

## Research on Innovative Development of Bamboo Industry in Xianning

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**Abstract:** Hubei Xianning fully recognizes the economic value of bamboo forest resources and strives to transform resource advantages into economic advantages. Through the research on the current status of the bamboo industry in Xianning, it was found that the bamboo industry has problems in development, management, processing, etc., and proposed innovative development ideas for the bamboo industry in Xianning to replace wood, plastics, tourism, and medicine in the overall planning and base. Put forward relevant innovative countermeasures in terms of construction, brand building, and technology investment.

### 1. Introduction

The bamboo industry is a green industry recognized worldwide. According to statistics, the area of bamboo forests in the world currently exceeds 2500 hectares. The Asia-Pacific region is the largest bamboo producing area in the world. China is not only the country with the largest area of bamboo forests in the world, but also the accumulation of bamboo and bamboo species resources rank first in the world. Therefore, it has the reputation of “Bamboo Kingdom”. People pay more and more attention to the bamboo industry because of its huge economic value, ecological value and cultural value. In fact, our people have always loved bamboo, and China is also the earliest country in the world to study, cultivate and use bamboo. Since modern times, the country has continuously introduced policies to promote the growth and development of the bamboo industry, which has led to a rapid increase in the output value of China's bamboo industry. From only 400 million yuan in 1981, to 20 billion yuan in 2000, to 80 billion yuan in 2007, and finally to 2019, the output value of the bamboo industry was close to 300 billion yuan. This remarkable progress has also continuously promoted local governments to begin to attach importance to the development of the bamboo industry.

#### 1.1 Development of Xianning Bamboo Industry

##### 1.1.1 Policy Support

In recent years, Xianning, Hubei, has fully realized the economic value of bamboo forest resources and has closely followed the country's emphasis on the development of bamboo forests. As early as 2003, the Chinese Bamboo Culture Festival was successfully held. On May 21, 2012, it was pointed out that “Xianning City wants to make bamboo industry a bamboo industry”. In 2013, the Xianning Municipal Party Committee and Government put forward the goal of building a tens of billions of yuan of bamboo industry, and all parts of the city have successively promoted the rapid development of the bamboo industry. In April 2019, Xianning City issued the “Implementation Opinions on Accelerating the Implementation of “133” Regional and Industrial Layout to Promote the City's High-Quality Development”, proposing that the city should accelerate the construction of the province's characteristic industry growth pole, the bamboo industry and the tea and camellia industries. Together are listed as the city's three tens of billions of industries. By March 2021, Xianning City will hold another bamboo industry development leadership group meeting and put forward new requirements. With the continuous introduction and improvement of

policies, the bamboo industry in Xianning has been vigorously developed.

### **1.1.2 Product Development**

At first, it was mainly based on traditional bamboo products. For example, the factory mainly produced primary products such as bamboo chopsticks, bamboo silk, toothpicks, as well as scaffolding and bamboo springboards at construction sites. Then it expanded its business and developed intensively, and began to vigorously develop, manufacture and sell bamboo plywood, bamboo flooring, bamboo raw fiber, bamboo charcoal fiber, clothing and home textile fiber, etc. Then began to develop bamboo handicrafts, industrial bamboo medicine, bamboo chemicals, and other life-related products with greater added value. For example, in recent years, the bamboo industry enterprises in Xianning City have developed new products such as raw material particles, bamboo salt and bamboo wine. And, in 2014, the country's first bamboo afforestation carbon sink project was launched in Tongshan, Xianning. Relying on bamboos that can "breathe", the county will reduce carbon emissions while promoting poverty reduction and revitalization. Up to now, the Tongshan Bamboo Carbon Sequestration Project has exceeded 400,000 mu, which has increased the income of more than 30,000 farmers. This is a microcosm of our city's development of the bamboo industry as the main industry relying on abundant bamboo resources. As a result, China's bamboo industry has gradually formed a scale. The output value of the bamboo industry has risen rapidly, attracting investors, and the scale of the bamboo industry chain has continued to expand and improve. Promote the steady progress of the construction of bamboo industrial parks. Then in recent years, it began to create bamboo ecological tourism, launching characteristic homestays and bamboo culture. Started to operate the tertiary industry. By the end of 2019, the city has achieved an output value of 6.7 billion yuan in the bamboo industry, but there is still a gap between the target of 10 billion yuan. And the output value of the tertiary industry is only 960 million yuan. So far, the status quo of each industry shows that the development of the three industries of Xianning bamboo industry has great development prospects.

## **1.2 Achievements in the Development of Bamboo Industry in Xianning City**

As one of the important industries in Xianning, the bamboo industry has encountered various problems in the development process, but it has made great achievements in the development process of the bamboo industry. In order to better fulfill the task of rural revitalization in Xianning, we must not only find and solve problems, but also better carry on the achievements made in the

### **1.2.1 The Scale of Base Construction**

The bamboo industry is beginning to take shape. By the end of 2020, the city's bamboo industry output value was 6.33 billion yuan, of which the first output value was 2.47 billion yuan, the second output value was 2.9 billion yuan, and the tertiary output value was 960 million yuan. The construction of the bamboo industrial park is progressing steadily. More than 2,000 acres of bamboo recycling economy industrial park has been built, and more than 20 enterprises have settled in it. Huiyuan Technology Bamboo Industry, Xiangteng Technology Company, and Lvshengyuan Bamboo Salt have a strong development momentum. The bamboo industry investment promotion has achieved remarkable results. The city has 68 bamboo processing enterprises with an annual output value of more than 300,000 yuan, more than 400 small and micro bamboo processing enterprises, and more than 60 bamboo products. With the implementation of the bamboo pulp and paper project of Nine Dragons Group, the promotion of the construction of a tens of billions of bamboo industry clusters has added a strong momentum. In recent years, we have vigorously attracted investment and successfully introduced 12 bamboo processing enterprises. This year, the Municipal Forestry Bureau introduced Shenzhen merchants to the Hot Spring Development Zone to develop bamboo charcoal processing, and the terminal products entered the market in early September.

### **1.2.2 Initial Results of Processing and Utilization**

The city has established 233 bamboo processing enterprises, and developed bamboo integrated

boards (bamboo plywood, bamboo flooring, etc.), bamboo crafts (bamboo weaving and bamboo carving), bamboo daily necessities (bamboo chopsticks, bamboo mats, bamboo beds, etc.), bamboo shoot food products, bamboo charcoal There are more than 600 varieties in 5 series, among which 23 products won the gold medal of the National Forest (Bamboo) Industry Expo. The bamboo industry enterprises in our city have developed new products such as raw material particles, bamboo salt, bamboo trays for western food, bamboo wine, etc., which are very popular in domestic and foreign markets. Chibi Chenming Paper, Tongcheng Longteng Bamboo, Chongyang Ruifa Bamboo Shoots, Xinda Flooring, Tongshan Hengtong Bamboo and other large-scale enterprises have gradually formed their brand effects.

### **1.2.3 Bamboo Forest Tourism is Booming**

The city seizes the opportunity of building a spring capital of Fragrant City and global tourism, relying on the advantages of bamboo resources, highlighting the characteristics of bamboo culture, improving the facilities of bamboo scenic spots, and establishing the brand of bamboo tourism. Relying on the stars and bamboo sea to develop sightseeing and leisure tours, relying on Zhuxiang Farmhouse to develop rural customs tours, and relying on Qianshan Bamboo Expo to develop popular science and cultural tours. In the past two years, the number of tourists received by the Bamboo Scenic Area has increased at a rate of 200,000 people per year. In 19 years, the number of tourists received has reached more than 3 million. The city has initially formed a system of bamboo eco-tourism scenic spots such as the Dazhuhai in southern Hubei, and Suiyang, Damu, Huanglong, Jinsha, Jiugong and Qianshan.

### **1.2.4 Obvious Results of Science and Technology Demonstration**

In the development of the bamboo industry, our city has always paid attention to the application of science and technology. It has successively established industry-university-research cooperation platforms with the International Bamboo and Rattan Center, Huazhong Agricultural University, Nanjing Forestry University, Zhejiang Agriculture and Forestry University and other scientific research institutes. To improve quality, we successfully implemented and completed the National Standards Committee “Eighth Batch of National Bamboo Production Comprehensive Standardization Demonstration Zone” project, and formulated the “Phoebe Bamboo Large Diameter Timber Cultivation Technical Regulations (Provincial)” and “Phoebe Bamboo Shoots Processing Technology” Based on such standards as “Regulations (Municipal Level)” and “Technical Specifications for Carbonized Reconstituted Bamboo Processes”, the ninth batch of national bamboo production comprehensive standardization demonstration zone upgrading projects have been successfully applied on this basis.

### **1.2.5 Technology is Maturing Day by Day**

Under the guidance of the forestry department, bamboo farmers have explored fast-growing and high-yielding technologies such as deep reclamation of bamboo forests, bamboo shoots and bamboos, timely top-dressing, and insect control. The main production area of nan bamboo promotes high-yield transformation, implements intensive management, implements planned harvesting of more than 150 bamboos per mu, and strictly controls the logging of 120-150 bamboos, which promotes the total and quality of nan bamboo. promote. Xian'an District Forestry Institute established 30 mu of bamboo forest in 1971, and has now expanded the forest to 108 mu, with 460 standing bamboos per mu, with an average bust circumference of 1.1 feet, and an average output value of 700 yuan per mu. It has become a demonstration base for fast-growing and high-yielding bamboo forests in the city. one.

## **2. Problems Faced by the Development of Bamboo Industry in Xianning**

Although the development trend of Xianning's bamboo industry is good, there is still a big gap compared with Zhejiang Anji and other places. The total output value of the bamboo industry in Anji County is 11.2 billion yuan, and the GDP contribution rate reaches 30%. However, the income

of the bamboo industry in Xianning only accounts for 5% of the total agricultural output value, and the resource advantage has not been transformed into an economic advantage. The problems faced by the development of the bamboo industry are mainly embodied in three aspects: extensive cultivation and management, lagging processing and utilization, and insufficient comprehensive development.

## **2.1 Extensive Cultivation Management**

### **2.1.1 The Consciousness of Raising Bamboo is Not Strong**

The vast majority of bamboo farmers follow the traditional management method, only cutting bamboo and sterile bamboo. Except for some bamboo forests that have been split and caressed, they rarely carry out reclamation, fertilization, and do not hook or number bamboos. Most bamboo forests are in extensive areas. Operating status.

### **2.1.2 Backward Business Philosophy**

Focusing only on the immediate interests, cutting the big and leaving the small, not only affects the growth of bamboo shoots and the growth of bamboo, but also affects the strength and stability of bamboo products. Blindly emphasize the protection of bamboo shoots, wasting a lot of bamboo shoot resources. The Chibi Liyuan Forest Farm Company had to purchase more raw materials from other places due to insufficient local bamboo shoot resources. According to estimates, under natural conditions, the annual output of bamboo shoots per 667m<sup>2</sup> is 50kg, reducing income by 150 yuan. Compared with Anji bamboo farmers, local bamboo farmers only account for about 60% of their income from bamboo per unit area, while the income of “three bamboo shoots (spring bamboo shoots, whip bamboo shoots, winter bamboo shoots)” does not account for 10%.

### **2.1.3 Higher Production Costs**

Young adults in rural areas go out to work, and bamboo production areas are generally short of labor. Normal bamboo tending requires 600 yuan for every 667m<sup>2</sup>. In addition, the road construction in the forest area is backward. A considerable proportion of bamboo forests are located in high mountains and far mountains and are closed to traffic. The harvesting and skidding are carried by manpower. The cost of cutting bamboo accounts for more than 30% of the selling price of bamboo. The extensive management of bamboo forests has caused “two differences and two lows”. The first is the poor quality of the forest. Most bamboo forests have an average standing bamboo volume of less than 150 plants/667m<sup>2</sup>, and an average DBH of less than 9.5cm. The standing bamboos are irregular and unevenly distributed; the second is the poor quality of bamboo, with few large-diameter bamboos and few mature bamboos. The third is the low yield of bamboo forests, 70% of the bamboo forests are low-yield forests, with an annual output of less than 20 bamboos/667m<sup>2</sup>; fourth, the production efficiency is low, most bamboo forests have an average annual income of less than 300 yuan/667m<sup>2</sup>, and The benefits of intensive bamboo forests vary greatly.

## **2.2 Processing and Utilization Lag**

### **2.2.1 Small Processing Scale**

Processing enterprises are few but small, leading enterprises with an output value of more than 100 million yuan are few, and the ability to drive development is weak. Chibi Guansen Company produces bamboo fiberboard and consumes 200t of leftover materials every day. At present, it can only provide 100t, indicating that there is no scale for primary processing.

### **2.2.2 Low Product Grade**

The processing level of enterprises is limited, the technological content is not high, and repeated construction is prominent. Product quality is uneven, new product development capabilities are weak, and market competitiveness is poor.

### **2.2.3 Processing is Not Matched**

The value-added of bamboo requires the participation of several economic organizations in the processing chain, each taking what they need, and sharing the cost, otherwise it will be difficult to sustain due to high processing costs. Xianning bamboo processing is still in the “three lows” stage. First, the processing conversion rate is low. 17 million raw bamboos are sold abroad, but less than 5 million bamboos are processed annually. Second, the added value of products is low, mostly semi-finished products, and very few end products and fine products. The third is the low resource utilization rate. The bamboo shoots, bamboo branches, bamboo leaves, bamboo sticks and bamboo processing waste are not fully utilized; the processing mainly stays on the main materials; the bamboo material utilization rate for the production of bamboo composite boards, reconstituted bamboo and bamboo paper can be used. It reaches 80%~90%; while the utilization rate of bamboo materials for producing bamboo flooring, bamboo plywood, and bamboo chopsticks is only 30%~50%, and the waste phenomenon is serious.

## **2.3 Insufficient Comprehensive Development**

### **2.3.1 Incomplete Marketing Network**

Although Zhaoliqiao, Guantangyi, Henggouqiao and other raw bamboo and bamboo products trading markets have naturally formed, the scale is small, there are no deep-processed products, the facilities are simple, and the business points are scattered and disorderly, which cannot produce agglomeration effect.

### **2.3.2 Bamboo Forest Development is Not Viable**

The current Xingxingzhuhai Scenic Area does not have other supporting resources, it is difficult to attract tourists, and cannot drive related links such as food, accommodation, travel, and shopping. The concept of three-dimensional management of bamboo is lacking, and bamboo farmers rarely carry out interplanting, intercropping, or sightseeing and leisure activities.

### **2.3.3 Poor Industrial Services**

The bamboo industry is seriously inadequate in research and development funds, technical extension is weak, and local experts and farmer technicians are extremely short. Most of the production and processing enterprises have not established cooperative relations with universities and scientific research institutes. There is no good project support for bamboo industry research. For example, bamboo afforestation and reclamation are included in low-yield forest transformation, and middle and young forest tending projects, with subsidies of 200 yuan and 100 yuan per 667 m<sup>2</sup>, but the actual cost is as high as 1,500 yuan and 900 yuan. Although local governments have introduced some supporting policies, they are difficult to implement. For example, in the 2013 100km forest road construction plan, the subsidy fund (100,000 yuan/km) has not yet been put in place. On the whole, the development of the bamboo industry in Xianning is not optimistic. It can be said that there are more plans, less actions, fewer implementations of forest land and enterprises, uneven cold and hot, and uneven progress. It needs to be implemented and promoted as a whole. .

## **3. Ideas and Countermeasures for Innovative Development of Bamboo Industry in Xianning**

### **3.1 Ideas for Innovative Development of Bamboo Industry**

The bamboo industry developed by the use of bamboo resources has become a globally recognized green industry. With the “dual carbon” goal and the “Guiding Opinions of the State Council on Accelerating the Establishment and Improvement of a Green and Low-Carbon Circular Development Economic System”, the innovative development of the bamboo industry in Xianning City The path is gradually clear. The development of green buildings and green building materials should be the main direction of environmental protection, and the development of bamboo by-products and bamboo culture should be the secondary direction. The development of the two should be supplemented by the research of high-tech bamboo products.

#### **3.1.1 Substituting Bamboo for Wood**

Bamboo is easy to grow and process, and the production cost of bamboo products is lower than that of wood materials. In recent years, environmental protection has become the number one element of residents' living and home furnishing needs, and bamboo home furnishing products are catering to this consumer concept. Use bamboo as building materials to drive the operation of the entire industry chain, replace wood with a large amount of bamboo, and strengthen the development of bamboo products in the construction and furniture fields.

### **3.1.2 Substituting Bamboo for Plastic**

Under the background that “banning plastic and limiting plastic” has become a global consensus and global action, based on the rapid growth, degradable, sustainable, and recyclable characteristics of bamboo, experts have put forward the viewpoint of “replacing plastic with bamboo”, which is undoubtedly Xianning. The development of the bamboo industry in the city provides a development direction. At present, there are more than 100 series and tens of thousands of varieties of bamboo products that have been developed, which is expected to become the best substitute for plastics. Seize the opportunity to strengthen the development of bamboo products in the fields of daily necessities, packaging and automotive materials.

### **3.1.3 Using Bamboo to Promote Travel**

Bamboo cultural tourism has become a new economic growth point for the bamboo industry. Although tourism is one of the pillars of the development of Xianning, due to the epidemic and infrastructure and other reasons, the development of cultural tourism in Xianning has been hit hard in the past two years. Combining bamboo forest resources with tourism resources, relying on bamboo resources to develop tertiary industries such as eco-tourism, leisure experience, bamboo forest health, etc., combining local well-known tourist attractions with bamboo forest resources, adapting measures to local conditions and creating landscapes to fully tap the potential of bamboo forest resources. To speed up the development of rural eco-tourism and turn Xianning's bamboo industry into a high-quality tourism resource.

### **3.1.4 Using Bamboo to Promote Medicine**

The medical and health effects of bamboo have long been recognized by the people of our country. Bamboo has a long history of medicinal use. From root to tip, its roots, branches and leaves, fruits and fungi have medicinal value and pharmacological effects. Hubei Institute of Science and Technology, a local university in Xianning, is well-known throughout the country in medicine, and uses this advantage to carry out research and development of bamboo in the field of medicine. At the same time, bamboo fiber is more and more widely used in the field of biomedicine. Especially in the medical field, the research prospect of using bamboo fiber as the base material of hemostatic dressing is very broad. However, the research and application of bamboo fiber at home and abroad is only in its infancy and needs to be researched.

## **3.2 Countermeasures for the Innovation and Development of the Bamboo Industry**

We need to actively deal with the problems of extensive cultivation management, lagging processing and utilization, and insufficient comprehensive development in the development process. Reasonably plan the cultivation process from the two dimensions of time and place, so that bamboo harvesting and cultivating bamboo can be carried out according to the plan, according to local conditions; strengthen the depth and breadth of the development of bamboo products, and achieve fine processing and deep processing; actively introduce talents and capital investment, do To comprehensive development to form Xianning Bamboo Industrial Park.

### **3.2.1 Reasonable Planning for Bamboo Harvesting and Cultivating Bamboo**

According to the climate and topography of Xianning, the scope and area of planting should be planned reasonably. Cultivate high-quality bamboo forests that meet the processing needs of bamboo products on the basis of high yield. Cultivation in different zones according to the direction of the production product-nan bamboo is suitable for building materials, and thunder bamboo is

suitable for bamboo shoot products... According to the maturity time of bamboo, it is cultivated in staggered peaks to achieve the optimization of resource utilization. Cultivate in accordance with the principle of “adapting measures to local conditions and combining seed collection”, focusing on cultivating bamboo to promote the process of bamboo construction, and organizing the revision and improvement of the city's bamboo industry development plan. In the planning process, comprehensive consideration is given to roads, water conservancy, electricity, communications, tourism and other infrastructure, unified planning and unified implementation.

### **3.2.2 Speed Up the Construction of High-Quality Bamboo Bases**

In 2014, the country's first bamboo afforestation carbon sink project was launched in Tongshan, bringing successful experience to the development of the bamboo industry in Xianning. Speeding up the construction of high-quality bamboo bases is an inevitable choice. Taking base construction as a key link in the development of the bamboo industry chain in Xianning, relying on the new round of returning farmland to forests and poverty alleviation projects, building standardized high-yield demonstration areas, demonstrations and driving mass intensive management, Standardized management. Guide and encourage powerful enterprises to build their own high-standard bamboo bases, and promote standardized planting of bamboo farmers.

### **3.2.3 Speed Up the Cultivation of Bamboo Enterprises**

Adhere to market-oriented, encourage and guide local bamboo enterprises to develop together, integrate resources and strength, and enhance the stamina of enterprise development. At the same time, we must adhere to the linkage of primary, secondary and tertiary industries. The first industry is planting, and the planting area must be expanded to increase yield and quality; the second industry is to vigorously develop the processing industry, especially deep processing, to increase the added value of resources; the third industry is to develop trade and open up the market for bamboo products. It is also necessary to optimize the business environment, increase investment promotion, introduce high-end strategic partners, and achieve new breakthroughs in bamboo handicrafts, bamboo furniture, bamboo flooring, bamboo decoration materials, bamboo fiber clothing, etc.

Speed up the brand building of bamboo products. Relying on Xianning's “Bamboo Rhyme Lingyun” brand culture and the reputation of “Nan Bamboo Hometown”, the establishment of Xianning bamboo product production records and origin certification system, using the Internet of Things platform to strengthen brand promotion, and improve consumers' recognition of Xianning bamboo products Knowledge, reputation and trust. At the same time, speed up the “three products and one standard” approval work, create a famous brand, strive to create a well-known trademark in China, and enhance the brand influence, market share and core competitiveness of Xianning Bamboo.

### **3.2.4 Speed Up the Development of Bamboo Products**

The bamboo processing industry must, on the basis of fully understanding the biological characteristics of bamboo plants, process them scientifically, make reasonable use of them, and strive to produce various high value-added bamboo products. For example, reorganized bamboo in its original form is listed as a key national scientific and technological research and development plan in the “Eleventh Five-Year Plan”. It has strong weather resistance, natural style, environmentally friendly products, outdoor service life can exceed 10 years, and its performance is even better than having a certain “word of mouth.” Of imported wood, the production and utilization of the original state reconstituted bamboo can achieve high added value. At the same time, enterprises should produce bamboo fiber products of various specifications and prices according to market demand, so that bamboo fiber can be used in automotive interior panels, mattresses, shoe materials, building materials and other fields in addition to the application of bamboo fiber in the textile field. Bamboo instead of wood”.

### **3.2.5 Accelerate Investment in Science and Technology**

It is necessary to increase basic research on bamboo forests and bamboo materials, accelerate the

formation of a bamboo standard system, and innovate bamboo raw material storage technologies. Advocate “substituting bamboo for plastic”, develop plastic substitutes in many fields, and carry out research on the recycling application and durability of bamboo products. Advocate “Bamboo to promote medicine”, research more effective bamboo fiber separation mechanism, determine scientific and reasonable process, technology, equipment plan, etc., develop bamboo silk separation equipment with higher separation quality and efficiency, and develop more suitable softeners and enzymes Preparation, to realize the continuous operation of biological enzyme degumming and equipment, and the operation is stable and reliable. While developing bamboo fiber products, invest research funds for medical development, so as to research and apply for patented products. Promote the “Talent Introduction” policy to attract bamboo industry researchers to Xianning. Cooperate with local universities to cultivate professional and technical talents. From bamboo species selection, introduction and promotion of new varieties, seedling breeding, cultivation management, disease and pest control, and new processing technologies, we will increase the promotion of bamboo high-yield cultivation techniques and improve the level of bamboo farming.

### **3.2.6 Deepen the Development of Bamboo Culture**

Bamboo culture promotes the development of Chinese literature, music, painting, gardening, folklore and other arts. In daily production and life, bamboo products have penetrated into all aspects of people's clothing, food, housing and transportation. Combine the emerging live broadcast and short video craze to shoot and produce videos to promote bamboo culture, and broaden the promotion channels for bamboo crafts and bamboo daily necessities. Use bamboo forest ecological environment, bamboo forest landscape, bamboo culture and other resources to develop bamboo forest health care, and build “forest baths” and other bamboo forest summer-releasing places in the counties rich in bamboo forest resources in Chongyang, Chibi and Tongshan, and develop unique bamboo forests based on different types of bamboo The characteristic bamboo forest landscape avenue completes the construction of the health care base. At the same time, using scenic spots such as the Star Bamboo Sea, Taiyi Cave and Jiugong Mountain to combine the advantages of local hot springs, strengthen infrastructure construction and develop bamboo forest tourism, so that there are scenery everywhere and all seasons.

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