mainly consists of an integrated model of vegetable farming, a multi-zone and an automated integration model. The integrated vegetable farming enterprise combines vegetable cultivation with aquaculture, integrates tourism development, and has the characteristics of systematic, large-scale and information management. With more than one belt, the automation integration enterprise involves a wider scope, and the monitoring of industrial production is relatively strong, and it has the characteristics of comprehensive, strong driving and high technical content. Both of them have a driving role for link companies, and monitoring is implemented in product production to ensure product safety. Based on the four types of industries, Guizhou has established a farmer-enterprise-sales eco-industrial development model,
combining industrial poverty alleviation with ecological construction to promote the green and healthy development of Guizhou's economy.

3.1.1. Integrated development model of vegetable culture

According to the ecological cycle development model of “pig + marsh + vegetable + pig”, the construction of pollution-free green vegetable base and non-anti-porcine breeding farm in the whole natural village will establish a three-product fusion of planting, breeding, processing, sales and tourism. The development of the whole industry chain enterprises; enterprises cultivate their own vegetable varieties, vegetables are organic products; in production and sales, according to the idea of factory management of agriculture, the use of agricultural Internet of Things and quality traceability system to ensure production safety, quality traceability; The main reason for the sale of the products is to use the “base + direct store + e-commerce” model to open the direct sales store of excellent vegetables in the community, to reduce the intermediate links, and to establish its own sales channels in the coastal cities to create Guizhou's mountainous vegetables. Leading brands have laid a solid foundation.

3.1.2. Multi-band, automated integration mode

The model is operated by the company + farmer's operation mode, and the seeds are distributed to the farmers free of charge. The company provides the farmers with planting technical support, combined with the drone automatic driving navigation low-altitude low-volume application aircraft, farmland soil heavy metal pollution passivation and repair technology, etc. Farm vegetables are planted and managed. Two-thirds of the vegetables sold in the province are sold in the province and are sold through wholesalers. The company applies pollution-free cultivation technology to develop new varieties of vegetables, adopts advanced technology in the packaging and storage of agricultural and sideline products, implements after-sales service for self-produced products, and realizes one-stop service of vegetable industry chain.

3.2. Vegetable industry chain structure

As one of the major industrial provinces in China, which is mainly based on summer and autumn vegetables, Guizhou Province has continuously expanded its agricultural production scale, and the concept of industrial development has been continuously improved. The traditional vegetable cultivation model is no longer suitable for the current market demand; in order to improve the quality of vegetables, vegetable products are prolonged. During the sales period, it is necessary to continuously improve the vegetable industry chain and systematically plan all aspects of the industrial chain to ensure the integration and interaction between the link industries [19]. Through investigation and analysis, Guizhou vegetable industry can be divided into junior high school and high-grade industrial chain by industry scale.

3.2.1. Primary industry chain

The chain is mainly for small-scale farmers, the chain mainly includes the purchase, planting, processing, sales and other links (Fig 3). The purchase channels of the farmers in the purchase chain are mainly to buy the vegetables sold in the local farmers market; The main reason is that the labor is used for sowing and management. The source of fertilizer is mainly farmyard manure; the processing process is mainly for farmers to simply select and then sell vegetables, and the sales volume is small. Farmers feed a small number of livestock, use residual vegetables to feed livestock, animal manure is used for vegetable cultivation, and the vegetable industry produced has natural and organic characteristics.

3.2.2. Intermediate industry chain

The chain is mainly for small companies or cooperatives (figure 3). The company's breeding bases are independent breeding, artificial planting or mechanical planting, and the processing links are basically manual batch processing. The company has stable sales channels and the products are mainly sold to
the province. All counties and cities. The chain model is relatively simple, and the products produced are relatively simple. The use of chemical fertilizers and films in the production process will have a certain negative impact on the ecological environment.

3.2.3. Advanced industry chain
The industrial chain basically conforms to the concept of circular economy development, and maximizes the economic and ecological value of each link. The industrial chain is mainly aimed at vegetable cultivation of large enterprises with circular ecosystems. The industrial chain mainly includes seedlings, planting, processing, sales, animal breeding, biogas utilization (mainly used for soil fattening), and base tourism (figure 4). In the chain, all kinds of vegetables are processed, processed or processed into non-staple foods, and the industrial chain and storage time are extended. The products are mainly sold outside the province, and the combination of e-commerce sales and direct marketing expands the sales scope.

Yuan Y et al\cite{20} added the theory of dissipative structure to the study of ecological industry chain, and concluded that the various production links of the eco-industrial chain are interrelated, and the eco-industrial chain is essentially an open system. There are interdependences, multiple diversity and long-term relationships among the chains of the agricultural industry chain \cite{21}. It can be seen from the various chain patterns and structures of the above vegetable industry chain that a close communication relationship between the upstream and downstream of the chain is formed. From the perspective of material flow, the agricultural ecological industry chain flows through both agricultural products and by-products and wastes produced in agricultural production processes, either as physical or intangible
energy \[22\]. Therefore, in the industrial production process, we should also pay attention to the environmental protection of by-products and waste.

3.3. Analysis of Vegetable Industry Chain Problem
Under the concept of circular economy development, the vegetable industry in Guizhou Province uses large enterprises to drive the development of the link industry. The industrial chain continues to expand outwards, and the ecological benefits and economic benefits are integrated. The eco-industrialization has begun to take shape; but the relevant enterprises are still in the production process. There is a problem of extensive management. There are still many places in Guizhou that retain the traditional extensive vegetable production mode. The production management methods are prominent and the ecological problems are serious.

3.3.1. Short industrial chain and imperfect product supporting facilities
Many areas in Guizhou are small-scale vegetable planting bases built by individual households or cooperatives according to market demand. The number of incidental industries is relatively small, resulting in a single industrial chain, and the links between enterprises and farmers are not close. Some planting enterprises have problems with the overall imperfect infrastructure. Vegetables are short-cycle foods, which are difficult to preserve. The shortage of cold storage and storage and fresh-keeping facilities has caused fluctuations in yield and quality of the vegetable industry. The links between the various links of the vegetable industry chain are extremely poor. Reduce the productivity of vegetable production and marketing and industrial competitiveness.

3.3.2. Farmers' production is relatively scattered, and the degree of planting is low.
Affected by the terrain, the cultivated land in Guizhou Province is relatively fragmented, resulting in the mountain agricultural production being mostly scattered; the vegetable production is mainly household contracted and distributed, and the production scale is small. The development of characteristic agriculture lacks production management and technology promotion talents. Agricultural science and technology are underdeveloped. Enterprises use advanced monitoring and management technologies to be less active. The supervision of industries in the production process is more traditional.

3.3.3. Insufficient brand building, less promotion of industrial technology
Guizhou has a wide area of vegetable cultivation, but the branding of the vegetable industry is not ideal. At present, only the pepper industry has formed a distinctive pepper brand, such as Laoganma and Zunyi shrimp pepper. Guizhou Province is one of the national high-efficiency agricultural production areas with mountain characteristics. The superiority of the ecological environment is also a business card for industrial development. However, manufacturers are still lacking in the mining of industrial brands. In the process of building an ecological industrial chain, there is less communication between vegetable enterprises in various urban areas, and advanced industrial technologies have not been well promoted and applied.

3.3.4. Insufficient policy propaganda and innovation, lack of ecological industry system guarantee
Another reason for the relatively slow development of Guizhou's industrial development is that the government lacks positive innovation in product promotion, and insufficient publicity and innovation on the awareness of ecological civilization, which leads to limited industrial development. In the mountainous areas of Guizhou, especially in ethnic minority areas, people's ideology and production methods are relatively backward, and their understanding of the development of green economy is not deep, resulting in poor scale production capacity and ecological benefits of mountain agriculture. There is no comprehensive industrial security system for the construction of ecological industrial chain. There is still a lack of rewards and punishments system that is innovative or unfavorable to environmental protection and industrial development.
3.3.5. The added value of products is not high, and the space for the transformation of ecological products to ecological industries is relatively large.

The value of ecological products (GEP) can be defined as the sum of the value of the final product and service provided by the regional ecosystem to humans\(^{[23]}\). Ecological agriculture is one of the realization mechanisms of ecological product value. The ecological value of products in all links in the process of constructing agricultural ecological industry chain can be realized. Throughout the development of Guizhou's vegetable industry, industrial development is relatively stable, ecological benefits are significant, but the evaluation of the value of ecological products is relatively lacking, the practice of ecological product value is relatively lagging, the added value of products is not high, leading to the transformation of ecological products into ecological industries. Insufficient, in the future development of the ecological product value accounting needs further study.

4. Vegetable industry chain optimization path

4.1. Innovate the ecological industrial chain construction model and strengthen infrastructure construction

Vegetable fresh-keeping period is generally 10-20 days, and processed dried vegetables are not easily accepted by the market. Therefore, enterprises can increase the value of vegetable by-products, extend the industrial chain, and increase the added value of products\(^{[24]}\) to ensure the maximum utilization of vegetables; Guizhou Province in recent years When tourism develops like a spring, it is possible to combine agriculture with the tertiary industry, develop an integrated agricultural and tourism industry, promote tourism with agriculture, and promote tourism to maximize the industrial chain. With the support of the government, improve the infrastructure construction of vegetable planting bases, improve the ecological environment, improve the quality of vegetable products, and ensure the maximum and optimal production of the entire vegetable industry chain. As the first national-level big data comprehensive experimental zone, Guizhou can apply 3S technology to the vegetable industry chain production management process, and monitor the industrial development status in real time for timely adjustment; the government should make reasonable planning for the poverty alleviation industry and do relevant compensation mechanisms. Promote the healthy development of the ecological industry and achieve the integration of big data, big ecology and big poverty alleviation.

4.2. Optimize regional layout and improve product planting structure

Give full play to the advantages of the southwest transportation hub, rely on the expressway and high-speed railway to vigorously develop characteristic varieties and special-purpose varieties in the surrounding area, integrate vegetable cultivation with administrative areas or natural areas as a unit, and do “one village, one product” and “one township one industry”. To achieve intensive and green production, develop rural characteristic industries according to local conditions; improve the level of facility cultivation in urban suburbs, combine vegetable industry with modern agricultural display, sightseeing and leisure agriculture, and enrich the content of agricultural ecological industry chain. Select representative areas to carry out pilot demonstrations of large-scale ecological industry development, accelerate the implementation of the “Thousand Enterprise Reform” project, actively create green enterprises, form an ecological industry development model that can be replicated and promoted, and establish an efficient ecological governance model.

4.3. Strengthen brand cultivation and create a mountainous vegetable industry

According to stakeholder theory and governance theory, all stakeholders who influence the eco-industrial chain should participate in the eco-industrial chain governance\(^{[25,26]}\), and brand building is undoubtedly an excellent way for industry propaganda and development, any link The stakeholders involved have the responsibility and obligation to make suggestions for the overall development of the industry chain; we can seize the opportunity of people to pursue green organic products in recent years to vigorously develop the green economy and give play to Guizhou's ecological advantages. Under the
background of the construction of the National Ecological Civilization Experimental Zone, Guizhou Province relies on the development of the “four-type” industry of green economy. The government should encourage enterprises to create national and provincial famous brands and trademarks and cultivate famous vegetable brands in mountainous areas. Promote ecological culture through multiple channels and promote green concepts.

4.4. Increase policy innovation and publicity, and build institutional guarantee for large ecological industrial chain

Policy support has a positive effect on industrial development\(^{(27)}\). The government should strengthen the strategic concept of “ecological priority, green development”, transform the concept of development, and commit to ecological protection and green production and consumption. Under the background of ecological development, fully understand the urgency and importance of promoting the industrial transformation in the new era, pay attention to the construction of large-scale ecological industrial system, actively promote green development, and do a good job in the promotion of ecological industry through the combination of centralized education and multimedia. All regions will effectively plan for the future development direction, development orientation and development path of large-scale ecological industries, strengthen responsibility and support the development of key ecological industries in the region. For enterprises and products that meet the development of large-scale ecological industries, the government should give preferential policies to encourage industrial development. Accelerate the improvement of the monitoring and evaluation system for large-scale ecological industry planning, so that the industrial development receives corresponding institutional guarantees.

4.5. Improve the realization mechanism of ecological product value and form an orderly ecological product market system

Exploring the realization path of ecological products is the proper meaning of building ecological civilization. The realization of the value of ecological products needs to establish a development framework systematically. The downstream of products involves a wider scope. Therefore, it is necessary to establish a sound ecological product value realization model and rationally plan product production space layout. The assessment of the value of ecological products should be considered comprehensively to promote the integration of ecological development and economy. In the process of realizing the value of the entire ecological product, strengthen policy and technical support, take the vegetable industry as an example, combine leading enterprises and scientific research institutions, build a communication platform, and promote research on the value of ecological products and the development of ecological industries. In the construction of the market system of ecological products, create an ecological product and its derivatives trading market, build an effective price discovery and formation mechanism, and form a unified, open, competitive and orderly ecological product market system.

5. conclusion

Based on the analysis and overview of the vegetable industry’s layout, development status, and industrial chain model in Guizhou Province, relevant problems in the ecological industry chain in Guizhou are identified and corresponding countermeasures are proposed. The starting point for the vegetable industry is the province’s mountainous and highly efficient agriculture. Provide reference for development and provide theoretical basis for further improvement and development of ecological industry chain; Guizhou has increased the construction of high-efficiency agriculture with mountain characteristics in the context of the "four-type" industrial development, which not only fits the two bottom lines of Guizhou's ecology and development, but also meets the requirements of the construction of a national ecological civilization experimental zone. Therefore, Guizhou can continue to develop on this basis An industry development model with Guizhou characteristics, exploring ways to realize the value of ecological products, forming a competitive and orderly ecological product
market system, and providing a theoretical basis for promoting the implementation of ecological civilization.

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References

[1] Sheng YW., Ma YJ. (2017) Research Progress and Prospect of Circular Agricultural Eco-industrial Chain Construction. J. Environmental Science & Technology. 40, 01: 75-84.

[2] Zhou H., Liu H. (2018) Analysis of the Path of High-efficiency Agriculture Development in Modern Mountainous Areas of Guizhou and Its Countermeasures. J. Modern Business Trade Industry. 39, 33: 23-24.

[3] Shan FB., Zhou J., Li X. (2017) Analysis of the Development Model of the Whole Industry Chain of Creative Agriculture. J. Northern Horticulture. 06: 199-204.

[4] Yin Q., Xiao ZY. (2002) The Concept and Application of Ecological Industry Chain. J. Environmental Science. 06: 114-118.

[5] QI ZH., WANG PC., YAN CY. (2009) A Review of the Theory of Co-occurrence Coupling of Ecological Industry Chain Based on Circular Economy. J. Ecological Economy (Academic Edition). 02: 185-188.

[6] Qu ZG., Chen GJ., Wang QY. (2008) Analysis of the Development of Sucrose Industry from the Perspective of Green Industry Chain. J. Journal of Southwest Forestry University. 04: 115-117+125.

[7] Pan D., Ying RY. (2013) Evaluation Method and Empirical Study of Agricultural Eco-efficiency in China——Analysis of SBM Model Based on Unexpected Output. J. Acta Ecologica Sinica. 33, 12: 3837-3845.

[8] Zhang JH., Zhao Q. (2006) Wang Shouhong, et al. Research and application of double-chain eco-agriculture model. J. Jiangsu Agricultural Sciences. 05: 4-7.

[9] Wang BY., Zhang WG. (2016) Research on the Time and Space Differences of Agricultural Eco-efficiency Measurement in China. J. China Population, Resources and Environment. 26, 06: 11-19.

[10] GUO YH. (2016) Case Analysis of Network Management of Stakeholder Relationship in Eco-industrial Chain. J. Science & Technology Progress and Policy. 33, 06: 58-64.

[11] Heeres R R., Vermeulen W J V., Walle F B D. (2004) Eco-industrial park initiatives in the USA and the Netherlands: first lessons. J. Journal of Cleaner Production. 12, 8-10: 985-995.

[12] Zhang F. (2006) Mountain Ecological Agriculture Engineering Technology. Beijing Chemical Industry Press, Beijing.

[13] LIU LL. (2008) The Importance of Ecological Agriculture in the Rise of Central China. J. Journal of Southwest Forestry University. 04: 57-60.

[14] Teng MY., Jian XY., Zhang L., et al. (2018) Theoretical Thinking on Modern Mountain Characteristic Efficient Agriculture. J. Journal of Shanxi Agricultural University (Social Science Edition). 17, 06: 60-65.

[15] Teng MY, Jian XY, Zhang L. (2018) How to build a high-efficiency agriculture with modern mountain features. J. Journal of Guangxi Vocational and Technical College. 2018, 11, 01: 14-19.

[16] Zhang DZ. (2012) Problems and Countermeasures of Sustainable Development of Vegetable Industry in China. J. Hunan Agricultural Sciences. 06: 6-8.
[17] Ji GJ, He QX, Li SJ. (2018) Development Status and Policy Suggestions of Chinese Vegetable Seed Production Base. J. China Cucurbits and Vegetables. 31, 09: 46-49.
[18] Yan X., Pei Y., Deng DX., et al. (2018) Analysis of the current situation of ecological vegetable industry in Guizhou Province and its development countermeasures. J. Journal of Changjiang Vegetables. 10: 80-84.
[19] Liu JL. (2017) Research on the Development of Edible Flowers in China from the Perspective of Industry Chain.J. Northern Horticulture. 03: 190-194.
[20] Yuan W., Chen XM. (2010) Research on the Formation Mechanism of Ecological Industry Chain Based on Dissipative Structure Theory. J. Inner Mongolia Social Sciences. 31, 06: 101-105.
[21] Jiao DM., Zhang ZF. (2011) Optimizing Agricultural Structure and Constructing Harmonious Agricultural Ecology Industry Chain. J. Agriculture of Jilin. 04:1.
[22] Liu SW., Li FJ. (2011) Promoting the Transformation of Traditional Agriculture "Ecologicalization"——A Study on the Construction of Agricultural Ecology Industry Chain Network. J. Tianjin Agricultural Sciences. 17, 03: 81-84.
[23] Lan BQ., Ye F. (2018) “Lishui Model” for Realizing the Value of Ecological Products. J. Zhejiang Economy. 18: 44-45.
[24] Li QL, Ming QZ. (2008) An Empirical Study on the Development of Rural Tourism Circular Economy——Taking Tuanjie Town, Xishan District, Kunming City as an Example. J. Journal of Southwest Forestry University. 04: 32-36.
[25] Guo YH. (2013) Research on the Difficulties and Governance Models of China's Ecological Industry Chain from the Perspective of Stakeholders.J. Journal of Industrial Technological Economics. 32, 06: 150-158.
[26] Xu JL. (2014) Study on Industrial Chain and Industrial Development Model of Herb Plants. J. Northern Horticulture. 06: 177-180.
[27] Li YK., Wang XR. (2018) Research on Agricultural Industrialization Management Mode and Industry Chain Benefit Distribution Mechanism——Based on Analysis of Chongqing Citrus Industry Chain. J. Jiangsu Agricultural Sciences. 46, 11: 336-340.